ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

MAR 03 2017

Submitted via eSIP system, EPA's Central Data Exchange, cdx.epa.gov

Ms. Alexis Strauss, Acting Regional Administrator
U.S. Environmental Protection Agency, Region IX
Mail Code ORA-1
75 Hawthorne Street
San Francisco, CA 94105

RE: Submittal of the State Implementation Plan Revision, 2008 Lead National Ambient Air Quality Standards, Hayden Nonattainment Area

Dear Ms. Strauss:

The Arizona Department of Environmental Quality (ADEQ) hereby adopts and submits to the U.S. Environmental Protection Agency (EPA) the enclosed State Implementation Plan (SIP) revision for the Hayden Lead Nonattainment Area (pursuant to A.R.S. §§ 49-104, 49-106, 49-404, 49-406, and 49-425; 40 CFR §§ 51.102 - 51.104).

Effective January 12, 2009, EPA revised the Lead (Pb) National Ambient Air Quality Standards (NAAQS), strengthening the primary and secondary standards from 1.5 micrograms per cubic meter (μ/m^3) to 0.15 μ/m^3 (73 FR 66964). EPA based this decision on new data that concluded a lower threshold was necessary to protect human health and welfare.

On October 3, 2014, EPA officially designated the Hayden area as nonattainment for the 2008 Pb NAAQS (79 FR 52205). The planning area boundaries match those for the Hayden sulfur dioxide nonattainment area. The Hayden area must attain the NAAQS by its statutory attainment date, which is October 3, 2019. Under the authority granted by the Governor and the State of Arizona, ADEQ is responsible for the preparation and submittal of the SIP revision. This SIP revision is intended to satisfy the nonattainment area-related requirements of the Clean Air Act, such as emission inventories, modeling demonstration, reasonable further progress, contingency measures, and Reasonably Available Control Measures (RACM). This SIP revision demonstrates future attainment of the Pb NAAQS in Hayden by 2019.

The enclosed SIP revision also includes the following control measures in the form of rules:

- R18-2-B1301, *Limits on Lead Emissions from the Hayden Smelter*
- R18-2-B1301.01, *Limits on Lead-Bearing Fugitive Dust from the Hayden Smelter*
- Appendix 14, *Procedures for Sulfur Dioxide and Lead Fugitive Emissions Studies for the Hayden Smelter*
- Appendix 15, *Test Methods for Determining Opacity and Stabilization of Unpaved Roads*

These rules regulate Pb emissions from the copper smelter currently owned and operated by ASARCO LLC. The version of the rules submitted herein is a draft Notice of Final Rulemaking (NFRM). ADEQ will submit the version of the rules as codified in the Arizona Administrative Code (A.A.C.) once they are published by the Secretary of State in April 2017. ADEQ requests EPA to approve A.A.C. R18-2-B1301, R18-2-B1301.01, Appendix 14, and Appendix 15 into the SIP.

Enclosed in this SIP revision for the Hayden Pb nonattainment area is the SIP document in Enclosure 1 and administrative materials in Enclosure 2. This submittal was conducted via EPA's online eSIP system through the Central Data Exchange (CDX). In accordance with 40 CFR 51.103, no paper copies of the revision were mailed to EPA.

ADEQ requests that EPA review and approve this SIP revision and accompanying rules into the Arizona SIP. If you have any questions, please contact Brian Parkey, Air Quality Improvement Planning Section, Air Quality Division, at (602) 771-4492 or Parkey.Brian@azdeq.gov.

Sincerely,



Timothy S. Franquist, Director
Air Quality Division
Arizona Department of Environmental Quality

Enclosures (2)

cc: Colleen McKaughan, EPA Region IX (via email)

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

January 4, 2017

To: Timothy S. Franquist Jr.
Division Director
Air Quality Division

Under A.R.S. §49-104 (D) (2), I authorize you, Timothy S. Franquist Jr., Division Director, Air Quality Division, Arizona Department of Environmental Quality, to perform any act, including execution of any pertinent documents, which I as Director of the Arizona Department of Environmental Quality am authorized or required to do by law with respect to A.R.S. Title 49, chapters 1 and 3 and any other acts relating to air quality including personnel actions.

This authority shall remain in effect until it is revoked or upon your separation from the Arizona Department of Environmental Quality. You may further delegate this authority in the best interest of the agency, however, those delegations must be in writing and you must forward a copy of any further delegations to me.

This delegation is effective back to May 23, 2016 and revokes all earlier delegations. I ratify all acts performed by you as Air Quality Division Director concerning the duties and functions in this delegation letter.

Misael Cabrera
Director

Authorizing Statute

A.R.S. § 49-104

A.R.S. § 49-104. *Powers and duties of the department and director*

A. The department shall:

1. Formulate policies, plans and programs to implement this title to protect the environment.
2. Stimulate and encourage all local, state, regional and federal governmental agencies and all private persons and enterprises that have similar and related objectives and purposes, cooperate with those agencies, persons and enterprises and correlate department plans, programs and operations with those of the agencies, persons and enterprises.
3. Conduct research on its own initiative or at the request of the governor, the legislature or state or local agencies pertaining to any department objectives.
4. Provide information and advice on request of any local, state or federal agencies and private persons and business enterprises on matters within the scope of the department.
5. Consult with and make recommendations to the governor and the legislature on all matters concerning department objectives.
6. Promote and coordinate the management of air resources to assure their protection, enhancement and balanced utilization consistent with the environmental policy of this state.
7. Promote and coordinate the protection and enhancement of the quality of water resources consistent with the environmental policy of this state.
8. Encourage industrial, commercial, residential and community development that maximizes environmental benefits and minimizes the effects of less desirable environmental conditions.
9. Assure the preservation and enhancement of natural beauty and man-made scenic qualities.
10. Provide for the prevention and abatement of all water and air pollution including that related to particulates, gases, dust, vapors, noise, radiation, odor, nutrients and heated liquids in accordance with article 3 of this chapter and chapters 2 and 3 of this title.
11. Promote and recommend methods for the recovery, recycling and reuse or, if recycling is not possible, the disposal of solid wastes consistent with sound health, scenic and environmental quality policies. Beginning in 2014, the department shall report annually on its revenues and expenditures relating to the solid and hazardous waste programs overseen or administered by the department.
12. Prevent pollution through the regulation of the storage, handling and transportation of solids, liquids and gases that may cause or contribute to pollution.
13. Promote the restoration and reclamation of degraded or despoiled areas and natural resources.
14. Assist the department of health services in recruiting and training state, local and district health department personnel.
15. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.
16. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.

17. Unless specifically authorized by the legislature, ensure that state laws, rules, standards, permits, variances and orders are adopted and construed to be consistent with and no more stringent than the corresponding federal law that addresses the same subject matter. This provision shall not be construed to adversely affect standards adopted by an Indian tribe under federal law.

B. The department, through the director, shall:

1. Contract for the services of outside advisers, consultants and aides reasonably necessary or desirable to enable the department to adequately perform its duties.
2. Contract and incur obligations reasonably necessary or desirable within the general scope of department activities and operations to enable the department to adequately perform its duties.
3. Utilize any medium of communication, publication and exhibition when disseminating information, advertising and publicity in any field of its purposes, objectives or duties.
4. Adopt procedural rules that are necessary to implement the authority granted under this title, but that are not inconsistent with other provisions of this title.
5. Contract with other agencies, including laboratories, in furthering any department program.
6. Use monies, facilities or services to provide matching contributions under federal or other programs that further the objectives and programs of the department.
7. Accept gifts, grants, matching monies or direct payments from public or private agencies or private persons and enterprises for department services and publications and to conduct programs that are consistent with the general purposes and objectives of this chapter. Monies received pursuant to this paragraph shall be deposited in the department fund corresponding to the service, publication or program provided.
8. Provide for the examination of any premises if the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed on the premises. The director shall give the owner or operator the opportunity for its representative to accompany the director on an examination of those premises. Within forty-five days after the date of the examination, the department shall provide to the owner or operator a copy of any report produced as a result of any examination of the premises.
9. Supervise sanitary engineering facilities and projects in this state, authority for which is vested in the department, and own or lease land on which sanitary engineering facilities are located, and operate the facilities, if the director determines that owning, leasing or operating is necessary for the public health, safety or welfare.
10. Adopt and enforce rules relating to approving design documents for constructing, improving and operating sanitary engineering and other facilities for disposing of solid, liquid or gaseous deleterious matter.
11. Define and prescribe reasonably necessary rules regarding the water supply, sewage disposal and garbage collection and disposal for subdivisions. The rules shall:

(a) Provide for minimum sanitary facilities to be installed in the subdivision and may require that water systems plan for future needs and be of adequate size and capacity to deliver specified minimum quantities of drinking water and to treat all sewage.
(b) Provide that the design documents showing or describing the water supply, sewage disposal and garbage collection facilities be submitted with a fee to the department for review and that no lots in any subdivision be offered for sale before compliance with the

standards and rules has been demonstrated by approval of the design documents by the department.

12. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious conditions at such places. The rules shall prescribe minimum standards for the design of and for sanitary conditions at any public or semipublic swimming pool or bathing place and provide for abatement as public nuisances of premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of health services and shall be consistent with the rules adopted by the director of the department of health services pursuant to section 36-136, subsection H, paragraph 10.

13. Prescribe reasonable rules regarding sewage collection, treatment, disposal and reclamation systems to prevent the transmission of sewage borne or insect borne diseases. The rules shall:

(a) Prescribe minimum standards for the design of sewage collection systems and treatment, disposal and reclamation systems and for operating the systems.

(b) Provide for inspecting the premises, systems and installations and for abating as a public nuisance any collection system, process, treatment plant, disposal system or reclamation system that does not comply with the minimum standards.

(c) Require that design documents for all sewage collection systems, sewage collection system extensions, treatment plants, processes, devices, equipment, disposal systems, on-site wastewater treatment facilities and reclamation systems be submitted with a fee for review to the department and may require that the design documents anticipate and provide for future sewage treatment needs.

(d) Require that construction, reconstruction, installation or initiation of any sewage collection system, sewage collection system extension, treatment plant, process, device, equipment, disposal system, on-site wastewater treatment facility or reclamation system conform with applicable requirements.

14. Prescribe reasonably necessary rules regarding excreta storage, handling, treatment, transportation and disposal. The rules shall:

(a) Prescribe minimum standards for human excreta storage, handling, treatment, transportation and disposal and shall provide for inspection of premises, processes and vehicles and for abating as public nuisances any premises, processes or vehicles that do not comply with the minimum standards.

(b) Provide that vehicles transporting human excreta from privies, septic tanks, cesspools and other treatment processes shall be licensed by the department subject to compliance with the rules. The department may require payment of a fee as a condition of licensure. After July 20, 2011, the department shall establish by rule a fee as a condition of licensure, including a maximum fee. As part of the rule making process, there must be public notice and comment and a review of the rule by the joint legislative budget committee. After September 30, 2013, the department shall not increase that fee by rule without specific statutory authority for the increase. The fees shall be deposited, pursuant to sections 35-146 and 35-147, in the solid waste fee fund established by section 49-881.

15. Perform the responsibilities of implementing and maintaining a data automation management system to support the reporting requirements of title III of the superfund amendments and reauthorization act of 1986 (P.L. 99-499) and article 2 of this chapter.

16. Approve remediation levels pursuant to article 4 of this chapter.

17. Establish or revise fees by rule pursuant to the authority granted under title 44, chapter 9, article 8 and chapters 4 and 5 of this title for the department to adequately perform its duties. All fees shall be fairly assessed and impose the least burden and cost to the parties subject to the fees. In establishing or revising fees, the department shall base the fees on:

(a) The direct and indirect costs of the department's relevant duties, including employee salaries and benefits, professional and outside services, equipment, in-state travel and other necessary operational expenses directly related to issuing licenses as defined in title 41, chapter 6 and enforcing the requirements of the applicable regulatory program.

(b) The availability of other funds for the duties performed.

(c) The impact of the fees on the parties subject to the fees.

(d) The fees charged for similar duties performed by the department, other agencies and the private sector.

C. The department may:

1. Charge fees to cover the costs of all permits and inspections it performs to ensure compliance with rules adopted under section 49-203, except that state agencies are exempt from paying the fees. Monies collected pursuant to this subsection shall be deposited, pursuant to sections 35-146 and 35-147, in the water quality fee fund established by section 49-210.

2. Contract with private consultants for the purposes of assisting the department in reviewing applications for licenses, permits or other authorizations to determine whether an applicant meets the criteria for issuance of the license, permit or other authorization. If the department contracts with a consultant under this paragraph, an applicant may request that the department expedite the application review by requesting that the department use the services of the consultant and by agreeing to pay the department the costs of the consultant's services. Notwithstanding any other law, monies paid by applicants for expedited reviews pursuant to this paragraph are appropriated to the department for use in paying consultants for services.

D. The director may:

1. If the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed, inspect any person or property in transit through this state and any vehicle in which the person or property is being transported and detain or disinfect the person, property or vehicle as reasonably necessary to protect the environment if a violation exists.

2. Authorize in writing any qualified officer or employee in the department to perform any act that the director is authorized or required to do by law.

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Authorizing Statute

A.R.S. § 49-106

A.R.S. § 49-106. *Statewide application of rules*

The rules adopted by the department apply and shall be observed throughout this state, or as provided by their terms, and the appropriate local officer, council or board shall enforce them. This section does not limit the authority of local governing bodies to adopt ordinances and rules within their respective jurisdictions if those ordinances and rules do not conflict with state law and are equal to or more restrictive than the rules of the department, but this section does not grant local governing bodies any authority not otherwise provided by separate state law.

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Authorizing Statute

A.R.S. § 49-404

A.R.S. § 49-404. *State implementation plan*

A. The director shall maintain a state implementation plan that provides for implementation, maintenance and enforcement of national ambient air quality standards and protection of visibility as required by the clean air act.

B. The director may adopt rules that describe procedures for adoption of revisions to the state implementation plan.

C. The state implementation plan and all revisions adopted before September 30, 1992 remain in effect according to their terms, except to the extent otherwise provided by the clean air act, inconsistent with any provision of the clean air act, or revised by the administrator. No control requirement in effect, or required to be adopted by an order, settlement agreement or plan in effect, before the enactment of the clean air act in any area which is a nonattainment or maintenance area for any air pollutant may be modified after enactment in any manner unless the modification insures equivalent or greater emission reductions of the air pollutant. The director shall evaluate and adopt revisions to the plan in conformity with federal regulations and guidelines promulgated by the administrator for those purposes until the rules required by subsection B are effective.

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Authorizing Statute

A.R.S. § 49-406

A.R.S. § 49-406. *Nonattainment area plan*

A. For any ozone, carbon monoxide or particulate nonattainment or maintenance area the governor shall certify the metropolitan planning organization designated to conduct the continuing, cooperative and comprehensive transportation planning process for that area under 23 United States Code section 134 as the agency responsible for the development of a nonattainment or maintenance area plan for that area.

B. For any ozone, carbon monoxide or particulate nonattainment or maintenance area for which no metropolitan planning organization exists, the department shall be certified as the agency responsible for development of a nonattainment or maintenance area plan for that area.

C. For any ozone, carbon monoxide or particulate nonattainment or maintenance area, the department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall, by November 15, 1992, and from time to time as necessary, jointly review and update planning procedures or develop new procedures.

D. In preparing the procedures described in subsection C of this section, the department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall determine which elements of each revised implementation plan will be developed, adopted, and implemented, through means including enforcement, by the state and which by local governments or regional agencies, or any combination of local governments, regional agencies or the state.

E. The department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall enter into a memorandum of agreement for the purpose of coordinating the implementation of the procedures described in subsection C and D of this section.

F. At a minimum, the memorandum of agreement shall contain:

1. The relevant responsibilities and authorities of each of the coordinating agencies.
2. As appropriate, procedures, schedules and responsibilities for development of nonattainment or maintenance area plans or plan revisions and for determining reasonable further progress.
3. Assurances for adequate plan implementation.
4. Procedures and responsibilities for tracking plan implementation.
5. Responsibilities for preparing demographic projections including land use, housing, and employment.
6. Coordination with transportation programs.
7. Procedures and responsibilities for adoption of control measures and emissions limitations.
8. Responsibilities for collecting air quality, transportation and emissions data.
9. Responsibility for conducting air quality modeling.
10. Responsibility for administering and enforcing stationary source controls.

11. Provisions for the timely and periodic sharing of all data and information among the signatories relating to:
    (a) Demographics.
    (b) Transportation.
    (c) Emissions inventories.
    (d) Assumptions used in developing the model.
    (e) Results of modeling done in support of the plan.
    (f) Monitoring data.

G. Each agency that commits to implement any emission limitation or other control measure, means or technique contained in the implementation plan shall describe that commitment in a resolution adopted by the appropriate governing body of the agency. The resolution shall specify the following:
1. Its authority for implementing the limitation or measure as provided in statute, ordinance or rule.
2. A program for the enforcement of the limitation or measure.
3. The level of personnel and funding allocated to the implementation of the measure.

H. The state, in accordance with the rules adopted pursuant to section 49-404, and the governing body of the metropolitan planning organization shall adopt each nonattainment or maintenance area plan developed by a certified metropolitan planning organization. The adopted nonattainment or maintenance area plan shall be transmitted to the department for inclusion in the state implementation plan provided for under section 49-404.

I. After adoption of a nonattainment or maintenance area plan, if on the basis of the reasonable further progress determination described in subsection F of this section or other information, the control officer determines that any person has failed to implement an emission limitation or other control measure, means or technique as described in the resolution adopted pursuant to subsection G of this section, the control officer shall issue a written finding to the person, and shall provide an opportunity to confer. If the control officer subsequently determines that the failure has not been corrected, the county attorney, at the request of the control officer, shall file an action in superior court for a preliminary injunction, a permanent injunction, or any other relief provided by law.

J. After adoption of a nonattainment or maintenance area plan, if, on the basis of the reasonable further progress determination described in subsection F of this section or other information, the director determines that any person has failed to implement an emission limitation or other control measure, means or technique as described in the resolution adopted pursuant to subsection G of this section, and that the control officer has failed to act pursuant to subsection I of this section, the director shall issue a written finding to the person and shall provide an opportunity to confer. If the director subsequently determines that the failure has not been corrected, the attorney general, at the request of the director, shall file an action in superior court for a preliminary injunction, a permanent injunction, or any other relief provided by law.

K. Notwithstanding subsections A and B of this section, in any metropolitan area with a metropolitan statistical area population of less than two hundred fifty thousand persons, the governor shall designate an agency that meets the criteria of section 174 of the clean air act and that is recommended by the city

that causes the metropolitan area to exist and the affected county. That agency shall prepare and adopt the nonattainment or maintenance area plan. If the governor does not designate an agency, the department shall be certified as the agency responsible for the development of a nonattainment or maintenance area plan for that area.

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Authorizing Statute

A.R.S. § 49-425

A.R.S. § 49-425. *Rules; hearing*

A. The director shall adopt such rules as he determines are necessary and feasible to reduce the release into the atmosphere of air contaminants originating within the territorial limits of the state or any portion thereof and shall adopt, modify, and amend reasonable standards for the quality of, and emissions into, the ambient air of the state for the prevention, control and abatement of air pollution. Additional standards shall be established for particulate matter emissions, sulfur dioxide emissions, and other air contaminant emissions determined to be necessary and feasible for the prevention, control and abatement of air pollution. In fixing such ambient air quality standards, emission standards or standards of performance, the director shall give consideration but shall not be limited to the relevant factors prescribed by the clean air act.

B. No rule may be enacted or amended except after the director first holds a public hearing after twenty days' notice of such hearing. The proposed rule, or any proposed amendment of a rule, shall be made available to the public at the time of notice of such hearing.

C. The department shall enforce the rules adopted by the director.

D. All rules enacted pursuant to this section shall be made available to the public at a reasonable charge upon request.

ADEQ
Arizona Department
of Environmental Quality

SIP Revision: Hayden Lead Nonattainment Area

Air Quality Division
March 2, 2017 FINAL

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Appendix A: Emission Inventory Technical Support Document for the 2008 Hayden Lead Nonattainment Area

Appendix B: Modeling Technical Support Document (TSD): Hayden Pb State Implementation Plan Revision

Appendix C: Copies of SIP Regulations – Draft Notice of Final Rulemaking and Published Notice of Proposed Rulemaking

Appendix D: 2008 Pb NAAQS Hayden Nonattainment Area Inventory Preparation Plan

Appendix E: Technical Memorandum: Hayden Pb Contingency Assumptions

Appendix F: Public Process Documentation

Completeness Criteria
(40 CFR Part 51, Appendix V, Section 2.0)

Appendix V Section 2.1 - Administrative Materials

(a) A formal signed, stamped, and dated letter of submittal from the Governor or his designee, requesting EPA approval of the plan or revision thereof (hereafter "the plan"). If electing to submit a paper submission with a copy in electronic version, the submittal letter must verify that the electronic copy provided is an exact duplicate of the paper submission.

See the cover letter for this SIP submission signed by ADEQ Air Quality Director Tim Franquist. Also submitted is a delegation of authority from Misael Cabrera, Director of ADEQ, to Tim Franquist, authorizing Mr. Franquist to perform any act the ADEQ Director is authorized to perform under the state air quality statutes, including the submission of SIPs to EPA.

This SIP submittal was conducted electronically via the online eSIP system in EPA's Central Data Exchange. Therefore, no paper copies were submitted.

(b) Evidence that the State has adopted the plan in the State code or body of regulations; or issued the permit, order, consent agreement (hereafter "document") in final form. That evidence shall include the date of adoption or final issuance as well as the effective date of the plan, if different from the adoption/issuance date.

See cover letter signed by Director Franquist.

Please note that at the time this SIP was submitted, the final version of the related regulations, R18-2-B1301, R18-2-B1301.01, Appendix 14, and Appendix 15, were still with the AZ Governor's Regulatory Review Council. Therefore, this SIP submittal contains both a published version of the Notice of Proposed Rulemaking and the draft Notice of Final Rulemaking. Once the rules are approved by the Governor's Regulatory Review Council and have been published by the AZ Secretary of State, ADEQ will make another submittal to EPA that contains the final published version of the regulations as codified in the Arizona Administrative Code (expected April 2017).

(c) Evidence that the State has the necessary legal authority under State law to adopt and implement the plan.

Arizona is authorized to adopt and implement SIPs under Arizona Revised Statutes (A.R.S.) Sections 49-104, 49-106, 49-404, 49-406 and 49-425. Copies of these statutes are included in this SIP submittal.

(d) A copy of the actual regulation, or document submitted for approval and incorporation by reference into the plan, including indication of the changes made (such as redline/strikethrough) to the existing approved plan, where applicable. The submission shall include a copy of the official State regulation/document, signed, stamped, and dated by the appropriate State official indicating that it is fully enforceable by the State. The effective date of any regulation/document contained in the submission shall, whenever possible, be indicated in the regulation/document itself; otherwise the State should include a letter signed, stamped, and dated by the appropriate State official indicating the effective date. If the regulation/document provided by the State for approval and incorporation by reference into the plan is a copy of an existing publication, the State submission should, whenever possible, include a copy of the publication cover page and table of contents.

See this SIP revision, the document submitted for approval.

As mentioned in Section (b) above, ADEQ is submitting copies of the actual regulations, R18-2-B1301 and R18-2-B1301.01, as well as Appendix 14 and Appendix 15, to be approved into the Arizona SIP. Please note that at the time this SIP revision was submitted, the final version of the related regulations were with the AZ Governor's Regulatory Review Council. Therefore, this SIP submittal contains both a published version of the Notice of Proposed Rulemaking and the draft Notice of Final Rulemaking. Once the rules are approved by the Governor's Regulatory Review Council and have been published by the AZ Secretary of State, ADEQ will make another submittal to EPA that contains the final published version of the regulations as codified in the Arizona Administrative Code.

(e) Evidence that the State followed all of the procedural requirements of the State's laws and constitution in conducting and completing the adoption/issuance of the plan.

Proof that ADEQ followed procedural requirements of Arizona state laws and constitution in adopting this plan is in Appendix F.

(f) Evidence that public notice was given of the proposed change consistent with procedures approved by EPA, including the date of publication of such notice.

Proof that ADEQ gave notice of the Hayden Pb SIP Revision in accordance with A.R.S. Section 49-444 is in Appendix F.

ADEQ published a notice of this SIP revision in the *Copper Basin News* on November 30, 2016 and December 7, 2016. Public notice was also given through ADEQ's website and sent to an email subscriber list of interested stakeholders on December 5, 2016.

(g) Certification that public hearing(s) were held in accordance with the information provided in the public notice and the State's laws and constitution, if applicable and consistent with the public hearing requirements in 40 CFR 51.102.

The certification and other documents related to the public hearing are in Appendix F. ADEQ held a public hearing on the Hayden Pb SIP Revision on January 10, 2017.

(h) Compilation of public comments and the State's response thereto.

The public comment responsiveness summary for the Hayden Pb SIP revision is in Appendix F.

Appendix V Section 2.1 - Technical Support

(a) Identification of all regulated pollutants affected by the plan.

This revision applies to the 2008 Lead NAAQS.

(b) Identification of the locations of affected sources including the EPA attainment/ nonattainment designation of the locations and the status of the attainment plan for the affected areas(s).

This SIP Revision is applicable to the Hayden nonattainment area for the 2008 Lead NAAQS.

(c) Quantification of the changes in plan allowable emissions from the affected sources; estimates of changes in current actual emissions from affected sources or, where appropriate, quantification of changes in actual emissions from affected sources through calculations of the differences between certain baseline levels and allowable emissions anticipated as a result of the revision.

See the Emissions Inventory submitted with this SIP revision in Appendix A.

(d) The State's demonstration that the national ambient air quality standards, prevention of significant deterioration increments, reasonable further progress demonstration, and visibility, as applicable, are protected if the plan is approved and implemented. For all requests to redesignate an area to attainment for a national primary ambient air quality standard, under section 107 of the Act, a revision must be submitted to provide for the maintenance of the national primary ambient air quality standards for at least 10 years as required by section 175A of the Act.

See the Modeling TSD in Appendix B for the SIP's attainment demonstration of the Pb NAAQS by the attainment year in 2019. The SIP's reasonable further progress demonstration is in Chapter 4 of the SIP, "Control Measures." Because this SIP is for a nonattainment area, ADEQ is not requesting redesignation at this time.

(e) Modeling information required to support the proposed revision, including input data, output data, models used, justification of model selections, ambient monitoring data used, meteorological data used, justification for use of offsite data (where used), modes of models used, assumptions, and other information relevant to the determination of adequacy of the modeling analysis.

See the Modeling TSD in Appendix B.

(f) Evidence, where necessary, that emission limitations are based on continuous emission reduction technology.

The emission reduction technology, or controls, are described in detail in Chapter 4 of the SIP, "Control Measures." The emission limit that is in R18-2-B1301 is derived from these controls. The demonstration of attainment with this emission limit can be found in the Modeling TSD in Appendix B.

(g) Evidence that the plan contains emission limitations, work practice standards and recordkeeping/reporting requirements, where necessary, to ensure emission levels.

As mentioned in Section (f) above, the control strategy is in Chapter 4 of the SIP. Copies of the regulations are in Appendix C. A.A.C. R18-2-B1301 includes an emission limit for the main stack of the copper smelter in the nonattainment area. All regulations submitted with this SIP revision (R18-2-B1301, R18-2-B1301.01, Appendix 14, Appendix 15) include particular work practice standards and recordkeeping/reporting requirements to ensure compliance with the emission limit and to ensure future attainment of the 2008 Pb NAAQS by 2019.

(h) Compliance/enforcement strategies, including how compliance will be determined in practice.

The compliance/enforcement strategies are incorporated into the regulations mentioned above and discussed in detail in Chapter 4 of the SIP revision.

(i) Special economic and technological justifications required by any applicable EPA policies, or an explanation of why such justifications are not necessary.

No known deviations from EPA policy.

1 INTRODUCTION

This chapter describes the purpose of this State Implementation Plan (SIP) Revision, summarizes the National Ambient Air Quality Standards (NAAQS) for lead (Pb), and presents regulatory requirements for Pb nonattainment areas. This chapter also provides a regulatory history of the Hayden nonattainment area (NAA), as well as a description of physical geography and the economic status of the area.

1.1 Statement of Introduction and Purpose

Effective January 12, 2009, the U.S. Environmental Protection Agency (EPA) revised the Lead NAAQS, strengthening the primary and secondary standards from 1.5 micrograms per cubic meter (μ/m^3) to 0.15 μ/m^3.[1] EPA based this decision on new data that concluded a lower threshold was necessary to protect human health and welfare.

Pursuant to CAA Section 107(d)(1)(A), Arizona was required to submit boundary recommendations for areas of the state that meet (attainment), do not meet (nonattainment), or cannot be classified for the 2008 primary NAAQS. On December 15, 2009, the Arizona Department of Environmental Quality (ADEQ) recommended that EPA delay a decision on the designation of nine townships centered on the Hayden primary copper smelter, owned and operated by Asarco, to provide additional time to collect ambient air quality data. EPA's initial response was to designate the Hayden Planning Area as unclassifiable and designated the rest of the State as unclassifiable/attainment until further data could be gathered to make a final designation. [2]

CAA section 107(d)(3) authorizes EPA to revise designations on the basis of any new air quality related considerations that the EPA deems appropriate. On April 21, 2014, EPA notified Arizona Governor Brewer that a Pb NAAQS violation had been measured in the Hayden Planning Area, and consequently, the area would be redesignated from unclassifiable to nonattainment.[3] EPA officially redesignated the Hayden Planning Area as nonattainment for the 2008 Lead NAAQS, effective October 3, 2014. The boundaries of the planning area were defined in accordance with the State's original recommendations, matching those of the 2010 Sulfur Dioxide NAA. [4]

Under the authority granted by the Governor and the State of Arizona, ADEQ is responsible for the preparation and submittal of the SIP revision. This SIP revision is intended to satisfy the requirements of Sections 172, 175A, 191, and 192 of the Clean Air Act with demonstration of future attainment, maintenance, and enforcement of the 2008 Lead NAAQS.

[1] *See* 73 FR 66964 (November 12, 2008)
[2] *See* 76 FR 72105 (November 22, 2011)
[3] *See* EPA 60 Day Letter to Governor Brewer Regarding Redesignation of Hayden Pb Planning Area (April 21, 2014)
[4] *See* 79 FR 52205 (September 3, 2014)

1.2 Rules to Be Added to the SIP

Table 1: Rules to Be Added to SIP

Rule or Statute Added[5]	Title	SIP Rule(s) Replaced
R18-2-B1301	Limits on Lead Emissions From the Hayden Smelter	N/A
R18-2-B1301.01	Limits on Lead-Bearing Fugitive Dust Emissions from the Hayden Smelter	N/A
Appendix 14	Procedures for Sulfur Dioxide and Lead Fugitive Emissions Studies for the Hayden Smelter	N/A
Appendix 15	Test Methods for Determining Opacity and Stabilization of Unpaved Roads	N/A

1.3 National Ambient Air Quality Standards

Title I of the CAA requires EPA to set NAAQS for pollutants that are considered harmful to both public health and the environment. Standards are set for six criteria pollutants: ground-level ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and Pb. The EPA sets two types of NAAQS that include primary and secondary standards. Primary standards are set to protect human health, and secondary standards are established to protect public welfare, including protection of visibility and prevention of damage to animals, crops, vegetation, and buildings.

The standard for each pollutant is set at a concentration measured in either parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter of air ($\mu g/m^3$). Each standard also has a distinct averaging time in order to provide the necessary level of protection. EPA reviews these standards every five years, and the standards are retained or revised based on review of scientific literature and analyses.

[5] *See* Appendix C for a copy of the rules. Please note that Appendix C is a draft Notice of Final Rulemaking. ADEQ will be submitted the codified version of the rules once they are published in the Arizona Administrative Code by the Secretary of State in April 2017. Also published with the lead rules are new rules for the 2010 Sulfur Dioxide NAAQS applicable to Hayden and Miami. While the rules were published in the same package, only the lead rules, R18-2-B1301, R18-2-B1301.01, Appendix 14, and Appendix 15, shall be considered part of the Hayden Lead Nonattainment SIP.

1.4 National Ambient Air Quality Standards for Lead

The EPA set primary and secondary NAAQS for Pb because it has adverse effects on human health as well as the environment, including animal and plant life. Lead is a heavy metal that occurs naturally in the environment. Lead emissions can also be a byproduct of various manufacturing processes.

Major sources of Pb emissions in air include ore and metals processing, leaded aviation gasoline, lead-acid battery manufacturing and other industrial processes. Lead may persist in the environment for long periods of time because it does not decompose in soil after deposition. Lead adversely impacts ecosystems by contributing to biodiversity loss through reduced reproduction and growth rates in plants and animals. [6]

In humans, exposure to Pb can have adverse effects on multiple organ systems, including neurological, reproductive, kidney, cardiovascular and immune systems. Lead may be inhaled or ingested through contact with contaminated air, soil, or water. Once the pollutant enters the body via the respiratory or gastrointestinal system, it is absorbed into the bloodstream and distributed throughout multiple organs. Lead may bioaccumulate in bones and soft tissues, causing persistent, long-term health problems. Lead bioaccumulation is more common in children due to rapid bone growth and replacement. Exposure to relatively low levels of Pb in children can have permanent adverse effects on neurological development, including reduced motor function, learning deficits, and lowered IQ. [7]

In 1978, the Pb NAAQS were first set at 1.5 $\mu g/m^3$, not to be exceeded by the maximum arithmetic mean concentration averaged over a calendar quarter.[8] In 2008, in order to better protect public health and welfare, EPA strengthened the primary (and secondary) NAAQS to 0.15 $\mu g/m^3$. The period of measurement was also changed from the calendar quarter basis in the 1978 standard to a three-month rolling average (not to be exceeded) form, evaluated over a three year period.[9]

Planning and control requirements for the 1978 Pb NAAQS were revoked one year after area designations for the 2008 Pb NAAQS (from the effective date of the new designation). In areas designated nonattainment for the 1978 NAAQS, that standard applied until the State submitted, and EPA approved, a SIP revision providing for attainment of the 2008 standard.[10]

Because of revocation procedures for the 1978 primary Pb NAAQS and the absence of any nonattainment areas designated for that standard in Arizona, no planning requirements remain in the State for the 1978 Pb NAAQs. Table 2 shows historical and current Pb standards.

[6] U.S. EPA, Lead in Outdoor Air, retrieved: http://www2.epa.gov/Pb/Pb-outdoor-air#sources
[7] U.S. EPA, Lead in Air: Health, retrieved: http://www.epa.gov/airquality/Pb/health.html
[8] 1977 Air Quality Criteria for Lead (USEPA, 1977)
[9] *Supra* note 1
[10] 40 CFR 50.16

Table 2: 2008 Lead National Ambient Air Quality Standards

2008 Lead National Ambient Air Quality Standards					
Final Rule	**Primary/Secondary**	**Averaging Time**	**Indicator**	**Level**	**Form**
1978[2]	Primary and Secondary	Calendar Quarter	Pb-TSP[1]	1.5µg/m^3	Not to be exceeded
2008[3]	Primary and Secondary	3-month period	Pb-TSP	0.15 µg/m^3	Not to be exceeded

Source: U.S. Environmental Protection Agency, http://www.epa.gov/ttn/naaqs/standards/pb/s_pb_history.html
Date accessed, April 24, 2015

[1] Lead in total suspended particles
[2] 43 FR 46246; Oct. 5, 1978
[3] 73 FR 66964; Nov.12, 2008

1.5 Hayden Area Regulatory Background

Lead emissions are a potential byproduct of metal ore smelting and processing. Smelting and mining activities have taken place in the Hayden NAA for over 100 years, with the Hayden primary copper smelter processing ores from the nearby Ray Mine as early as 1912. The towns of Hayden and Winkelman were founded in 1887 and 1909, respectively, in order to provide housing for workers supporting smelter operations.[11] Beginning in 1958, the Hayden smelter began processing ores from various mine sites across the State. American Smelting and Refining Company (Asarco) currently owns and operates the smelter. In 1999 Grupo Mexico, a mining company out of Mexico, acquired Asarco, and the company now operates as a U.S. subsidiary of Grupo Mexico.[12]

In 2008, following a finding of soil contamination from historical mining and smelting activities in the area, Asarco, under EPA Superfund and ADEQ direction, began remediation efforts at several sites in Hayden and Winkelman. A 2010 Administrative Order on Consent between Asarco, ADEQ and EPA required Asarco to continue soil, water, and air remediation and monitoring efforts at the site; those activities are ongoing as of 2015.[13]

The Hayden smelter is currently operating under a permit issued by ADEQ on October 9, 2001. This permit is a Class I major source operating permit in accordance with Title V of the CAA. Per

[11] *See* ADEQ, Superfund Alternative Sites: Asarco Hayden Plant. (2015, May 5) Retrieved: http://legacy.azdeq.gov/environ/waste/sps/ASARCO_Hayden_Plant.html.
[12] *See* Asarco, About Us. (2015, Sept. 15) Retrieved: http://www.asarco.com/about-us/.
[13] *Supra* note 11

prescribed permit renewal deadlines, Asarco applied for a renewal of this permit on April 10, 2006.

Smelter operations were originally permitted as a major source of criteria pollutants and minor source for hazardous air pollutants. During ADEQ's permit review and renewal process in November 2011, EPA concluded that the smelter should instead be classified as a major source of hazardous air pollutants and issued a Finding of Violation against Asarco. This finding of violation resulted in a Consent Decree finalized in December 2015 intended to address any additional provisions in the facility's Class I permit.[14]

ADEQ is currently working on the Class I permit renewal for the facility, expected to be finished in 2017, which will incorporate control technologies used to comply with the Consent Decree. Pursuant to R18-2-304.J, the facility is currently operating under a permit shield as a timely application was submitted for permit renewal, and the facility is not in violation until the Director of ADEQ takes final action on the application.

1.5.1 2008 Lead NAAQS

Under the Clean Air Act Section 110(a)(1) and (2), the State was required to submit a revision to the Arizona State Implementation Plan within three years of promulgation of the 2008 Pb NAAQS. On October 14, 2011, Arizona submitted the *Arizona State Implementation Plan Revision under Clean Air Act Section 110(a)(1) and (2): Implementation of the 2008 Lead National Ambient Air Quality Standard*, which addressed elements or "infrastructure" of state air quality programs needed to attain and maintain the new Pb NAAQS. EPA approved most elements of this plan on February 19, 2015.[15] Certain permitting-related elements of Arizona's SIP submittal were addressed in a separate rule. The elements of the 2011 submittal that address CAA sections 110(a)(2)(C), (D), (J) and (K) were disapproved in a final rule on July 14, 2015.[16] ADEQ is currently working to revise and resubmit these sections related to New Source Review and Interstate Pollution Transport.

The promulgation of the 2008 Pb NAAQS also required adjustments to Pb ambient air monitoring networks, requiring states to establish monitors near non-airport point sources that emit 1.0 ton per year or more of Pb.[17] This was lowered to 0.5 tons per year when the *Revisions to Lead Ambient Air Monitoring Requirements* were finalized on December 27, 2010. Per these requirements, monitors were established near the two primary copper smelters in the State, located in the towns of Miami and Hayden, AZ.

On December 15, 2009, under requirements of CAA Section 107(d)(1), Governor Brewer, on behalf of the State of Arizona, submitted to the EPA boundary recommendations for areas of

[14] *See* Consent Decree No. CV-15-2206-PHX-JZB, U.S. EPA vs. Asarco, issued November 2015, available online here: https://www.epa.gov/enforcement/asarco-llc-settlement.
[15] *See* 80 FR 47860 (August 10, 2015; effective: Sept. 9, 2015)
[16] *See* 80 FR 40906 (July 14, 2015; effective: August 3, 2015)
[17] *See* 40 CFR Part 58, Appendix D

the State that meet (attainment), do not meet (nonattainment), or could not be classified due to lack of data.

Based on ambient air monitoring data that was available at the time of designation, the State recommended that the EPA promulgate unclassifiable/attainment designations for the entire state of Arizona, with the exception of the Hayden area. At the time of this designation, exceedances of the newly promulgated Pb NAAQS were recorded near the Hayden smelter, but not enough quality assured and certified monitoring data (per 40 CFR 58 Appendix A) was available to classify the area as nonattainment.[18] The State requested that EPA delay judgment on the designation of the nine townships centered on the Hayden smelter until further assessment of ambient air quality data. In the instance that the area was classified as nonattainment in the future, the State recommended that planning area boundaries be identical to those of the Hayden Sulfur Dioxide NAA. In concurrence with the State's recommendations, EPA designated the Hayden area as unclassifiable until further data could be gathered.[19]

On April 21, 2014, EPA notified Governor Brewer that Pb NAAQS violations had been measured in the Hayden area. Consequently, EPA redesignated the area to nonattainment, effective October 3, 2014.[20] The Hayden Pb NAA boundary was based on the State's original boundary recommendations. EPA's action triggered Clean Air Act (CAA) requirements under Section 110 for the State to submit a SIP revision that demonstrates how the area will attain the 2008 Pb NAAQS.

1.6 Hayden NAA Description

Sections 2.5.1 through 2.5.4 describe the boundary, geography and climate, demographics, and economy of the Hayden planning area to provide additional context for this SIP revision.

1.6.1 Hayden NAA Boundary

Pursuant to Section 107(d) of the CAA, EPA, with input from the States, designates areas as either "nonattainment", "attainment", or "unclassifiable" for each NAAQS. The CAA defines a nonattainment area as any area that exceeds the NAAQS for a given pollutant or contributes to ambient air quality in a nearby area that does not meet the NAAQS for a given pollutant. EPA designated portions of Gila County and Pinal County as nonattainment for the 2008 Pb standard.[21] The current boundaries of the nonattainment and unclassified areas are codified in 40 CFR 81.

[18] *See* 76 FR 72099 (November 22, 2011; effective Dec. 31, 2011)
[19] *Id.,* at 72105
[20] *Supra* note 4
[21] *Supra* note 4

Table 3 provides the township and range information that defines the boundaries for the Hayden Pb NAA.

Table 3: Hayden Pb Nonattainment Area Boundaries

Hayden Lead Area Township Classifications			
County	**Designated Area**	**Does Not Meet Primary**	**Cannot Be Classified**
Gila			
	T4S, R14E	X	
	T4S, R15E	X	
	T4S, R16E	X	
	T5S, R15E	X	
	T5S, R16E	X	
Pinal			
	T4S, R14E	X	
	T4S, R15E	X	
	T4S, R16E (except those portions in the San Carlos Indian Reservation)	X	
	T5S, R14E	X	
	T5S, R15E	X	
	T5S, R16E (except those portions in the San Carlos Indian Reservation)	X	
	T6S, R14E; T6S, R15E; T6S, R16E (except those portions in the San Carlos Indian Reservation)	X	
Source: 40 CFR 81 (79 Fed. Reg. 56963; September 24,2014)			

The Hayden Lead NAA is comprised of 9 townships located in portions of Gila County and Pinal County. Figure 1 depicts a map of the NAA.

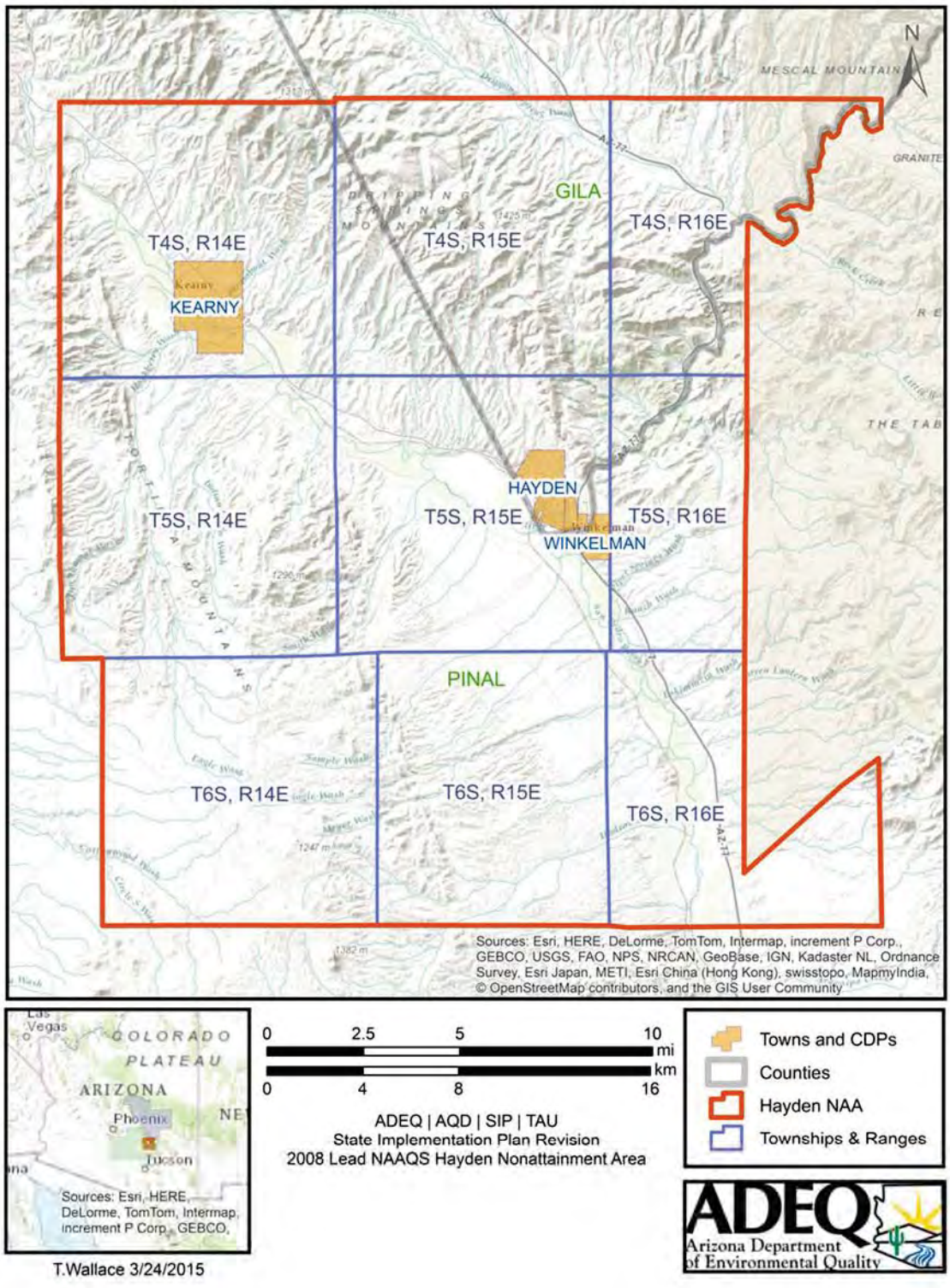


Figure 1: Map of Hayden Pb Nonattainment Area

1.6.2 Geography and Climate

The Hayden Lead NAA is found within Gila and Pinal Counties in southern and central Arizona. Gila County, located in the southern portion of the state, encompasses approximately 4,752 square miles. Located in central Arizona, Pinal County, encompasses approximately 5,374 square miles. Hayden is approximately 50 miles northeast of Tucson and 35 miles south of Globe. Other towns in the NAA include Winkleman, which borders Hayden to the southeast and Kearny, located in the northwest section of the NAA. The area is characterized by complex terrain with mountain ranges forming natural boundaries that isolate the NAA from the rest of Gila and Pinal Counties. Elevations range from roughly 1,800 feet to more than 5,000 feet above sea level, with the Town of Hayden situated at an elevation near 2,050 feet above sea level. The climate of the area is classified as subtropical steppe climate, characterized by dry summers and cooler, wetter winters.[22]

Average annual temperatures in the Hayden NAA range from 85.2 degrees Fahrenheit in the summer to 48.3 degrees Fahrenheit in the winter. Annual precipitation in the NAA averages 14.88 inches. Precipitation occurs mainly in late winter/early spring, with an average rainfall of 5.50 inches from January to March, and during the summer monsoon season with an average rainfall of 3.99 inches from July to September.[23]

1.6.3 Population

On June 23, 2011, the Governor of Arizona signed Executive Order 2011-04 designating the Arizona Department of Administration (ADOA) as the state agency responsible for preparing official population estimates and projections for the State of Arizona. This Executive Order requires all State Agencies to use the data developed by ADOA for any purpose that requires the use of population estimates and projections. Pursuant to this Order, all of the information presented in this section is derived from data gathered from ADOA.

Table 4 shows past, current, and projected population data for Gila County, Pinal County, and the Hayden NAA from 2010-2040. Population numbers are projected to remain relatively stable in the portion of the NAA in Gila County and are projected to grow in the portion of the NAA in Pinal County by 2040.

[22] *See* Weatherbase. (2015, April 24) Retrieved: http://www.weatherbase.com/weather/weather-summary.php3?s=524920&cityname=Winkleman%2C+Arizona%2C+United+States+of+America&units=.
[23] *See* National Oceanic and Atmospheric Administration, National Climatic Data Center

Table 4: Population of Hayden Pb Nonattainment Area

Current and Projected Population for Hayden Pb NAA					
Places	**2010**	**2015**	**2020**	**2030**	**2040**
Hayden Pb NAA, Gila County	1,279	1,291	1,329	1,372	1,401
Hayden Pb NAA, Pinal County	3,292	3,630	4,458	5,962	8,177
Hayden Pb NAA (total)	4,571	4,921	5,787	7,334	9,578
Source: Arizona Department of Administration- May 15, 2015, Internal report					

1.6.4 Economy

As noted previously, the Hayden Pb NAA is located in portions of Gila County and Pinal County. Top industries in both Counties include education, healthcare and social services, retail, agriculture and mining. The copper mining industry, in particular, supports the economies of many towns located within the NAA. In 2013, around 40 percent of the civilian labor force in the Towns of Hayden and Winkelman worked in occupations classified as mining, agriculture, forestry, and fishing/hunting, compared to around 10 percent in greater Gila County (see Table 6).

The Hayden smelter operations, currently owned and operated by Asarco, have a significant impact on the economies of Hayden, nearby communities in the NAA, and on Arizona's economy as a whole. Hayden operations for processing copper ores include: 27,400 ton/day concentrator, a 720,000 ton/year copper smelter, and a sulfuric acid plant. Hayden operations produce over 300 million pounds of copper annually.[24]

In 2012, Asarco operations in Hayden contributed $140.8 million in wages, salaries and benefits to local workers. Additionally, Asarco pays royalties on minerals mined from state leases across Arizona and leases on Indian land. In 2012, Asarco's Hayden operations employed approximately 1,403 people and across the state of Arizona, Asarco estimates it is directly responsible for over 3,600 jobs.[25]

Table 5 shows employment rates in the towns of Hayden and Winkelman, as well as Gila and Pinal Counties from 2010 to 2013. The labor force declined in Hayden from 2010 to 2013 but grew in Gila County and Pinal County. Unemployment rates increased in all three areas, with

[24] *See* Asarco, About Us (2015, Sept.) Retrieved: http://www.asarco.com/about-us/our-locations/hayden-operations/.
[25] *Supra* note 10

the largest increase of almost 9 percent in Hayden. Unemployment remained around 8 percent in Winkelman.

Table 5: Labor Force

Civilian Labor Force for Hayden Planning Area, Arizona (# of employees)		
Employment Status	**2010***	**2013****
Hayden		
Civilian Labor Force	359	266
Unemployed	28	49
Percent Unemployed	7.8%	18.4%
Winkelman		
Civilian Labor Force	184	122
Unemployed	15	10
Percent Unemployed	8.2%	8.2%
Gila County		
Civilian Labor Force	19,865	20,925
Unemployed	1,376	2,547
Percent Unemployed	6.9%	12.2%
Pinal County		
Civilian Labor Force	136,067	151,491
Unemployed	10,490	18,327
Percent Unemployed	7.7%	12.1%
Source: U.S. Census Bureau, American Fact Finder. (2015, April 29). Retrieved from http://factfinder.census.gov. *2006-2010 American Community Survey, 5-Year Estimates (2010) **2009-2013 American Community Survey, 5-Year Estimates (2013)		

Table 6 shows employment by sector for Hayden, Winkelman, Gila County, and Pinal County from 2009 to 2013. Educational services, health care, and social assistance were the largest employment sectors in both Gila County and Pinal County, while agriculture, forestry, fishing, hunting, and mining accounted for almost half of the workforce in Hayden and Winkelman.

Table 6: Labor Force by Sector

Labor Force by Employment Sector 2009-2013 (# of employees)								
Employment Sector	Hayden		Winkelman		Gila County		Pinal County	
	Estimate	% Employed	Estimate	% Employed	Estimate	% Employed	Estimate	% Employed
Agriculture, Forestry, Fishing, Hunting, & Mining	94	43.3	44	39.3	1,868	10.2	5,051	3.8
Construction	0	0	16	`4.3	1,245	6.8	8,994	6.8
Manufacturing	32	14.7	5	4.5	591	3.2	13,149	9.9
Wholesale trade	0	0	0	0	145	0.8	2,616	2.0
Retail trade	0	0	0	0	2,092	11.4	16,216	12.2
Transportation, Warehousing, & Utilities	0	0	0	0	899	4.9	6,286	4.7
Information	0	0	0	0	183	1.0	2,787	2.1
Finance, Insurance, & Real Estate	0	0	4	3.6	944	5.1	8,861	6.7
Professional, Scientific, Administrative, & Waste Management	19	8.8	3	2.7	1,317	7.2	11,852	8.9
Educational Services, Health Care, & Social Assistance	32	14.7	29	25.9	4,618	25.1	27,077	20.3
Arts, Entertainment, Recreation, Accommodation, & Food Services	5	2.3	0	0	2,219	12.1	12,855	9.7
Other Services (except public administration)	6	2.8	0	0	725	3.9	5,469	4.1
Public Administration	29	13.4	11	9.8	1,532	8.3	11,951	9.0
Source: U.S. Census Bureau, American Fact Finder. (2015, April 29). Retrieved from http://factfinder.census.gov. 2009-2013 American Community Survey, 5 Year Estimates								

1.7 General SIP Approach- Regulatory Requirements and Guidance

In November 1990, the U.S. Congress enacted a series of amendments to the CAA. One of the primary effects of the revision was to expand and clarify the planning provisions for those areas not meeting the NAAQS. The CAA, as amended, authorizes comprehensive federal and state programs to provide for attainment and maintenance of the NAAQS. Section 1.7.1 outlines CAA requirements for Pb nonattainment areas. In addition, EPA has published guidance documents to clarify environmental regulations relating to attainment of the NAAQS and to assist in developing approaches for implementing those regulations. Section 1.7.2 summarizes applicable EPA guidance.

1.7.1 Clean Air Act and Code of Federal Regulations Requirements

Clean Air Act, Title I, Part A and Title I Part D, Subparts 1 and 5 are applicable to this SIP. Sections 172(c), 175(A), 176(c) (1)(A), 191, and 192 set forth the requirements for Pb nonattainment areas. Clean Air Act requirements for this SIP are described in greater detail in Table 7 below.

Table 7: Clean Air Act Regulatory Requirements

Clean Air Act (CAA) Regulatory Requirements for Pb NAA SIPs		
CAA Citation	**Action to Meet Requirement**	**Location in SIP**
CAA Title I – Air Pollution Prevention and Control; Part A – Air Quality and Emissions Limitations; Section 110 – Implementation Plans		
110(a)(1) and (2)	Clean Air Act (CAA) Section 110(a)(1) requires states to submit State Implementation Plans (SIPs) within three years following the promulgation of new or revised National Ambient Air Quality Standard (NAAQS) to provide for implementation, maintenance, and enforcement of such standards. Each of these SIPs must address certain basic elements, or the "infrastructure", of its air quality management programs under CAA Section 110(a)(2). These elements, detailed in CAA Sections 110(a)(2)(A) through (M), include provisions for monitoring, emissions inventories, and modeling designed to assure attainment and maintenance of the NAAQS. The *Arizona State Implementation Plan Revision under Clean Air Act Section 110(a)(1) and (2): Implementation of the 2008 Lead National Ambient Air Quality Standard* was submitted to EPA on October 14, 2011.	
110(l)	"Each revision to an implementation plan submitted by a State under this Act shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171), or any other applicable requirement of this Act." This SIP includes a discussion on anti-backsliding provisions to ensure that no other NAAQS will be inferred with.	**Chapter 6.**
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for NAAs; Subpart 1 – NAAs in General; Section 172. Nonattainment Plan Provisions in General; Subsection 172(c) Nonattainment Plan Provisions		
172(c)(1) – In General	"Such plan provisions shall provide for the implementation of all reasonably available control measures [RACM] as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available	**Chapter 4.**

	control technology [RACT]) and shall provide for attainment of the national primary ambient air quality standards." RACT is defined for Pb as that technology which is necessary to achieve the NAAQS (40 CFR 51.100(o)). Chapter 4 contains an explanation of applicable RACM/RACT for Pb point and area sources in the nonattainment area.	
172(c)(2) – RFP (Reasonable Further Progress)	"Such plan provisions shall require reasonable further progress" defined in CAA Sec. 171(1) as "… annual incremental reductions in emissions … for the purpose of ensuring attainment of the applicable national ambient air quality standards by the applicable date." This submittal demonstrates, in accordance with 73 FR 66964 (November 12, 2008), that the Hayden NAA will attain and maintain the Pb NAAQS with implemented control measures that adhere to an ambitious compliance schedule, which is expected to periodically yield significant emissions reductions. As such, the RFP requirement is met.	**Chapter 4**
172(c)(3) – Inventory [Emissions]	"Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met." ADEQ maintains a historical and current database of actual emissions from State-permitted stationary and area sources. All non-permitted source emissions data (e.g., minor and mobile sources) are from the 2011 National Emissions Inventory (NEI) v.2, data provided by Asarco, or data from the EPA Superfund's remedial investigation. Base year and projected emissions are contained in Chapter 3.	**Chapter 3**
172(c)(4) – Identification and Quantification	"Such plan provisions shall expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with Section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the Administrator that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date." The permit program requirements of CAA Section 173(a)(1)(B) are applicable to sources located in a "targeted economic development zone" as determined by the Administrator under consultation with the Secretary of Housing and Urban Development. No such zones are currently known to exist within the Hayden Pb NAA.	

172(c)(5) – Permits for New and Modified Major Stationary Sources	"Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with section 173." Nonattainment new source review (NNSR) programs should ensure that construction and modification of major stationary sources will not interfere with RFP towards the attainment of the 2008 Pb NAAQS. The NNSR requirements apply on a pollutant-specific basis with respect to each nonattainment pollutant for which a source has the potential to emit in amounts greater than the applicable major source threshold for the pollutant, i.e. in major amounts (40 C.F.R. § 51.165 (a)(1)(iv)). For new sources located in areas that are designated nonattainment for the 2008 Pb NAAQS, 100 tpy or more of Pb represents a major amount. Similarly, Pb NNSR requirements also apply to any existing major stationary source of Pb that proposes a major modification, i.e., a physical change or change in the method of operation that results in a significant net emissions increase (0.6 tpy or more) of Pb (40 CFR § 51.165 (a)(1)(x)(A)). ADEQ's NSR/PSD permitting program is in A.A.C. Title 18, Chapter 2, Article 4 – Permit Requirements for New Major Sources and Major Modifications to Existing Major Sources. On October 29, 2012 ADEQ submitted a revision to the SIP to update its program to comply with all current federal NSR requirements, including NSR reform. On June 29, 2015, EPA signed a limited approval/limited disapproval (LA/LD) of this SIP revision (80 FR 67319, November 2, 2015). EPA completed its evaluation of ADEQ's SIP revision and on June 22, 2016 issued a final rulemaking addressing requirements for the permitting of PM2.5 precursors in nonattainment areas (81 FR 40525; effective July 22, 2016). ADEQ is under an obligation to correct the deficiencies identified by EPA. Until the corrections are approved, however, the rules subject to the LA/LD will be part of the SIP. ADEQ has revised its rules to correct the deficiencies, which were finalized and published in the Arizona Administrative Register on February 10, 2017. A SIP revision will be developed and ADEQ expects to submit the package to EPA by April 2017.	
172(c)(6) – Other Measures	"Such plan provisions shall include enforceable emissions limitations, and such other control measures, means or techniques …, as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part." Emissions limitations, control measures, and applicable compliance schedules for Pb sources in the nonattainment area may be found in Chapter 4.	**Chapter 4**
172(c)(7) – Compliance with Section 110(a)(2)	"Such plan provisions shall also meet the applicable provisions of Section 110(a)(2)." As noted above, the *Arizona State Implementation Plan Revision under Clean Air Act Section 110(a)(1) and (2): Implementation of the 2008 Lead National Ambient Air Quality Standard* was submitted to EPA on October 14, 2011.	

172(c)(8) – Equivalent Techniques	"Upon application by any State, the Administrator may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the Administrator determines that the proposed techniques are, in the aggregate, less effective than the methods specified by the Administrator." This section is not applicable; ADEQ did not use equivalent techniques for this plan. ADEQ's intended modeling (Modeling Protocol) and emissions inventory (Inventory Preparation Plan) methodologies were submitted to and reviewed by EPA. Dispersion modeling to establish emissions limits for the Asarco copper smelter was conducted using AERMOD and LEADPOST with EPA's concurrence and in accordance with the "Guideline on Air Quality Models."	**Chapters 3 and 5; Appendices A and B**
172(c)(9) – Contingency Measures	"Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator." Consistent with 73 FR 67040 (Nov. 12, 2008), this submittal includes emissions limits, compliance schedules, and permit program and enforcement information that demonstrate the area will attain and maintain the Pb NAAQS with control measures fully implemented. It also contains a contingency measure to be implemented if the area fails to achieve RFP or fails to attain the NAAQS by the attainment year of 2019. As such, the contingency measure requirement is met.	**Chapter 4**
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for NAAs; Subpart 1 – NAAs in General; Section 176. Limitations on Certain Federal Assistance		
176(c) – Transportation Conformity	Transportation conformity is required to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state air quality implementation plan (SIP). Conformity, to the purpose of the SIP, means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. Title 40 CFR § 93.102(b) waives transportation conformity for Pb nonattainment and maintenance areas.	
176(c) – General Conformity	Similar to Transportation Conformity, which applies to highways and mass transit projects, the General Conformity Rule, which applies to all other federal actions, ensures that the actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national standards for air quality. General conformity for the Hayden Pb nonattainment area, located within both Gila and Pinal Counties, must be addressed to assure Pb emissions from any federal actions or plans do not exceed the rates outlined in 40 CFR §	

	93.153(b) (see 58 FR 63253; November 30, 1993). Criteria for making determinations and provisions for general conformity are located in R18-2-1438 of the A.A.C. There are no known federal plans or actions affecting air quality currently in the Hayden area nor are any foreseen through the year 2019. ADEQ commits to review and comment, as appropriate, on any federal agency draft general conformity determination it receives pursuant to 40 CFR § 93.155 for activities scheduled in this air quality planning area.
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for NAAs; Subpart 5 – Additional Provisions for Areas Designated Nonattainment for Sulfur Oxides, Nitrogen Dioxide, or Lead; Section 191. Plan Submission Deadlines and Section 192. Attainment Dates	
191(a) – Submission	"Any State containing an area designated or re-designated under section 107(d) as nonattainment with respect to the national primary ambient air quality standards for sulfur oxides, nitrogen dioxide, or Pb subsequent to the date of the enactment of the Clean Air Act Amendments of 1990 shall submit to the Administrator, within 18 months of the designation, an applicable implementation plan meeting the requirements of this part." Designation of the Hayden area as nonattainment was effective October 3, 2014 (79 FR 52205; September 3, 2014). The nonattainment area plan is due to EPA by April 2016. See this submittal.
192(a) – Plans Under Section 191(a)	"Implementation plans required under section 191(a) shall provide for attainment of the relevant primary standard as expeditiously as practicable, but no later than 5 years from the date of the nonattainment designation." Designation of the Hayden area was effective October 3, 2014 (79 FR 52205; September 3, 2014). The information provided in this plan demonstrates the area will attain the Pb air quality standard on or before the required October 2019 date.

1.7.2 EPA Guidance

Applicable guidance for demonstrating attainment of the 2008 Pb NAAQS includes the following EPA memoranda:

The July 8, 2011, Memorandum, "2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers,"[26] and the July 11, 2011, "Addendum to the 2008 Lead NAAQS Implementation," Scott L. Mathais, Interim Director, U.S. Environmental Protection Agency, Air Quality Policy Division, offer guidance on attainment demonstrations, modeling, reasonable further progress (RFP) and contingency measures for producing SIP revisions for the 2008 Lead NAAQS. The addendum provides guidance on producing emissions inventories for the 2008 NAAQs specifically.[27]

The March 2012 Memorandum, "Implementation of the 2008 Lead National Ambient Air Quality Standards, Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emission," U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, provides guidance on developing RACM for sources in Pb nonattainment areas, including reasonably available control technologies (RACT) for major point sources. This memorandum also provides some guidance on RACM for re-entrained Pb found in fugitive dust. [28]

The September 2012 Memorandum, "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures," U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, provides guidance for developing RACM and best available control measures for fugitive dust from point sources.[29]

The November 2011 Memorandum, "Guidelines for Preparing Letters Submitting State Implementation Plans (SIPs) to EPA and for Preparing Public Notices for SIPs," from Janet McCabe and Becky Weber to Air Division Directors, Regions 1-10, U.S. EPA, provides guidelines for SIP revision submittal.

[26] Retrieved from: http://www.epa.gov/airquality/Pb/pdfs/20110708QAguidance.pdf.
[27] Retrieved from: http://www.epa.gov/airquality/Pb/pdfs/20120810eiqanda.pdf.
[28] http://www.epa.gov/airquality/Pb/pdfs/2012ImplementationGuide.pdf.
[29] Retrieved from: http://yosemite.epa.gov/ee/epa/ria.nsf/EIO/394EE050F671140C85256A3B00534D0D

2 AIR QUALITY MONITORING

This chapter provides historical ambient air monitoring network information in order to provide context for the Hayden Lead NAA's network, NAAQS exceedances, and air monitor placement.

Ambient monitoring networks for air quality are established to sample pollutants in a variety of representative settings, to assess health and welfare impacts, and to assist in determining air pollution sources. These networks contain individual monitoring sites that are operated by a number of government agencies and regulated facilities.

The EPA protocols for Pb monitoring are located in the following sections of the Code of Federal Regulations (CFR):

- 40 CFR Part 50, Appendix G, Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air
- 40 CFR Part 50, Appendix Q, Reference Method for the Determination of Lead in Particulate Matter as PM10 Collected from Ambient Air
- 40 CFR Part 53 Subpart C, Ambient Air Monitoring Reference and Equivalent Methods
- 40 CFR Part 58 and Appendices A, C, D, and E, Ambient Air Quality Surveillance

In order for data to be used for determining NAAQS compliance (i.e. for boundary designations), it must meet the above requirements. Specifically, data must be measured using instruments designated by EPA as Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM); it must be reported to the Air Quality System (AQS)[30] and must follow an EPA approved quality assurance plan.

2.1 Hayden Pb Monitoring Network

Air monitoring is generally performed by state, local, and tribal agencies at federally required locations or other locations with suspected high pollutant concentrations. EPA and state, local, and tribal agencies may also monitor in areas where the public has complaints or concerns. Agencies planning to use air pollutant measurements for regulatory purposes operate with EPA reference or equivalent methods and develop and follow approved quality assurance procedures.[31] ADEQ's Pb monitor established for NAAQS compliance is located at the Globe Highway site within the Hayden NAA.

In July 2013, as part of the Superfund Remedial Investigation/Feasibility Study (RI/FS) with ADEQ and EPA, Asarco began operating several ambient air quality monitors in the Hayden NAA to measure ambient air impacts from smelter emissions and remediation progress. As of late 2015, these monitors do not follow an EPA approved quality assurance plan, and data is not reported to AQS. Therefore, data from these monitors cannot be used for determination of

[30] EPA's repository of air quality data.
[31] *See* U.S. EPA, Air Monitoring (2017, Feb) Retrieved: https://www.epa.gov/air-quality-management-process/ambient-air-monitoring

NAAQS compliance.[32] Data from these monitors is discussed here as supplemental information to describe the ambient air quality of the area.

ADEQ installed an additional Special Purpose Monitor (SPM) in the NAA in January 2016 near Hillcrest Avenue, where Asarco is currently operating a monitor as part of the RI/FS. The addition of an ADEQ-operated monitor at this site is designed to determine the location of maximum ambient Pb concentration.

2.1.1 Meteorological and Ambient Air Monitoring Sites

ADEQ operates meteorological equipment at selected sites throughout its network. Some sites were originally established because other meteorology networks (NWS, AZMet, etc.) were not located near ADEQ's ambient air quality monitoring sites. As recommended in ADEQ's Five-Year Network Assessment, ADEQ has begun to expand the meteorology monitoring network and standardize the meteorological measurements so that all sites collect measurements of wind speed, wind direction, temperature, and relative humidity. ADEQ only reports meteorology data to AQS as required by 40 CFR Part 58.16.

ADEQ maintains two meteorological monitors in the NAA, which are the Hayden Old Jail and Globe Highway monitoring sites. The Hayden Old Jail monitor is located approximately 0.66 miles west of the Asarco concentrator and smelter complexes, and the Globe Highway monitor is located approximately 0.59 miles to the east of the Asarco Smelter. Asarco also maintains and operates a meteorological monitor at the Camera Hill location, which is south of the smelter.

The locations of the Hayden meteorological monitors are listed in Table 8 below and Figure 2 is a map of the monitoring stations in relation to the smelter property.

Table 8: Hayden Meteorological Monitoring Stations

Hayden Meteorology Monitoring Stations				
Site Name	Distance to Smelter (miles)	Latitude	Longitude	Elevation (feet)
ADEQ Monitors				
Globe Highway	0.59	33.00251	-110.76545	1,984.9
Hayden Old Jail	0.66	33.00621	-110.78645	2,044
ASARCO Monitors				
ST-10: Camera Hill	0.22	33.00046	-110.775	2,057.1

[32] U.S. EPA, Final Report, April 2014. Technical System Audit, Asarco Hayden Plant Site, Ambient Air Monitoring Program, January 22-January 28, 2014.



Figure 2: Map of Hayden Meteorological Monitors

ADEQ monitors ambient Pb concentrations in the Hayden NAA at the Globe Highway monitor and the fairly new Hillcrest monitoring station. As part of the RI/FS, Asarco has been monitoring ambient Pb concentrations throughout the NAA since 2013.[33]

The locations and monitoring period of all Pb monitors (both ADEQ-operated and Asarco-operated) in the planning area are listed in Table 9.

[33] *Id*.

Table 9: Ambient Pb Monitoring Stations and Locations

Hayden Pb Monitoring Stations				
Site Name	Distance to Smelter (miles)	Latitude	Longitude	Elevation (feet)
ADEQ Monitors				
Globe Highway	0.59	33.00251	-110.76545	1,968
Hillcrest	.39	33.00363	-110.78232	2,113
ASARCO Monitors				
ST-02: Winkelman High School	0.63	32.99505	-110.77156	2,014
ST-05: Globe Hwy	0.59	33.00254	-110.76542	1,968
ST-09: Reverts Crushing	0.49	32.99670	-110.77734	2,096
ST-14: Smelter Parking Lot	0.22	33.00254	-110.77911	2,096
ST-18: North Hayden Station	0.83	33.01105	-110.78684	2,123
ST-23: Hillcrest Avenue	0.39	33.00363	-110.78232	2,113
ST-26: Concentrator Station	0.50	33.00622	-110.78369	2,096

Figure 3 below shows a map of the ambient Pb monitoring network in the NAA, including those operated by ADEQ and Asarco.

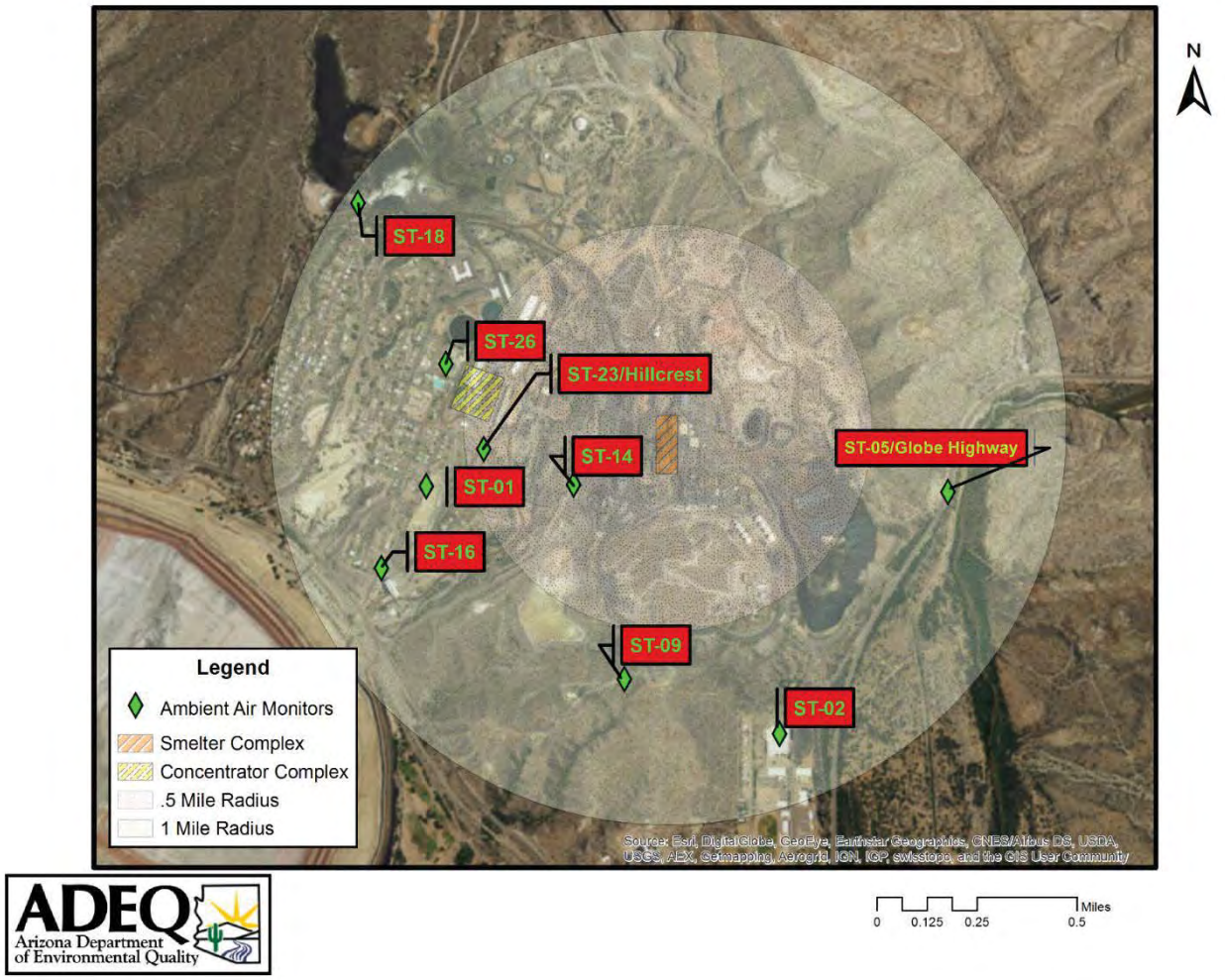


Figure 3: Map of Source-Operated Ambient Air Monitor

2.1.2 Monitoring Equipment and Quality Assurance Procedures

ADEQ's two TSP-Pb monitors (one operating as the primary monitor, the other as a quality assurance, collocated monitor) at Globe Highway are required per 40 CFR part 58 Appendices A and D. ADEQ's current data quality assurance program plan (QAPP) was approved by EPA Region 9 in January 2013. ADEQ sustains a quality assurance system as required by EPA to ensure high quality data is collected. The EPA primarily specifies the quality assurance (QA) requirements for operating air monitors in 40 CFR Part 58 Appendix A, *The Quality Assurance Handbook for Air Pollution Measurement Systems: Volume II: Ambient Air Quality*, and other supporting guidance documents.

ADEQ develops quality assurance plans for air monitoring networks, which provide detailed information regarding the specifics of each air monitoring network and how data will be managed. Components of ADEQ's quality system include, but are not limited to: ADEQ being established as the primary quality assurance organization (PQAO) for the criteria and non-criteria pollutant air monitoring data collected and reported to EPA's Air Quality System (AQS); an agency-level Quality Management Plan (QMP), which is an "umbrella" document that defines, in broad terms, the strategies used to carry out quality assurance and quality control (QA/QC) in environmental data collection activities; and Division-level quality assurance program plans (QAPPs) for each major, ongoing air monitoring network.[34]

The five Asarco TSP-Pb monitors in the area are currently operated by contractor Haley & Aldrich, Inc. In January 2014, the EPA Region 9 Quality Assurance Office performed a Technical Systems Audit (TSA) of Asarco's ambient monitoring network to determine if appropriate quality assurance and data management procedures were in place. EPA determined that Haley & Aldrich was operating an adequate network but found several deficiencies in Haley & Aldrich's QAPP. Haley & Aldrich is currently working to remedy these deficiencies.[35]

2.2 Lead Data Summary

A violation of the 2008 Pb primary NAAQS occurs when the three month rolling average ambient Pb concentration exceeds 0.15 µg/m^3. ADEQ's Globe Highway monitor recorded four violations of the 2008 Pb Primary NAAQS in 2011, three violations in 2012, no violations in 2013, two violations in 2014, and no violations in 2015 and 2016. Table 10 shows the design values at the Globe Highway monitor from 2011 to beginning of 2017.[36]

[34] ADEQ, State of Arizona Air Monitoring Network Plan for the Year 2015, July 1, 2015.
[35] *Supra* note 33.
[36] Existing air quality data is summarized pursuant to 40 CFR § 51.115.

Table 10: Ambient Pb Concentrations-Globe Highway Monitor

ADEQ Globe Highway Monitor Rolling 3-month Average Pb concentration (µg/m^3)[37]												
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
2011			0.11	0.18	0.21	0.27	0.23	0.14	0.07	0.08	0.08	0.09
2012	0.07	0.14	0.15	0.20	0.16	0.20	0.15	0.14	0.12	0.11	0.09	0.06
2013	0.04	0.05	0.10	0.11	0.11	0.12	0.11	0.11	0.06	0.06	0.04	0.03
2014	0.02	0.04	0.07	0.11	0.15	0.17	0.16	0.12	0.09	0.07	0.05	0.07
2015	0.06	0.08	0.07	0.08	0.07	0.11	0.11	0.12	0.07	0.07	0.06	0.06
2016	0.06	0.04	0.07	0.08	0.14	0.12	0.12	0.08	0.08	0.06	0.04	0.03
2017	0.04											

Table 11 below shows the rolling three-month average Pb concentration from the Hillcrest monitor, which was operating starting January 2016. ADEQ's Hillcrest monitor is collocated to Asarco's RI/FS Pb monitor, ST-23. This monitor addition will substantially increase the representativeness of Pb monitoring data available to ADEQ for regulatory purposes. In 2016, two violations occurred at the Hillcrest monitor.

Table 11: Ambient Pb Concentrations-Hillcrest Monitor

ADEQ Hillcrest Monitor Rolling 3-month Average Pb concentration (µg/m^3)[38]												
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
2016	N/A	N/A	0.22	0.16	0.07	0.09	0.10	0.08	0.09	0.12	0.14	0.14
2017	0.11											

[37] Highlighted values indicate a violation of the Pb NAAQS (over 0.15 µg/m^3).
[38] Highlighted values indicate a violation of the Pb NAAQS (over 0.15 µg/m^3). Months January and February for the Hillcrest monitor are "N/A" due to the fact that a complete rolling three-month average for 2016 is not available until March, as the monitor was not installed and operating until January 2016.

Figure 4 is a chart of three-month rolling averages monitored at the ADEQ Globe Highway monitor from 2011, when data collection began, through the end of 2016.

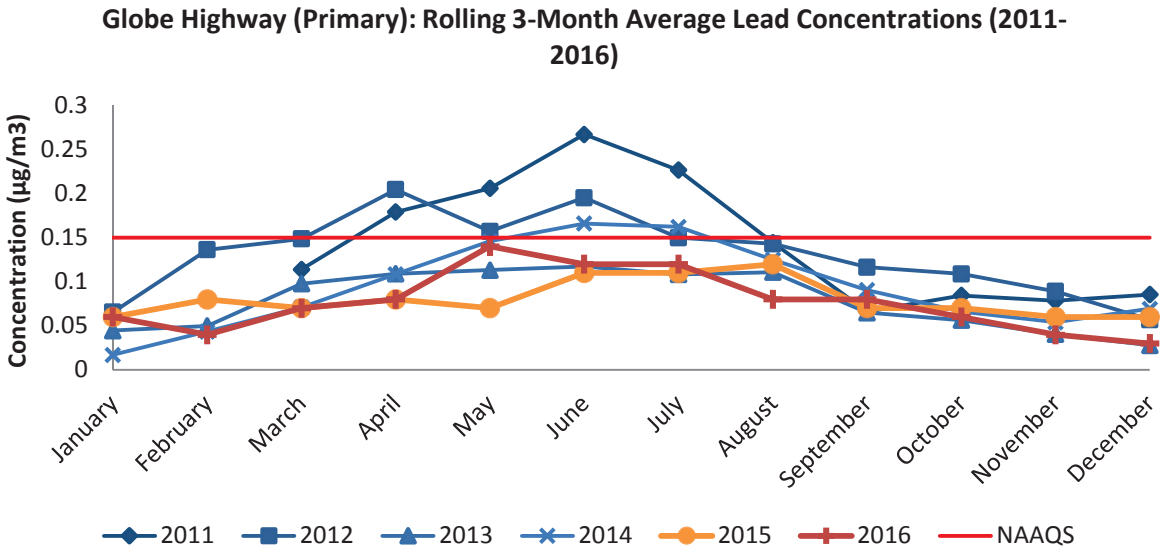


Figure 4: Pb Design Values 2011-2016

NAAQS exceedances at all monitors were analyzed in conjunction with meteorological data in order to evaluate potential emissions sources and weather conditions that resulted in high ambient air concentrations of Pb. An in-depth meteorological analysis can be found in the Emissions Inventory TSD in Appendix A. Emissions sources are discussed in greater detail in Chapter 3.

3 Emissions Inventories

Section 172(c)(3) of the CAA requires that nonattainment area plans include an emissions inventory from all significant sources within a planning area:

> *"Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met."*

An emissions inventory helps identify the significant sources and source categories across the NAA. These inventories are intended to identify significant sources of emissions to help inform pollution control measures that will bring the area into attainment.

ADEQ inventoried Pb emissions for the base year of 2012. ADEQ chose 2012 as the base year from which to inventory emissions in accordance with EPA guidance.[39] The following reasons further support 2012 as a base year: the Hayden Pb NAAQS nonattainment designation was based on 2012 data; three NAAQS violations were recorded in 2012; and it is the most recent year with verified ambient air monitoring data from a SLAMS monitor.

Hayden was designated nonattainment for Pb in 2014. The CAA provides that nonattainment areas must meet attainment as expeditiously as practicable, but no later than five years after the effective date of designation. Therefore, the Hayden Pb NAA must attain the NAAQS by 2019. ADEQ projected base year emissions to the attainment year of 2019.

The following chapter provides a broad overview of methodologies and Pb sources in the Hayden NAA for the years 2012 and 2019. For more information, see the Emissions Inventory Technical Support Document (EI TSD) in Appendix A.

3.1 Point Sources

In accordance with the 2008 Pb NAAQS implementation rule,[40] ADEQ performed an emissions inventory for all point sources in the NAA with a potential to emit 0.5 tons per year (tpy) or more of Pb. ADEQ found that the only point source in the NAA is the primary copper smelter owned and operated by Asarco. ADEQ's emission inventory sectioned this source into three categories: stack and smelting process-related fugitives[41], non-smelting process related fugitives, and roads.

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[39] *See* U.S. EPA, Air Quality Policy Division, Memorandum, "2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers," July 8, 2011.

[40] *See* 73 FR 66964 (November 12, 2008)

[41] Fugitive Pb emissions that originate from the flash furnace, converters, and anode furnaces are considered "smelting process-related" fugitive emissions, whereas emissions from dust-related sources outside the smelter (like roads or materials handling) are referred to as "non-smelting process related" fugitive emissions. Calculations and further methods are discussed in detail in the EI TSD in Appendix A.

3.1.1 Stack & Smelting Process-Related Fugitives

Base year emissions for stack and smelting process-related fugitive emissions were supplied to ADEQ by Asarco in a 2012 emissions report retrieved from the State and Local Emissions Inventory System (SLEIS). Asarco subdivided process-related fugitive emissions from the anode furnace because the anode baghouse was not installed and fully operational until the end of 2012. Therefore, three different emissions conditions were quantified: no control-emissions (before the baghouse was installed), partial controlled (the baghouse is installed but not operated at maximum efficiency), and full control (the baghouse is installed and operated at maximum effectiveness). This is reflected in Table 1 below.

ADEQ projected stack and smelter process-related fugitive emissions for 2019 based on Asarco's maximum allowable quantity of Pb emissions, that is, their permitted (and federally enforceable) Potential to Emit (PTE). It is important to note that the PTE limits used in the 2019 emissions inventory and modeling reflects the controls that will be implemented as part of the Consent Decree and the Converter Retrofit Project (CRP).

In 2012, the highest contributors of Pb emissions were the main stack emissions coming from the flash furnace and converter, followed by fugitive emissions escaping from the converter. In 2019, the highest contributors will be the main stack and flash furnace and converter fugitives. The anode furnaces in comparison remain a minor contributor in both years. Table 12 below displays emissions for these sources for 2012 and 2019.

Table 12: Smelter Stack and Smelting-Process Fugitive Emissions

2012 Actual & 2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory			
Smelter Stack & Fugitive Emissions			
Source	**Description**	**2012 Emissions (tons)**	**2019 Facility Potential to Emit (tons)**
Main Stack			
Dryer with Flash Furnace and Converter	Emission Point: Annulus Main Stack-R&R	1.06	2.99
Acid Plant	Emission Point: Acid Plant Inner Main Stack	0.011	
Anode Furnace Baghouse	Emission Point: Anode Baghouse Stack	.0113	
Flash Furnace & Converter Fugitives			
Flash Smelting	Emission Point: Flash Furnace Fugitives	0.495	1.4
Converter	Emission Point: Converter Fugitives	0.968	
Anode Furnace			
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (No Control Operating Days)	0.243	0.04
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (Partial Control Operating Days)	0.146	
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (Full Control Operating Days)	0.028	
Smelter Stack & Fugitive Emissions Total		**2.97**	**4.43**

3.1.2 Non-smelting Process-Related Fugitives

Simply put, non-smelting process related fugitive emissions at Asarco's Hayden smelter result from processes that are separate from the building where copper is smelted. These sources include slag pouring, reverts crushing and handling, concentrate handling, and dewatering of the Venturi scrubber slurry. ADEQ used the following methods to derive emissions for years 2012 and 2019:

Slag pouring - Base year Pb emissions due to slag pouring were provided by the facility in their 2012 emissions report in SLEIS. The calculation method used can be found in EPA AP-42, *Compilation of Air Pollutant Emission Factors,* Chapter 12.3 using tables 12.3-19. For attainment

year emissions, ADEQ used Asarco's permitted PTE emissions, which was also calculated using EPA AP-42, Chapter 12.3, tables 12.3-19.

Reverts crushing and handling – For base year emissions, three scenarios were considered for each reverts handling area: wind erosion, batch drop, and load out. To quantify emissions from these scenarios, ADEQ used two different estimation methods applying different Pb factors one obtained from EPA Superfund's Remedial Investigation/Feasibility Study (EPA RI/FS) and one obtained from Asarco's 2019 PTE calculation, to particulate matter (PM) emissions and compared the results. The final masses of Pb in PM from these two approaches varied by 1.7 percent. ADEQ concluded both approaches are reasonable and the most conservative emission value was retained. For attainment year emissions, ADEQ applied percent efficiencies for wind fences and water sprays outlined in the Consent Decree to base year Pb emission factors.

Concentrate handling - Like reverts crushing, ADEQ quantified concentrate handling emissions for three scenarios: wind erosion, batch drop, and load out. These scenarios were applied to the concentrate bedding and overflow storage areas. ADEQ quantified these scenarios by applying a percent Pb factor, which was developed from the EPA RI/FS, to PM totals reported in Asarco's 2012 SLEIS emissions report. For attainment year emissions, ADEQ applied percent efficiencies for wind fences and water sprays outlined in the Consent Decree to base year Pb emission factors.

Dewatering of Venturi scrubber slurry – For base year emissions, ADEQ quantified emissions from the wet/dry bins using EPA AP-42, Section 11.2.3 from May 1983 and applied a Pb factor from the RI/FS. The dewatering of scrubber slurry, as it occurred in the base year, will drastically change in the attainment year. The slurry will no longer be dried in wet/dry bins, but rather in an enclosed system maintained under negative pressure. Therefore, ADEQ did not project emissions from the wet/dry bins but rather used a 2019 PTE value provided by Asarco for the new system.

Consent Decree-related controls and process changes are expected to reduce emissions from 2012 base year to the 2019 attainment year. Maximum potential emissions from non-smelting process related fugitive emissions are expected to be 0.13 tpy in 2019 as compared to 0.32 tpy in 2012. Table 13 below reports emissions from each source for years 2012 and 2019.

Table 13: Non-Smelting Process-Related Fugitive Emissions

2012 Actual & 2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory			
Process Fugitive Emissions			
Source	**Description**	**2012 Emissions (tons)**	**2019 Facility Potential to Emit (tons)**
Pouring of Slag at the Slag Dump	fugitive emissions are released when molten slag is poured at the dump	0.04780	0.047795
Pile-Unloading bedding area	Emissions resulting from wind erosion	0.00005	0.00009
Unloading from truck/rail to bedding area	unloading of copper concentrate and by-products from truck or rail to unloading dump hopper	0.00001	0.00001
Load out from storage piles onto belt	Emissions from load out of concentrate in outdoor storage	0.00011	0.00006
Overflow concentrate storage	Emissions resulting from wind erosion	0.00097	0.00079
Transfer from truck to overflow concentrate storage	Emissions from transfer of copper concentrate to outdoor storage	0.00001	0.00003
Load out from overflow storage	Emissions from the load out of copper concentrate in outdoor storage	0.00002	0.00006
South Reverts	Wind erosion at the south reverts crushing area	0.00193	0.00024
South Reverts	Reverts transfer from truck to storage piles-south	0.00059	0.00022
South Reverts	Reverts load out from storage piles-south	0.00468	0.00177
North Reverts	Wind erosion at the North reverts area	0.00001	0.0000004
North Reverts	Reverts transfer from truck to storage piles-north	0.00029	0.0001106
North Reverts	Reverts load out from storage piles north by converter area	0.00468	0.00177
SmithCo Reverts	Reverts operations carried out by contractor	.00311	.008
Wet/Dry Bins #1	Emissions resulting from wind erosion	0.12900	0.07
Wet/Dry Bins #1	Emissions from load out of scrubber slurry	0.00010	
Wet/Dry Bins #2	Emissions resulting from wind erosion	.097	
Filter Plant	Emissions resulting from wind erosion	.035	
Process Fugitive Emissions Total		**0.32**	**0.13**

3.1.3 Roads

Due to the interaction between high temperature atmospheric Pb emissions and coarse particulate matter (PM), ADEQ decided to quantify leaded dust emissions from unpaved and paved roads at Asarco Hayden Operations. For base year emissions, ADEQ took 2012 SLEIS data submitted by Asarco for PM and applied percent Pb factors, which were determined in the RI/FS.

ADEQ's approach to projecting road dust emissions to the attainment year involved the controls outlined in the Consent Decree's fugitive dust plan. ADEQ applied a 90 percent control efficiency from chemical dust suppressants to unpaved road dust required by the Consent Decree in its 2019 emissions projection. The Consent Decree requires Asarco to clean paved roads with sweepers, vacuum, or wet broom vehicles no less frequently than daily. ADEQ's paved road projections are based on the facility's expected PTE for 2019, which reflects these controls.

As shown in Table 14,, facility road emissions are expected to slightly decrease in the attainment year.

Table 14: Paved and Unpaved Road Emissions

2012 & 2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory		
Facility Road Emissions		
Source	**2012 Emissions (tons)**	**2019 Facility Potential to Emit (tons)**
Paved Roads	0.091	0.016
Unpaved Roads	.0458	0.027
Facility Road Emissions Total	**0.137**	**0.043**

3.2 Nonpoint Sources

ADEQ inventoried and projected nonpoint (or area) source emissions for 2012 and 2019 using data obtained from the 2011 NEI V2 and allocating population according to methods in the EI TSD in Appendix A.

Table 15 below shows that emissions from all area sources in the NAA were minimal, with a combined total of 0.0000139 tons in 2012, accounting for essentially 0 percent of total Pb emissions in the base year. Area source emissions remain negligible in the 2019 attainment year.

Table 15: Nonpoint Sources Emissions

2012 & 2019 Area Source Pb Emissions			
Source	**Description**	**2012 Emissions (tons)**	**2019 Projected Emissions (tons)**
Residential-Kerosene-Total: All Heater Types	Stationary Source Fuel Combustion	0.0000000089	0.0000000091
Residential-Distillate Oil-Total: All Combustor Types	Stationary Source Fuel Combustion	0.0000000914	0.0000000935
Cremation-Humans	Miscellaneous Area Sources	0.0000013558	0.0000013861
Cremation-Humans	Miscellaneous Area Sources	0.0000031279	0.0000041664
Residential-Distillate Oil-Total: All Combustor Types	Stationary Source Fuel Combustion	0.0000000479	0.0000000638
Residential-Kerosene-Total: All Heater Types	Stationary Source Fuel Combustion	0.0000000047	0.0000000062
Airports : Aviation Gasoline-Stage 2: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000004568	0.0000006084
Airports : Aviation Gasoline-Stage 1: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000088307	0.0000117625
Area Source Emissions Total		**0.0000139**	**0.000018**

3.3 Mobile Sources

Historically, on-road and off-road mobile sources were a potential source of Pb emissions due to leaded fuel. ADEQ did not inventory or model Pb emissions from on-road vehicles because leaded gasoline was completely phased out by 1996 and, thus, is not calculated as a pollutant in the EPA MOVES model used to quantify mobile source emissions. Currently, the only fuels allowed to contain lead are those used in non-road applications, such as outboard marine engines, piston engine aircraft, farm equipment, and race cars. A survey of the 2011 NEI V2 found that in Gila and Pinal Counties, only aircraft and locomotives use leaded fuel. ADEQ apportioned mobile source emissions to the NAA for base year 2012 through a combination of rail line, airport landing, takeoff & operation (LTO) data, and population adjustment factors in conjunction with 2011 NEI V2 data. ADEQ used population growth factors to project mobile source emissions for the 2019 attainment year.

Like nonpoint sources, mobile sources in the Hayden NAA were also a minor source of Pb emissions in 2012, with total emissions of 0.0152 tons, accounting for less than 1 percent of total annual Pb emissions in the NAA. Mobile source emissions slightly increase but remain very minor in 2019, with a combined contribution of around 0.02 tons (see Table 16 below).

Table 16: Mobile Nonroad Source Emissions

2012 & 2019 Mobile Nonroad Pb Emissions			
Source	**Description**	**2012 Emissions (tons)**	**2019 Projected Emissions (tons)**
Locomotive	Gila County Portion of NAA	0.0000087	0.0000089
Aircraft	Pinal County Portion of NAA	0.0146623	0.0195302
Locomotive	Pinal County Portion of NAA	0.0005060	0.0006740
Mobile Nonroad Emissions Total		**0.0152**	**0.02**

3.4 Summary of All Sources

Emissions in the 2019 attainment year are expected to differ from the 2012 base year across all sources. Emissions from mobile and area source categories are both projected to increase due to expected population growth in Gila and Pinal counties. However, even with a significant increase in population, and thus an increase in emissions from these two source categories, the total contribution from mobile and area sources will remain very low in the 2019 attainment year, with a combined contribution of less than 0.5 percent of total Pb emissions in the NAA.

Emissions from the Asarco Hayden Operations, the only point source in the NAA, will change significantly based on reconfiguration of the smelting process under the CRP and the application of controls across all emission points under the Consent Decree. The point source category has the potential to increase emissions by roughly 41 percent in the attainment year. However, this increase is based on a comparison between actual emissions in the base year and what the facility is permitted to emit in the attainment year. ADEQ only used these permit maxima in order to produce conservative projections; there is no specific reason to believe that the facility will approach its permitted limit. Therefore, the comparison of actual and potential emissions should be done with reservation.

ADEQ feels with the changes brought on by the converter retrofit project and fugitive dust plan are likely to significantly improve the ambient air quality in the town of Hayden. Computer modeling in the attainment demonstration will evaluate the extent of this improvement.

Table 17 contains a summary of 2012 and 2019 emissions from all source categories in the Hayden NAA.

Table 17: Summary of Emissions

2012 & 2019 Projected Hayden Pb Nonattainment Emission Inventory Summary		
Projected Hayden Pb NAA Emissions Summary		
Source	**2012 Emissions (tons)**	**2019 Projected Emissions (tons)**
Point	3.4	4.60
Area	0.0000139	0.000018
Mobile Nonroad	0.0152	0.020
Hayden Pb NAA Emissions Total	**3.42**	**4.85**

ADEQ used the 2019 Pb emissions inventory to inform the control measure analysis (see Chapter 4). The 2019 emissions inventory was also used as inputs from the model used for the attainment demonstration (see Chapter 5).

4 CONTROL MEASURES

As discussed in Chapter 3, Asarco's Hayden Operations is the primary source of Pb emissions in the Hayden NAA. Control measures specific to smelter operations will provide the necessary regulation to lower Pb emissions and meet the 2008 Pb NAAQS. This chapter provides the overall control strategy in achieving emission reductions necessary for the attainment of the Pb NAAQS in the nonattainment area.

The following sections summarize regulatory requirements for control measures, provide a broad overview of the current and future control measures that are applicable to Asarco's Hayden Operations, and present ADEQ's analysis that demonstrates how the rules fulfill RACM/RACT requirements.

4.1 Requirements

Section 172(c)(1) of the CAA requires that nonattainment area plans include a control strategy that provides for attainment of the NAAQS:

> *Such plan provisions shall provide for the implementation of all reasonably available control measures [RACM] as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology [RACT]) and shall provide for attainment of the national primary ambient air quality standards.*

EPA has interpreted Section 172(c)(1) to mean that a state must "consider all potentially available measures to determine whether they [a]re reasonably available for implementation in the area, and whether they would advance the [area's] attainment date."[42]

EPA has defined RACT as: "the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."[43] EPA has interpreted the terms RACT and RACM as being the level of emissions control that is necessary to provide for expeditious attainment of the NAAQS within a nonattainment area. Courts have upheld this interpretation of the statute with respect to nonattainment SIPs.[44] Additionally, the "General Preamble" to the 1990 CAA Amendments and other policy and guidance documents partially describe the methodology to determine RACM/RACT.

A nonattainment plan should include enforceable emissions limitations and other control measures, including schedules and timetables for compliance, as necessary to provide for attainment of the NAAQS by the applicable attainment date.[45] Such plan provisions shall

[42] *See* 66 FR 586, page 607 (January 3, 2001); Sierra Club v EPA, 294 F.3d 155, 162-63 (D.C. Cir. 2002).
[43] *See* 44 FR 53762 (September 17, 1979); 57 FR 13498 (April 16, 1992).
[44] *See* NRDC v. EPA, 571 F.3d 1245, 1252-53 (D.C. Cir. 2009).
[45] *See* C.A.A. § 172(c)(6)

provide implementation of all reasonably available control measures (RACM), including reasonably available control technology (RACT), as expeditiously as practicable.[46] Therefore, the control strategy for the Hayden Pb nonattainment area must qualify as RACM/RACT.

EPA recommends that, at minimum, all stationary sources emitting 0.5 tpy or more of Pb emissions should undergo a RACT review.[47] ADEQ focused its RACM/RACT analysis on Asarco's Hayden Operations because it is the single largest contributor to Pb emissions in the Hayden NAA. ADEQ's full RACM/RACT analysis is in section 4.5.

4.2 Identification of Significant Sources

The most significant point source—and most significant source overall—is the primary copper smelter currently owned and operated by Asarco, which accounts for over 99 percent of Pb emissions. Emissions generally come from the hot-metal smelting process and lead-bearing fugitive dust.

Nonpoint sources—for example, residential kerosene heaters and airports—account for 0 percent of the nonattainment area's Pb emissions. Additionally, mobile sources like locomotives and aircrafts account for 0 percent of the nonattainment area's Pb emissions as well.[48] For this reason, these sources are not considered significant sources and were not included in the controls analysis.

The attainment control strategy focuses on Asarco's Hayden Operations, in particular, the smelting process and fugitive Pb dust sources. Significant sources or activities within Asarco's Hayden Operations are identified in the Emissions Inventory (see Appendix A). These sources are also summarized in Table 18 below[49], along with the corresponding required controls and projected emission reductions.

[46] *See* C.A.A. § 172(c)(1)
[47] *See* 73 FR 66964, at 67037 (November 12, 2008).
[48] Refer to Chapter 3 and Appendix A of this submittal for more information on the emissions inventory.
[49] Table 18 is also in ADEQ's Modeling TSD in Appendix B.

Table 18: Summary of Sources for RACM

Modeled Source	Controls Applied	2012 Actual Emissions, t/y	2019 Projected Actual Emissions, t/y	Projected Reductions	Modeled Emissions, t/y
Main Stack	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding.	1.08	0.889	17%	2.99 (PTE)
Flash Furnace Fugitives	Matte Tapping Ventilation System	0.495	0.1025	79.3%	1.03 (PTE)
Converter Aisle Fugitives	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding	0.968	0.024	97.5%	0.37 (PTE)
Anode Furnace Fugitives	Improved ventilation system	0.417	0.0431	89.7%	0.04 (PTE)
Anode Baghouse Stack	Sent to the main stack	0.0113	0.0145	N/A	Included in main stack
Slag Dump	Restrictions on slag dumping location	0.05	0.05	__	0.05
Acid Plant Scrubber Blowdown Solids Drying	Thickener Project	0.26	0.07	73%	0.07 (PTE)
Concentrate storage area	Wind fence, water sprays	0.001	0.000056	94%	0.00088 (PTE)
Bedding area	Wind fence, water sprays	0.00017	0.000015	91%	0.00016 (PTE)
Reverts operations	Wind fence, water sprays	0.0122	0.00042	97%	0.0041 (PTE)
Paved Roads	Sweepers	0.091	0.015	84%	0.015
Unpaved Roads	Chemical Dust Suppressant (on a schedule achieving 90% control efficiency)	0.046	0.028	39%	0.028

As explained more in the Emissions Inventory TSD, the sources identified in Table 18 above are those that contribute the majority of Pb emissions.

For the smelter rule, R18-2-B1301, the control strategy relies on the facility implementing an Operations and Maintenance Plan, which must incorporate applicable operating parameters that are reliable indicators of control equipment operations. The control equipment listed in Table 18 for the main stack and smelting fugitives will be addressed in the Operations and Maintenance Plan.

The dust rule, R18-2-B1301.01, is focused primarily on leaded dust sources identified in the Emissions Inventory (see Appendix A). As summarized in Table 18 above, these leaded dust sources are:

- Concentrate storage and handling
- Reverts crushing and crushed reverts storage and handling
- Uncrushed reverts storage and handling
- Bedding material storage and handling
- Acid plant scrubber blowdown solids drying
- Unpaved roads
- Paved roads
- Slag dumping[50]

The control measures in the rules focused on these smelting and fugitive dust sources are discussed in greater detail in the RACM/RACT analysis in section 4.5.

To assist in a broad understanding of the smelting process and where Pb emissions come from, the following sections present an overview of Asarco's Hayden Operations and Pb emission points, followed by a description of the current controls and future ones to be implemented.

4.2.1 Overview of Operations and Significant Sources

Asarco owns and operates a primary copper smelter within the Hayden Pb nonattainment area.[51] The smelter is one of three in the United States and has been operating since the early 1900s, around the same time the Town of Hayden was established. The original facility employed eight multiple hearth roasters and two reverberatory furnaces to process copper sulfide ore. Today the Hayden primary copper smelter utilizes an oxygen flash smelting process as well as converters and anode furnaces to produce anode copper. An oxygen plant produces oxygen for the furnace and a sulfuric acid plant recovers the sulfur dioxide produced during smelting. A water treatment plant recovers process water from both the acid plant and flash furnace gas cleaning systems for reuse.

A general understanding of Asarco's operations is helpful in comprehending the associated emissions from these activities and the impact they have on the nonattainment area.

[50] It should be noted that slag dumping fugitive emissions are not addressed in the Pb dust rule, due to the fact that the emissions are controlled via throughput restrictions enforced via Asarco's Title V permit.
[51] Asarco also owns a copper mine, called the Ray Mine, located near the town of Kearny. The mine is included in the Hayden PM_{10} nonattainment area and is not a significant source of Pb emissions.

4.2.1.1 Smelting Process-Related Emissions

Mining and Milling

Copper is used in many facets of everyday life, from plumbing to cell phones and architecture to medicine. To obtain pure copper for these uses, copper-bearing mineral (ore) is mined and processed via sequential beneficiation steps. These steps include size reduction by means of crushing and milling, and a flotation process that separates the metallic mineral from the non-metallic constituent, resulting in a higher-grade product (concentrate) and a waste stream (tailings). Asarco owns and operates several facilities that mine copper ore and supply copper concentrate to Asarco's Hayden Smelter.

Concentrate Feed and Preparation

Once the concentrate is received at the Hayden Smelter, it is sampled for metal and sulfur content for commercial and metallurgical control purposes. The concentrate is then transported to the bedding plant where a relatively homogenous "mix" of copper concentrate, silica flux, and recycled process by-products is prepared. This mix is the feed material to the INCO Flash Furnace.

INCO Flash Furnace

Prior to introduction into the INCO Flash Furnace, the feed material is dried in one of two fluidized bed dryers and recovered in an associated product baghouse. The dried feed is then conveyed to furnace feed bins, one for each of the four burners. Flash smelting occurs when the dried feed is introduced into the INCO Flash Furnace, along with 95 percent pure oxygen, through the burners. Combustible constituents of the feed (predominately sulfur) ignite, providing the heat to melt the feed mixture.

The molten material produced in the flash process separates into two layers, with the lighter top layer being iron-rich slag and the heavier lower layer being copper matte. The slag is skimmed off the top of the molten bath into large pots which are transported to the slag deposition area. The molten copper matte is tapped from the bottom of the furnace into a ladle and transferred via overhead crane to the converter furnaces.

The matte tapping/slag skimming and dryer emissions are routed to a particulate control device (electrostatic precipitator – pre-Converter Retrofit Project (CRP), ventilation gas baghouse – post-CRP) before exiting the 1,000 foot stack annulus. Flash furnace process gases are conditioned through a series of unit operations en route to the acid plant for sulfur dioxide recovery before exiting the 1,000-foot stack center.

Peirce-Smith Converters

Molten matte, containing approximately 58 percent copper, is transferred to the converters from the flash furnace for further processing. In the converters, air is injected beneath the molten bath through tuyeres to further remove sulfur and other impurities (blowing). The first stage of the converting process (slag blow) yields an iron-silicate slag that is returned to the flash furnace for additional copper recovery. The final stage of the converting process (copper

blow) combusts the remaining sulfur to produce blister copper. (The pre-CRP converter department configuration consists of five Peirce-Smith type converters; the post-CRP configuration replaces the five converters with three larger Peirce-Smith converters.)

Each converter is equipped with primary and secondary hooding systems to ventilate the process. The primary hooding system captures process gases produced during blowing for conditioning through a series of unit operations en route to the acid plant for sulfur dioxide recovery. As with the flash furnace process gas, the resultant acid plant tail gas exits the 1,000-foot stack center. The secondary hooding system captures gases that escape the primary hood during blowing or are emitted when the converter is performing secondary operations such as charging and skimming. Ventilation gases collected by the secondary hooding system report to a baghouse for particulate removal before exiting the 1,000-foot stack annulus. The post-CRP configuration will direct secondary hood gases captured during blowing to the acid plant for sulfur dioxide recovery. Secondary hood gases captured during secondary operations (charging and skimming) will still report to the baghouse. Also a feature of the CRP, a tertiary hooding system will be installed to collect emissions from ladle transfers and/or emissions that may escape the primary and secondary hooding systems to be routed to the 1,000-foot stack.

Anode Furnaces

Blister copper from the converters is transferred via ladle to the anode refining furnaces (3). The anode refining process consists of an oxidizing stage and a reduction stage called "poling." Sulfur remaining in the blister copper is further oxidized to a finer endpoint than is achievable in the converter furnaces. Natural gas is then injected into the molten copper to scavenge oxygen that reacted with the copper during converting and the anode oxidizing cycle rather than creating sulfur dioxide, i.e., reducing the copper oxide back to copper. This produces anode copper (more than 99 percent pure) which is cast into anodes on two casting wheels, each with 16 anode molds. The anodes are then transported to Asarco's facility in Amarillo, Texas where the copper is further refined before being sold as copper wire or copper cake.[52]

In 2012, Asarco installed a ventilation system for the anode furnaces to collect process gases and control particulate matter with a baghouse. The baghouse exhausts through a dedicated stack, however the post-CRP configuration will route that exhaust to the 1,000-foot stack annulus.

In addition to smelting process-related emissions, Pb is also emitted from sources not directly part of the smelting process. These sources are generally located outside of the smelter and originate from fugitive dust containing Pb. These fugitive dust sources are discussed further in the next section.

4.2.1.2 Fugitive Leaded Dust Emissions

In addition to the smelting process, Pb emissions also come from sources outside the smelting building. Pb emissions in the form of lead-bearing fugitive dust result from a variety of sources

[52] *See* Making Copper, American Smelter and Refining Company. (2015 Oct. 20) Retrieved: http://www.asarco.com/about-us/our-locations/asarco-mineral-discovery-center/making-copper/.

such as materials handling, roads, and reverts crushing. The major sources of lead-bearing fugitive dust at Asarco's Hayden Operations include:

- *Slag handling*: Slag is a byproduct of the smelting process. Slag that is high in copper is segregated in a designated section of the slag deposition area for reprocessing through the Hayden Concentrator, whereas slag that contains little copper is deposited in an area less likely to be reprocessed. Pb emissions can occur when molten slag is poured and cooled at the deposition area. The Consent Decree requires slag to be dumped only in a designated area.[53] Emissions are controlled via Asarco's Title V permit, which requires throughput restrictions.

- *Reverts crushing & handling*: Reverts are copper-bearing process materials that are recovered and returned (reverted) to the smelting process. Reverts typically consist of matte, slag and copper ladle shells; copper oxide slag; launder accretions and cleanup of molten material splashes and spills. Some of the revert material is crushed and reintroduced into the smelting process as flash furnace feed; larger reverts are reintroduced into the converters directly. Revert materials are currently managed outside and stored in open piles susceptible to wind loss. Under R18-2-B1301.01, revert material shall be crushed and stored only within an area protected by a wind fence designed to reduce fugitive emissions. Crushed reverts are required to be wetted to maintained at a nominal 10 percent surface moisture content (which is consistent with other PM_{10} rules; see section 4.5.3.3). Uncrushed reverts, however, considering their large mass, are required to be wetted to minimize emissions to the greatest extent practicable. Reverts must also be crushed and crushed reverts must be stored on concrete pads. These requirements are also mandated by the Consent Decree.

- *Concentrate handling*: Concentrate is the primary copper-containing material that comprises the flash furnace feed. The Hayden Smelter receives concentrate by trucks and/or rail from other Asarco operations and outside sources. Concentrate is stored in open piles northwest of the smelter (the concentrate storage area). Concentrate typically has high moisture content, and the storage piles receive supplemental wetting as necessary to mitigate dust emissions, however, potential Pb emissions can result from wind loss and loading/unloading operations in this area. Under R18-2-B1301.01, concentrate shall be stored only within an area protected by a wind fence and wetted to maintain a nominal 10 percent surface moisture content. Concentrate must also be stored on concrete pads. These requirements are also mandated by the Consent Decree.

- *Dewatering of scrubber slurry*: Process gases from the flash furnace and converters are cleaned of particulate before being treated at the sulfuric acid plant. Particulate-laden slurry resulting from the gas cleaning operations, termed "acid plant blowdown", is routed to a cone settling system at the filter plant. The underflow from the cone settlers is collected via a vacuum truck and transported to one of the concrete solar drying pads

[53] *See* Appendix B of Consent Decree, Number 21.

where the material is air-dried. Once the material is relatively dry, it is bagged and sold to other facilities for metals recovery. The potential Pb emissions from this system occur through the material transfers and track-out onto paved roadways where the material dries and becomes susceptible to wind.

Asarco will be installing a new acid plant scrubber blowdown system consisting of a venturi scrubber that reports to a new thickener. Underflow from the thickener will go to a filter press for further liquid removal, with the resulting filter cake being electrically dried and discharged directly into bags. This new thickener project (or wet gas cleaning system/plant) is scheduled to be operational by November 2016. Once operational, acid plant scrubber blowdown solids will not be allowed to dry in open outdoor storage, which shall greatly reduce fugitive Pb emissions. This control is required under R18-2-B1301.01 and the Consent Decree.

- *Roads:* Asarco's Hayden Operations' roadways are primarily paved, with a few unpaved roads that see heavy equipment traffic. The major source of Pb emissions from roadways is track-out and spillage onto paved roadways from material handling and storage operations. Such material can become airborne as a result of windy conditions and/or vehicle traffic. Under R18-2-B1301.01, spillage on paved roads must be cleaned up, at minimum, at the end of every workday. Track-out from the bedding area is mitigated through rumble grates. Paved roads must be cleaned daily. Unpaved roads will be controlled via chemical dust suppressants, verified through a soil stabilization test. Should any area of unpaved road be broken down, chemical dust suppressants must be reapplied.

In all, Asarco's Hayden Operations include: a 29,000 ton/day concentrator and a 693,500 ton/year copper smelter consisting of an oxygen flash furnace, converters, anode casting, oxygen plant, acid plant, and associated facilities. The operations produce over 300 million pounds of copper annually.[54]

4.3 Existing Control Measures

The Hayden smelter currently operates under a Title V permit[55] issued by ADEQ in 2001. The Hayden smelter is also regulated under A.A.C. R18-2-715 (*Standards of Performance for Existing Primary Copper Smelters; Site-Specific Requirements*) and R18-2-715.01 (*Standards of Performance for Existing Primary Copper Smelters-Compliance and Monitoring*),[56] but these

[54] *See* Hayden Operations, American Smelter and Refining Company. (2015 Aug. 17) Retrieved: http://www.asarco.com/about-us/our-locations/hayden-operations/.
[55] *See* Operating Permit No. 1000042, issued by the Arizona Department of Environmental Quality to Asarco on October 9, 2001, available upon request to ADEQ's Records Center.
[56] Sections (F), (G), and (H) of R18-2-715 were approved into the Arizona SIP on September 23, 2014 (79 FR 56655). Rule R18-2-715.01 was approved into the Arizona SIP on November 1, 2004 (69 FR 63321).

rules apply primarily to SO_2 emissions and will be amended to update emission limits and control strategies for the 2010 SO_2 NAAQS.

Currently, process-related Pb emissions are controlled through several devices:

- An R&R Cottrell electrostatic precipitator (ESP) captures PM from the flash furnace, matte tapping/slag skimming operations, and concentrate dryers
- Primary hooding that collects process gases from the converters and routes them through the gas cleaning system and then the acid plant
- Secondary hooding that routes emissions to a baghouse for particulate control
- Anode furnaces baghouse that ventilates and captures PM emissions from the anode furnaces

Figure 5 below depicts Asarco's current operations prior to the CRP.[57]

[57] Diagram courtesy of Asarco, LLC.

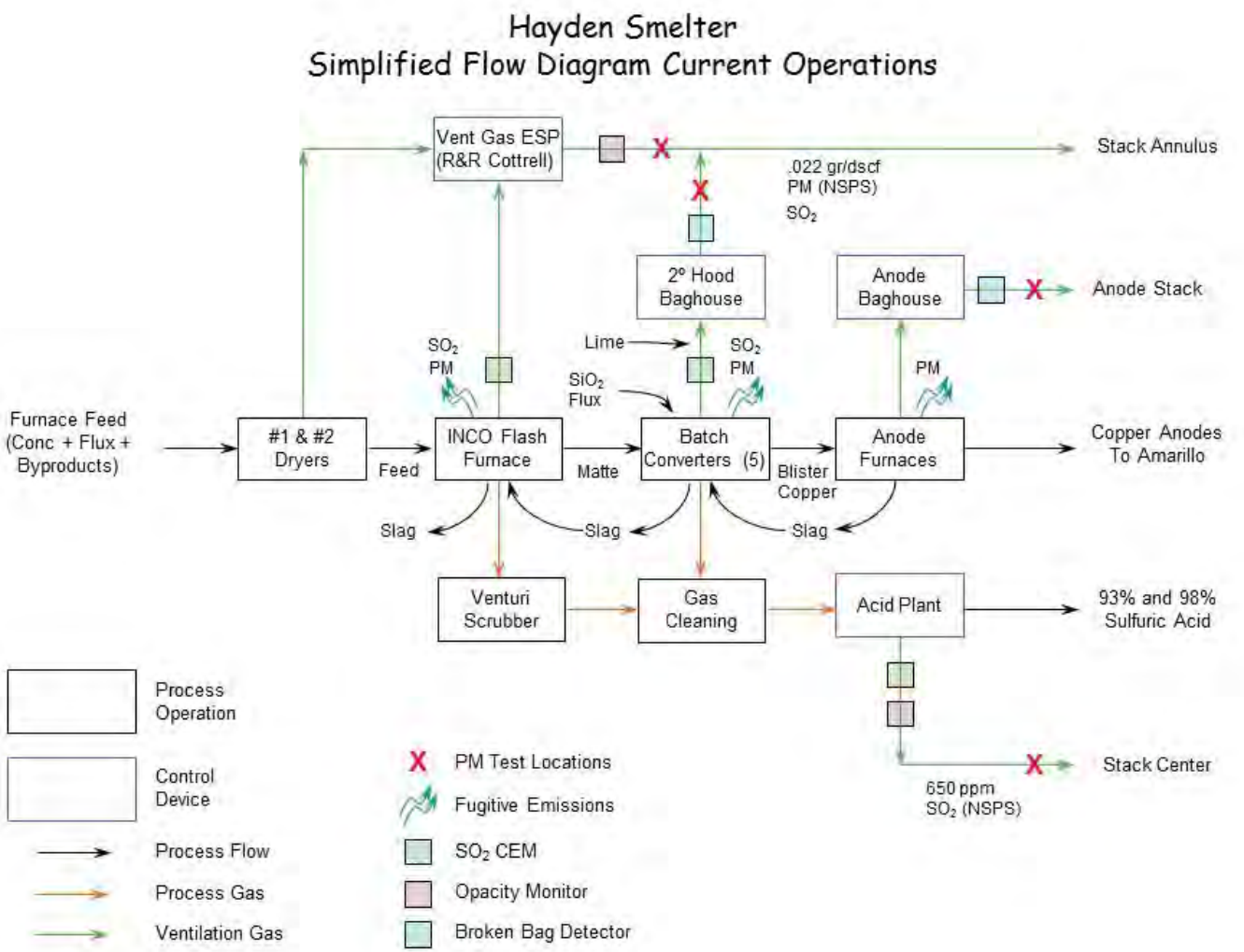


Figure 5: Diagram of Asarco's Current Operations

Asarco's 2001 Title V permit requires these controls, as well as additional requirements for fugitive dust sources as a means to control Pb and PM emissions. Asarco must take reasonable precautions to ensure that PM does not become airborne. ADEQ's rules regulating PM emissions are in the Arizona Administrative Code, Article 6, "Emissions from Existing and New Nonpoint Sources."[58] Such reasonable precautions in Asarco's Title V permit include:

- 20 percent opacity limit
- Chemical dust suppressants on unpaved roads
- Wetting of paved roads
- Using spray bars or wetting agents when crushing or handling materials
- Operating machinery with minimal fall of material
- EPA Method 9 observations for visible emissions

In order to provide for attainment by 2019, ADEQ developed a main stack emission limit and incorporated controls from the Consent Decree into two new rules—R18-2-B1301 and R18-2-B1301.01—applicable to Asarco's Hayden Operations. These control measures are discussed further in section 4.4 below.

4.4 Attainment Control Measures

In November 2015, EPA and Asarco entered a Consent Decree[59] that primarily requires Asarco to implement pollution controls for hazardous air pollutants (including Pb), and also particulate and sulfur dioxide. Because Pb compounds are found in PM emissions from the smelting process and fugitive dust, Asarco will be installing controls that will reduce PM emissions as a surrogate for Pb.

Asarco enlisted Gas Cleaning Technologies, Inc. (GCT) to review pollution control technology around the world in an effort to devise the best strategy to minimize SO_2 emissions at the Hayden Smelter in order to comply with the 2010 SO_2 NAAQS. As a solution, GCT developed the Converter Retrofit Project (CRP). In all, the purpose of the CRP is three-fold: The retrofit will help Asarco comply with the 2010 SO_2 and 2008 Pb NAAQS, the Consent Decree with EPA, and the new Pb-specific rules developed for this SIP. But ultimately, the CRP and the associated improved control technology will mitigate harmful air pollutants in Hayden.

On June 24, 2014, Asarco submitted a permit application for the CRP. Asarco's permit was subsequently revised[60] in December 2015 to incorporate the CRP. ADEQ is currently drafting a

[58] *See*, in particular, A.A.C. R18-2-604, "Open Areas, Dry Washings, or Riverbeds"; R18-2-605, "Roadways and Streets"; R18-2-606, "Material Handling"; and R18-2-607, "Storage Piles."
[59] Access the Consent Decree from EPA's website here: https://www.epa.gov/enforcement/asarco-llc-settlement.
[60] *See* Significant Permit Revision No. 60647 to Operating Permit No. 1000042 issued by the Arizona Department of Environmental Quality to Asarco on December 28, 2015, available upon request to ADEQ's Records Center.

Title V permit renewal for the facility, aiming to be issued by end of 2016. The control measures from the Consent Decree and CRP are considered in the emission limits and requirements in rule R18-2-B1301, which is discussed further in section 4.4.1 below.

In June 2016, Asarco submitted a proposed Fugitive Dust Plan to EPA in compliance with the Consent Decree. The proposed Fugitive Dust Plan details the control strategy for sources of fugitive dust. The Fugitive Dust Plan-related controls are considered in the requirements in rule R18-2-B1301.01, which is discussed further in section 4.4.2 below.

In 2016, Asarco began equipment procurement and construction on the CRP. Overall, the CRP and adjunct projects will entail:

- Replacing the five existing Peirce-Smith converters with three 15x35 foot Peirce-Smith converters. Only one converter will be blowing at a time, with the second converter hot and the third in standby or repair mode. Two new air blast blowers and a new delivery system will also be installed.
- Modifying the converter aisle to fit the new larger converters and the updated primary and secondary hooding systems. Modifications include lowering the aisle grade by six feet, installing shorter crane rail girders, enhancing building column foundations, installing new sheeting to reduce the aisle opening, and modifying the roof above the new converters to create canopy hoods for the new tertiary hooding system.
- Installing a new tertiary hooding system to capture any converter aisle emissions not collected by the primary or secondary hooding systems and route the emissions to the main stack.
- Replacing the existing R&R Cottrell ESP with a new vent gas baghouse.
- Installing a new converter primary gas system to a new gas cleaning plant. New water-cooled primary hoods with a dedicated cooling tower will also be installed. These units would be close-coupled to evaporative cooling spray chambers followed by a common 4-field hot ESP with dust handling systems.

Figure 6 below depicts Asarco's operations with CRP improvements.[61]

[61] Diagram courtesy of Asarco, LLC.

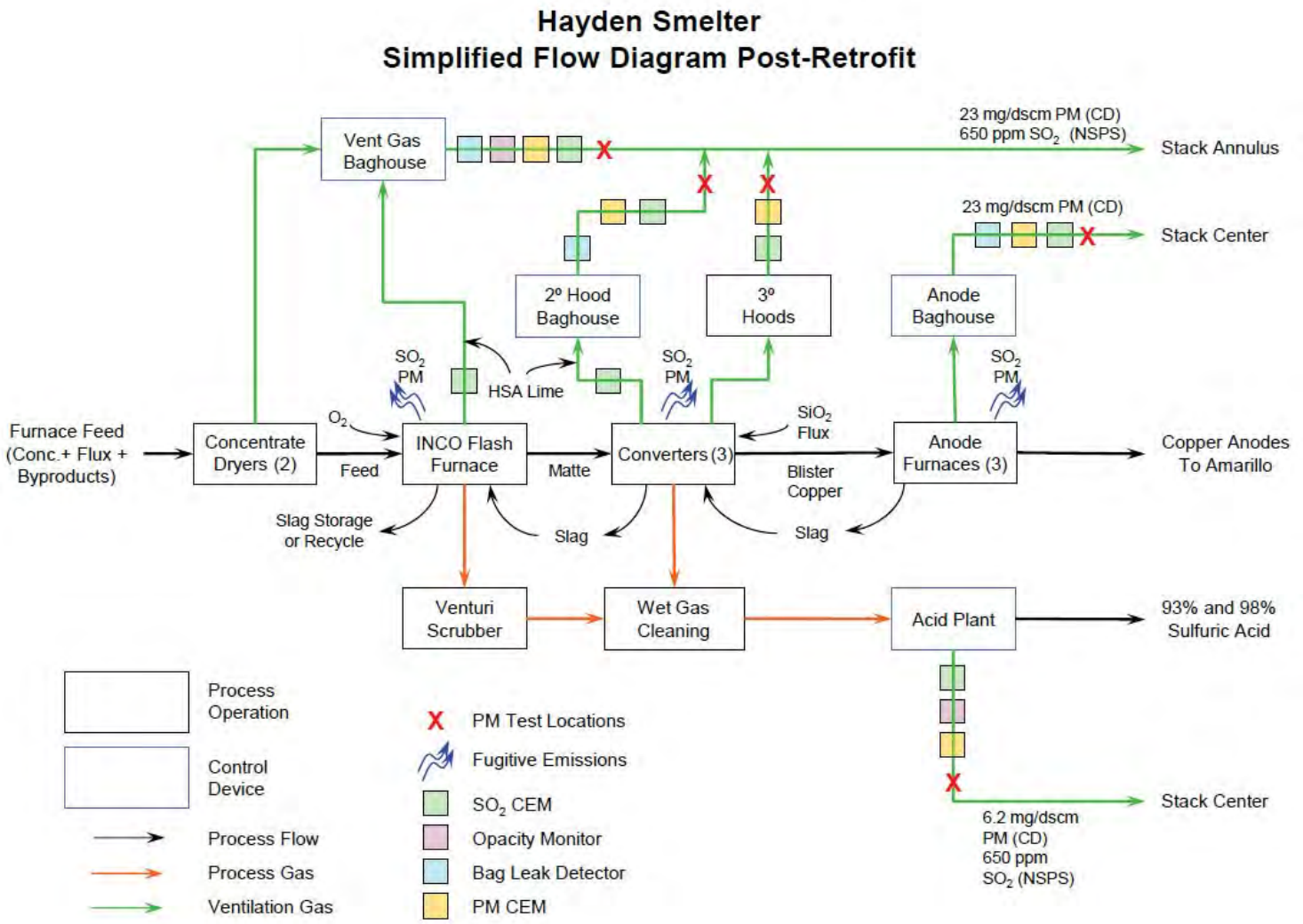


Figure 6: Diagram of Asarco's Operations Post-CRP

Concurrent with the CRP, Asarco will also modify its acid plant scrubber blowdown drying system to improve the processing of solids removed from the ventilation gases before going to the acid plant. Asarco will be drying the blowdown solids only in an enclosed system that is maintained under negative pressure to avoid emitting fugitives. Overall, the new system[62] will entail:

- A venturi scrubber in which slurry goes to a new thickener;
- The underflow from the thickener will go to a filter press for further liquid removal, and the resulting filter cake is sent to electric dryers to provide final drying;
- The exhaust from the dryers will be sent to the converter ID fan inlet duct; and,
- The dried cake will be discharged directly into supersack bags.

The Consent Decree also requires Asarco to develop and comply with a Fugitive Dust Plan to control lead-bearing fugitive dust surrounding the smelter building. Such control measures from the Plan and incorporated in R18-2-B1301.01 include:

- Wind fences to encircle materials storage piles
- Water sprays to wet materials piles
- Chemical dust suppressants for unpaved roads
- Cleaning of paved roads
- Concrete pads for select materials storage areas
- 20 percent opacity limit
- Preventative maintenance procedures for control measures
- Specific inspections for each source
- Speed limit of 15 mph for vehicles
- Ambient air and meteorological monitoring

ADEQ modeled the controls in the Consent Decree described above to demonstrate attainment.[63] No further controls than those taken from the Consent Decree are needed to reach attainment. Therefore, the control measures from the Consent Decree that are necessary to attain the NAAQS are included in this SIP and incorporated in rules R18-2-B1301 and R18-2-B1301.01 to ensure that even after the termination or expiration of the Consent Decree, the Hayden planning area will continue to attain. The rules are described in further detail in Sections 4.4.1 and 4.4.2 below.

[62] By December 2016, this system was installed and operational.
[63] See Chapter 5 for the modeled attainment demonstration.

4.4.1 Overview of R18-2-B1301 Requirements

Rule R18-2-B1301 is designed specifically for the Asarco copper smelter and addresses Pb emissions from the hot smelting of copper process. The rule establishes an emission limit for the main stack and requires Asarco to develop an operations and maintenance plan for each capture system and control device. Asarco must demonstrate compliance with the rule on the earlier of July 1, 2018, or 180 calendar days after completion of the CRP. The following provides a description of rule R18-2-B1301[64] requirements:

Emission limit: The rule specifies a numeric emissions limit for the main stack, which is 0.683 pound of lead per hour. This emission limit is based on facility calculations and Potential to Emit values, of which were modeled to demonstrate attainment. The form of the limit is based on a per hour basis to conform with stack testing requirements. The main stack limit is the maximum allowable emissions that provide adequate protection of the NAAQS.[65]

Operational standards: At all times, including periods of startup, shutdown and malfunction, Asarco must operate its smelter and control equipment in a manner consistent with good air pollution control practices to minimize Pb emissions. Asarco must develop and implement an operations and maintenance plan that sets requirements for each capture system and control device, in addition to inspections, preventative maintenance, and monitoring devices. A similar operations and maintenance plan requirement is mandated by the Consent Decree.[66]The plan, and any plan revisions, must be submitted to ADEQ for review. However, after conducting a study on the smelting-process fugitive emissions, and should any operating parameters need to change based on the study results, the owner or operator must submit such changes to the ADEQ for approval.

During the development of the rule, ADEQ, Asarco, and EPA Region 9 composed a list of operational parameters that must be included in the operations and maintenance plan under the rule to provide assurance of fugitive emissions control, considering there is no numerical fugitive emissions limit in the rule. The "numerical limit" for fugitive emissions is set forth in the attainment modeling demonstration, but given the nature of fugitive emissions, a numerical limit requirement in the rule was deemed unenforceable. Therefore, a more flexible, yet still enforceable, list of operational parameters is required by the rule to ensure fugitives are properly controlled. The fugitive emissions will be further measured and confirmed during the fugitive emissions studies required by Appendix 14 of the rule. Appendix 14 and the rule also require that should any operational parameters need to change to stay consistent with the modeled fugitive emissions after a study, the owner or operator must submit such changes to ADEQ for approval, and then ADEQ must submit such changes to EPA Region 9 as a SIP revision.

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[64] *See* Appendix C for a copy of the rules, including R18-2-B1301.

[65] *See* Chapter 5 for ADEQ's modeling analysis that demonstrates how the emission limit protects and attains the NAAQS.

[66] *See* Section IV, Number 27 in Consent Decree No. CV-15-02206-PHX-DLR between Asarco LLC and the United States Environmental Protection Agency. (3 Nov. 2015) Retrieved: https://www.epa.gov/enforcement/asarco-llc-settlement.

Compliance methods: To demonstrate compliance with the main stack emission limit, Asarco must conduct annual performance testing on the gas streams that are routed to the main stack (acid plant tail gas, vent gas baghouse, anode furnace baghouse, tertiary hooding, secondary hooding baghouse). Asarco must then calculate the combined results from the tests in pounds per hour to see if emissions are at or below the limit. Asarco must use the results from the most recent testing to determine compliance.

During the SIP's development in conjunction with EPA, Asarco, and ADEQ, it was determined that annual stack testing was the only viable option to verify compliance with the main stack limit. While there are Continuous Emissions Monitoring Systems (CEMS) installed to measure SO_2 at the facility (required by the Consent Decree), there are no such monitoring systems available or required to be installed for Pb emissions. While the modeled emission limit for the main stack is the highest out of all the sources (2.99 tpy), this modeled limit is based on Asarco's requested Potential to Emit (PTE) and is the facility's maximum permitted amount to emit. Due to the height of the main stack—1,000 feet—emissions will greatly disperse high into the atmosphere. It is more likely that the fugitive dust emissions are contributing to violations at the ambient air monitors[67], not emissions from the main stack. Therefore, annual stack testing provides the necessary compliance method for the main stack emission limit.

To ensure that fugitive emissions are controlled, as stated earlier, Asarco must maintain and operate the capture and control equipment in accordance to the operations and maintenance plan. Additionally, Asarco must conduct fugitive emissions studies in accordance with Appendix 14 to demonstrate that fugitive emissions are consistent with the modeled emissions in the SIP's attainment demonstration.

The Appendix 14 fugitive emissions study is consistent with requirements for such study in the Consent Decree, but also requires Asarco to analyze the operational parameters to see if they are reliable indicators of control equipment operations and that the control equipment are operating accordingly to minimize fugitive Pb emissions. Asarco must submit a study protocol to ADEQ and EPA for review and approval at least six months before conducting a study (which is also consistent with the Consent Decree requirements). The study must evaluate the smelting process that includes the flash furnace, converters, and anode furnaces. After a study is complete, Asarco must compile a study report for submittal to ADEQ and EPA that includes the resultant emissions, descriptions of operational parameters, and an analysis of whether the results from the study demonstrate that the operational parameters ensure that fugitive emissions are consistent with the modeled fugitive Pb emissions in the attainment demonstration. If such analysis shows that the operational parameters do not ensure consistency with the modeled limits, then Asarco must conduct modeling to ensure that the resultant emissions still provide protection of the Pb NAAQS. Asarco must submit such modeling to ADEQ and EPA for review and approval. If such revised emissions show that attainment is still met, then ADEQ will submit such revised emissions data, modeling demonstration, and operational parameters as a SIP revision to EPA.

[67] *See* the Emissions Inventory TSD in Appendix A for more discussion on ambient air violations and contributing sources.

Recordkeeping and reporting: Rule R18-2-B1301 requires recordkeeping for the operations and maintenance plan, emissions limit compliance calculations, control device maintenance activities, performance tests results, Appendix 14 fugitive emissions study protocols and results, and occurrence of startup and shutdown events.

Asarco must provide semiannual reports on any construction of control equipment; notification of the start of such construction and initial startup; notification of any emission limit exceedance; quarterly reports of deviations of operations; and performance testing results.

4.4.2 Overview of R18-2-B1301.01 Requirements

Rule R18-2-B1301.01[68] was developed to control lead-bearing fugitive dust emissions surrounding the Asarco copper smelter. Asarco must comply with the rule no later than December 1, 2018, when the last of the fugitive dust controls will be installed. The following provides a description of rule R18-2-B1301.01 requirements, which are closely tied to the Consent Decree and will be approved by EPA through that process.

Operational standards: At all times, Asarco must operate and maintain Pb fugitive dust sources and related control equipment in a manner consistent with good air pollution control practices to minimize Pb emissions and in accordance with a fugitive dust plan that is reviewed by ADEQ. The fugitive dust plan must addresses major sources of leaded fugitive dust, including paved and unpaved roads, concentrate piles, uncrushed and crushed reverts, the acid plant scrubber blowdown solids, and bedding area. The plan must detail the controls used to minimize emissions, include design plans of controls, any necessary modifications to certain controls, sample inspection sheets, preventative maintenance procedures, and physical inspections. The fugitive dust plan is also required by the Consent Decree.[69]

Because R18-2-B1301.01 requires a dust plan that covers sources already included in the Consent Decree dust plan, Asarco will be able to develop one plan to comply with both R18-2-B1301.01 and the Consent Decree. The only difference is that the terms of the R18-2-B1301.01 dust plan will continue to exist even after the Consent Decree is terminated or expires. ADEQ ensured that all the dust plan requirements necessary to achieve attainment were included in R18-2-B1301.01 so that they continue to be in effect after the Consent Decree's termination or expiration. What's more, the housekeeping and performance requirements for sources covered under the R18-2-B1301.01 dust plan are independently required in the rule, regardless of a dust plan, to provide further protection of the NAAQS.

Physical inspection requirements: The rule sets specific inspection frequencies, for example: Daily inspections of water sprays, material storage piles, conveyor systems, rumble grates, paved roads, unpaved roads, and material handling areas; weekly inspections of wind fences; and bi-weekly inspections of the acid plant scrubber blowdown drying system building. As part

[68] *See* Appendix C for a copy of the rules, including R18-2-B1301.01.

[69] *See* Appendix B of Consent Decree No. CV-15-02206-PHX-DLR between Asarco LLC and the United States Environmental Protection Agency. (3 Nov. 2015) Retrieved: https://www.epa.gov/enforcement/asarco-llc-settlement.

of the fugitive dust plan, Asarco must include sample inspection sheets for each required inspected source as well as keep such inspection sheets as records. The frequency of these inspections match those in the Consent Decree.[70]

Ambient air monitoring: Ambient Pb concentrations must be monitored in four locations already established (and required by the Consent Decree)[71]: ST-14, ST-23, ST-26, and ST-18. Samples of Pb must be collected continuously (every six days). The samples must be retained for at least three years and submitted to a certified laboratory for analysis. Asarco is required to keep records of ambient air concentrations of Pb calculated for the applicable rolling average for each monitor.

In addition to ambient air monitors, Asarco must operate a meteorological station at a location approved by ADEQ to continuously record wind speed and direction. This station is used to collect such data for use in determining high wind events for Pb dust sources. The Consent Decree also requires Asarco to operate a meteorological station at the Camera Hill location for use in determining high wind events.[72]

Corrective action requirements: There are essentially two different corrective action provisions in R18-2-B1301.01. First, when Asarco becomes aware that any provision under the fugitive dust plan is not being met, Asarco must take prompt corrective action to return to compliance, whether that be returning water sprayers to their optimal performance, repairing damaged conveyor hoodings, cleaning any material trackout, or revising the fugitive dust plan itself. This corrective action provision is similar to one provided in the Consent Decree.[73] Asarco is required by the rule to maintain inspection checklists that detail any corrective actions taken, and to also report to ADEQ any correction actions.

The second corrective action provision in R18-2-B1301.01 is also in the Consent Decree,[74] and requires Asarco to take corrective actions if opacity from any sources covered by the rule exceeds 15 percent, as determined by an EPA Reference Method 9 reading. The corrective action must be taken within 30 minutes of discovery of the visible emissions. Asarco must conduct an analysis to determine what caused the excess visible emissions and implement a control strategy that will avoid future exceedances of the opacity limit. Asarco may submit a request to ADEQ to modify the fugitive dust plan accordingly.

Opacity limit: Opacity from sources covered by the rule cannot exceed 20 percent, as determined by an EPA Reference Method 9 reading (except for unpaved roads, which opacity shall be determined by an EPA-approved soil stabilization test method set forth in Appendix 15 of the rule). A Method 9-certified observer must conduct weekly visible emissions survey of all sources. A similar requirement is in the Consent Decree.[75]

[70] *Id.*, at number 28.
[71] *Id*, at Appendix B, Fugitive Dust Plan, number 31.
[72] *Id*, at Appendix B, Fugitive Dust Plan, number 32.
[73] *Id.*, at number 24.
[74] *Id.*, at number 24.
[75] *Id.*, at number 29.

Housekeeping requirements: While housekeeping requirements must be addressed in the fugitive dust plan, Asarco must comply with such housekeeping requirements regardless of the plan. The rule details the modes of control, frequency, and efficiencies. The requirements in the rule mirror those in the Consent Decree.[76] Examples of controls for materials piles include concrete pads, wind fences, and water sprays. Unpaved roads must be controlled via chemical dust suppressants and paved roads must be routinely cleaned either by sweeper, vacuum, or wet broom. See R18-2-B1301.01(D) in Appendix C of this SIP for all housekeeping requirements for all sources of Pb dust.

Compliance method: Because fugitive dust emissions are historically difficult to measure, compliance with provisions in R18-2-B1301.01 is demonstrated through the implementation of all requirements in the fugitive dust plan and implementation of housekeeping requirements in R18-2-B1301.01(D).[77]

Contingency requirements: The contingency measure for the Hayden Pb NAA is increasing the frequency of paved road cleaning to twice per day rather than once per day. To ensure that the contingency is implemented without any significant action by EPA and/or the State, ADEQ incorporated the requirements in the Pb dust rule. See section 4.7 of this chapter for more discussion on the contingency measure and how it meets CAA requirements.

Recordkeeping and reporting requirements: Rule R18-2-B1301.01 requires general recordkeeping and reporting. Such records include those required by the fugitive dust plan, inspection sheets, visible emissions survey results, housekeeping occurrences (i.e. chemical dust suppressant applications, intensity of water sprayers, location of washdowns, etc.), monitoring samples and ambient air concentration calculations, meteorological data, and any instances when operations deviated from the fugitive dust plan. Such recordkeeping requirements are consistent with those in the Consent Decree.

On a quarterly basis, Asarco is required to report to ADEQ all instances where fugitive dust emissions exceeded 15 percent opacity, all dates of high wind events, all recounts of corrective actions taken and their successes, results of ambient air concentration calculations and meteorological data, a summary of when recordkeeping systems were not operating, and progress reports on any new construction of control measures for fugitive dust sources.

4.4.3 Enforceability

The following sections address enforceability requirements[78] for both rules applicable to Asarco's Hayden Operations.

[76] *Id.,* at numbers 3-4, 6, 7, 10, 14, and 15.
[77] This compliance method is consistent with federal requirements for National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for primary copper smelters. See 40 C.F.R. Part 63, Subpart QQQ.
[78] *See* Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency, memorandum issued by J. Craig Potter, Thomas L. Adams Jr., and Francis S. Blake, U.S. Environmental Protection Agency. (23 Sept. 1987).

4.4.3.1 Authority

ADEQ has broad statutory authority to adopt and implement both rules under A.R.S. § 49-104 and § 49-106. Additionally, the Air Quality Division of ADEQ possesses statutory authority under A.R.S. § 49-425 to adopt rules that are necessary to reduce air pollution. While the Hayden Pb NAA includes townships in both Gila and Pinal Counties, under A.R.S. § 49-402, ADEQ has jurisdiction over Asarco's Hayden Operations.

Additionally, ADEQ has authority to carry out the necessary investigations, inspections, and enforcement of any rules and permit provisions. Such authority includes those defining violations and processes for violation consequences such as A.R.S. §§ 49-460 – 464.

4.4.3.2 Applicability

Rules R18-2-B1301 and R18-2-B1301.01 apply to the owner or operator of the primary copper smelter in Hayden, AZ. At the time of this SIP, the smelter is owned and operated by Asarco.

4.4.3.3 Compliance Date and Implementation Schedule

Nonattainment plans should contain legally enforceable compliance schedule by which all sources must be in compliance with any applicable requirement of the plan.[79] In general, rule R18-2-B1301 is effective on the earlier of July 1, 2018 or 180 days after the completion of all CRP improvements. Rule R18-2-B1301.01 is effective no later than December 1, 2018, when the last of the fugitive dust controls will be implemented. Asarco's compliance schedule for the rules and attainment is greatly influenced by deadlines set forth in the Consent Decree. Furthermore, the compliance schedule is very aggressive, given the attainment year of 2019. The compliance schedule of controls and expected emissions reductions for the Hayden Pb NAA is included in the RFP discussion in section 4.6.

4.4.3.4 Standard of Conduct

The provisions of R18-2-B1301 and R18-2-B1301.01 are sufficiently clear so the regulated entity is on notice of all requirements. The 2008 Pb NAAQS became effective on January 12, 2009.[80] The Hayden Pb planning area's nonattainment designation became effective on October 3, 2014.[81] The effectiveness of the new standard and designation of nonattainment has provided Asarco sufficient time to determine the appropriate control technology to ensure attainment of the 2008 Pb NAAQS. Furthermore, the appropriate control technology was further developed and dictated by a Consent Decree between EPA and Asarco, which became effective on December 30, 2015.

4.4.3.5 Equivalency Provisions and Discretionary Emission Limits

Both rules do not contain provisions for alternative practices or emission limits.

[79] *See* 40 C.F.R. § 51.260.
[80] *See* 73 FR 66964, November 12, 2008.
[81] *See* 79 FR 52205, September 3, 2014.

4.4.3.6 Recordkeeping and Reporting

R18-2-B1301 requires Asarco to maintain records for at least five years and keep them on-site for at least two years.[82] Asarco must maintain records of its operations and maintenance plans, in addition to all records of maintenance activities and inspections, quality assurance and quality control activities, performance tests, compliance calculations, and any startup, shutdown, and malfunction periods. Furthermore, Asarco must report to ADEQ the beginning of construction on new equipment necessary to comply with the main stack emission limit. Asarco must also send semiannual progress reports on such construction and notify ADEQ when such equipment begins operation. Additionally, within 60 days of completing a performance test on smelter equipment, Asarco must report results to ADEQ.

R18-2-B1301.01 also requires Asarco to maintain records for at least five years and keep them on-site for at least two years. Such records include fugitive dust plans, physical inspection checklists, logs of preventative maintenance and housekeeping conducted, ambient air monitoring samples and calculations, opacity readings, corrective actions, etc. Then, on a quarterly basis, Asarco must submit reports on observed opacity readings that exceeded the opacity limit, any corrective actions taken, and progress summaries on any construction of new equipment aimed to control leaded fugitive dust emissions.

4.4.3.7 Test Methods

The Hayden primary copper smelter must comply with the main stack emission limit set forth in R18-2-B1301. Main stack emissions cannot exceed 0.683 pound of Pb per hour. A summary of the attainment modeling demonstration supporting this emissions limit is in Chapter 5 with full documentation in Appendix B.

While there are no emission limits in R18-2-B1301.01 for leaded fugitive dust sources, there is a 20 percent opacity limit required for all sources. Additionally, compliance with the fugitive dust plan will provide protection of the NAAQS.

The rules contain other provisions regarding compliance and testing requirements. These provisions include requirements for monitoring and compliance demonstrations.

Monitoring requirements

Requirements for ambient air and meteorological monitoring are in R18-2-B1301.01. Similar to Consent Decree requirements, Asarco is required to monitor Pb concentrations with four monitors. Samples must be collected continuously (24-hour filters placed and collected every six calendar days). The samples must be submitted to a laboratory no later than 18 days from the sample's removal from the monitor. Asarco then must calculate the applicable rolling average ambient levels of Pb.

Additionally, Asarco must monitor wind speed and direction with a meteorological station installed and in a location approved by ADEQ. Asarco must monitor for high wind events in case

[82] This requirement is consistent with the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for the primary copper smelter source category, 40 C.F.R. § 63.1440 (Subpart QQQ).

additional controls or curtailment actions need to be taken for fugitive dust sources covered under R18-2-B1301.01.

Operations and Maintenance (O&M) Plan and Fugitive Dust Plan

Per R18-2-B1301, Asarco is required to develop an O&M plan for the capture systems and control devices used to control or ventilate emissions from the flash furnace, converters, and anode furnaces. This plan will be submitted no later than May 1, 2018. Any revisions to the O&M plan shall be submitted to ADEQ for review, however, revisions can be implemented upon submittal in order to not restrict necessary operations. Changes to certain parameters deemed critical to successful operation of the capture system and control device require prior approval from ADEQ to provide assurance of fugitive emission control.

Asarco is also required to develop and submit to ADEQ (under the SIP) and EPA (under the Consent Decree) a fugitive dust plan for review. The plan will outline control methods, preventative maintenance procedures, and physical inspections requirements for fugitive Pb dust sources. The initial fugitive dust plan must be submitted no later than May 1, 2017.[83] Any revisions of the fugitive dust plan must be submitted to ADEQ for review.

Compliance Demonstration

Main Stack Emission Limit

R18-2-B1301 sets a Pb emission limit (in pounds per hour) for the smelter's main stack. In order to demonstrate compliance with this limit, the rule requires Asarco to conduct annual performance tests on the equipment that is routed to the main stack (anode furnace baghouse, acid plant, secondary baghouse, tertiary hooding system, and vent gas baghouse). The performance tests must be conducted in accordance with EPA Method 29. Within EPA Method 29 are mathematical formulas used to determine the amount of Pb within particulate matter samples collected from each piece of equipment. From these performance tests, R18-2-B1301 requires Asarco to calculate the combined amount of Pb emitted from the emission points in pounds per hour to determine compliance with the limit. ADEQ modeled this emission limit to demonstrate that it is protective of the Pb NAAQS (see chapter 5 and Appendix B).

Smelter-Process Fugitives

Compliance with the approved smelter process fugitive modeling demonstration is shown by meeting the capture and control device operating parameters set forth in the approved capture and control system operations and maintenance plans. Any failure to comply with a plan requirement must be recorded and corrected and reported to ADEQ. Additionally, Asarco will conduct fugitive studies in accordance with Appendix 14 of the rule to demonstrate that smelter process fugitives are being controlled in accordance with the approved modeling demonstration. If a fugitive study shows emissions are higher than those used in the approved

[83] Please note that Asarco submitted its initial proposed fugitive dust plan to EPA and ADEQ in June 2016 to meet Consent Decree deadlines. As part of this SIP's development, ADEQ reviewed Asarco's proposed plan to ensure consistency among requirements in R18-2-B1301.01.

modeling demonstration, Asarco must demonstrate that those higher emissions still support attainment or implement additional controls or both. The revised approach must be submitted to ADEQ, and if approved, ADEQ must submit such changes to EPA Region 9 as a SIP revision.

Leaded Fugitive Dust Compliance

Fugitive dust sources are historically difficult to quantify and demonstrating compliance usually requires adherence to a fugitive dust plan. This is also consistent with National Emission Standards for Hazardous Air Pollutants (NESHAPs) for the primary copper smelter source category.[84] R18-2-B1301.01 thus requires Asarco to demonstrate compliance by implementing all control measures specified in the most current fugitive dust plan. To provide extra protection, the control measures required by the dust plan are also independently required in the rule. To monitor compliance, the rule requires Asarco to report any observed opacity readings that exceed 15 percent, as well as any corrective actions taken. Asarco must also maintain records of fugitive dust plan revisions, housekeeping of dust sources, preventative maintenance and inspection procedures, as well as opacity readings.

Considering there are no emission limits for leaded fugitive dust, R18-2-B1301.01 provides extra security and protection of the NAAQS by requiring a 20 percent opacity limit. Furthermore, if any visible emissions appear to exceed 15 percent as evident through a Method 9 reading, Asarco must take prompt action controlling the emissions. Additionally, if any provisions of the fugitive dust plan are not being met, Asarco must make corrective action that brings the area back into compliance. These corrective actions include, but are not limited to, modifications to water sprayers, material trackout cleaning, and reapplying chemical dust suppressants.

4.4.3.8 Exemptions

There are no exemptions from rule requirements for the Hayden primary copper smelter.

4.4.4 Adequate Resources for Plan

Nonattainment plans must also include a description of the resources available to the State and local agencies at the date of submission of the plan and of any additional resources needed to carry out the plan during the five-year period following its submission. The description must include projections of the extent to which resources will be acquired.[85]

As the implementing agency, the cost to ADEQ of rulemaking and enforcement of the rules and Asarco's new Title V permit will be minimal. ADEQ's current full-time staff coordinated the development of the rules with Asarco and EPA; no additional resources were needed. ADEQ expects that its current permits and compliance staff is adequate to implement and enforce the new rules. Therefore, resources are already acquired and no resource-related projections are applicable.

[84] *See* 40 C.F.R. § 63.1453(f).
[85] *See* C.A.A. § 110(a)(2)(E)(i); 40 CFR § 51.280.

Overall, ADEQ expects that the current resources available to the agency will be adequate to carry out this plan for the Hayden Pb NAA through the next five years.

4.5 RACM/RACT Analysis

In conducting its RACM/RACT analysis, ADEQ referred to the following guidance documents issued by EPA:

- *Implementation of the 2008 Lead National Ambient Air Quality Standards Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions*, by Doug MacIntyre for U.S. EPA, March 2012
- Appendix 1 – Available Fugitive Lead-Bearing Dust Control, State Implementation Plans for Lead Nonattainment Areas; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 58 FR 67748, Dec. 22, 1993.

There are three factors that should be considered in determining whether a control measure is RACM, as established by EPA:[86]

- Economic feasibility
- Cost effectiveness
- Extent of adoption by other states

In its 2008 Pb NAAQS RACM guidance, EPA explicitly defined potential RACM, including RACT, for specific major point source categories of Pb emissions including secondary lead smelters, lead acid battery manufacturing, iron/still mills, and iron/steel foundries. Because there are only three primary copper smelters in the country (two of which are in Arizona), and the Asarco copper smelter is the only facility currently operating in a Pb nonattainment area, RACM was not explicitly defined for the primary copper smelter source category in EPA's guidance. EPA suggests comparing RACM for a primary copper smelter to a similar source category in the guidance. Of the three source categories, ADEQ found that secondary lead smelters had the most similar processes and emissions points to those of primary copper smelters, and thus compared the control measures for Asarco's Hayden Operations to RACM for the secondary lead smelter category.

The guidance also states that a particular control may constitute RACM if it was or will be adopted to comply with other federal regulations such as maximum available control technology (MACT) requirements under National Emissions Standards for Hazardous Air Pollutants (NEHSAPs). Since control measures in the Consent Decree are designed to bring the smelter into compliance with NESHAP requirements of 40 C.F.R. Part 63, Subpart QQQ for

[86] *See* Implementation of the 2008 Lead National Ambient Air Quality Standards Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions, U.S. EPA. (March 2012).

primary copper smelters, these controls are required to meet prescribed MACT standards, and therefore also meet RACM requirements.

RACT applies to existing sources in an area emitting 0.5 tons per year or more, including stack emissions, process-related fugitive emissions, and lead-bearing fugitive dust.[87] The only source that meets this description is Asarco's Hayden Operations. Therefore, ADEQ focused its RACM/RACT analysis on the new rules applicable to Asarco.

These new rules, R18-2-B1301 and R18-2-B1301.01, primarily incorporate control technology and measures Asarco will already be doing under the Consent Decree that also demonstrate attainment of the 2008 Pb NAAQS. This is discussed in further detail in the following section.

4.5.1 Discussion on Consent Decree Requirements

As mentioned before, the control measures incorporated into rules R18-2-B1301 and R18-2-B1301.01 are already federally required by the Consent Decree or under NESHAPs. Traditionally, RACM/RACT analyses are conducted prior to modeling and rule development. However, ADEQ wanted to maximize the use of the controls being implemented under the Consent Decree for meeting SIP requirements. In December 2015, the Consent Decree was finalized, and ADEQ began modeling efforts to see if controls from the Consent Decree that regulated Pb emissions would attain the 2008 Pb NAAQS. ADEQ took inventory of the Pb emissions in the NAA (see Appendix A), and then modeled the prescribed controls from the Consent Decree on those sources. The model demonstrated attainment (see Appendix B) with these Consent Decree controls. Soon after, the controls were turned into two new rules applicable to the Hayden copper smelter.[88]

Furthermore, implementation of additional controls either from or in addition to the Consent Decree is not needed considering the area models attainment. In some instances, implementing additional controls can expedite attainment before the attainment year. However, for the Hayden Pb NAA, control implementation relies heavily on the schedule set forth in the Consent Decree, which is:

- Permanently cease operation of the five existing converters and complete installation of two of three new, high-efficiency converters no later than May 1, 2018
- Replace the existing R&R Cottrell ESP with a new vent gas baghouse for the dryers and flash furnace no later than May 1, 2018
- Complete the CRP[89] no later than December 1, 2018
- Start the first study on fugitives from the smelting process no later than six months after the completion of the CRP (at maximum, by June 1, 2019). A study protocol must be

[87] *See* 73 FR 66964, 67037 (12 Nov. 2008).
[88] Refer to section 4.4 of this chapter for more detailed information on the controls inputted in the rules from the Consent Decree.
[89] See Section 4.4 for a description of the CRP.

submitted six months prior to the study's commencement (at maximum, by December 1, 2018).

- Submit a Fugitive Dust Plan within 180 days of the Consent Decree's effective date (at maximum, by May 2016)
- Implement Fugitive Dust Plan controls roughly between 120-180 days of EPA's approval of Plan

Because these Consent Decree-related controls are tied to attainment, Hayden Pb NAA's schedule of control implementation is based on the schedule required by the Consent Decree. Given that the attainment year is 2019, the schedule is already expeditious, considering that the CRP is required to be finished by the end of 2018 and most of the fugitive dust controls are being installed in 2017-2018. Therefore, it is not reasonable to implement further controls considering the requirements in the rules are all that's needed to reach attainment and are required to be implemented according to the expeditious schedule in the Consent Decree.

A RACM/RACT analysis traditionally also includes an analysis on the cost effectiveness of the controls. Because the control measures are already independently required under the Consent Decree or NESHAPs, ADEQ did not conduct a traditional cost analysis.[90] For context, Asarco will be spending roughly $150 million to install the new control technology under the Consent Decree. The cost of the Converter Retrofit Project alone is estimated to be about $110 million.

The following sections present ADEQ's RACM/RACT analysis for each rule.

4.5.2 Rule R18-2-B1301 Demonstration of RACM/RACT

In formulating its RACM/RACT demonstration for R18-2-B1301[91], ADEQ referenced EPA's RACM guidance for the 2008 Pb NAAQS, in particular, the RACM/RACT detailed for the secondary lead smelter source category. In the guidance, NESHAP requirements are referred to as meeting RACM, considering requirements under NESHAPs are MACT-level of control. Therefore, ADEQ has compared the rule to NESHAP requirements for secondary lead smelters to follow EPA guidance. But because the Hayden smelter is actually a primary copper smelter, and thus must comply with NESHAPs for the primary copper smelting source category, ADEQ also compared the rule to NESHAPs for primary copper smelters.

[90] In developing its RACM/RACT analysis, ADEQ referred to the South Coast Air Quality Management District's (SCAQMD) analysis of its rule 1420.1, which controls Pb emissions from lead-acid battery recycling facilities. Because a lead-acid battery recycling facility applicable to 1420.1 (Exide Technologies) was also under a similar settlement agreement as Asarco, SCAQMD also excluded the controls required by the settlement from its RACM cost analysis. EPA approved SCAQMD's rule and RACM analysis in 2014 (79 FR 13875). For SCAQMD's socioeconomic report on rule 1420.1, see *Draft Socioeconomic Assessment for Proposed Rule 1420.1—Emissions Standard for Lead from Large Lead-Acid Battery Recycling Facilities,* South Coast Air Quality Management District, August 2010, available here: http://www.aqmd.gov/home/library/clean-air-plans/lead-state-implementation-plan.

[91] *See* Appendix C for a copy of the rules, including R18-2-B1301.

4.5.2.1 Comparison to Primary Copper Smelting NESHAPs

EPA promulgated emission standards and compliance requirements for primary copper smelters under NESHAPs.[92] Primary copper smelters that emit any single HAP at the rate of 10 tons or more per year or any combination of HAPs at a rate of 25 tons or more per year must comply with NESHAPs for major sources. The NESHAP requirements represent MACT under CAA Section 112. MACT requirements apply nationwide, regardless of whether an area attains the Pb NAAQS, so EPA expects MACT requirements are also needed in order to fulfill RACM/RACT requirements.[93]

As stated previously, Asarco, the owner and operator of the primary copper smelter in the Hayden NAA, entered a Consent Decree with EPA over NESHAP requirements under 40 CFR Part 63, Subpart QQQ. Therefore, in its RACM/RACT analysis, ADEQ compared the rules to NESHAP requirements for primary copper smelters.

A summary of NESHAP-related MACT requirements for primary copper smelters and how they are addressed in rule R18-2-B1301 is provided below.

During all times when copper matte or slag is tapped or skimmed from a smelting furnace, a capture system must collect off-gases released from the tapping/skimming port in use. The design and placement of this capture system must be such that the tapping port opening, launder, and receiving vessel (e.g., ladle, slag pot) are positioned within the confines or influence of the capture system's ventilation draft during those times when the copper matte or slag is flowing from the tapping port opening.

A ventilation system for the flash furnace's tapping port is required, and required to be positioned as described under NESHAPs, by the Consent Decree. Such ventilation system will be addressed in Asarco's O&M plan, which is required under R18-2-B1301. Under the rule, the O&M plan must include air flows and other parameters to ensure the capture system is operating properly to control emissions. A fugitive emissions study conducted in accordance with Appendix 14 will verify such operational parameters to ensure fugitive Pb emissions from the smelting process are consistent with those modeled in the attainment demonstration.

MACT requires a capture system for each existing copper converter. For Pierce-Smith converters (as is the case for the Hayden smelter), a capture system design must include a primary hood and additional hooding (e.g. secondary hoods) to properly control emissions.

As part of the Consent Decree, Asarco will be installing updated primary and secondary hooding over the converter aisle, in addition to new tertiary hooding, which will be addressed in the O&M plan required by R18-2-B1301.

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[92] *See* 67 FR 40478, June 12, 2002; codified at 40 C.F.R. § 63.1440.

[93] *See* Technical Support Document for EPA's Proposed Rulemaking for the California State Implementation Plan, South Coast Air Quality Management District, Rule 1420.1, Emission Standards for Lead from Large Lead-Acid Battery Recycling Facilities, prepared by Adrianne Borgia and reviewed by Andrew Steckel, U.S. EPA. (June 2012) Retrieved: http://www.regulations.gov/.

MACT requires that all copper smelting processes and related control equipment must be operated in a manner consistent with good air pollution control practices for minimizing emissions. All processes and controls must be operated in accordance with an operation and maintenance plan that addresses preventative maintenance, capture system inspections, and operating limits.

The smelter rule requires that Asarco operates smelting processes and control equipment in a manner consistent with good air pollution practices. Asarco must also submit an O&M plan that must be reviewed by ADEQ. The plan must address monitoring devices for control devices, operational limits, preventative maintenance, and inspections. The rule prescribes the minimum operational parameters that will be used as representative and reliable indicators of the capture system or control device operation, which will ensure the adequate control of smelting-process fugitive emissions. Such operational parameters are consistent with NESHAPs, and include volumetric flow rates, damper position settings, and blowing hours.

MACT requires an initial performance test to demonstrate compliance with particulate matter emission and opacity limits. Performance tests can be conducted using a variety of EPA reference methods, including Reference Method 29. Thereafter, continuous compliance is demonstrated through annual performance tests.

To comply with the main stack emission limit in R18-2-B1301, Asarco must conduct initial performance tests on five gas streams routed to the main stack no later than 180 days after the completion of all CRP-related improvements. Thereafter, performance tests must occur annually. The rule mandates that all performance tests must be conducted in accordance with Method 29, *Determination of Metals Emissions from Stationary Sources*.

MACT requires appropriate monitoring devices for capture systems and control devices used to measure accurate parameters of operating limits and to demonstrate continuous compliance with operating limits.

Rule R18-2-B1301 requires monitoring devices to be addressed in the O&M plan for control devices and capture systems, in addition to setting operational limits for each system or device.

MACT requires semiannual compliance reports. MACT also requires that records must be maintained at least for five years and kept on site for at least two years.

R18-2-B1301 requires Asarco to submit semiannual progress reports of construction for any CRP-related improvement. Asarco must also submit reports of the performance testing conducted to comply with the main stack emission limit, in addition to calculations for emission limit compliance. The rule requires records to be kept onsite for two years and retained for at least five.

Based on the above comparison to control measures prescribed by NESHAPs for primary copper smelters, the control measures required by R18-2-B1301 applicable to Asarco's Hayden Operations meets RACM/RACT requirements.

4.5.2.2 Comparison to Secondary Lead Smelting NESHAPs and EPA Guidance

A summary of the minimum elements required for secondary lead smelters by EPA guidance and NESHAPs, and how they are fulfilled by requirements in R18-2-B1301 is provided below. It is important to note that these rules mirror control measures that are independently required by the Consent Decree.

MACT for an existing source must maintain 1.0 milligrams of lead per dry standard cubic meter in any process vent gas and 0.20 milligrams of lead per dry cubic meter from a secondary lead smelting facility on a rolling 12-month average basis.

While NESHAPs for *secondary lead smelters* requires such limit, NESHAPs for *primary copper smelters* does not. Therefore, R18-2-B1301 requires an emission limit for the main stack that is protective of the 2008 Pb NAAQS and demonstrates attainment for the area (see the Modeling TSD in Appendix B).

Initial performance tests and annual compliance tests are required unless a continuous emissions monitoring system (CEMS) is installed. Method 29 is an available test method.

R18-2-B1301.01 requires initial performance tests on the emission points that are routed to the main stack no later than 180 days after completion of the CRP. Thereafter, annual tests are required. Tests must be conducted in accordance with Method 29.

Fabric filters controlling uncontrolled lead process emissions from stacks:[94]

EPA gave fabric filters, or baghouses, a RACM rating of 3 for secondary lead smelters.[95] Fabric filters are commonly used on secondary lead smelters, which suggests they are one of the most economically feasible control technologies. Available data shows fabric filters are also a cost-effective way to control Pb emissions, costing on average roughly $400/ton.

Rule R18-2-B1301 requires Asarco to maintain control equipment to minimize Pb emissions in accordance with an O&M plan. Such equipment will include a vent gas baghouse to capture emissions from the concentrate dryers and flash furnace, a baghouse for the secondary hooding over the converters, and a baghouse for the anode furnaces.

Partial and total enclosures to control fugitive process lead emissions:

EPA gave partial enclosure hoods for smelter process units a RACM rating of 3. All secondary lead smelters use partial (or total) enclosure hooding systems to control fugitive emissions from the smelting process. The enclosure hooding systems ventilate emissions to control devices such as baghouses.

[94] For more information on these RACM and EPA's analysis, see *Implementation of the 2008 Lead National Ambient Air Quality Standards Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions* issued in March 2012 by U.S. EPA, more specifically at section 4.0 on page 16.

[95] In EPA's RACM guidance for the 2008 Pb NAAQS, certain RACM were rated based on EPA's criteria and given a rating of 1, 2, or 3, with a score of 3 demonstrating a high likelihood of the control measure constituting RACM.

Under R18-2-B1301, Asarco must operate control devices that minimize Pb emissions in accordance with an O&M plan. Such control equipment will include CRP-related improvements to the primary and secondary hooding systems over each converter, as well as a new tertiary hooding system over the converter aisle. Emissions from the secondary hooding are ventilated to a baghouse when the converter is not blowing and routed to the acid plant when the converter is blowing. The tertiary hooding system will capture any converter aisle emissions not collected by the primary and secondary hooding and route them to the main stack instead of allowing them to escape into the atmosphere as process fugitive emissions. Hooding and enclosure systems will be improved on matte and slag tap ports. Such hooding improvements and the addition of the tertiary hooding is also required by the Consent Decree.

MACT requires recordkeeping for two years and maintained for five years.

The rule requires records to be kept onsite for two years and retained for at least five.

Based on the above comparison to control measures prescribed by EPA and NESHAPs for secondary lead smelters, the control measures required by R18-2-B1301 applicable to Asarco's Hayden Operations meets RACM/RACT requirements.

4.5.3 Rule R18-2-B1301.01 Demonstration of RACM/RACT

In determining whether the fugitive dust requirements in the Consent Decree also required by rule R18-2-B1301.01[96] constitute RACM/RACT, ADEQ referred to the General Preamble of the CAA Amendments, other states' PM10 rules, South Coast Air Quality Management District's rule for Pb emissions from lead-acid battery recycling facilities, as well as federal NESHAP requirements.

It was found that the dust controls from the Consent Decree and in R18-2-B1301.01 are very similar to those found in the General Preamble, non-leaded PM_{10} rules, and NESHAPs for primary copper smelters.

4.5.3.1 Comparison to NESHAPs & Evaluation

As stated earlier, Asarco will be installing its fugitive dust controls to comply with federal NESHAPs for the primary copper smelter source category, which is MACT level of control. The requirements in R18-2-B1301.01 mirror what's required under the Consent Decree and NESHAPs. For this comparison, ADEQ drew on EPA's RACM guidance document for the 2008 Pb NAAQS and NESHAP requirements for two source categories: Primary Copper Smelters and Secondary Lead Smelters. Generally, R18-2-B1301.01 requirements are consistent with either NESHAPs for copper smelters or NESHAPs for lead smelters, or sometimes both. And because EPA's RACM guidance draws on NESHAP requirements for secondary lead smelters, R18-2-B1301.01 follows EPA's guidance as well.

This comparison, along with ADEQ's evaluation of R18-2-B1301.01, is in Table 19 below.

[96] See Appendix C for a copy of the rules, including R18-2-B1301.01.

Table 19: Comparison & Evaluation of Pb Dust Rule to EPA Guidance & NESHAPs

(Selected) Definitions				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
"*High wind event*" means any period of time beginning when the average wind speed, as measured at a meteorological station maintained by the owner or operator that is approved by the Department, is greater than or equal to 15 miles per hour over a 15 minute period, and ending when the average wind speed, as measured at the approved meteorological station maintained by the owner or operator, falls below 15 miles per hour over a 15 minute period."	n/a	n/a	n/a	Considering NESHAPs nor guidance does not address high wind events, this fugitive Pb dust rule requirement is considered RACM.
"*Lead-bearing fugitive dust*" means uncaptured and/or uncontrolled particulate matter containing lead that is entrained in the ambient air and is caused by activities, including, but not limited to, the movement of soil, vehicles, equipment, and wind.	n/a	n/a	n/a	NESHAPs nor guidance addresses this type of definition, however, it is consistent with the similar definition in South Coast's Pb rule (see Table 22).

(Selected) Definitions				
"*Material pile*" means material, including concentrate, uncrushed reverts, crushed reverts, and bedding material, that is stored in a pile outside a building or warehouse and is capable of producing lead-bearing fugitive dust.	n/a	n/a	n/a	Although NESHAPs and guidance does not address this type of definition, the fugitive Pb dust rule is consistent with similar definitions in other non-leaded PM10 rules (see Table 21).
"*Non-smelting process sources*" means sources of lead-bearing fugitive dust that are not part of the hot metal process, which includes smelting in the INCO flash furnace, converting, and anode refining and casting. Non-smelting process sources include storage, handling, and unloading of concentrate, uncrushed reverts, crushed reverts, and bedding material; acid plant scrubber blowdown solids; and paved and unpaved roads.	n/a	n/a	"Fugitive dust source" means a stationary source of hazardous air pollutant emissions at a secondary lead smelter that is not associated with a specific process or process fugitive vent or stack. Fugitive dust sources include, but are not limited to, roadways, storage piles, lead bearing material handling transfer points, lead bearing material transport areas, lead bearing material storage areas, other lead bearing material process areas, and buildings. (See § 63.542).	Meets RACM. The definition used for secondary lead smelter's is generally consistent with the Hayden Pb dust rule definition.

(Selected) Definitions				
"*Storage and handling*" means all activities associated with the handling and storage of materials that take place at the Hayden Smelter, including, but not limited to, stockpiling, transport on conveyor belts, transport or storage in rail cars, crushing and milling, arrival and handling of offsite concentrate, bedding, and handling of reverts.	n/a	n/a	"Materials storage and handling area" means any area of a secondary lead smelter in which lead-bearing materials (including, but not limited to, broken battery components, reverberatory furnace slag, flue dust, and dross) are stored or handled between process steps including, but not limited to, areas in which materials are stored in open piles, bins, or tubs, and areas in which material is prepared for charging to a smelting furnace. (See § 63.542)	Meets RACM. The definition used for secondary lead smelter's is generally consistent with the Hayden Pb dust rule definition.
"*Trackout/carry-out*" means any materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that may then fall onto the road.	n/a	n/a	n/a	Although NESHAPs and guidance does not address such definition, the fugitive Pb dust rule is consistent with similar definitions in other non-leaded PM10 rules (see Table 21).

Fugitive Dust Plan & Compliance				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
Development, implement, and follow a fugitive dust plan that addresses sources of fugitive Pb dust. Compliance with the rule is demonstrated through full implementation of the fugitive dust plan, in addition to the housekeeping requirements (which are the same requirements that will go into the fugitive dust plan, but they are also required independently by the rule regardless of a plan to ensure control of emissions).	While NESHAPs for secondary lead smelters and primary copper smelters require a dust plan, such requirement was not discussed in EPA's guidance.	Must operate according to a "written fugitive dust control plan" which must address sources like outdoor piles, bedding areas, conveyor transfer points, and roadways. (See § 63.1445). Compliance is demonstrated through implementing all of the fugitive control measures specified for the source in the fugitive dust control plan. (See § 63.1453).	Must prepare and at all times operate according to a "standard operation procedures" manual that describes in detail the measures to control the fugitive dust emissions from sources listed, which include roadways, storage areas, handling areas, etc. (See § 63.545). Compliance is demonstrated through operating at all times according to the standard operating procedures manual (see § 63.545).	Meets RACM. Requiring a dust plan is consistent with NESHAPs for both source categories, primary copper smelters and secondary lead smelters (although secondary lead smelter uses a "standard operation procedures manual"). Compliance methods are also consistent with both NESHAPs.

Paved Roads				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including paved roads.	n/a	n/a	n/a	Considering guidance nor NESHAPs addresses an opacity limit, this fugitive Pb dust rule requirement is considered RACM for being consistent with opacity limits in other non-leaded PM10 rules (see Table 21).

Paved Roads				
Clean roads at least once daily with a sweeper, vacuum, or wet broom in accordance with manufacturer recommendations.	EPA's guidance matches the requirements for NESHAPs for Secondary Lead Smelters, which requires paved roads to be cleaned twice per day (see guidance, page 23). However, no requirement similar to this is required under NESHAPs for Asarco's source category, which is primary copper smelters.	NESHAPs for primary copper smelters has no specific requirement for cleaning paved roads.	NESHAPs for secondary lead smelters requires paving all areas subject to vehicle traffic and must clean the pavement twice per day (see § 63.545).	Meets RACM. The Hayden rule incorporates a paved road cleaning frequency that brings the NAA into attainment. There are no paved road cleaning requirements under NESHAPs for primary copper smelters, only for secondary lead smelters. Therefore, the Hayden rule appears to meet RACM, considering it requires paved roads to be cleaned at least once per day, which is more stringent than the non-existent NESHAPs requirement for primary copper smelters.
Rapidly clean up track-out and carry out on paved roads that extends a cumulative distance of 50 linear feet or more; clean all other trackout and carry out at the end of the workday.	No specific requirement resembling trackout and carryout clean-up, but guidance does list timely cleaning of accidental releases as a RACM measure (see page 25).	No specific requirement, however, trackout and carryout could be addressed via a facility's "fugitive dust control plan" (see § 63.1445).	No specific requirement, however, trackout and carryout could be addressed via a facility's "standard operating procedures manual" (see § 63.545).	Meets RACM. In addition to mirroring general PM10 rule requirements in other states (see Table 21) the Hayden rule goes beyond NESHAP requirements by specifying clean-up frequencies for trackout and carry-out.

Paved Roads				
Speed limit of 15 mph with signs posted.	No requirement.	No requirement.	No requirement.	Meets RACM. While guidance and NESHAPs do not require specific speed limits for paved roads, the Hayden rule is generally consistent with other states' PM10 rules (see Table 21).

Unpaved Roads				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including unpaved roads.	While EPA's guidance recognizes that there is no known adoption of chemical dust suppression for source categories addressed in the guidance, which are secondary lead smelting, lead acid battery manufacturing, and iron and steel foundries, this Hayden Pb dust rule requirement is consistent with NESHAP requirements for primary copper smelters. (Note: Other R18-2-B1301.01 requirements listed	The controls in the fugitive dust plan must address such sources as roadways used by trucks for transporting bulk materials (which would include unpaved roads). Available controls listed in NESHAPs include dust suppression agents (see § 63.1445). (Note: Other R18-2-B1301.01 requirements listed here are generally not mentioned in NESHAPs, and are therefore not	There are no requirements applicable to unpaved roads for secondary lead smelters. This is due to the fact that all roads subject to vehicle traffic must be paved or otherwise encapsulated (see § 63.545(c)(2)). (Note: Other R18-2-B1301.01 requirements listed here are generally not mentioned in NESHAPs, and are therefore not compared in this table).	Meets RACM. Generally, EPA cited paving unpaved roads as a known control measure for source categories like secondary lead smelters, which conforms to the NESHAP requirements for that source category. However, given that the Asarco smelter is a primary copper smelter, not a secondary lead smelter, the Hayden Pb dust rule stays consistent with NESHAP requirements for the primary copper smelter source category and thus requires chemical dust suppressants to be used on unpaved roads.
Chemical dust suppression application for high-leaded unpaved roads, including slag hauler road, secondary crusher road, and reverts crushing operations roads.				
Soil stabilization requirements for unpaved roads, which are a 20 percent opacity limit, silt loading limit of 0.33 oz/ft2, and silt content limit of 6 percent.				
Maintain back-up watering trucks and personnel for visible emissions control.				

Immediate, but no later than 30 minutes after observation, application of water or chemical dust suppressant where visible emissions are observed.	here were not addressed in EPA's guidance and are therefore not compared in this table.)	compared in this table).		Chemical dust suppressants are also known BACM for other serious PM10 nonattainment areas in the Southwest (see Table 21).
Reapplication of chemical dust suppressants within 24 hours of discovery of breakdown.				
Collection and prevention of runoff and/or sweeping material				
Speed limit of 15 mph with posted signs.				

Material Storage Piles and Material Handling				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including storage piles.	EPA's guidance lists partial enclosures with wet suppression as available controls for storage areas and storage piles. (Note: Other R18-2-B1301.01 requirements listed here were not addressed in EPA's guidance and are therefore not compared in this table.)	The controls in the fugitive dust plan must address sources like material piles and conveying system transfer points. Controls listed include wind screens/fences and spraying water. (See § 63.1445). (Note: Other R18-2-B1301.01 requirements listed here are generally not mentioned in NESHAPs, and are therefore not compared in this table).	Vehicles must be washed at each exit of material storage and handling areas. Material transport must be conducted within closed conveyor systems or in sealed, leak-proof containers unless activities are contained in a total enclosure. All other lead-bearing material must be contained and covered for transport outside of a total enclosure in a manner that prevents spillage or dust formation. Material handling areas and other sources of dust must be operated in a	Meets RACM. The Hayden Pb dust rule combines requirements from both EPA's guidance, NESHAPs for primary copper smelters, and NESHAPs for secondary lead smelters. Like EPA's guidance and NESHAPs for primary copper smelters, the Hayden Pb dust rule requires water sprays and wind fences to be used for material storage piles. Also, material conveyor systems must have minimized drop heights to lessen fugitive dust emissions. In addition, while NESHAPs for secondary
Material conveyor systems drop heights must be minimized to the greatest extent practicable and any spillage must be cleaned within 30 minutes of discovery.				

Storage of concentrate and crushed reverts must be on concrete pads.			total enclosure maintained under negative pressure. (See § 63.545(c)(5) and (c)(7) and § 63.544). (Note: Other R18-2-B1301.01 requirements listed here are generally not mentioned in NESHAPs, and are therefore not compared in this table).	lead smelters require vehicle washings, the Hayden Pb dust rule requires rumble grates at the bedding plant, which is a similar measure used to control dust at a material storage and handling area.
Water sprays for storage piles, requiring a 10 percent surface moisture content, as determined by ASTM method D2216-10, for concentrate, crushed reverts, and bedding materials.				
Wind fences for storage piles, with material pile height not to exceed wind fence height, and the wind fence must have a porosity of 50 percent or less.				
Materials being transported by vehicle must be covered by a tarp and the cargo compartment must be free of holes or other openings.				
Water suppression or handling postponement during high wind events.				
Maintain rumble grates at all of the bedding plant area's entrances and exits for control of dust from loader tires.				

Dry acid plant scrubber blowdown solids only in an enclosed system that uses a venturi scrubber, thickener, filter press, and electric dryer that is maintained under negative pressure. The negative pressure of the electric dryer enclosure is maintained using a 2,500 ACFM dyer ventilation fan to be used at all times the electric dryer is operational. Monitoring of the negative pressure is demonstrated through the run and stop states of ventilation fan and electric dryer.	EPA's guidance listed partial/total enclosures in combination with negative pressure for storage areas/process units as RACM due to its widespread use at secondary lead smelters (11 of 14 smelters) and adoption by the South Coast Air Quality Management District (see guidance, page 23).	While total enclosures are required for secondary lead smelters, they are not required for primary copper smelters. Generally, material storage piles are controlled via wind fences and water sprays.	Control sources of fugitive dust emissions within total enclosures that are maintained under negative pressure and vented to a control device designed to capture lead particulate. (See § 63.544).	Meets RACM. Although total enclosures for materials storage, such as the acid plant scrubber blowdown solids, are not required under NESHAPs for primary copper smelters, Asarco will be installing such system as part of the Consent Decree. The new system will dry the acid plant's scrubber blowdown solids in a total enclosure, with a dryer system maintained under negative pressure in order to minimize emissions. Such control then, is more stringent for a primary copper smelter and therefore, constitutes RACM.

Recordkeeping and Reporting				
R18-2-B1301.01 Requirement	**2008 Pb NAAQS RACM Guidance for *Secondary Lead Smelter Source Category & Fugitive Dust***	**NESHAPs for *Primary Copper Smelters (40 CFR Part 63, Subpart QQQ)* *MACT***	**NESHAPs for *Secondary Lead Smelters (40 CFR Part 63, Subpart X)* *MACT***	**R18-2-B1301.01 Evaluation**
Current and past fugitive dust plans.	Recordkeeping and reporting requirements were not discussed in EPA'	No recordkeeping requirements pertaining to dust sources were identified.	Records that must be kept/maintained in a "form suitable and readily available for expeditious review" include: inspections, cleaning of paved roads, corrective actions, and malfunctions. (See §§ 63.546 and 63.550).	Meets RACM. Even though records for fugitive dust sources are not required under NESHAPs for primary copper smelters, the Hayden Pb dust rule requires similar records to those under NESHAPs for secondary lead smelters.
Physical inspection sheets, checklists, and/or logsheets.				
All records of unpaved road stabilization and opacity tests and materials piles moisture content tests, if any.				
Maintenance, inspections, quality assurance and control, samples, and wind data from ambient air and meteorological stations, in addition to records of periods where monitors are inoperative.				

Recordkeeping system for fugitive dust sources, including visible emissions observations, corrective actions, water sprayer operations, chemical dust suppression application, timing of paved road cleaning, Reference Method 9 opacity readings, operating conditions, calibration records for measurement devices, and records for operational deviations.				
Records must be maintained for 5 years and kept onsite for at least 2 years.		Records must be kept on site for at least 2 years after the date of record. Records must be maintained for 5 years. (See § 63.1456).	Records must be kept on site for at least 2 years after the date of record. Records must be maintained for 5 years.	Meets RACM. The records retention requirement is consistent with NESHAPs for both source categories.
Quarterly reports that include visible emissions observations, high wind event dates, corrective actions, progress on control construction, raw monitoring data and calculated ambient air concentrations.		Must submit semiannual compliance reports that include any deviations from work practice standards (which would apply to fugitive dust control practices). (See § 63.1455).	Must submit reports no less frequent than specified under § 63.10(e)(3) of General Provisions (see § 63.550).	Meets RACM. NESHAPs for primary copper smelters require semiannual reports, whereas the Hayden Pb dust rule requires more frequent quarterly reports.

4.5.3.2 Comparison to General Preamble Control Menu & Evaluation

Appendix 1 of the General Preamble for the Implementation of Title I of the Clean Air Act[97] lists specific available control measures for fugitive leaded dust; most measures mirror those in Appendix C1 of the General Preamble for non-leaded particulate matter. Appendix 1 measures are required to be considered in any RACM analysis. These measures, along with ADEQ's evaluation of R18-2-B1301.01, is in Table 20 below. Requirements in R18-2-B1301.01 are generally consistent with those in Appendix C1.

[97] *See* 58 FR 67752 (Dec. 22, 1993).

Table 20: Comparison & Evaluation of Pb Dust Rule to General Preamble Control Menu

General Preamble Control Measure	R18-2-B1301.01 Evaluation
Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.	Requires application of chemical dust suppressants on high-leaded unpaved roads, including access points where unpaved roads meet paved roads. See subsection (D)(10).
Require dust control plans for construction or land-clearing projects.	Not applicable to any significant source.
Require haul trucks to be covered.	Requires that trucks hauling fugitive lead dust sources to be covered by a tarp and compartments to be free of holes. See subsection (D)(4).
Provide for traffic rerouting or rapid clean up of temporary (and not readily preventable) sources of dust on paved roads (water erosion runoff, mud/dirt carryout areas, material spills, skid control sand). Delineate who is responsible for cleanup.	Requires clean up of spillage that extends 50 linear feet or more as expeditiously as practicable, and at the end of the work day for all other spillage. See subsection (D)(9)(c).
Require paving, chemically stabilizing, or otherwise stabilizing permanent unpaved haul roads, and parking or staging areas at commercial, municipal, or industrial facilities.	Requires chemical dust suppression for high-leaded unpaved roads, including haul roads, access points, and areas of vehicle handling of material. See subsection (D)(10)(a).
Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads.	Requires a speed limit of 15 mph with posted signs. See subsection (D)(10)(h).
Limit use of recreational vehicles on open land.	Not applicable to any significant source.
Require curbing and pave or stabilize (chemically or with vegetation) shoulders of paved roads.	Paved roads make up roughly 2.7% of the total 2012 base year emissions inventory for the Hayden NAA. There are far more significant emissions reductions achieved through daily paved road cleaning (84%). Additionally, curbing paved roads is identified as BACM in other serious PM10 NAAs, such as Imperial and San Joaquin Valley Counties. The Hayden Pb NAA is required to meet RACM requirements. Therefore, due to this being an insignificant source that is already effectively controlled via daily cleaning, a BACM measure like curbing would not significantly reduce emissions to expedite attainment.
Pave or chemically stabilize unpaved roads.	Requires chemical dust suppression for high-leaded unpaved roads, including access points and areas of vehicle handling of material. See subsection (D)(10).

Pave, vegetate, or chemically stabilize unpaved parking areas.	Not applicable to any significant source (see Emissions Inventory TSD in Appendix A).
Require dust control measures for material storage piles.	Requires wind fences, water sprays, and concrete pads for concentrate storage and reverts crushing; requires wind fences and water sprays for all other dust sources (uncrushed reverts and bedding materials). Scrubber blowdown solids from the acid plant that were previously dried outdoors will now be required to be dried in an enclosed system with a dryer maintained under negative pressure. See subsections (D)(11) - (D)(15).
Provide for storm water drainage to prevent water erosion onto paved roads.	Due to the arid climate of the Hayden NAA, water erosion runoff only infrequently occurs during periods of heavy rain, usually generated by intense, localized thunderstorms that occur in the late summer and early fall. Runoff is generally contained in stream and normally dry wash channels. Any erosion on paved surfaces is usually narrowly restricted to where these flows may cross roadways. Because emissions from entrainment of erosion sediment on paved roads are very localized and minimal, and rerouting of storm water channels or roadways require significant time and infrastructure investment, this measure is not feasible. This measure also would not significantly advance attainment of the NAAQS due to substantial research and infrastructure development. Furthermore, subsection (D)(9)(c) already requires rapid clean up of trackout and carryout, which would also clean up any erosion of material following these infrequent rain events.
Require revegetation, chemical stabilization, or other abatement of wind erodible soil, including lands subjected to water mining, abandoned farms, and abandoned construction sites.	Not applicable to any significant source.
Rely upon the soil conservation requirements of the Food Security Act to reduce emissions from agricultural operations.	Not applicable.
Require washing of undercarriages and wheels of vehicles immediately prior to leaving the plant area.	While the rule does not explicitly require wheel and/or undercarriage washing, rumble grates are required for the bedding plant area. See subsection (D)(14)(c). Furthermore, wheel washes are considered BACM in Imperial County, CA and Maricopa County, AZ for serious PM10 areas. Because the Hayden Pb NAA is required to implement RACM instead, and because roads are a rather insignificant source, rumble grates at the bedding area are sufficient.

Require that water used for dust suppression and vehicle washing contain a limited amount of lead (e.g. less than or equal to 0.1 ppm).	Chemical suppressants, rather than water, are used for control of dust from unpaved roads. Vehicle washing is also not required. Therefore, this RACM measure is not applicable.

While the General Preamble suggests paving unpaved roads, the Hayden Pb NAA's attainment strategy depends on a chemical dust suppression application intensity and schedule that achieves a 90 percent control efficiency. This is greater than the paving control efficiency EPA cites in the 2008 Pb NAAQS RACM guidance, which is 66 percent.[98] Therefore, chemical dust suppression is required rather than paving to achieve the higher control efficiency. The dust suppression control efficiency is required under the Consent Decree, and its inclusion in the Pb dust rule makes this requirement enforceable after the Consent Decree is terminated or expired.

Additionally, while paving is a suggested RACM in EPA's 2008 Pb NAAQS RACM guidance, so is chemical dust suppression, which is considered BACM in Maricopa County as well as other Southwestern states, including California and Nevada (see Table 21). As shown in Chapter 5, Hayden is projected to attain the NAAQS in 2019 using chemical dust suppression on unpaved roads. Considering that chemical dust suppression already achieves 90 percent control efficiency and that unpaved roads constitute less than 2 percent of the base year emissions inventory, paving would not expedite attainment any quicker than already required.

Furthermore, ADEQ analyzed unpaved roads at Asarco's Hayden Operations and determined which ones had the highest Pb content, referring to samples taken between 2013 and 2015 during EPA's Remedial Investigation and Feasibility Study. The analysis shows that not all unpaved roads at Asarco's facility have the same amount of Pb content. The unpaved roads with the highest Pb content are the slag hauler road and the concentrate storage area. The chemical dust suppression application intensity and schedule in the rule mirrors what Asarco developed for its Fugitive Dust Plan required by the Consent Decree. The rule thereby focuses on the unpaved road that has the highest Pb content, the slag hauler road, which is required to have the most frequent application of chemical dust suppressants (the rule also requires application on additional unpaved roads). While there will be no chemical dust suppression applied on the concentrate storage area roads, the Pb content of the surrounding unpaved roads will decrease due to the use of concrete pads, wind fences, and water suppression for concentrate storage. For ADEQ's complete analysis, refer to the "Unpaved Road De Minimis Analysis" in the Modeling TSD in Appendix B.

In sum, while the General Preamble suggests paving unpaved roads, the fugitive Pb dust rule focuses on those roads that have the most Pb content and requires chemical dust suppression for its higher control efficiency. Chemical dust suppression is also a recognized BACM in other Southwestern states.

[98] See *Implementation of the 2008 Lead National Ambient Air Quality Standards Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions,* U.S. EPA, March 2012, page 24.

In general, R18-2-B1301.01 contains most fugitive Pb dust controls identified by EPA in the General Preamble. While R18-2-B1301.01 is focused on a point source, rather than a county-level distribution of different sources (as such as in a PM_{10} NAA), the controls Asarco will be using to control leaded fugitive dust are similar to those identified in Appendix 1 of the General Preamble.

4.5.3.3 Comparison to Other PM10 Rules & Evaluation

While the fugitive Pb dust rule is focused on leaded dust, EPA expects that the rule should also meet RACM for non-leaded particulate matter, or PM_{10}. For this analysis, ADEQ referred to rules approved by EPA in Nevada, California, and Arizona. These rules were approved by EPA as BACM for serious PM_{10} nonattainment areas. The PM_{10} rules incorporated in this analysis include:

- San Joaquin Valley Air Pollution Control District, CA
- Imperial County Air Pollution Control District, CA
- Clark County Department of Air Quality, NV
- Maricopa County Air Quality Department, AZ

PM_{10} emission control rules developed by these areas were reviewed, summarized, and grouped by source category for use in assessing commonalities and differences in the Hayden Pb NAA's control strategy. The results are used to identify the level of control, the applicability for the Hayden Pb NAA, and the general consistency between requirements. The comparative results are summarized in Table 21 below.

In summary, the measures that control leaded dust via R18-2-B1301.01 are generally consistent with and conform to non-leaded PM_{10} rules in other Pacific Southwestern states.

Table 21: Comparison & Evaluation of Pb Dust Rule to PM10 Rules

(Selected) Definitions					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
"*High wind event*" means any period of time beginning when the average wind speed, as measured at a meteorological station maintained by the owner or operator that is approved by the Department, is greater than or equal to 15 miles per hour over a 15 minute period, and ending when the average wind speed, as measured at the approved meteorological station maintained by the owner or operator, falls below 15 miles per hour over a 15 minute period."	No similar requirement.	See rule 800, section C, which defines "wind gust" as: "Is the maximum instantaneous wind speed as measured by an anemometer." See also rule 801 for construction and earthmoving activities, which states that the 20% opacity limit shall not apply when wind gusts exceed 25 mph as long as there's a control measure in place.	See rule 8021 for construction and earthmoving activities, which requires activities to cease when VDE exceeds 20 percent opacity.	No similar requirement.	Meets RACM. While the "high wind event" definition is unique for Asarco's purposes and consistent with the definition in the Consent Decree, it draws similarities with the Imperial County definition which uses a specific tool to measure wind speeds.

(Selected) Definitions					
"*Lead-bearing fugitive dust*" means uncaptured and/or uncontrolled particulate matter containing lead that is entrained in the ambient air and is caused by activities, including, but not limited to, the movement of soil, vehicles, equipment, and wind.	See rule 310, section 200, which defines "fugitive dust" as: "The particulate matter not collected by a capture system, that is entrained in the ambient air, and is caused from human and/or natural activities, such as, but not limited to, the movement of soil, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers, and does not include emissions from process and combustion sources that are subject to	See rule 800, section C, which defines "fugitive dust" as: "The particulate matter entrained in the ambient air which is caused from man-made and natural activities such as, but not limited to, movement of soil, vehicles, equipment, blasting, and wind. This excludes particulate matter emitted directly in the exhaust of motor vehicles or other fuel combustion devices, from portable brazing, soldering, or welding equipment, pile drivers, and stack emissions from stationary sources."	See rule 8011, section C, which defines "fugitive dust" as: "any solid particulate matter entrained in the ambient air which is caused by anthropogenic or natural activities which is emitted into the air without first passing through a stack or duct designed to control flow, including, but not limited to, emissions caused by movement of soil, vehicles, equipment, and windblown dust. This excludes particulate matter emitted directly in the exhaust of motor vehicles, from other fuel combustion devices, portable brazing, soldering,	See Section 0, which defines "fugitive dust" as: particulate matter, that is not collected by a capture system, is entrained in the ambient air and is caused from human and/or natural activities, such as, but not limited to, movement of soil, vehicles, equipment, blasting, and wind. For the purpose of these regulations, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and	Meets RACM. The "lead-bearing fugitive dust" definition draws several requirements from the other PM10 rules (i.e. "entrained in the ambient air" and use of "uncaptured/uncontrolled") but is adapted for leaded particulate matter and to Asarco's operations. The activities/sources listed in the other PM10 rules are consistent with those listed in the Pb dust rule (i.e. movement of soil and wind).

(Selected) Definitions					
	other rules in Regulation III (Control of Air Contaminants) of these rules."		or welding equipment, and from pile drivers."	from pile drivers, and does not include emissions from process and combustion sources that are subject to other sections of these regulations."	

(Selected) Definitions					
"*Material pile*" means material, including concentrate, uncrushed reverts, crushed reverts, and bedding material, that is stored in a pile outside a building or warehouse and is capable of producing lead-bearing fugitive dust.	See rule 310, section 200, which defines "bulk material" as "any material, including but not limited to, the following materials that are capable of producing fugitive dust: earth; rock; silt; sediment; sand; gravel; soil; fill; aggregate less than 2 inches in length or diameter; dirt; mud; demolition debris; cotton; trash; cinders; pumice; sawdust; feeds; grains; fertilizers; fluff from shredders; dry concrete."	See rule 800, section C, which defines "bulk material" as: "Earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate, dirt, mud, debris, and other organic and/or inorganic material consisting of or containing particulate matter with five percent or greater silt content...." etc.	See rule 8011, section 3.0, which defines "bulk material" as "any unpackaged material with a silt content of more than 5 percent." See also "open storage pile" which is defined as: "Any accumulation of bulk material, stored outside a building or warehouse."	No similar requirement.	Meets RACM. While Maricopa County and Imperial County have definitions for "bulk material" that do not include references to a pile, San Joaquin Valley's definition for "open storage pile" is similar to the Pb dust rule's definition. The definitions for "bulk material" use "...capable for producing fugitive dust," which is also used in the Pb dust rule. The San Joaquin rule's definition of "open storage pile" uses "...stored outside a building or warehouse," which is also used in the Pb dust rule. The Pb dust rule combines the language from these rules while adapting it especially for Asarco's operations.

(Selected) Definitions					
"*Non-smelting process sources*" means sources of lead-bearing fugitive dust that are not part of the hot metal process, which includes smelting in the INCO flash furnace, converting, and anode refining and casting. Non-smelting process sources include storage, handling, and unloading of concentrate, uncrushed reverts, crushed reverts, and bedding material; acid plant scrubber blowdown solids; and paved and unpaved roads.	See rule 310, section 200, which defines "dust-generating operation" as "Any activity capable of generating fugitive dust, including, but not limited to, the following activities: Land clearing, maintenance, and land clean-up using mechanized equipment; earthmoving; weed abatement by discing or blading; excavating; construction; demolition; bulk material handling; storage and/or transporting operations; operation of any outdoor equipment; operation of motorized machinery..." etc.	See rule 800, section C, which defines "earthmoving activities" as: "The use of any equipment for an activity that may generate fugitive dust emissions, including, but not limited to, cutting and filling, grading, leveling, excavation, trenching, loading or unloading of bulk materials, demolishing, drilling, adding to or removing bulk materials from open storage piles, weed abatement through disking and back filling."	See rule 8011, section 3.0, which defines "earthmoving activities" as: "The use of any equipment for an activity that may general fugitive dust emissions, including, but not limited to, cutting and filling, grading, leveling, excavating, trenching, loading or unloading of bulk materials, demolishing, blasting, drilling, adding to or removing bulk of materials from open storage piles, weed abatement through disking, and back-filling."	No similar requirement.	Suggests RACM. This Pb dust rule definition is especially unique to Asarco's operations and is consistent for a rule that controls leaded dust, as opposed to non-leaded dust. The sources of Pb dust listed in the definition are those found to be sources in Asarco's operations. The PM10 rules have definitions for bulk materials used in earthmoving/dust-generating activities, which is somewhat different from Asarco's operations. While Asarco's operations do generate dust, the Pb dust rule is focused on those that generate leaded dust. The Pb dust rule definition is consistent with the other PM10 rules, in that it addresses storage, handling, and unloading of bulk materials.

(Selected) Definitions					
"*Storage and handling*" means all activities associated with the handling and storage of materials that take place at the Hayden Smelter, including, but not limited to, stockpiling, transport on conveyor belts, transport or storage in rail cars, crushing and milling, arrival and handling of offsite concentrate, bedding, and handling of reverts.	See rule 310, section 200, which defines "bulk material handling, storage, and/or transporting operation" as "the use of equipment, haul trucks, and/or motor vehicles, including, but not limited to, for the following activities that are capable of producing fugitive dust: loading; unloading; conveying; transporting; piling; stacking; screening; grading; moving bulk materials."	See definition for "Earthmoving Activities" referenced above, which includes loading/unloading of bulk materials, and adding to or removing materials from open storage piles.	See rule 8011, section 3.0, which defines "bulk material handling, storage, and/or transporting operation" as: "includes but is not limited to the use of equipment, haul trucks, and/or motor vehicles for the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials at an industrial, institutional, commercial, and/or governmental owned or operated site or facility."	No similar requirement.	Meets RACM. While like in the other definitions the Hayden Pb dust rule is focused on Asarco's operations, the definition is consistent with the other PM10 rules in that it includes loading/unloading of materials, transportation of materials, and other handling. Furthermore, the consistent use of "including but not limited to" in the rules allows the definition to be applied to other sources if needed. This definition in the Pb dust rule is also consistent with the definition in the Consent Decree.

(Selected) Definitions					
"*Trackout/carry-out*" means any materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that may then fall onto the road.	See rule 310, section 200, which defines "trackout/carryout" as "Any and all bulk materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen or been deposited onto an area accessible to the public."	See rule 800, section C, which defines "trackout/carry-out" as: "Any and all bulk materials that adhere to and agglomerate on the exterior surfaces of motor vehicles and/or equipment (including tires) that may then fall onto the pavement."	See rule 8011, section 3.0, which defines "carryout and trackout" as: "any and all materials that adheres to and agglomerates on vehicles, haul trucks, and/or equipment (including trailers, tires, etc.) and falls onto a paved public road or the paved shoulder of a paved public road."	No similar requirement.	Meets RACM. The Hayden Pb dust rule definition is consistent with the other PM10 rules. The other PM10 rules apply to paved public roads, or an area accessible to the public. The Pb dust rule is more general, and uses "road" to include unpaved and paved roads in the facility, consistent with clean-up requirements in subsection (D)(9) and (D)(10).

Fugitive Dust Plan					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
Development, implement, and follow a fugitive dust plan that addresses sources of fugitive Pb dust.	See rule 310, section 402, which requires a Dust Control Plan for any dust-generating operation that involves a disturbed surface area equal or greater than 0.10 acre. A plan must also be submitted if any application for a Dust Control permit is submitted.	See rule 800, which requires that Border Patrol, BLM, or any other owner or operator of a recreational OHV use area to prepare and follow a dust control plan for minimizing PM10 emissions. The control requirements for each dust plan is tailored to each user's type of operation (i.e. recreational OHV use versus Border Patrol immigration monitoring practices). See also rule 801 which requires dust control plan for construction and earthmoving activities.	See rule 8021, which requires a Dust Control Plan for Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities. Rule 8011 also allows a Fugitive PM10 Management Plan for unpaved roads and unpaved vehicle/equipment traffic areas in replace of compliance with applicable requirements in rules 8061 and 8071.	See rule 94, which requires owner or operators of construction activities to develop a Dust Mitigation Plan.	Meets RACM. The Hayden Pb rule is consistent with PM10 rules applicable to other dust-generating operations like OHV use and construction.

Paved Roads					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including paved roads.	See rule 310, section 303, which requires a general 20 percent opacity limit for dust-generating operations.	No requirement for paved roads. (Note that rule 401, "Opacity of Emissions" was adopted prior to 1979 and has opacity-related limits based on the Ringlemann Chart, which does not seem to apply to paved roads.)	No requirement for paved roads. (Note the definition for "Limit Visible Dust Emissions to 20% Opacity" in rule 8011, which does not seem to apply to paved roads.)	See rules 91 and 93, which require a 20 percent opacity limit for unpaved roads and unpaved shoulders/medians of paved roads.	Meets RACM. The general use of a 20 percent opacity limit for dust sources, like paved roads, in Maricopa County (and in other states for sources other than paved roads) signify that this requirement maintains such consistency.
Clean roads at least once daily with a sweeper, vacuum, or wet broom in accordance with manufacturer recommendations.	No requirement. (Referred to Rule 310).	No requirement. (Referred to rules 800 and 805).	See rule 8061, which requires each city, county, or state agency responsible for existing paved roads to purchase and use a PM10 efficient street sweeper.	See rule 93, which requires any street sweeping equipment to be PM10 efficient. See also rule 94, which prohibits the use of dry rotary brushes and blower devices, unless sufficient water is applied, for cleaning paved roads.	Meets RACM. Both Maricopa County and Imperial County do not require paved road cleaning, and San Joaquin and Clark County require PM10-efficient sweepers, which are considered BACM, whereas the Hayden Pb NAA is required to implement RACM. Furthermore, the control efficiency from cleaning once daily was inputted into the modeling and brings the area into attainment, thereby reducing Pb emissions.

Paved Roads					
Rapidly clean up track-out and carry out on paved roads that extends a cumulative distance of 50 linear feet or more; clean all other trackout and carry out at the end of the workday.	See Maricopa County rule 310, section 306, which requires immediate clean-up when trackout extends 25 linear feet or more and at the end of the workday for all other trackout from areas accessible to the public.	See Imperial County rule 803, which requires immediate clean-up when trackout extends 50 linear feet or more and at the end of the workday for all other trackout.	See San Joaquin Valley rule 8041, which requires trackout to be cleaned at the end of the work day, and immediately when trackout extends 50 linear feet or more within urban areas.	See Clark County rule 94, which applies to construction activities, and requires that mud or dirt not be tracked out onto a paved road if it extends 50 feet or more in cumulative length. (See also the Dust Control Handbook, Best Management Practice 20 for Trackout/Carryout). Rule 93 also provides some protection against trackout via stabilized shoulders.	Meets RACM. The trackout clean-up requirements are generally consistent with other states' rules, which are considered BACM.
Speed limit of 15 mph with signs posted.	No requirement. (Referred to rules 310 and 311).	No requirement. (Referred to rules 800 and 805).	No requirement for paved roads, however Rule 8021 requires speed limit of 15 mph for unpaved roads for earthmoving and construction activities.	No requirement (referred to rule 93).	Meets RACM. The speed limit is consistent with the limit set forth in San Joaquin's rules for unpaved roads for construction and earthmoving activities.

Unpaved Roads					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including unpaved roads.	See rule 310, section 303, which requires a general 20 percent opacity limit for dust-generating operations.	See rule 805, which requires a 20 percent opacity limit for unpaved roads. See also rule 801 for construction and earthmoving activities, which requires a 20 percent opacity limit for a construction site and for persons performing any earthmoving activities.	See rule 8061, which requires a 20 percent opacity limit for unpaved roads. See also rule 8021 for construction and earthmoving activities, which requires a 20 percent opacity limit.	See rule 91, which requires a 20 percent opacity limit for unpaved roads.	Meets RACM. The general use of a 20 percent opacity limit for dust sources in other states signify that this requirement maintains such consistency among sources and states.
Chemical dust suppression application for high-leaded unpaved roads, including slag hauler road, secondary crusher road, and reverts crushing operations roads.	See rule 310, section 305.7, which lists non-water dust suppression as a control measure.	See Rule 805, which lists chemical stabilization as a control measure. See also rule 801 for construction and earthmoving activities, which also requires chemical stabilization or water for unpaved haul/access roads.	See rule 8061, which lists chemical suppressants as a control measure. See also rule 8021 for construction and earthmoving activities, which also requires chemical dust suppressants for unpaved surfaces.	See rule 91, which lists dust palliatives as a control measure.	Meets RACM. The other states' rules constitute BACM and are consistent with Hayden's chemical dust suppression requirement.

Unpaved Roads					
Soil stabilization requirements for unpaved roads, which are a 20 percent opacity limit, silt loading limit of 0.33 oz/ft2, and silt content limit of 6 percent.	See Maricopa County rule 310, section 304.2, which requires a 20 percent opacity limit for unpaved haul/access roads as determined by test method in Appendix C, Section 2.1 (EPA-approved unpaved road opacity observations method), and same silt loading and silt content requirements for unpaved roads, as determined by test method in Appendix C, Section 2.1 (EPA-approved soil stabilization method).	See Imperial County Rule 805, which requires a 20 percent opacity limit for unpaved haul/access roads and unpaved roads as determined by test method in Rule 800, Appendix A, Section A (same EPA-approved unpaved road opacity observations method), and same silt loading and silt content requirements for unpaved roads, as determined by test method in Rule 800, Appendix B, Section C (same EPA-approved soil stabilization method).	See San Joaquin Valley rule 8061, which requires a 20 percent opacity limit for any unpaved road segment with 26 or more average annual daily trips, as determined by test method in rule 8011, Appendix A, Section 1 (same EPA-approved unpaved road opacity observations method), and same silt loading and silt content requirements for unpaved roads, as determined by test method in rule 8011, Appendix B, Section 3 (same EPA-approved soil stabilization method).	See Clark County rule 91, which requires a 20 percent opacity limit, as determined by test method in rule 91, subsection 91.4.1 (same EPA-approved unpaved road opacity observations), and same silt loading and silt content requirements for unpaved roads, as determined by test method in rule 91, subsection 91.4.1 (same EPA-approved soil stabilization method).	Meets RACM. The soil stabilization requirements are consistent with other states' rules, which constitute BACM, and are the same methods EPA has approved in Maricopa County, California, and Nevada.

Unpaved Roads					
Maintain back-up watering trucks and personnel for visible emissions control.	While back-up water trucks are not explicitly required, Maricopa County rule 310, section 305.7 lists watering as a control measure for unpaved haul/access roads.	While back-up water trucks are not explicitly required, Imperial County rule 805 lists watering as a control measure for unpaved roads.	While back-up water trucks are not explicitly required, San Joaquin Valley rule 8061 lists watering as a control measure for unpaved roads.	While back-up water trucks are not explicitly required, Clark County rule 91 allows other alternative control measures as approved by the Control Officer and Region IX, which could include watering.	Meets RACM. The back-up watering trucks requirement is in addition to the chemical dust suppressants.
Immediate, but no later than 30 minutes after observation, application of water or chemical dust suppressant where visible emissions are observed.	No requirement. (Referred to rule 310).	No requirement. (Referred to rules 800 and 805).	No requirement. (Referred to rule 8061).	No requirement. (Referred to rule 91).	Meets RACM. This corrective measure for visible emissions from unpaved roads provides additional protection.
Reapplication of chemical dust suppressants within 24 hours of discovery of breakdown.	No requirement. (Referred to rule 310).	No requirement. (Referred to rules 800 and 805).	While no specific requirement in rule 8061 is listed, rule 8071 has similar re-application requirements for water or chemical suppressants for unpaved vehicle/equipment traffic areas with	No requirement. (Referred to rule 91).	Meets RACM. Like the visible emissions corrective action above, this requirement goes beyond to provide further protection against dust emissions.

Unpaved Roads					
			more than 50 Average Annual Daily Trips.		
Collection and prevention of runoff and/or sweeping material	No specific requirement for unpaved roads, however Maricopa County rule 310, section 306 has trackout/carry-out requirements for paved roads where areas are accessible to the public (see Paved Roads above).	No specific requirement for unpaved roads, however Imperial County rule 803 has trackout/carry-out requirements for *paved roads* (see Paved Roads table).	No specific requirement for unpaved roads, however San Joaquin Valley rule 8041 has trackout/carry-out requirements for *paved public roads* (see Paved Roads table).	No requirement. (Referred to Clark County rules 41, 91, and 93).	Meets RACM. None of the other states included in this analysis have requirements to minimize runoff and sweeping material on unpaved roads. This measure adds additional protection to prevent dust emissions.
Speed limit of 15 mph with posted signs.	See rule 310, section 304.2, which as an alternative to stabilization requirements for unpaved roads, allows for limiting vehicle trips to no more than 20 per day and limiting speeds to no more than 15 mph. (See also rule 310, section 305.2, which requires a 15 mph speed limit; rule 310, section 305.6, which requires a 15	See rule 800, which lists available control measures for unpaved roads and unpaved vehicle/equipment traffic areas that includes a speed limit of 15 mph.	See rule 8021 for construction and earthmoving activities, which requires a speed limit of 15 mph with posted signs for uncontrolled unpaved haul/access roads within construction sites.	No requirement. (Referred to rule 91).	Meets RACM. The Hayden Pb rule speed limit is consistent with limits in Maricopa, Imperial, and San Joaquin Counties.

Unpaved Roads					
	mph speed limit; as well as rule 310, section 305.7 which also requires a 15 mph speed limit.)				

Material Storage Piles and Material Handling					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
Facility-wide, overall 20 percent opacity limit for all fugitive lead dust sources, including storage piles.	See rule 310, section 303, which requires a general 20 percent opacity limit for dust-generating operations.	See rule 802, which requires a 20 percent opacity limit for bulk material handling, storage, haul trucks, and transport.	See rule 8031, which requires a 20 percent opacity limit for bulk material handling, storage, and transport.	See rules 91 and 93, which require a 20 percent opacity limit for unpaved roads and paved roads, but no such specific requirement for storage piles. See also rule 94, which requires a 20 percent opacity limit for construction and earthmoving activities.	Meets RACM. The general use of a 20 percent opacity limit for dust sources in other states signify that this requirement maintains such consistency among sources and states.

Material Storage Piles and Material Handling					
Material conveyor systems drop heights must be minimized to the greatest extent practicable and any spillage must be cleaned within 30 minutes of discovery.	See Maricopa County rule 310, section 305.4, which lists control options for bulk material stacking, loading, and unloading, including mixing materials with water or non-water suppressants.	See Imperial County rule 802, which lists several measures for bulk material handling/transfer, which include water sprays at transfer points, chemical stabilization, or sheltering/enclosing.	See San Joaquin Valley rule 8031, which requirements that any transport of bulk material using a chute or conveyor to be either fully enclosed, sprayed with water, or washed.	See Clark County rule 94, which includes materials storage and handling for construction and earthmoving activities. Sources must choose controls listed in Dust Control Handbook (conveyor belts not addressed).	Meets RACM. Although other states require water suppression, enclosing, or other stabilization requirements, these constitute BACM and are therefore not applicable to the Hayden Pb NAA, which must meet RACM requirements. Minimizing drop heights and requiring quick clean-up will provide enough emissions minimization to reach attainment.
Storage of concentrate and crushed reverts must be on concrete pads.	No requirement (Referred to rule 310).	No requirement. (Referred to rule 802).	No requirement (referred to rule 8031).	See rule 94, which includes materials storage and handling for construction and earthmoving activities. Sources must choose controls listed in Dust Control Handbook (no use of concrete pads included in Handbook).	Suggests RACM. These particular Pb dust sources must be stored on a concrete pad to prevent re-entrainment. No other states included in this analysis do not require such concrete pads.

Material Storage Piles and Material Handling					
Water sprays for storage piles, requiring a 10 percent surface moisture content, as determined by ASTM method D2216-10, for concentrate, crushed reverts, and bedding materials.	See Maricopa County rule 310, section 305.5, which lists several available options, including watering to achieve a minimum 12 percent soil moisture content, as determined by ASTM method D2216-05.	See Imperial County rule 802, which lists several measures, which include application of water or chemical suppressants on bulk material storage piles. No surface moisture content is required. See also rule 801 for construction and earthmoving activities, which requires water or chemical stabilization in addition to wind barriers.	See San Joaquin Valley rule 8031, which lists several measures, including watering to limit opacity to 20 percent or less, as determined by test method in rule 8011, Appendix A, Section 2. See also rule 8021 for construction and earthmoving activities, which requires water or chemical suppressants to be used along with wind barriers.	See Clark County rule 94, which includes materials storage and handling for construction and earthmoving activities. Sources must choose controls listed in Dust Control Handbook (See Best Management Practice 19 for Stockpiling, which includes water suppression).	Meets RACM. The general use of watering for bulk materials suggests this requirement is consistent with other states. Some variation exists between moisture content limits, but rule's 10 percent moisture content requirement is consistent with Asarco's Consent Decree with EPA, and the test method provides enforceability. (Please note that uncrushed reverts are not required to have 10 percent moisture content due to the porosity of the materials.)

Material Storage Piles and Material Handling					
Wind fences for storage piles, with material pile height not to exceed wind fence height, and the wind fence must have a porosity of 50 percent or less.	See Maricopa County rule 310, section 305.5, which lists several measures, including wind barriers, storage silos, or three-sided enclosures to be used in conjunction with watering. The 3-sided enclosure height must equal the pile height and must have 50 percent or less porosity.	See Imperial County rule 802, which lists several measures, which include wind barriers/fences with less than 50 percent porosity in conjunction with water or chemical suppressants. Rule 802 also lists a 3-sided structure as a measure, with less than 50 percent porosity and a height that is at least equal to the bulk material pile height. See also rule 801, for construction and earthmoving activities, which requires wind fences to be used in conjunction with water or chemical suppressants.	See San Joaquin Valley rule 8031, which lists several measures, including wind barriers with less than 50 percent porosity to be used in conjunction with water or chemical suppressants. A 3-sided structure is also an available measure, with a height at least equal to storage pile height. See also rule 8021 for construction and earthmoving activities, which requires wind barriers to be used along with water or chemical suppressants.	See Clark County rule 94, which includes materials storage and handling for construction and earthmoving activities. Sources must choose controls listed in Dust Control Handbook (See BMP 19 for Stockpiling, which includes a 3-sided barrier with height equal to pile height and with a porosity of 50 percent or less).	Meets RACM. This rule requirement blends other states' requirements, which are considered BACM. The rule is consistent with the general 50 percent porosity requirement, as well as material pile height limits. Like the other states, Asarco must use the wind fences in conjunction with water suppression.

Material Storage Piles and Material Handling					
Materials being transported by vehicle must be covered by a tarp and the cargo compartment must be free of holes or other openings.	See Maricopa County rule 310, section 305.1 and 305.2, which requires haul truck loads of bulk materials to be covered by a tarp and that cargo compartments must be free of holes or other openings.	See Imperial County rule 802, which requires all haul truck loads of bulk materials to be completely covered or enclosed and that cargo compartments must be free of holes or other openings.	See San Joaquin Valley rule 8031, which lists several control measures, including covering haul trucks with a tarp and that cargo compartments must be free of holes or other openings.	See Clark County rule 94, which includes materials storage and handling for construction and earthmoving activities.	Meets RACM. This requirement is consistent with the other states' rules.
Water suppression or handling postponement during high wind events.	While there is no requirement in Maricopa County's fugitive dust rule 310, there are similar requirements for nonmetallic mineral processing sources in rule 316, section 306. Rule 316 requires water suppression or ceasing operations during periods of high wind.	See rule 801 for Construction and Earthmoving Activities, where activity postponement and water suppression are available control measures during high winds.	See rule 8021 for Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities, which requires ceasing operations when the 20 percent opacity limit is exceeded due to wind.	See rule 94, which includes materials storage and handling for construction and earthmoving activities.	Meets RACM. This requirement is similar to other states' high wind control measures pertaining to nonmetallic mineral processing and construction.

Material Storage Piles and Material Handling					
Maintain rumble grates at all of the bedding plant area's entrances and exits for control of dust from loader tires.	See Maricopa County rule 310, section 306, which requires trackout control devices, including wheel wash systems, gravel pads, grizzly or rumble grates, or paving, for all exits onto areas accessible to the public at certain work sites.	See Imperial County rule 803, which lists control measures, including a track-out control device for all sites with access to a paved road and with 150 or more average vehicle trips per day, or 20 or more average vehicle trips per day by vehicles with three or more axles. Available trackout control devices include gravel pads, grizzlies, wheel wash systems, and paving.	See San Joaquin Valley rule 8041, which requires a trackout control device for any owner or operator of a site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with 3 or more axles, and any owner or operator of an operation subject to a Dust Control Plan. Available trackout control devices include grizzlies, gravel pads, and paving.	See Clark County rule 94, which includes materials storage and handling for construction and earthmoving activities.	Meets RACM. While the other states may require trackout control devices at paved roads on work sites or public areas, these are considered BACM in other states, whereas the Hayden Pb NAA is required to meet RACM. Therefore, the rule requires a trackout control device (rumble grates) at the bedding plant area due to its traffic use. This requirement is consistent with Asarco's Consent Decree with EPA.

Recordkeeping and Reporting					
R18-2-B1301.01 Requirement	**Maricopa County AQD, AZ **BACM***	**Imperial County APCD, CA **BACM***	**San Joaquin Valley APCD, CA **BACM***	**Clark County Dept of Air Quality, NV **BACM***	**R18-2-B1301.01 Evaluation**
Current and past fugitive dust plans.	See rule 310, section 502, which requires records relating to Dust Control Plans, consisting of evidence of inspections, clean-up measures, water usage, dust suppressant application, frequency, implementation of controls, results of test methods, etc. Also requires records for any operations not subject to a Dust Control Plan that provide evidence of control measure application, with type, extent of coverage, and date applied. Records must be retained for 2 years after the date	See rule 800, which requires records that provide evidence of control measure application and compliance with the rule. The records must describe the type of treatment/control measure, extent of coverage, and date applied, include frequency. Records must be retained for 2 years after date of each entry and available upon APCD request.	See rule 8011, which requires records for when a control measure is implemented, including type of control, location, date, frequency, etc. Records must be retained for one year following termination of dust-generating activities. For any Title V sources, records must be retained for at least 5 years.	For unpaved roads, rule 91 requires records that provide evidence of control measure application, coverage, and date applied. Records must be retained for at least 1 year. Written reports must also be submitted to document compliance. For paved roads, rule 93 requires records that provide evidence of control measure application, coverage, and date applied. Records must be retained for at least 1 year. Written reports must also be	Meets RACM. The Hayden Pb dust rule requires that current and past fugitive dust plans be retained for at least 5 years and kept on-site for at least 2 years. Similar records include evidence of type of control applied, frequency, date of application, any corrective measures taken, etc. In general, the Hayden Pb dust rule requires similar records at other states' rules, with the same, if not longer, retention schedule. In addition to recordkeeping, the rule requires quarterly reporting.
Physical inspection sheets, checklists, and/or logsheets.					

All records of unpaved road stabilization and opacity tests and materials piles moisture content tests, if any.	of when such records were initiated. For any Title V sources, records must be retained for at least 5 years.			submitted to document compliance.	
Maintenance, inspections, quality assurance and control, samples, and wind data from ambient air and meteorological stations, in addition to records of periods where monitors are inoperative.					
Recordkeeping system for fugitive dust sources, including visible emissions observations, corrective actions, water sprayer operations, chemical dust suppression application, timing of paved road cleaning, Reference Method 9 opacity readings, operating conditions, calibration records for measurement devices, and records for operational deviations.					

Records must be maintained for 5 years and kept onsite for at least 2 years.					
Quarterly reports that include visible emissions observations, high wind event dates, corrective actions, progress on control construction, raw monitoring data and calculated ambient air concentrations.					

4.5.3.4 Comparison to South Coast Air Quality's Lead Acid Battery Recycling Facility Rule

In developing guidance for conducting a RACM/RACT analysis for the 2008 Pb NAAQS, EPA drew heavily upon California's South Coast Air Quality Management District (SCAQMD) rule 1420.1, which aims to control lead and arsenic emissions from large lead-acid battery recycling facilities. The SCAQMD rule was adopted prior to the publication of EPA's guidance document, and is in most cases, more stringent than what's federally required. Considering that SCAQMD rule 1420.1 applies to sources within the secondary lead smelter category, EPA used it for developing suggested RACM for the secondary lead smelter source category.

Because there are only three primary copper smelters in the U.S., RACM was not explicitly developed in EPA's guidance. Therefore, ADEQ drew upon EPA's suggestions for the secondary lead smelter category, a source that has somewhat similar emission points and processes to copper smelters. It should be noted again that rule 1420.1 was developed to comply with NESHAPs for secondary lead smelters, while Asarco is required to comply with NESHAPs for primary copper smelters. Therefore, some requirements between the Asarco rule and the South Coast rule differ. The requirements from SCAQMD's rule that are similar to the Hayden Pb dust rule are compared to and evaluated in Table 22 below.

Table 22: Comparison & Evaluation of Pb Dust Rule to SCAQMD's Rule 1420.1

(Selected) Definitions		
R18-2-B1301.01 Definition	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
"*High wind event*" means any period of time beginning when the average wind speed, as measured at a meteorological station maintained by the owner or operator that is approved by the Department, is greater than or equal to 15 miles per hour over a 15 minute period, and ending when the average wind speed, as measured at the approved meteorological station maintained by the owner or operator, falls below 15 miles per hour over a 15 minute period."	No similar requirement.	Suggests RACM. While the South Coast rule does not have a high wind requirement for dust sources, the Hayden Pb dust rule definition is consistent with the Imperial County definition in Table 21.
"*Lead-bearing fugitive dust*" means uncaptured and/or uncontrolled particulate matter containing lead that is entrained in the ambient air and is caused by activities, including, but not limited to, the movement of soil, vehicles, equipment, and wind.	See section (c), which defines "fugitive lead-dust" as: "any solid particulate matter containing lead that is in contact with ambient air and has the potential to become airborne."	Meets RACM. Both definitions describe Pb dust as being airborne/entrained, containing Pb, and in the form of particulate matter.
"*Material pile*" means material, including concentrate, uncrushed reverts, crushed reverts, and bedding material, that is stored in a pile outside a building or warehouse and is capable of producing lead-bearing fugitive dust.	No similar requirement.	Meets RACM. While South Coast rule does not have a definition, the Hayden Pb dust rule conforms to other PM10 rule definitions (see Table 21).

"*Non-smelting process sources*" means sources of lead-bearing fugitive dust that are not part of the hot metal process, which includes smelting in the INCO flash furnace, converting, and anode refining and casting. Non-smelting process sources include storage, handling, and unloading of concentrate, uncrushed reverts, crushed reverts, and bedding material; acid plant scrubber blowdown solids; and paved and unpaved roads.	A somewhat similar definition for "process" in subsection (c), which is: "using lead or lead-containing materials in any operation including, but not limited to, the charging of lead-containing materials to smelting furnaces, lead refining and casting operations, and lead-acid battery breaking."	Suggests RACM. The South Coast rule does not have a definition for those sources of fugitive Pb dust. However, the definition for "process" in the South Coast rule is somewhat similar to the Hayden Pb dust rule, in that it applies to lead-containing materials from battery breaking, which is a source of fugitive dust. This consistency between definitions suggests that the Hayden Pb dust rule definition meets RACM.
"*Storage and handling*" means all activities associated with the handling and storage of materials that take place at the Hayden Smelter, including, but not limited to, stockpiling, transport on conveyor belts, transport or storage in rail cars, crushing and milling, arrival and handling of offsite concentrate, bedding, and handling of reverts.	See section (c), which defines "materials storage and handling area" as: "any area of a large lead-acid battery recycling facility in which lead-containing materials including, but not limited to, broken battery components, reverberatory furnace slag, flue dust, and dross, are stored or handled between process steps. Areas may include, but are not limited to, locations in which materials are stored in piles, bins, or tubs, and areas in which material is prepared for charging to a smelting furnace."	Suggests RACM. While the definitions differ and apply in different ways (i.e. storage and handling vs. storage and handling *areas*), the rules are generally consistent. Both address applicable sources of Pb dust as well as the storage and preparation/handling of such sources.
"*Trackout/carry-out*" means any materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that may then fall onto the road.	No similar requirement.	Meets RACM. While the South Coast rule does not have a requirement or definition for trackout/carry-out, the Hayden Pb dust rule definition meets RACM based on the comparison to PM10 rules (see Table 21).
Paved Roads		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**

Clean roads at least once daily with a sweeper, vacuum, or wet broom in accordance with manufacturer recommendations.	See subsection (h)(9)(A), which requires vacuum sweeping of paved areas subject to vehicular or foot traffic three times per day.	Meets RACM. Subsection (D)(9) in the Hayden rule requires the frequency of cleaning that gets the Hayden NAA into attainment, as evident in the modeling. South Coast's cleaning frequency for large lead-acid battery recycling facilities is more stringent than what is required under NESHAPs for secondary lead smelters, which requires paved roads to be clean twice per day (see 40 CFR Part 63, Subpart X). However, no cleaning frequency is required under NESHAPs for primary copper smelters, such as Asarco's Hayden Operations. Therefore, the rules once per day requirement meets RACM considering it is cost-effective and minimizes emissions to bring the area into attainment.
Rapidly clean up track-out and carry out on paved roads that extends a cumulative distance of 50 linear feet or more; clean all other trackout and carry out at the end of the workday.	See subsection (h)(9)(B), which requires vacuum sweeping immediately, no later than one hour after any maintenance activity or event that results in deposition of fugitive lead-dust.	Meets RACM. The Hayden rule requires similar rapid clean-up in subsection (D)(9)(c). Any trackout or carry-out on paved roads must be cleaned up "as expeditiously as practicable" and at the end of the workday. While the Hayden rule does not have a time limit similar to South Coast's rule, the Hayden rule is consistent with similar PM10 rules in other Southwest states (see Table 21).

Speed limit of 15 mph with signs posted.	See subsection (h)(11) which requires a plant-wide speed limit of 5 mph.	Meets RACM. The Hayden rule, subsection (D)(9), requires a speed limit for paved roads, which is consistent with other PM10 rules (see Table 21). While South Coast's plant-wide speed limit is lower than the Hayden rule, this would not be practical at Asarco's Hayden Operations, where not all paved roads have the same traffic and operations, and thus vehicle speeds vary. The 15 mph speed limit was factored into the Pb emissions calculations inputted in the modeling, which demonstrates attainment.
Unpaved Roads		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
Chemical dust suppression application schedule for high-leaded unpaved roads, including slag hauler road, secondary crusher road, and reverts crushing operations roads.	Requires that all facility grounds to be encapsulated (paved, with concrete, asphalt, as approved by Executive Director). See subsection (h)(4).	Meets RACM. The Hayden rule, subsection (D)(10), is focused on unpaved roads that have the highest Pb content. While South Coast's rule requires that all facility grounds to be encapsulated, this requirement is consistent with NESHAPs for secondary lead smelters (see 40 CFR Part 63, Subpart X), and no such requirement exists under NESHAPs for primary copper smelters (see 40 CFR Part 63, Subpart QQQ). Furthermore, the control efficiency achieved through the application of chemical dust suppression was inputted in the modeling, demonstrating attainment.

20 percent opacity limit, silt loading limit of 0.33 oz/ft2, and silt content limit of 6 percent.	No requirement.	Meets RACM. As demonstrated in Table 21, the unpaved road stabilization requirements in the Hayden rule, subsection (D)(10)(c), are consistent with other states' PM10 rule requirements for unpaved roads. It is assumed that South Coast has no such requirement considering the rule complies with NESHAPs for secondary lead smelters, which requires all areas subject to vehicle traffic to be encapsulated (i.e. paved).
Maintain back-up watering trucks and personnel for visible emissions control.	No requirement.	Meets RACM. The Hayden rule, subsection (D)(10)(d), requires a protective measure should any visible emissions arise from treated unpaved roads. As shown in Table 21, other states' PM10 rule requirements for unpaved roads do not require such back-up measures. It is assumed that South Coast has no such requirement considering the rule complies with NESHAPs for secondary lead smelters, which requires all areas subject to vehicle traffic to be encapsulated (i.e. paved).
Immediate, but no later than 30 minutes after observation, application of water or chemical dust suppressant where visible emissions are observed.	No requirement.	Meets RACM. The Hayden rule, subsection (D)(10)(e), requires another protective and corrective measure should any visible emissions arise from treated unpaved roads. As shown in Table 21, other states' PM10 rule requirements for unpaved roads do not require such corrective measures. It is assumed that South Coast has no such requirement considering the rule complies with NESHAPs for secondary lead smelters, which requires all areas subject to vehicle traffic to be encapsulated (i.e. paved).

Reapplication of chemical dust suppressants within 24 hours of discovery of breakdown.	No requirement.	Meets RACM. The Hayden rule, subsection (D)(10)(f), requires an additional corrective action should any portion of treated unpaved road break down and be susceptible to dust emissions. As shown in Table 21, other states' PM10 rule requirements for unpaved roads do not require such corrective measures. It is assumed that South Coast has no such requirement considering the rule complies with NESHAPs for secondary lead smelters, which requires all areas subject to vehicle traffic to be encapsulated (i.e. paved).
Collection and prevention of runoff and/or sweeping material	No requirement.	Meets RACM. The Hayden rule, subsection (D)(10)(g), requires a protective measure against re-entrainment of Pb dust from runoff or sweeping materials on unpaved roads. As shown in Table 21, other states' PM10 rule requirements for unpaved roads do not require such protective measure. It is assumed that South Coast has no such requirement considering the rule complies with NESHAPs for secondary lead smelters, which requires all areas subject to vehicle traffic to be encapsulated (i.e. paved).

Speed limit of 15 mph with posted signs.	See subsection (h)(11) which requires a plant-wide speed limit of 5 mph.	Appears to generally meet RACM. The Hayden rule requires the same speed limit for unpaved roads as paved roads. While South Coast's plant-wide speed limit is lower than the Hayden rule, this would not be practical at Asarco's Hayden Operations, where not all unpaved roads have the same traffic and operations (i.e. slag hauler versus general plant traffic), and thus vehicle speeds vary. The 15 mph speed limit for unpaved roads is consistent with paved roads, which essentially provides a restrictive limit for all roads with high leaded dust content. Furthermore, the Hayden rule says the speed limit shall not "exceed 15 mph," which will allow Asarco to operate at speeds lower than 15 mph. The speed limit of 15 mph is also consistent with other PM10 rules (see Table 21).
Storage Piles		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
Water sprays with a 10 percent surface moisture requirement for concentrate, crushed reverts, and bedding material.	Requires total enclosures for battery breaking areas, materials storage and handling areas, and dryer and dryer areas. Emissions from total enclosures are then vented to a lead emission control device. A sealed, leak-proof container is required for sources not stored in a total enclosure. See subsection (e).	Meets RACM. While South Coast's rule matches the requirements for NESHAPs for secondary lead smelters, Asarco will be installing MACT measures under NESHAPs for primary copper smelters. Under NESHAPs for primary copper smelters, storage pile control measures include wind fences and water suppression. Therefore, the Hayden rule meets applicable MACT requirements and thus qualifies as RACT (see subsections (D)(11)-(D)(14). Furthermore, the use of water sprays brings the NAA into attainment.

Wind fences for concentrate, uncrushed reverts, crushed reverts, and bedding material.	Requires total enclosures for battery breaking areas, materials storage and handling areas, and dryer and dryer areas. Emissions from total enclosures are then vented to a lead emission control device. A sealed, leak-proof container is required for sources not stored in a total enclosure. See subsection (e).	Meets RACM. While South Coast's rule matches the requirements for NESHAPs for secondary lead smelters, Asarco will be installing MACT measures under NESHAPs for primary copper smelters. Under NESHAPs for primary copper smelters, storage pile control measures include wind fences and water suppression. Therefore, the Hayden rule meets applicable MACT requirements and thus qualifies as RACT (see subsections (D)(11)-(D)(14). Furthermore, the use of wind fences brings the NAA into attainment.
Concrete pads for concentrate and crushed reverts.	Requires total enclosures for battery breaking areas, materials storage and handling areas, and dryer and dryer areas. Emissions from total enclosures are then vented to a lead emission control device. A sealed, leak-proof container is required for sources not stored in a total enclosure. See subsection (e).	Suggests RACM. While South Coast's rule matches the requirements for NESHAPs for secondary lead smelters, Asarco will be installing MACT measures under NESHAPs for primary copper smelters. As shown in Table 21, no other states' PM10 rules require concrete pads. Therefore, the addition of concrete pads for these sources provide further protection when paired with wind fences and water sprays (see subsections (D)(11) and (D)(13).

Dry acid plant scrubber blowdown solids only in an enclosed system that uses a venturi scrubber, thickener, filter press, and electric dryer that is maintained under negative pressure. The negative pressure of the electric dryer enclosure is maintained using a 2,500 ACFM dyer ventilation fan to be used at all times the electric dryer is operational. Monitoring of the negative pressure is demonstrated through the run and stop states of ventilation fan and electric dryer.	Requires total enclosures for battery breaking areas, materials storage and handling areas, and dryer and dryer areas. Emissions from total enclosures are then vented to a lead emission control device. A sealed, leak-proof container is required for sources not stored in a total enclosure. Ventilation of a total enclosure at any opening must be maintained at a negative pressure of at least 0.02 mm of Hg (0.011 inches of H2O) measured using a digital differential pressure monitoring system. See subsection (e).	Meets RACM. Asarco's use of a total enclosure system for drying acid plant scrubber blowdown solids is consistent with South Coast's use of total enclosures for materials storage sources, which is required MACT under NESHAPs for secondary lead smelters (see 40 CFR § 63.544). No total enclosure requirements exist for Asarco's source category, primary copper smelters, under NESHAPs. Therefore, this Hayden rule requirement is more stringent and meets RACM (see subsection (D)(15).
Ambient Air Monitoring		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
Minimum four sampling sites required.	Minimum four sampling sites required, as approved by Executive Director. See subsection (j).	Meets RACM. The Hayden rule, subsection (F), is consistent with the South Coast rule.
Lead samples must be collected continuously at all sites, with 24-hour filters placed and collected at minimum, every 6 calendar days.	Lead samples must be collected daily as 24-hour, midnight-to-midnight samples at all sites. See subsection (j).	Meets RACM. South Coast's rule is more stringent than the NAAQS and federal requirements. The Hayden rule is consistent with federal ambient air monitoring requirements for Pb in 40 CFR § 58.12.
Submit samples to a certified lab within 18 days after a filter's removal. The lab must then submit analysis/results to owner or operator within 21 days from lab's receipt of samples. The owner or operator must calculate and record within 14 days of results ambient lead concentrations.	Submit samples to SCAQMD-approved lab within 3 calendar days of collection and calculate ambient lead concentrations for individual 24-hour samples within 15 calendar days of the end of the calendar month in which samples were collected. See subsection (j).	Meets RACM. The Hayden rule is consistent with requirements set forth in the EPA/Asarco Consent Decree and laboratory analysis requirements in the South Coast rule. The Hayden rule's time limits allows for more practicality for samples that are collected every 6 days, rather than South Coast's daily collection.

Must retain lead samples for at least 3 years.	Must retain lead samples for 1 year. See subsection (j).	Meets RACM. The Hayden rule requires samples to be retained longer than the South Coast rule to allow historical comparative analyses.
Follow the owner or operator's Quality Assurance Project Plan (QAPP) and operate monitors in accordance with 40 CFR Part 58, Appendix A.	Collect samples in accordance with 40 CFR Part 50, Appendix B and analyze samples in accordance with 40 CFR Part 50, Appendix G. See subsection (j).	Meets RACM. The Hayden rule is consistent with requirements set forth in the EPA/Asarco Consent Decree. Asarco's monitors will not be used for comparison to the NAAQS, therefore, a QAPP is a reasonable requirement. Should the monitors be used for NAAQS-comparison in the future, they will have been sited and operated in accordance with quality assurance requirements in 40 CFR Part 58, Appendix A. At that time, sample analysis and collection can then follow federal requirements rather than the facility's QAPP.
Continuously monitor and record wind speed and direction using station approved by Department.	Continuously record wind speed and direction using station approved by Executive Director. See subsection (j).	Meets RACM. The Hayden rule's meteorogical monitoring requirements is consistent with South Coast's requirements.
Recordkeeping		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
Current and past fugitive dust plans.	No requirement.	Meets RACM. While South Coast does not require a fugitive dust plan, the Hayden rule, subsection (H), is consistent with MACT requirements under NESHAPs for primary copper smelters (see 40 CFR § 63.1445).
Physical inspection sheets, checklists, and/or logsheets.	Records of inspections of control equipment (see subsection (m)(1)(C)).	Meets RACM. The Hayden rule, subsection (H)(1), is consistent with South Coast's recordkeeping requirements for inspections.

All records of unpaved road stabilization and opacity tests and materials piles moisture content tests, if any.	No requirement.	Meets RACM. While the South Coast rule does not require an opacity limit to keep record of, or any road stabilization or moisture requirements, the Hayden rule does and such records must be retained to provide evidence of any opacity observations or soil stabilization tests. See subsection (H)(1).
Maintenance, inspections, quality assurance and control, samples, and wind data from ambient air and meteorological stations, in addition to records of periods where monitors are inoperative.	Results of all ambient air lead monitoring and meteorological monitoring. See subsection (m)(1)(B).	Meets RACM. The Hayden rule is consistent with recordkeeping of ambient air and meteorological samples and data requirements in the South Coast rule. See subsection (H)(1).
Recordkeeping system and records for fugitive dust sources, including visible emissions observations, corrective actions, water sprayer operations, chemical dust suppression application, timing of paved road cleaning, Reference Method 9 opacity readings, operating conditions, calibration records for measurement devices, and records for operational deviations. Records must also reflect who conducted the activity or observation, location/nature of activity, and dates and times.	Records of housekeeping activities, including name of person performing activity, and dates and times on which specific activities were completed. See subsection (m).	Meets RACM. The Hayden rule, subsection (H)(2), is consistent with similar recordkeeping requirements for housekeeping requirements in the South Coast rule.
Records must be maintained for 5 years and kept onsite for at least 2 years.	Records must be maintained for 5 years and kept onsite for at least 2 years. See subsection (m).	Meets RACM. The records retention requirement in the Hayden rule is consistent with the South Coast rule, as well as MACT requirements under NESHAPs for both source categories.

Reporting		
R18-2-B1301.01 Requirement	**Rule 1420.1: South Coast AQMD, CA**	**R18-2-B1301.01 Evaluation**
Quarterly reports that include visible emissions observations, high wind event dates, corrective actions, progress on control construction, raw monitoring data and calculated ambient air concentrations.	By 15th of each month, the results of ambient air lead and wind monitoring. See subsection (n)(1).	Meets RACM. South Coast's reporting is more frequent to follow the daily ambient air monitoring collection requirements in the rule, whereas the Hayden rule, subsection (I), requires the correct reporting frequency to follow the continuous ambient air monitoring requirements (i.e. a 24-hour filter being placed and collected every 6 days).
	Notification and written report for any ambient air concentration exceedances.	Not applicable. The Hayden rule does not require a facility-wide ambient air concentration limit like South Coast. Instead, the Hayden rule requires an emissions limit for the main stack, consistent with the attainment modeling emission rates. Considering the modeling demonstrates attainment, a facility-wide ambient air concentration limit is not needed.
	Initial and ongoing facility status reports. Ongoing facility status reports must be submitted annually. See subsections (n)(3) and (n)(4).	Meets RACM. The Hayden rule, subsection (I), requires quarterly reporting, whereas the South Coast rule requires annual reporting.

4.6 Reasonable Further Progress

4.6.1 Requirements

CAA Section 172(c)(2) requires that nonattainment area plans demonstrate that the area will achieve reasonable further progress (RFP) defined as an incremental reduction in emissions before the attainment date. For Pb nonattainment areas, RFP does not necessarily need to be in the form of linear reductions, but instead is achieved through demonstration of adherence to an "ambitious compliance schedule"[99] which is "expected to periodically yield significant emissions reductions, and as appropriate, linear progress."[100]

4.6.2 Compliance Schedule & Reductions

EPA recommends that Pb nonattainment SIPs provide a detailed schedule for compliance of RACM, including RACT, and accurately indicate the corresponding annual emission reductions to be achieved.[101] EPA notes that it is appropriate to expect early implementation of less technology-intensive measures, followed by more intensive controls later on. Should the area fail to implement such controls, sanctions and contingency measures would be triggered.[102]

Please note that this SIP's control strategy coincides with controls in the Consent Decree, therefore, the control implementation schedule is tied to deadlines mandated by the Consent Decree. Controls for fugitive dust like wind fences will begin installation during 2017, and more intensive controls will be implemented by 2018. Therefore, the Hayden Pb NAA is projected to reduce emissions to meet attainment by 2019 within a two-year period. The compliance date in the smelter rule (R18-2-B1301) is on the earlier of July 1, 2018, or 180 calendar days after completion of CRP improvements.[103] The compliance date in the Pb dust rule (R18-2-B1301.01) is December 1, 2018.[104] Therefore, by 2018, all controls will be implemented and compliance with both rules is expected. The Consent Decree requirements provide for an ambitious compliance schedule and will help the Hayden area attain the NAAQS as expeditiously as practicable.

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[99] *See* 2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers, memorandum issued by Scott Mathias, U.S. EPA. (8 July 2011).
[100] See 73 FR 66964 (Nov. 12, 2008).
[101] 2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers, memorandum issued by Scott Mathias, U.S. EPA. (8 July 2011).
[102] See 73 FR 66964, 67038 (Nov. 12, 2008).
[103] Note that the compliance date is the same date as the new rule for the 2010 SO_2 NAAQS applicable to Asarco (R18-2-B1302). The controls mitigating leaded smelting emissions also mitigate SO_2 emissions, therefore, both rules have the same compliance date. The deadlines in the Consent Decree for these controls dictated the compliance date for both the Pb and SO_2 rules.
[104] Note that the compliance date for the Pb dust rule is later than the date for the smelter rule (R18-2-B1301). This is because some fugitive dust controls, like wind fences, are being installed at a staggered schedule due to resource use, meaning cost, personnel, and current facility configuration.

Table 23 below shows the implementation schedule of RACT required by this SIP, as well as the corresponding annual Pb emissions and pounds of Pb reductions for each control.

Table 23: Control Implementation Schedule and Emission Reductions

Control Measure	Date of Implementation	Pb Emissions Reduced Per Year (tpy)	Pounds of Pb Reduced Per Year (lbs/yr)
Implementation of chemical dust suppression for unpaved roads	Within 30 days of EPA approval of intensity and schedules in Fugitive Dust Plan[105]	0.018	36
Implementation of wind fences for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate)	Within 120 days of EPA approval of the Fugitive Dust Plan or the date of completion in the approved FDP, whichever is later	0.00488	9.76
Implementation of water sprays for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate)	Within 120 days of EPA approval of the Fugitive Dust Plan or the date of completion in the approved FDP, whichever is later		
Implementation of new acid plant scrubber blowdown drying system	November 30, 2016	0.190	380
Implementation of new primary, secondary, and tertiary hooding systems for converter aisle	July 1, 2018	1.318	2636
Implementation of new ventilation system for matte tapping and slag skimming for flash furnace	July 1, 2018	0.393	785
Total Reductions		**1.923**	**3846.8**

[105] The Fugitive Dust Plan referenced in Table 23 above is the Fugitive Dust Plan developed and submitted by Asarco to EPA to comply with the Consent Decree (see Section IV "Compliance Requirements," Paragraph 25, "Fugitive Dust Plan." In the Consent Decree, certain fugitive dust controls must be implemented within a certain amount of time after EPA's approval of designs and the Fugitive Dust Plan (i.e. within 120 days of approval). Considering the SIP's control strategy relies heavily on the controls in the Consent Decree, the RFP schedule for the fugitive dust controls (chemical dust suppressants, wind fences, water sprays, new drying system) thus incorporates the schedule mandated by the Consent Decree.

For Pb nonattainment areas, both RFP and contingency measure requirements are somewhat intertwined. EPA recommends that the amount of emissions reduced by a contingency measure (or group of measures) should equal one year's worth of RFP emissions reductions.

Traditionally, emissions reductions contributable to contingency measures were measured in tons per year (tpy). But in areas where a single source is responsible for nonattainment, EPA thinks it reasonable[106] to identify the amount of reductions required for contingency purposes by reference to reductions in ambient air concentrations. Considering that Pb emissions in the NAA are contributable to Asarco's Hayden Operations, ADEQ used this ambient air concentration approach to measure contingency measure reductions. (See section 4.7 below for more discussion on contingency measures.)

Because contingency measure reductions for the NAA are being measured using ambient air concentrations, and RFP is demonstrated through an ambitious compliance schedule that identifies the annual emissions reductions contributable to each control, ADEQ wanted to depict RFP using both emissions and ambient air concentrations. Because there are two ambient air monitors in the NAA, a demonstration of RFP using data from both monitors are depicted in in Figure 7 and Figure 8 below. Emissions and monitoring data starts at 2012 because that is the base year ADEQ used to calculate reductions contributable to contingency measures (see section 4.7). The RFP "slope" (blue line) is measured in ambient air concentrations, not emissions.

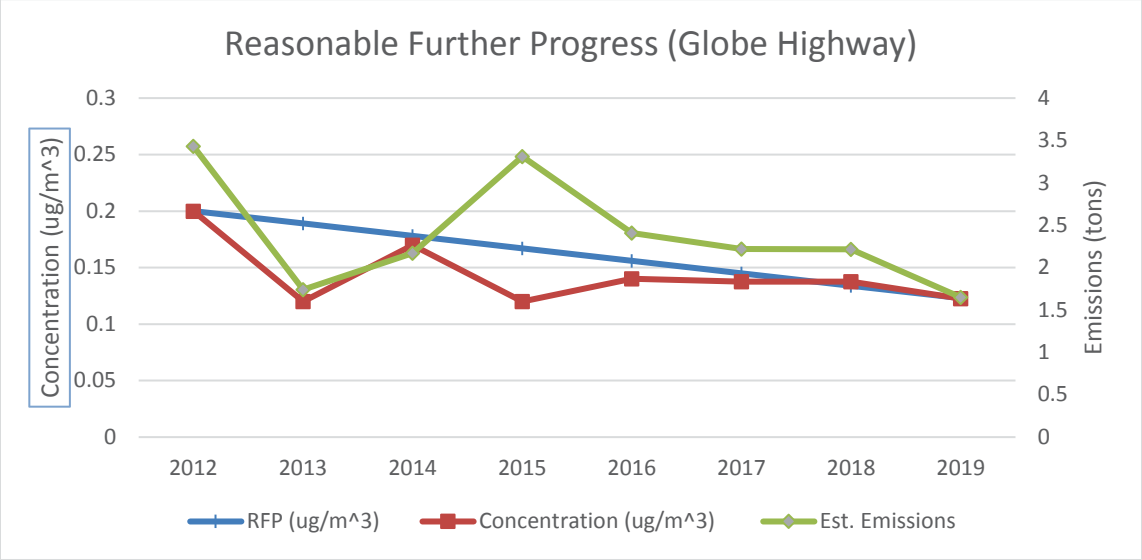


Figure 7: RFP Demonstration (Globe Highway Monitor)

The next figure depicts RFP using data from the Hillcrest monitoring location. The first Hillcrest monitor was not installed by Asarco until 2013. Therefore, the concentration value for year 2012 is the same concentration for year 2012 from the Globe Highway monitor. Then for years 2013-2014, concentrations from the monitor operated by Asarco at Hillcrest is used. ADEQ

[106] *See* 2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers, memorandum issued by Scott Mathias, U.S. EPA. (8 July 2011).

installed a monitor at Hillcrest in 2015. Therefore, for years 2015 and 2016, concentrations from the monitor installed and operated by ADEQ at Hillcrest is used. For future years, historical concentrations were averaged.

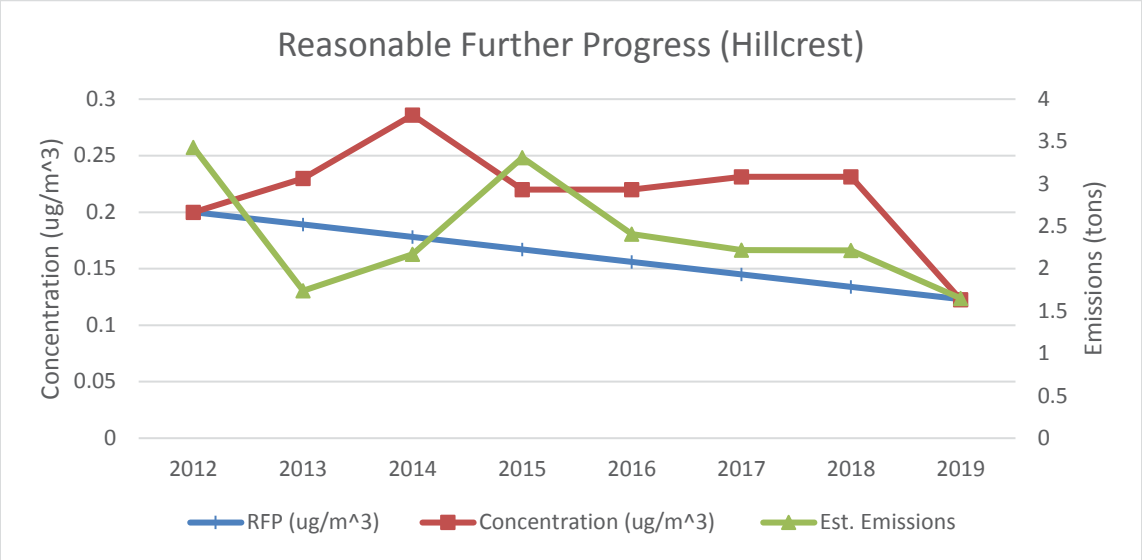


Figure 8: RFP Demonstration (Hillcrest Monitor)

Note that ambient air concentrations and emissions for years 2012-2015 are based on actual data and facility provided estimates, respectively. Emissions for years 2017 and 2018 account for less intensive fugitive dust controls, and 2019 emissions are based on the installation of the CRP improvements on the smelter building.

As expected, there is a gradual decrease in emissions from 2016 to 2018 as fugitive dust controls are implemented, and then a sharp decline in both emissions and concentrations between 2018 and 2019, reflecting more intensive controls. Note that in 2017, Asarco will be operating the newly installed acid plant scrubber blowdown drying system. This change in operations will eliminate emissions from high-leaded ground-level sources, and is anticipated to have a positive impact on ambient air concentrations.

4.7 Contingency Measures

4.7.1 Requirements

CAA 172(c)(9) requires that SIPs contain specific controls, called contingency measures, that will be implemented if the area fails to meet RFP or attain the NAAQS by the attainment date. These measures must be implemented without further action from the state or the Administrator. The key requirements associated with contingency measures for Pb nonattainment areas are:

- Contingency measures must be fully adopted rules or control measures that are ready to be implemented as expeditiously as practicable upon a determination by EPA that the area failed to achieve the 2008 Pb NAAQS by the attainment date or maintain RFP.
- The measures must be able to be implemented without further action (or at least minimal action) by the state or the Administrator.
- The SIP should contain trigger mechanisms for the contingency measures.
- The SIP should contain a schedule of implementation of contingency measures.
- The SIP must also indicate the contingency measures should consist of control measures for the area that are not already part of the control strategy used to demonstrate attainment.
- EPA expects all actions needed to affect full implementation of the measures to occur within 60 days after the EPA notifies the state of a failure to attain or maintain RFP.
- The amount of emissions reduction that a single measure or a group of measures should achieve for contingency purposes would be equal to the amount represented by annual average RFP.

4.7.2 Required Reduction

As mentioned earlier, a contingency measure, or group of measures, must reduce emissions by at least one year's worth of RFP reductions. Traditionally this is demonstrated with emissions reductions. But because one source is contributing the Pb emissions in the NAA, ADEQ is instead measuring reductions using ambient air concentrations.

EPA recommends[107] using the year of designation as the base year for calculating reductions. While the Hayden NAA was designated in 2014, EPA used ambient air monitoring data from 2012 to make the designation. Since the reduction is being measured in ambient air concentrations, ADEQ used 2012 as the base year in the calculation to coincide with the monitoring data EPA used for designation.

EPA recommends subtracting attainment year emissions from base year emissions and then dividing that amount by the number of years between the attainment and base years. The same formula for calculating emissions reductions applies to concentrations.

For the Hayden NAA, ADEQ calculated the annual average RFP using the following equation:

(2019 modeled concentration – 2012 highest monitored concentration) / 7 years = Annual Average RFP

The highest monitored concentration for 2012 was used, considering that in one year, there are actually 12 rolling-three month averages (one for each month). Using the highest recorded

[107] *Id.*, at page 3.

concentration provides a more conservative approach rather than averaging the concentrations.[108]

The annual average RFP is calculated below:

$$0.20\ \mu g/m^3 - 0.12\ \mu g/m^3 / 7\ \text{years} = 0.0114\ \mu g/m^3$$

Therefore, contingency measures for the Hayden nonattainment area must reduce ambient Pb concentrations by 0.0114 $\mu g/m^3$ when triggered.

4.7.3 Contingency Measure: Increased Paved Road Cleaning

A provision in rule R18-2-B1301.01 requires Asarco to double the frequency of paved road cleaning from once per day to twice per day. ADEQ modeled two different scenarios to measure the outcome of ambient air reductions: 1) attainment modeling with once/day paved road cleaning, and 2) attainment modeling with twice/day paved road cleaning.

To model revised emissions for the twice/day cleaning, ADEQ used a technical support document from the Maricopa Association of Government's (MAG) transportation improvement program[109] that demonstrates how paved road cleaning impacts silt loading. In MAG's analysis, conventional street sweepers, as those used by Asarco, reduce silt loading by 55 percent of the original value on the day of sweeping.[110] MAG's analysis is based on PM_{10}. This is consistent with ADEQ's Pb emissions calculations for paved roads, which use PM_{10} as a starting point for the calculation. Rather than using MAG's 55 percent reduction on the day of sweeping, ADEQ included a 10 percent margin of safety, which resulted in a 45 percent reduction in silt content percent for paved roads. This reduction is assumed to reflect the increased cleaning frequency. ADEQ's methods and assumptions are further detailed in the Technical Memo, "Hayden Pb Contingency Assumptions," in Appendix E.

The NAAQS design value from the attainment modeling is 0.1226 $\mu g/m^3$. The NAAQS design value from the contingency measure modeling is 0.1103 $\mu g/m^3$. The difference between these two concentrations is 0.0123 $\mu g/m^3$, which is more than the required reduction needed for contingency purposes (which is 0.0114 $\mu g/m^3$). Therefore, the increased frequency of paved road cleaning achieves the required reduction needed to protect RFP and attainment.

The contingency measure is triggered upon either failure to meet the control implementation deadlines in Table 23 (RFP) or failure to meet attainment of the NAAQS by the statutory attainment date. The contingency measure must be implemented within 60 days of notification

[108] *See* EPA's designation of the Hayden NAA for 2012 ambient air concentrations for each rolling three month period: 79 FR 52205, 52206 (Sept. 3, 2014). Please also note that year 2013 data was generally trending lower concentrations than 2012 data, which provides further basis for using 2012 as the base year in the calculation.
[109] See *Methodologies for Evaluating Congestion Mitigation and Air Quality Improvement Projects*, Maricopa Association of Governments, April 16, 2009. Available here: http://azmag.gov/Documents/pdf/cms.resource/EP_2009-04-16_Evaluating-Congestion-Mitigation-and-Air-Quality-Improvement-Projects_54941.pdf
[110] *Id*., at page 36.

by EPA Region 9 of such failure. These triggers, 60-day timeframe, as well as the actual contingency measure, were incorporated into R18-2-B1301.01[111] to conform with EPA guidance, which expects that contingency measures should take effect "without further action by the state or the Administrator." EPA interprets this requirement to mean that no further rulemaking actions by the state, or EPA, would be needed to implement the contingency measures.[112] By having the contingency measure requirements in R18-2-B1301.01, there is no further action needed to have the increased paved road cleaning take effect. ADEQ will ensure that the measure is fully implemented within the 60 days timeframe.

The increased paved road cleaning is also a practical contingency measure, as Asarco will already be operating cleaning devices and conducting such cleaning as part of the SIP's control strategy for fugitive Pb dust. Considering that dust sources like paved roads are located near ambient air monitors, controlling them is important to achieve attainment.

[111] *See* subsection (E) in particular.
[112] *See* 73 FR 66964 (Nov. 12, 2008).

5 Attainment Demonstration

ADEQ conducted air quality modeling for the Hayden NAA to demonstrate attainment of the 2008 Pb NAAQS by 2019. Air quality modeling is conducted to show that the control measures, emission limits, and rules that will be implemented at the air pollution source(s) are adequate to provide for attainment and maintenance of the applicable NAAQS. The adequacy of control strategies should be demonstrated by means of air quality models, databases, and other requirements specified in the Guideline on Air Quality Models in 40 CFR Part 51, Appendix W.[113] The modeling demonstration should also contain a summary of maximum air quality concentrations expected to result from implementation of the control strategy,[114] as well as a presentation of emission levels expected to result from implementation of each control measure.[115]

Modeling for the Hayden Pb NAA was performed in accordance with the EPA's Guideline on Air Quality Models (GAQM). Additionally, ADEQ referred to the "2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers" guidance document.

This chapter provides an overview of the methodologies and results from the modeling conducted to demonstrate that the control strategy for this SIP originating from the Consent Decree will bring the Hayden Pb NAA into attainment. More information can be found in the Attainment Modeling Technical Support Document (Modeling TSD) in Appendix B.

5.1 Modeling Demonstration Overview

There are many types of air quality modeling, and the type is selected based on the characteristics of the pollutant being modeled. Dispersion modeling is EPA's preferred type for modeling Pb. In general, dispersion modeling uses mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source. A dispersion model uses emission rates and meteorological inputs to predict ambient air concentrations. These air concentrations are modeled at specific locations—referred to as receptors—within the modeled ambient air boundaries. The receptors are located in areas that are accessible to people, therefore, areas that are considered ambient air.[116] The ambient air concentrations at these receptors and in the area as a whole determines attainment of the NAAQS.

5.1.1 Modeling Domain

The first step in modeling is to determine the size of the modeling domain, which depends on the number of sources to explicitly model and size of the receptor network in order to account for the areas of impact. The modeling domain should at a minimum encompass the

[113] *See* 40 CFR § 51.112.
[114] *See* 40 CFR § 51.115.
[115] *See* 40 CFR § 51.112.
[116] *See* 40 CFR § 50.1 for the legal definition of "ambient air."

nonattainment area and include the sources thought most likely to cause or contribute to NAAQS violations in and around the nonattainment area. In the modeling exercise, all modeled receptors should exhibit modeled attainment of the NAAQS.

ADEQ established the modeling domain for the Hayden Pb NAA by analyzing emission sources and developing the ambient air boundaries for the receptor network.

5.1.1.1 Modeled Emission Sources

ADEQ's Emissions Inventory (EI) for the Hayden Pb NAA includes point, area, and mobile nonroad sources. The point source category contributes 99 percent of the Pb emissions in the NAA. Moreover, the only facility in this category is the ASARCO's Hayden Operations. Due to this inventory make up, ADEQ focused its contributing sources analysis on the aforementioned facility.

At the ASARCO facility, ADEQ has determined the following processes/emissions points to be the contributors of Pb emissions:

- Main stack emissions
- Fugitive emissions from the smelting process
- Fugitive leaded dust emissions (i.e. slag dumping and re-entrained leaded silts/material)

Of the sources listed above, ADEQ believes that the main stack emissions to contribute the least to ambient air lead concentrations. This is due to the amount of dispersion possible when the plume is emitted at 1,000 feet (304 m), which is the height of the stack at this facility.

ADEQ's Emissions Inventory analyzes the impact of smelting process-related fugitive emissions and fugitive dust sources at various monitors near the smelter. Some monitors are impacted more by the smelting process fugitives, while others are impacted more by fugitive dust sources. The two SLAMS monitors are Hillcrest and the Globe Highway monitors. At the Hillcrest monitor, materials handling sources contribute the most to NAAQS exceedances. ADEQ theorizes this is due to the open air drying of the acid plant scrubber blowdown solids that takes place east of the monitor, which will be consolidated into an enclosed system prior to the attainment year.

At the Globe Highway monitor, hot gaseous Pb emissions have the largest contribution to NAAQS exceedances. The sources impacting this monitor are likely slag dumping and smelting process-related fugitives. See the Emissions Inventory in Appendix A for an in-depth analysis on emission sources. Refer to the Modeling TSD in Appendix B for more information on how these emission sources were configured and inputted into the model.

5.1.1.2 Ambient Air Boundary and Receptor Grid

In conducting modeling for its permit, ASARCO followed guidance in Section 3.4.3 of the ADEQ's Air Dispersion Modeling Guidelines (ADMG) to identify two separate areas with determined boundaries to model. The Ambient Air Boundary (AAB) is the area open to the public of which

modeling receptors are to be placed. The Process Area Boundary (PAB) is the area that consists of ASARCO's copper concentrating and smelting operations. The PAB is fenced and not considered to be accessible by the public, therefore is not considered ambient air.

In defining the PAB, Asarco included only areas where processes, operations, and activities associated with and supporting Asarco's concentrating and smelting operations occur. As such, the PAB included the locations of equipment and operations where the handling, processing, movement, and management of feed materials, products, and byproducts are conducted. Asarco properties connected to the Hayden Operations but not part of the PAB, were treated as "ambient air" for modeling purposes. During the preparation of this TSD, EPA requested more clarifications on the methodology that was used to define the process air boundary, which is also known as the "ambient air boundary" or AAB. EPA also requested revisions or justification of the portions of the boundary that were not defined based on installation of physical barriers such as fence lines. Asarco submitted additional data and submitted a revised PAB to ADEQ to be included in the modeling. Figure 9 shows the updated AAB.



Figure 9: Asarco Ambient Air Boundary

In January 2017, Asarco informed ADEQ that they had purchased land to the east of the smelter, which was previously excluded from the AAB. ADEQ included this land to Asarco's AAB and updated the modeling information. However, it did not change the final modeling results. Figure 10 below shows the updated AAB.



Figure 10: Asarco's Updated Ambient Air Boundary

A modeling domain with a total coverage of approximately 33 kilometers by 34 kilometers, centered on the Asarco Smelter facility was developed. The modeling domain covers portions of Gila and Pinal Counties and encompasses the entire Hayden NAA. A total of 2,753 receptors were placed in the modeling domain. Spacing of the receptors is as follows:

- every 25 m along the AAB;
- every 100 m from the AAB to a distance of 1 km (including the Towns of Hayden and Winkelman);
- every 500 m from 1 km out to a distance of 4 km;
- every 1000 m from 4 km to the NAA boundary; and
- every 2500 m along the NAA.

Additional methods are discussed further in the Modeling TSD. Figure 11 below depicts the modeled receptors with the updated AAB.



Figure 11: Modeled Receptors

5.1.2 Model Selection & Approach

5.1.2.1 Hybrid Modeling Approach

Situated in a low-lying portion of a valley, with mountains reaching over 4,000 feet to the north, east and southwest, the Hayden NAA is subject to a distinct mountain-valley diurnal wind pattern. Under stable atmospheric conditions, nighttime winds are typically from the southeast with speeds less than 10 miles per hour. These conditions cause air to pool in low-lying areas at night, causing pollutants within the air to settle in these areas. The up-slope air flows and convection that occur during the day increase dispersion out of the Hayden area. Under normal daytime conditions, surface winds in the Hayden area range from west-southwesterly to west-northwesterly as the atmosphere becomes less stable.

In the Hayden SO_2 SIP, Camera Hill meteorological (MET) data was used because it best represented MET conditions seen at the main stack, which has the highest impact on ambient SO_2 concentrations. However, for the Hayden Pb SIP, a large number of sources exist near ground level, with a significant elevation difference with Camera Hill. Using the Camera Hill MET data to model these emission sources may not be representative of the actual Pb concentrations in the modeling area. Additionally, the very complex terrain in Hayden area

causes the monitoring stations to experience different wind speeds and wind directions for a given time period. Considering all these issues, ADEQ decided to use a hybrid approach to model Asarco's Pb emissions. In this approach two different MET data sets were used to run AERMOD. Camera Hill MET data were used to model the emissions from the main stack and roofline fugitives and Hayden Old Jail MET data were used to model the emissions from near ground sources such as material storage and handling and road dust emissions.

ADEQ's performance evaluation of the hybrid approach is in the Modeling TSD in Appendix B.

5.1.2.2 AERMOD

ADEQ used the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), version 15181 to predict ambient concentrations in simple, complex and intermediate terrain. AERMOD is the recommended sequential model in EPA's GAQM (40 CFR 51, Appendix W) (U.S. EPA, 2005) for near-field analysis.

There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET (version 15181), a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP (version 11103), a terrain data preprocessor that incorporates complex terrain using USGS Digital Elevation Data. Other non-regulatory components of this system include: AERSURFACE (Version 13016), a surface characteristics preprocessor, and BPIPPRIM, a multi-building dimensions program incorporating the Good Engineering Practice technical procedures for PRIME applications (U.S. EPA, 2004a).

ADEQ used the regulatory default option. This option commands AERMOD to:

- Use the elevated terrain algorithms requiring input of terrain height data for receptors and emission sources;
- Use stack tip downwash (building downwash automatically overrides);
- Use the calms processing routines;
- Use buoyancy-induced dispersion; and
- Use the missing meteorological data processing routines.

5.1.2.3 LEADPOST

The NAAQS for lead is defined as 0.15 µg/m^3 for rolling three-month averaging time. Therefore, the modeled design value is calculated as the rolling three-month average concentration at each receptor. AERMOD does not calculate the design value, so post-processing is required. The EPA post-processor, LEADPOST, can be used to calculate the design values.

LEADPOST is a FORTRAN program designed to read monthly concentration output from AERMOD or an alternative model and calculate rolling three-month averages by receptor and source group.

This program was used to calculate the maximum rolling three-month average concentration for each receptor and overall maximum concentration (across all receptors and source groups).

In the hybrid approach, AERMOD was run separately using each of the MET data sets and their associated emission sources. Post-processing files containing highest monthly concentrations were generated for each run. Post-processing files were then processed to combine the concentrations predicted at each receptor. The combined Post-processing file was then used as an input to LEADPOST to calculate the maximum rolling 3-month average concentration.

5.1.3 Meteorological Data

EPA's AERMET tool (version 15181) was used to process meteorological data for use with AERMOD. AERMET merges National Weather Service (NWS) surface observations with NWS upper air observations and performs calculations of meteorological parameters required by AERMOD.

EPA recommends that AERMOD be run with a minimum of 5 years of NWS data or 1 year of on-site meteorological data. As described in Section 5.1.2, a hybrid modeling approach was used for this project. The meteorological data used in the sequential modeling consists of on-site hourly surface observations collected by Asarco from a 10-meter tower located approximately 0.35 kilometers south of the smelter building, on Camera Hill and also on-site hourly surface observations collected by ADEQ's Hayden Old Jail 10-meter station located approximately 1.06 kilometers west of the Asarco concentrator and smelter complexes.

The Camera Hill met data were used to model the Pb emissions from the main stack and fugitive rooflines and Hayden Old Jail met data were used to model the emissions from lower elevation sources such as material storage and handling sources, paved roads, unpaved roads, etc. The meteorological data used in the modeling cover the period from August 2013 to August 2014, with the raw on-site data provided by Asarco and ADEQ.

EPA's AERSURFACE tool was used to calculate the surface roughness length, albedo and Bowen ratio inputs required by AERMET. EPA developed AERSURFACE to identify these parameters within a defined radius from a specified point. In this case, ADEQ input the UTM coordinates of the on-site meteorological stations to AERSURFACE along with a 1-kilometer radius per EPA guidance. USGS National Land Cover Data (NLCD) for the area were used as inputs to AERSURFACE.

Meteorological data from the two ambient air monitors is provided in the Modeling TSD in Appendix B.

5.1.4 Background Concentration

EPA requires background air quality estimates to be added to modeling results for comparison to the NAAQS. For the Hayden Pb project ADEQ determined a background concentration based on a regional monitor to be more appropriate than local monitors. This determination was based on the nature of lead emissions from the facility.

For this demonstration ADEQ based its background ambient air lead concentration on data collected from the Pima County Department of Environmental Quality's State or Local Air Monitoring Station (SLAMS) termed Children's Park monitor located in Tucson. This monitor began collecting data on February 27, 2012, and collects total suspended particle (TSP) data over a 24-hour period.

The methodology used to calculate the background concentration involved taking all measurements during 2013 and calculating a mean concentration. The year 2013 was chosen rather than the base year due to completeness of data (two months of data were missing in the base year). Using the 59 observations in 2013 an annual mean of 0.0028 µg/m^3 was calculated. This values was then added to the modeled concentration as background Pb concentration.

5.2 Modeling Results and Emission Limits

By the attainment year, emission reductions will be achieved through the implementation of controls required by rules R18-2-B1301 and R18-2-B1301.01. Table 24 below depicts the amount of Pb emissions reductions achieved by the control measures. The "Modeled Emissions" listed in the last column were inputted into the modeling and the three-month rolling average concentrations were calculated using LEADPOST post-processor.

It should be noted that the emissions used in the model were a combination of what Asarco requested for a permit limit (main stack and smelter fugitives)[117] and conservative calculation methodologies.[118] ADEQ included the emission limit for the main stack in R18-2-B1301, which is the modeled permit limit Asarco requested, converted from tons per year to pounds per hour.

In Table 24, 2019 projected actual emissions are also listed for each source. These values were supplied by the facility and used the same calculation methodologies that were used for 2012 actual emission as well as PTEs.

For the main stack and roofline fugitive emissions, anticipated emission reductions (from future state controls) were applied to historic data. Emissions from materials handling operations and roads were calculated using more realistic throughput and Pb factors. This is opposed to the conservative assumptions made when calculating modeled PTE emissions.

[117] See the Modeling TSD in Appendix B for more information on the requested permit limits.
[118] See the Emission Inventory TSD in Appendix A for calculation methodologies.

Table 24: Past, Future, and Modeled Emissions

Modeled Source	Controls Applied	2012 Actual Emissions, t/y	2019 Projected Actual Emissions, t/y	Projected Reductions	Modeled Emissions, t/y[119]
Main Stack	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding.	1.08	0.889	17%	2.99 (PTE)
Flash Furnace Fugitives	Matte Tapping Ventilation System	0.495	0.1025	79.3%	1.03 (PTE)
Converter Aisle Fugitives	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding	0.968	0.024	97.5%	0.37 (PTE)
Anode Furnace Fugitives	Improved ventilation system	0.417	0.0431	89.7%	0.04 (PTE)
Anode Baghouse Stack	Sent to the main stack	0.0113	0.0145	N/A	Included in main stack
Slag Dump	Restrictions on slag dumping location	0.05	0.05	__	0.05
Acid Plant Scrubber Blowdown Solids Drying	Thickener Project	0.26	0.07	73%	0.07 (PTE)
Concentrate storage area	Wind fence, water sprays	0.001	0.000056	94%	0.00088 (PTE)
Bedding area	Wind fence, water sprays	0.00017	0.000015	91%	0.00016 (PTE)
Reverts operations	Wind fence, water sprays	0.0122	0.00042	97%	0.0041 (PTE)
Paved Roads	Sweepers	0.091	0.015	84%	0.015
Unpaved Roads	Chemical Dust Suppressant (on a schedule achieving 90% control efficiency)	0.046	0.028	39%	0.028

[119] Potential to Emit (PTE) values for the concentrate storage area, bedding area, and reverts operations were derived using the same calculation methods that were applied to calculate 2019 projected actuals. However, for PTE values, Asarco supplied more conservative throughput. Also the lead factors used for PTE calculations were based on mean lead assay values (source specific) plus two standard deviations.

Table 25 presents the actual ambient Pb concentration resulting from the modeling, which is 0.12 µg/m^3 on a rolling three-month average, demonstrating attainment.

Table 25: Maximum Modeled Ambient Pb Concentration

Modeled Source	Design Concentration, µg/m^3	Background Concentration, µg/m^3	Total Concentration, µg/m^3	NAAQS, µg/m^3
Asarco Smelter Facility	0.1198 [a]	0.0028	0.1226	0.15
a. Predicted to occur at (520655.09375 m, 3651578.00 m)				

ADEQ's full modeling demonstration is in the Modeling TSD in Appendix B.

6 Anti-Backsliding Provisions

Section 110(l) of the CAA provides that EPA shall not approve a SIP revision if it interferes with attainment, reasonable further progress, or other CAA requirements:

> *"Each revision to an implementation plan submitted by a State under this Act shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171), or any other applicable requirement of this Act."*

In addition to 110(l), CAA §193 prohibits the modification of a control, or a control requirement, in effect or required to be adopted before November 15, 1990 in any nonattainment area unless such a modification ensures equivalent or greater emission reductions:

> *"Each regulation, standard, rule, notice, order and guidance promulgated or issued by the Administrator under this Act, as in effect before the date of the enactment of the Clean Air Act Amendments of 1990 shall remain in effect according to its terms, except to the extent otherwise provided under this Act, inconsistent with any provision of this Act, or revised by the Administrator. No control requirement in effect, or required to be adopted by an order, settlement agreement, or plan in effect before the date of the enactment of the Clean Air Act Amendments of 1990 in any area which is a nonattainment are for any air pollutant may be modified after such enactment in any manner unless the modification insures equivalent or greater emission reductions of such air pollutant."*

The 2008 Pb NAAQs proposed rule[120] states that "any proposed SIP revision being considered by EPA after the effective date of the revised Pb NAAQs would be evaluated for its potential to interfere with attainment or maintenance of the new standard...EPA believes that any area attaining the revised Pb NAAQS would also attain the existing Pb NAAQS, and thus reviewing proposed SIP revisions for interference with the new standard will be sufficient to prevent backsliding." Furthermore, EPA proposed to retain the existing 1978 Pb NAAQS until one year following the effective date of designations for any new or revised NAAQS, except that for current nonattainment areas, the standard would remain in effect until approval of a SIP for the new standard. EPA finalized[121] the proposed approach effective January 12, 2009.

No area in Arizona has ever been designated nonattainment for the 1978 Pb NAAQS.[122] The only area in Arizona designated nonattainment for the 2008 Pb NAAQS is Hayden. Therefore, Hayden only needs to attain the 2008 Pb NAAQS, and interference with the 1978 standards is not applicable.

The control strategies described in this SIP revision are intended to bring the Hayden area into attainment for the 2008 Pb NAAQS. The information contained in Chapters 4 and 5 evaluate the

[120] *See* 73 FR 29184, 29275 (May 20, 2008).
[121] *See* 73 FR 66964 (Nov. 12, 2008).
[122] *See* 56 FR 56694 (Nov. 6, 1991).

control strategies and emission reductions that will occur from implementation of the new control technology. The following sections demonstrate that this SIP revision will not interfere with the ability of the Hayden NAA to attain and maintain any other NAAQS under the CAA.

6.1 Demonstrating Noninterference with Attainment of the NAAQS under CAA Section 110(l)

Title I of the CAA requires EPA to set NAAQS for those pollutants that are considered harmful to public health or the environment. Accordingly, the air quality standards are divided into two types: primary and secondary. Primary standards are designed for the protection of public health and secondary standards are intended to protect public welfare, such as decreased visibility and damage to animals, crops, vegetation, and buildings.[123] To date, EPA has established standards for six common air pollutants referred to as criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ground-level ozone O_3, particulate matter (PM), and sulfur dioxide (SO_2). EPA is also required to periodically evaluate those standards and revise them if scientific analyses indicate new standards would be more protective of public health and welfare.

Under Clean Air Act Section 107(d), states must make recommendations and EPA must designate areas that meet (attainment), cannot be classified, or do not meet (nonattainment) new or revised NAAQS. Based on air quality data and other factors, EPA designates areas as "nonattainment" if those areas are found to violate or contribute to violations of a NAAQS. Reasonable further progress is defined in Section 171 of the CAA as *"… such annual incremental reductions in emissions of the relevant air pollutant … for the purpose of ensuring attainment of the applicable national ambient air quality standard ..."*

The Hayden Pb NAA is located in both Gila and Pinal counties in which a primary copper smelter currently owned by ASARCO operates. The area is designated as attainment or unclassifiable for CO, NO_2, O_3, and $PM_{2.5}$. Although designations have not yet been made for the 2015 O_3 NAAQS, the area is recommended as attainment or unclassifiable for that pollutant under CAA Section 107(d)(1)(A).[124] The area is designated nonattainment for SO_2, Pb, and PM_{10}. Table 26 shows the current designation status of the area for each criteria pollutant listed in 40 CFR 81.303.[125]

[123] U.S. Environmental Protection Agency, http://www.epa.gov/air/criteria.html. Date Accessed: October 29, 2013.
[124] Arizona Department of Environmental Quality. (2016). 2015 Ozone NAAQS Boundary Recommendation.
[125] 40 CFR 81.303, July 1, 2015 Edition.

Table 26: NAAQS Designations for Hayden

Designation Status for the Hayden Planning Area			
Pollutant	**Primary/Secondary**	**Averaging Time**	**Designation**
Carbon Monoxide (CO)	Primary (1971)	8-hour	Nonclassifiable/Attainment
		1-hour	Nonclassifiable/Attainment
Lead (Pb)	Primary and Secondary (2008)	Rolling 3 Month Average	Nonattainment
Nitrogen Dioxide (NO_2)	Primary (2010)	1-hour	Unclassifiable/Attainment
	Primary and Secondary (1971)	Annual	Cannot be classified or better than national standards
Ozone (O_3)	Primary and Secondary (2015)	8-hour	Not yet designated
	Primary and Secondary (2008)	8-hour	Unclassifiable/Attainment
	Primary and Secondary (1997)	8-hour	Unclassifiable/Attainment
$PM_{2.5}$	Primary (2012)	Annual	Unclassifiable/Attainment
	Primary and Secondary (2006)	24-hour	Unclassifiable/Attainment
	Primary and Secondary (1997)	Annual	Unclassifiable/Attainment
	Primary and Secondary (1997)	24-hour	Unclassifiable/Attainment
PM_{10}	Primary and Secondary (1987)	24-hour	Nonattainment
Sulfur Dioxide	Primary (2010)	1-hour	Nonattainment
	Primary (1971)	24-hour	Does not meet primary standards
	Primary (1971)	Annual	Does not meet primary standards
	Secondary (1971)	3-hour	N/A
Source: 40 CFR 81.303			

6.2 Noninterference with Attainment of the 1978 Pb NAAQS

In 1991, EPA finalized designations for the 1978 Pb NAAQS, in addition to designations for ozone, CO, and PM.[126] Designations became effective on January 6, 1992. In January and February 1991, EPA notified Governors of affected states that they should proceed to designate as nonattainment those areas that had recorded violations of the 1978 Pb NAAQS. States that were designated nonattainment included Alabama, Georgia, Indiana, Minnesota, Montana, but not any areas in Arizona. As stated earlier, Hayden needs to attain the 2008 Pb NAAQS and thus, interference with the 1978 Pb NAAQS is not applicable.

6.3 Noninterference with Attainment of the PM_{10} NAAQS

Along with Miami, the Hayden area was originally designated as a Group I Area under the 1987 PM_{10} NAAQS. The State was required to submit a SIP revision within nine months of promulgation of the NAAQS.[127]

In a 1990 clarification, the combined Hayden/Miami Group I Area was specified to include all or part of 26 contiguous townships in and around the towns of Hayden and Miami. Consistent with EPA's PM_{10} grouping scheme, the Hayden/Miami Group I Area was designated and classified as a moderate PM_{10} nonattainment area upon enactment of the 1990 CAA amendments.[128]

In September 1989 ADEQ submitted the *Final PM_{10} State Implementation Plan for the Hayden Group I Area.* In July 1994, EPA proposed a limited approval/disapproval of the Hayden SIP. EPA proposed the limited disapproval primarily because the plan only addressed the Hayden portion of the nonattainment area. ADEQ submitted a formal petition to exclude the Miami area from the Hayden/Miami PM_{10} Nonattainment Area in November 1994. EPA advised ADEQ that because the Miami area had recorded past exceedances of the TSP standards and had met the 1990 PM_{10} nonattainment designation criteria, the Miami portion could not be excluded from nonattainment area status.

In July 2006, ADEQ requested that the Hayden/Miami PM_{10} Nonattainment Area be separated into two nonattainment areas. The request was based on topographical and climatological differences between the Hayden and Miami areas (the areas are in separate airsheds) and the clean PM_{10} air quality record in the Miami area (no exceedances have been recorded since PM_{10} monitoring began in 1987). On March 28, 2007 EPA concurred with ADEQ's request and the Hayden/Miami PM_{10} Nonattainment Area was officially split into two independent nonattainment areas.[129] In the same action, EPA also determined that the Miami Nonattainment Area had continued to meet the PM_{10} NAAQS and issued a clean data finding for

[126] *See* 56 FR 56694 (Nov. 6, 1991).
[127] *See* 52 FR 24672 (July 1, 1987) and 52 FR 29383 (Aug. 7, 1987).
[128] Effective November 15, 1990.
[129] 72 FR 14422, March 28, 2007; effective May 29, 2007

the area. Currently, both Miami and Hayden are still designated nonattainment until ADEQ submits maintenance SIPs and redesignation requests.

Table 27 shows the potential PM_{10} emissions from operations at the Hayden Smelter. The data show that potential emissions have not changed from previous years and are not anticipated to change in future years.

Table 27: Potential PM10 Emissions For Hayden Smelter

Potential PM10 Emissions from Hayden Smelting Operations (tpy)								
Facility	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2018**	**2023**
Hayden Concentrator	197	197	197	197	197	197	197	197
Hayden Smelter	290	290	290	290	290	290	244	244
Ray Mine	3237	3237	3237	3237	3237	3237	3237	3237
Source: ADEQ and Pinal County Air Quality Department, Annual Emissions Data Reports								

Table 28 shows the actual emissions of PM_{10} at Asarco's Hayden Concentrator, Hayden Smelter, and Ray Mine. While the potential to emit remains constant, actual emissions of PM_{10} for the smelter and concentrator slightly increase between 2011 and 2014, and actual emissions for the Ray Mine lessen between 2011 and 2014.

Table 28: Actual PM10 Emissions For Hayden Smelter

Facility PM_{10} Actual Emissions (tons/year)				
Facility	**2011**	**2012**	**2013**	**2014**
Asarco – Hayden Concentrator	26.35	24.59	26.22	44.05
Asarco – Hayden Smelter	269.75	154.64	174.74	210.99
Asarco – Ray Mine	1,347.34	1,579.84	1,078.15	644.23
Source: ADEQ and Pinal County Air Quality Department, Annual Emissions Data Reports				

Table 29 shows the ambient monitoring data for the Hayden Old Jail Monitor, which is the monitoring site used for comparison with the PM_{10} NAAQS. The data show that the monthly concentrations are below the PM_{10} NAAQS. Since June 2013, there have been no recorded exceedances at the Hayden Old Jail.

Table 29: Ave PM10 Ambient Air Concentrations

Monthly Average PM_{10} Concentrations at the Hayden Old Jail Monitor	
Date	**Average PM_{10} ($\mu g/m^3$) Concentrations**
June 2013	69.68
July 2013	36.68
August 2013	34.23
September 2013	38.06
October 2013	50.45
November 2013	29.58
December 2013	25.56
January 2014	40.74
February 2014	38.98
March 2014	44.71
April 2014	44.79
May 2014	52.29
June 2014	50.37
July 2014	36.37
August 2014	33.25
September 2014	28.06
October 2014	36.56
November 2014	31.78
December 2014	23.09
Source: ADEQ Ambient Monitoring Data for the Hayden Old Jail	

ADEQ is currently developing a redesignation request and maintenance SIP for the Hayden PM_{10} NAA. Current air quality is showing no exceedances and is expected to maintain clean air quality in the future, especially with the addition of fugitive Pb dust controls implemented by Asarco to comply with the Consent Decree and this SIP. The reductions in fugitive Pb dust emissions, and thus PM emissions, achieved by the controls, combined with the current clean air quality, demonstrates noninterference with the PM_{10} NAAQS in the Hayden area.

6.4 Noninterference with Attainment of the 1971 and 2010 SO2 NAAQS

The Hayden SO_2 Nonattainment Area was initially designated under the 1971 SO_2 NAAQS in March 1978 and comprised all of Gila County.[130] The current boundaries of the nonattainment and unclassified areas are codified at 40 CFR 81.303.

In 2006, EPA initiated a review of the air quality criteria for oxides of sulfur and the 1971 SO_2 primary NAAQS.[131] Taking into consideration available literature, technical information, and scientific recommendations, EPA proposed that the 24-hour and annual 1971 SO_2 NAAQS were

[130] *See* 43 FR 8968 (March 3, 1978).
[131] *See* 71 FR 28023.

not adequate to protect public health with a satisfactory margin of safety against respiratory problems associated with short-term SO_2 exposures.[132] On June 22, 2010 EPA promulgated the new 2010 SO_2 NAAQS establishing a new short-term primary standard with a 1-hour (daily maximum) averaging time and a form defined as the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations, and a level of 75 ppb.[133] In the same action, EPA also revoked the 1971 24-hour and annual standards recognizing that a 1-hour standard set at 75 ppb will have the effect of generally maintaining 24-hour and annual SO_2 concentrations well below the levels of the 1971 24-hour and annual standards.

In the 2010 SO_2 NAAQS final rule, EPA determined that the 1971 24-hour and annual primary standard will remain in effect for at least one year following the effective date of the initial area designations before being revoked under 40 CFR 50.4(e). For any SO_2 areas with EPA-approved attainment and maintenance SIPs for the 1971 SO_2 NAAQS, all provisions in the SIPs need to continue to be implemented until they are subsumed by any new EPA-approved SIPs for the 2010 SO_2 NAAQS. This would ensure that both the new nonattainment NSR requirements and the general conformity requirements for a revised standard are in place so that there will be no gap in the public health protections provided by these two programs. It will also ensure that all nonattainment areas under the current NAAQS and all areas for which SIP calls have been issued would continue to be protected by currently required control measures.

The final regulations also stipulate that the 1971 SO_2 NAAQS shall remain in place for nonattainment areas not satisfying the requirements for a SIP call under the prior NAAQS. The 1971 SO_2 NAAQS will be revoked only after an air agency submits a SIP providing for attainment of the 2010 SO_2 NAAQS and it is approved by EPA.

ADEQ submitted to EPA the Hayden SO_2 Nonattainment Area State Implementation and Maintenance Plan for the 1971 SO_2 NAAQS in June 2002. EPA has not acted on the June 2002 submittal. Per EPA's guidance, the 1971 standard will not be revoked until the SIP revision for the 2010 SO_2 NAAQS is submitted to and is approved by EPA. Therefore, the state is required to continue to implement provisions of the 2002 Hayden SO_2 SIP. When the 24-hour and annual SO_2 standards are officially revoked, all statutory requirements related to future state submission regarding the 1971 SO_2 standards under CAA Sections 110, 172, 175A, 191 and 192 no longer apply. This includes any remaining requirements for the submittal of second 10-year maintenance plan required under CAA Section 175A.

ADEQ has developed a SIP for the Hayden nonattainment area for the 2010 SO_2 NAAQS and plans to submit it in April 2017. The attainment demonstration in the Hayden 2010 SO_2 NAA SIP shows that the SO_2 emission limit established for the Hayden Smelter will allow the area to attain the 2010 SO_2 NAAQS. Given the area will attain the new standard, which is more stringent than the previous standard, the control measures in Hayden 2010 SO_2 SIP revision will not interfere with attainment and maintenance of the 1971 SO_2 NAAQS.

[132] *See* 75 FR 35520.
[133] *Id.*

Furthermore, the control equipment part of the SO_2 SIP is the same equipment used in this Pb SIP's control strategy. The purpose of the control measures is to reduce emissions of SO_2, Pb, and leaded-PM_{10}. Given that the modeling for the 2010 SO_2 SIP shows attainment, implementation of the controls for Pb will not interfere with attainment of the 2010 SO_2 NAAQS.

6.5 Noninterference with Attainment of the CO, NO_2, $PM_{2.5}$, and Ozone NAAQS

The Hayden area is designated as attainment or unclassifiable for NO_2, CO, $PM_{2.5}$, and O_3 (see Table 26). Although designations have not yet been made for the 2015 O_3 NAAQS, the area is recommended to be designated as attainment or unclassifiable.

Table 30 shows the potential emissions for NO_X, CO, and volatile organic compounds (VOCs). Post-control emissions are expected to decrease or remain the same as current levels. Given that the area is attainment/unclassifiable for NO_2 and CO, it is unlikely that the controls will interfere with those NAAQS in the Hayden area.

Table 30: Potential Emissions of NOx, CO, VOCs

Potential Emissions				
Pollutant	**Current Potential Emissions (tpy)**	**Post-Control Potential Emissions (tpy)**	**Emissions Difference (tpy)**	**Percent Difference**
NO_X	31.3	31.2	-0.1	-47.8
CO	26.3	26.2	-0.1	-2.4
VOC	1.7	1.7	0	0
Source: Arizona Department of Environmental Quality (2016). Technical Review and Evaluation of Application for Air Quality Significant Permit Revision No. 60647 to Operating Permit No. 1000042, Asarco LLC – Hayden Smelter				

The primary constituents of O_3 (NO_X and VOC) are projected to decrease slightly or remain constant. Based on the recommendation of attainment/unclassifiable for NO_X, CO, and VOCs, the reductions in potential emissions achieved by the new control technology will result in noninterference with the O_3 NAAQS in the Hayden area. The control technology will also assist in capturing $PM_{2.5}$ emissions. Considering the area is attaining the $PM_{2.5}$ NAAQS, interference with continued attainment is not expected.

6.6 Noninterference with Regional Haze Requirements

The Hayden Smelter is subject to FIP requirements for NOx and SO_2, and SIP requirements for PM_{10} under the Regional Haze Program. Under the FIP, the Hayden Smelter must comply with

an annual emission limit of 40 tons per year of NOx from the converters and anode furnaces.[134] To control PM_{10}, the smelter must continue to use the existing controls and meet specified provisions of the NESHAPs for Primary Copper Smelters.[135] The smelter must reduce SO_2 at both the converters and anode furnaces.[136] The converters must comply with an emission limit of 99.8 percent control efficiency on a 365-day rolling average for the primary system and 98.7 percent efficiency on a 365-day rolling average for the secondary capture system. The smelter must impose a work practice standard requiring the anode furnaces to be charge only with blister copper or higher purity copper.

Lead is not a pollutant regulated under the Regional Haze Program. However, the controls and requirements for PM_{10} will provide protection against any particulate matter with any leaded materials. Furthermore, the upgrades and improvements in the control technology at the Hayden smelter are in accordance with FIP and SIP requirements and thus will result in noninterference with the federal standards for Regional Haze.

6.7 Noninterference with Requirements for Consent Decree, CV-15-2206-PHX-JZB

On November 3, 2015 EPA and the Department of Justice announced a settlement with Asarco LLC requiring the company to install new equipment and pollution control technology to reduce emissions of toxic heavy metals at the Hayden Smelter. Asarco will also provide funding for local environmental projects, replace a diesel locomotive with a cleaner model, and pay a civil penalty.

The requirements outlined in the Consent Decree served as the foundation for the CRP and other control measures proposed in the SO_2 and Pb SIPs for the Hayden NAA. The control technology and other requirements all comply with the settlement and will result in noninterference with Consent Decree, CV-15-2206-PHX-JZB.

6.8 Air Toxics

The Mercury and Air Toxics Standards (MATS) are designed to reduce air pollution from coal and oil-fired power plants under CAA Section 111 (New Source Performance Standards) and 112 (Hazardous Air Pollutants/Air Toxics). Copper smelters are not subject to the MATS rules but they are required to comply with the National Emission Standards to Hazardous Air Pollutants (NESHAP) for Primary Copper Smelting

The applicable NESHAPs for copper smelters are 40 CFR Part 63, Subpart QQQ and Subpart ZZZZ. Asarco asserts that the Hayden Smelter is not a major source of hazardous air pollutants as prescribed in CAA Section 112 and the CFR. However, the upgraded controls and

[134] *See* 79 FR 52420 (Sept. 3, 2014).
[135] *See* 78 FR 46142 (Sept. 30, 2013), 79 FR 52420, 52448 (Sept. 3, 2014).
[136] *Supra* Note 130.

enhancements that will be implemented per the requirements of Consent Decree will comply with CAA Section 112. Therefore, ADEQ concludes that this SIP revision will not interfere with any applicable air toxics requirements of the CAA.

7 Conclusion

The 2008 Pb NAAQS were promulgated on November 12, 2008 based on EPA's extensive research on the human health effects of Pb pollution. The Hayden planning area was first proposed to be designated nonattainment in 2010, however, due to insufficient monitoring data from a non-NAAQS monitoring system, the designation didn't become official until 2014. The Hayden Pb NAA must attain the NAAQS by 2019. The primary source of Pb emissions in the area is the primary copper smelter owned and operated by ASARCO.

This SIP demonstrates, through modeling, an emissions inventory, and two rules that constitute RACM/RACT, the area will attain by its statutory attainment date in 2019. The area is under a very expeditious compliance schedule, required to meet attainment in two years. The attainment strategy for this SIP integrates control equipment already independently required by a Consent Decree between EPA and ASARCO. Should the area fail to attain, or fail to meet the compliance schedule required for Reasonable Further Progress, ASARCO must implement the contingency measure of increased paved road cleaning.

By complying with nonattainment-area related regulatory requirements under the Clean Air Act and applicable guidance, this SIP provides an enforceable vehicle to successfully mitigate Pb emissions in the Hayden nonattainment area in order to protect public health and the environment.

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ADEQ
Arizona Department
of Environmental Quality

Appendix A: Emission Inventory Technical Support Document for the 2008 Hayden Lead Nonattainment Area

Air Quality Division
March 2, 2017

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1 Introduction

On August 20, 2014, The United States Environmental Protection Agency (EPA) took final action to re-designate the Hayden Planning Area from unclassifiable to nonattainment for the 2008 Lead (Pb) National Ambient Air Quality Standard (NAAQS). The EPA published the final rule in the Federal Register (FR) on September 3, 2014, and the rule went into effect on October 3, 2014[1].



Figure 1-1: ASARCO Copper Smelter

The Arizona Department of Environmental Quality (ADEQ) must prepare a State Implementation Plan (SIP) revision demonstrating attainment with the 2008 Pb NAAQS within 5 years of the effective date of designation. This requirement necessitates attainment of the standard with enforceable control measures by October 3, 2019. ADEQ has developed a comprehensive emission inventory of all Pb emissions within the Hayden Pb Nonattainment Area (NAA).

The Hayden Pb NAA encompasses the portions of Gila and Pinal county bound by the townships and ranges outlined in Table 1-1. In Pinal County, the NAA excludes portions of townships and ranges found in the San Carlos Indian Reservation.

Table 1-1: Portions of Arizona Counties Designated Nonattainment

County	Portions of County Designated Nonattainment
Gila County	The portions of Gila County that are bounded by: T4S, R14E; T4S, R15E; T4S, R16E; T5S, R15E; T5S, R16E
Pinal County	The portions of Pinal County that are bounded by: T4S, R14E; T4S, R15E; T4S, R16E; T5S, R14E; T5S, R15E; T5S, R16E; T6S, R14E; T6S, R15E; T6S, R16E

Figure 1-2 is a detailed map of the portions of Gila and Pinal Counties that are bounded by the townships and ranges listed in Table 1-1. Figure 1-2 also includes the towns and Census Designated Places (CDP) within the Hayden Pb NAA.

1.1 Purpose

The purpose of this Technical Support Document (TSD) is to provide an emission inventory (EI) of Pb emission sources within the Hayden area. This document provides a detailed account of the processes ADEQ undertook to develop the emission inventory for the Hayden NAA. ADEQ will use the EI and analyses in this TSD as a regulatory tool to bring the area back into attainment with the NAAQS, and as the basis for the development of a modeling protocol for the attainment demonstration.

[1]FR#: 2014-20920; Docket ID: EPA-R09-OAR-2014-0266

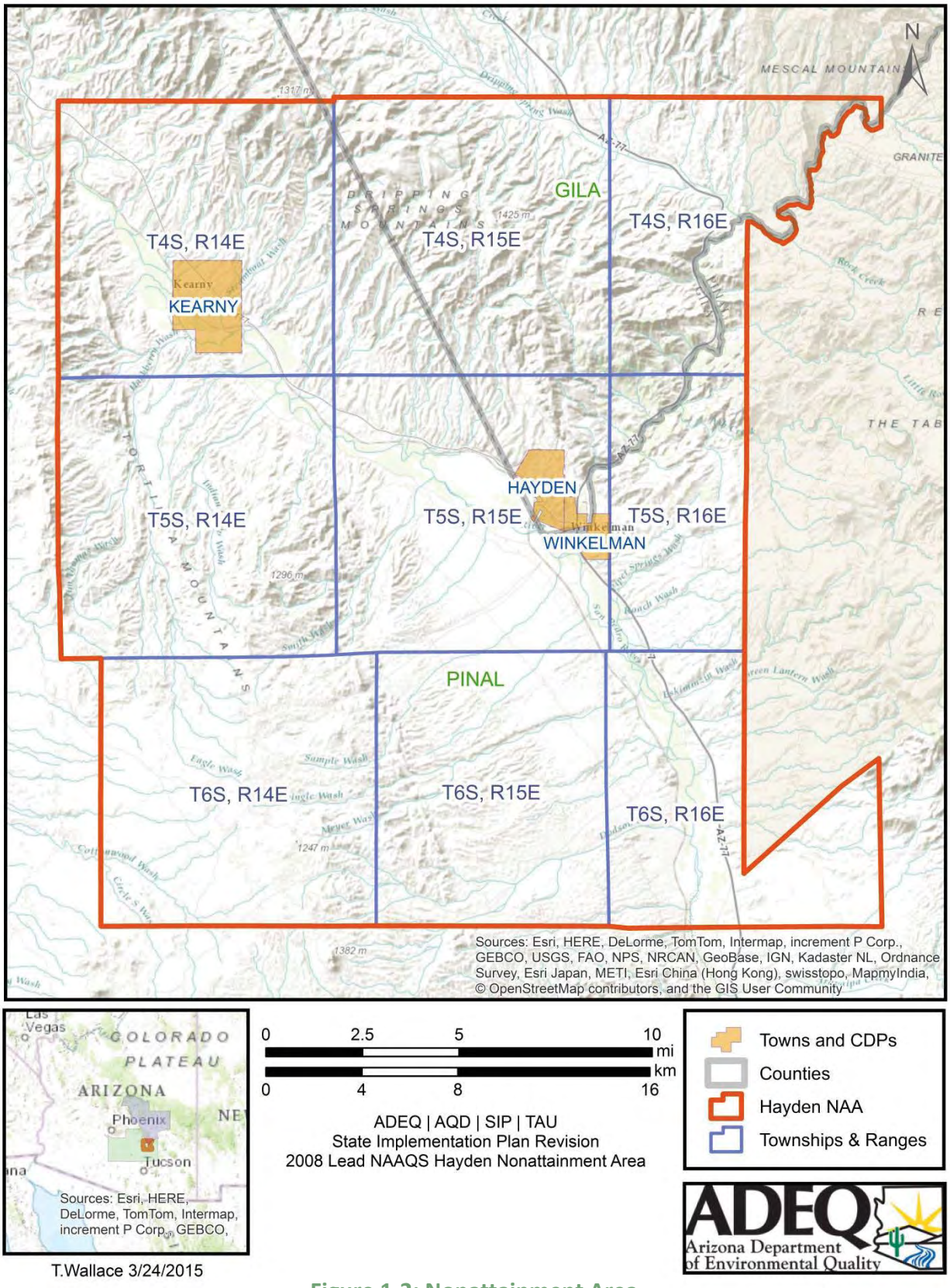


Figure 1-2: Nonattainment Area

1.2 Lead Emissions in the Hayden Planning Area

Since 1965, with Clair Patterson's findings regarding leaded fuels, the phenomenon of airborne lead and its adverse health effects has been a focus of environmental policy makers. The largest at-risk demographics include children and pregnant women. In children, extensive exposure can lead to anemia, hearing problems, slowed growth, and behavior and learning issues. Regarding pregnant women, lead accumulates within the mother's bones, along with calcium. When released, the maternal calcium and lead is used to form the bones of the fetus. With this in mind, ADEQ has meticulously reviewed all significant sources in the Hayden NAA.

Within the 275 square mile NAA, the following source categories of Pb emissions were found: mobile nonroad, area, and point source. Mobile nonroad sources include modes of transportation that still use leaded fuels, comprising locomotives and piston-engine aircraft. The lead compound found in aviation fuel is tetraethyl lead. This compound is added to increase fuel octane, prevent engine knock, and prevent loss of compression for engines lacking hardened valves[2]. The Kearny airport is the only airport found in the bounds of the NAA. Within the NAA there are roughly 38 miles of rail that mainly transports raw material for the mineral operations. The majority of this rail is located in Pinal County, with the remainder concentrated around the city of Hayden. This length of rail makes up the locomotive portion of the inventory.

Area sources of lead in the NAA are related to the storage and transport of aviation gasoline and residential combustion of fuels. These residential fuels consist of kerosene and distillate oil. Finally, the point source category is limited to one source, the Asarco LLC primary copper smelter found in the City of Hayden. The focus of the SIP revision will be on the Asarco smelter due to it comprising the majority of the emission inventory (see Summary of 2012 Base Year Emission Inventories).

1.3 Emission Inventory Base Year Determination

ADEQ proposes a base year of 2012 for the preparation of a Pb inventory, contingency measure calculations, and as the basis for the attainment demonstration. 2012 is the year the designation is based on, and is consistent with the recommendation by EPA in the *2008 Lead NAAQS Implementation Questions and Answers*. EPA Region 9 recommended ADEQ examine 2012, 2013, and 2014 as possible base years for the following reasons:

- Hayden was designated nonattainment in 2014, and EPA would generally expect ADEQ to use 2014 as a base year unless another year is more appropriate
- Asarco ambient monitors, operated under an Administrative Order of Consent[3] between ADEQ, Asarco and EPA, indicated that there may have been violations of the 2008 Lead NAAQS in 2013, but regulatory certified Globe Highway Monitors, which report to EPA's Air Quality System (AQS) database, did not indicate such a violation

[2] EPA (December 2010). Calculating Piston-Engine Aircraft Airport Inventories for lead for the 2008 National Emissions Inventory. Office of Transportation and Air Quality. Ann Arbor MI. EPA-420-B-10-044

[3] US EPA, *ASARCO LLC Settlement*. www.epa.gov/enforcement/asarco-llc-settlement (see Consent Decree under "Settlement Resources").

- EPA would like a comparison of the lead emissions of each year at the Asarco LLC Hayden Smelter rather than rely solely on the ambient monitored values[4]

ADEQ ruled out 2014 as a base year as not enough data will be available for ADEQ to perform an adequate attainment demonstration prior to the submission deadline. Preliminary smelter emission data for 2014 will not be available until July 2015, and will not be finalized and verified until the end of October 2015 at the earliest. Additionally, 2014 had fewer violations of the standard than all years except 2013.

The selection of 2012 as the base year supports the requirement for timeliness of data and is illustrative of a year with exceedances and violations of the primary standard. ADEQ operates two collocated State and Local Air Monitoring Station (SLAMS) for Pb ambient monitoring at the Globe Highway site in Winkelman, Arizona. The Globe Highway Primary Monitor recorded four violations of the 2008 Pb Primary NAAQS in 2011, three such violations in 2012, no violations in 2013, two violations in 2014, and no violations in 2015 and 2016. Figure 1-3 shows the 3-month rolling averages monitored at the Primary Globe Highway SLAMS from 2011 through the end of 2016.

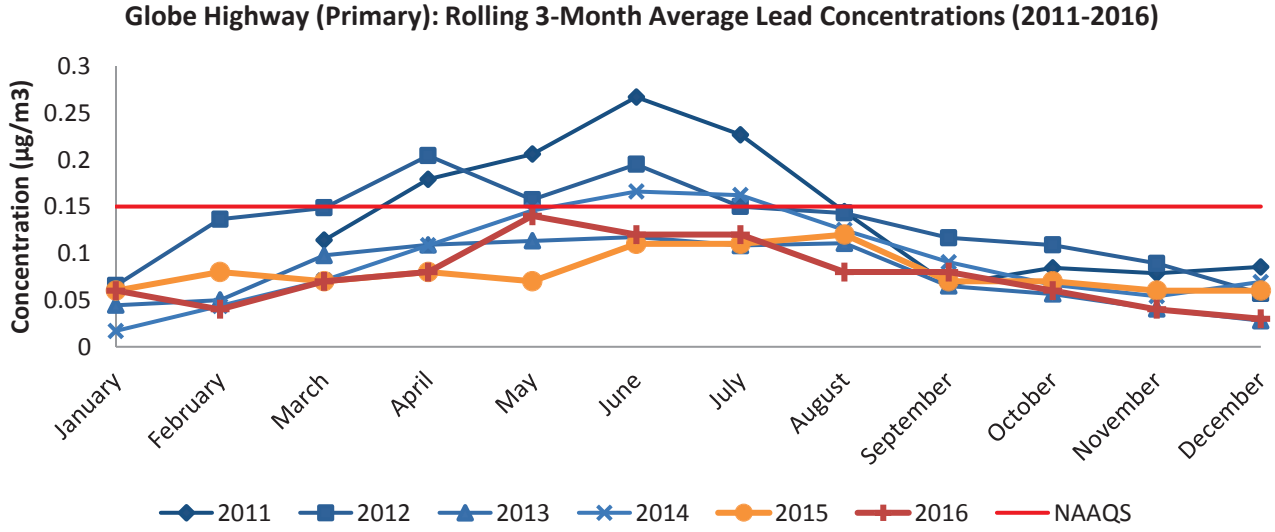


Figure 1-3: 3-month Rolling Average Lead Concentrations at Globe Highway Monitor

A reduction in emissions is observed when comparing annual lead emissions from the smelter. This is not due to operational changes such as decreased throughput. Rather, the observed emissions reductions are the result of the addition of control devices. For example, in June of 2012, Asarco LLC installed a baghouse downstream of process gas from the anode furnace. This control device reduced lead emissions by roughly 50% from 2012 to 2013, which is illustrated in Figure 1-4 below.

[4] Email correspondence with EPA Air Planning Office (AIR-2), Region 9 between 3/12/2015 and 3/23/2015

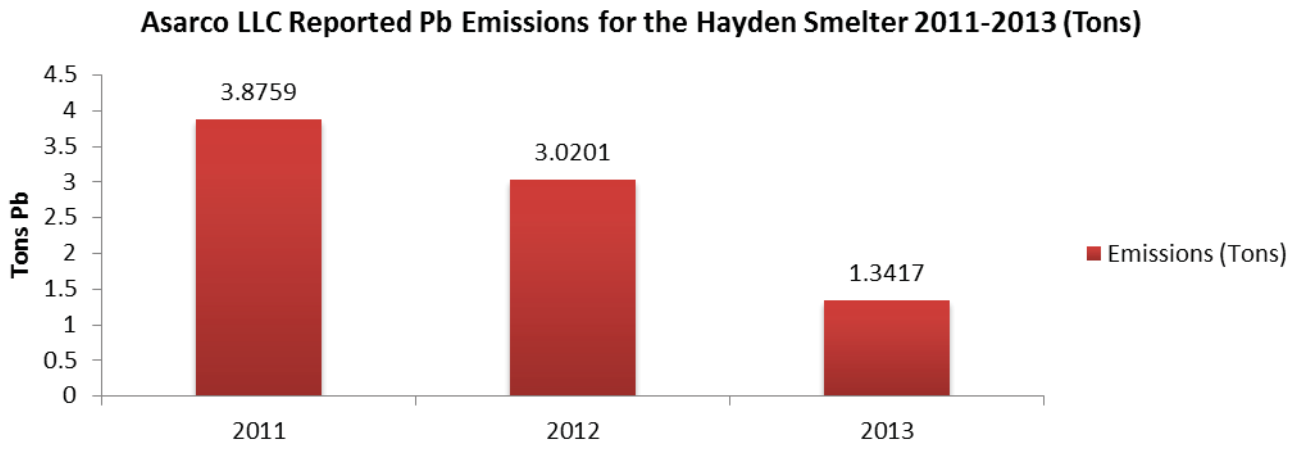


Figure 1-4: Asarco LLC Hayden Smelter Reported Annual Lead Emissions

Currently, the Globe Highway collocated monitors are the only NAAQS compliant monitors in the NAA which have approved Quality Assurance (QA) plans for verifying and submitting data in AQS. Asarco has installed a number of monitors at various heights around the facility as part of their remediation project under the CERCLA settlement[5]. ADEQ used data from these monitors to determine specific fugitive and volume sources to model in the attainment demonstration. As lead is environmentally and biologically persistent, these monitors may indicate the need for control to prevent track-out or windblown fugitive emissions as a school, park and public pool are located within a few thousand feet of the smelter, and conveyer lines delivering ore concentrate run along residential properties.

In the base year determination, ADEQ ruled out 2013 as a base year because no violations occurred at a NAAQS-compliant monitor. Additionally, the reported plant-wide fugitive, acid plant main stack, main stack annulus, and anode baghouse stack emissions were roughly half of what they were in 2012. Asarco provided documentation to support these emissions estimates with their annual emission inventory questionnaire submission for that year. These estimates in-turn are consistent with the lack of violations recorded at the Globe Highway monitors in 2013. ADEQ modeled possible sources of high ambient concentrations at the settlement monitors in the attainment demonstration. This analysis was used to determine the control measures put in the SIP revision.

In summary, ADEQ proposes 2012 as the base year for the following reasons:

- 2012 has the highest reported emissions after the installation of the anode baghouse
- 2012 is the year the designation of nonattainment is based
- 2012 has three recorded violations, second only to a year prior to the installation of controls

[5] See Section 3.2.1 of this document.

2 Population and Urbanization

Gila County is one of five interior counties in the central part of Arizona; it is surrounded by Yavapai and Maricopa Counties to the west, Coconino and Navajo Counties to the north, Pinal County to the south, and Graham County to the southeast. The county seat of Gila County is Globe, which lies approximately 74 linear miles east by south from Phoenix. The incorporated communities of Hayden, Miami, Payson, Star Valley, and Winkelman also reside within Gila County, as does the town of San Carlos, which is located on the San Carlos Apache Reservation. The Arizona Department of Administration (ADOA) estimated the 2011 population of Gila County at 53,577 persons. Gila County had a 2010 population density of only 11.3 persons per square mile, compared to 414.9 and 56.3 persons per square mile for Maricopa County and the state respectively[6].

Pinal County is one of five interior counties in the central part of Arizona; it is surrounded by Gila County to the north, Graham County to the east, Pima County to the south, and Maricopa County to the north and west. The county seat of Pinal County is Florence, which lies approximately 61 linear miles southeast from Phoenix. The incorporated communities of Apache Junction, Casa Grande, Coolidge, Eloy, Kearny, Mammoth, and Superior also reside within Pinal County. ADOA estimated the 2011 population of Pinal County at 384,231 persons. Pinal County had a 2010 population density of 70.0 persons per square mile, compared to 414.9 and 56.3 persons per square mile for Maricopa County and the state respectively[7].

2.1 Hayden Lead Nonattainment Area

The Hayden Pb NAA has been codified in 40 CFR 81.303 and is comprised of the portions of Gila County and Pinal County bound by the townships and ranges listed in Table 2-2 and represented geographically in Figure 1-2. Population estimates for the entire Hayden Pb NAA as well as the respective proportions of Gila and Pinal Counties are also presented in Table 2-2. The Hayden NAA encompasses the towns of Hayden, Winkelman and Kearny, for which population data have been included in Table 2-1.

Table 2-1: Towns in Hayden Pb NAA

Hayden Pb NAA Towns[8]	
Location	2012 Population
Kearny	1,979
Hayden	657
Winkelman	350

[6] Note: from US Census Bureau. (January 6, 2014), *State and County QuickFacts.* U.S. Department of Commerce. Retrieved from: http://quickfacts.census.gov/qfd/states/04/04007.html on August 13, 2014.
[7] Ibid. Retrieved from: http://quickfacts.census.gov/qfd/states/04/04021.html on August 13, 2014.
[8] ADOA 2012 population estimate. (July 1, 2012). *Population Estimates for Arizona Counties, Incorporated Places & Balance of County.* Retrieved from: https://population.az.gov/sites/default/files/documents/files/pop-estimates2012-04pla.pdf

Table 2-2: Geographic Location and Population

Hayden Pb NAA[9]			
Land Area		275 square miles	
2012 Population		4,690	
2019 Projected Population		5,502	
Gila County Portion		Pinal County Portion	
Land Area	58 square miles	Land Area	217 square miles
2012 Population	1,280	2012 Population	3,410
2019 Projected Population	1,322	2019 Projected Population	4,180
Township, Range		Township, Range	
4S, 14E		4S, 14E	
4S, 15E		4S, 15E	
4S, 16E		4S, 16E	
5S, 15E		5S, 14E	
5S, 16E		5S, 15E	
-		5S, 16E	
-		6S, 14E	
-		6S, 15E	
-		6S, 16E	

2.2 Hayden Lead Nonattainment Area Population and Land Use

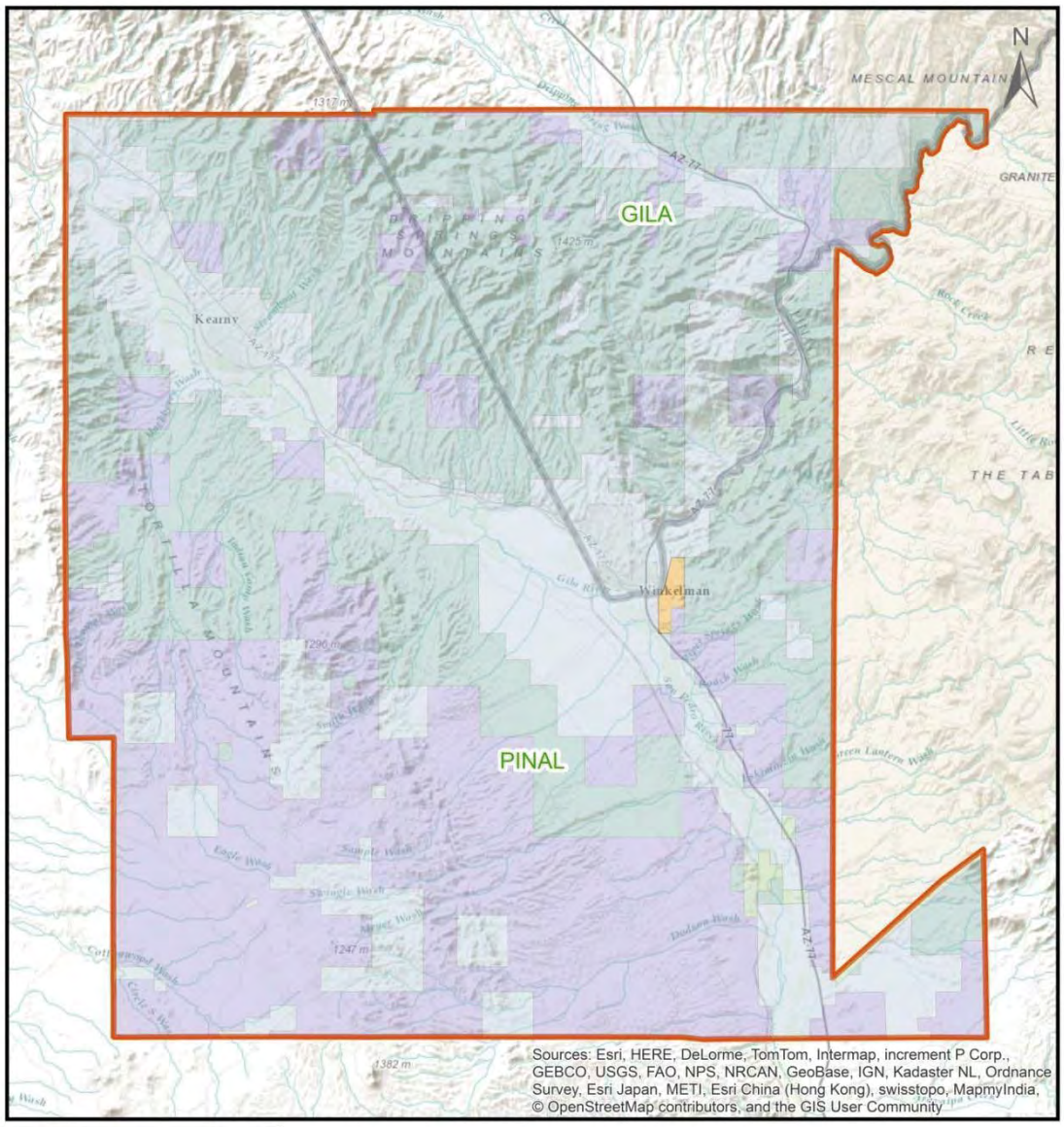
The Hayden NAA area encompasses portions of two counties: Gila and Pinal. The Gila County portion of the NAA is approximately 58 square miles[10] while the Pinal County portion is 217 square miles[11]. The majority of the land within the NAA is owned and managed by the either the Bureau of Land Management (39.1%) or the Arizona State Land Department (35.5%). The remainder of the land within the NAA is comprised of privately held land along with a small area of land located to the east of Winkelman, which the Bureau of Reclamation manages. The San Carlos reservation, which is located east of Hayden, is not included on the NAA. A breakdown of the land owners in the Hayden Pb NAA are presented in Table 2-3 and Figure 2 1.

Table 2-3: Land Use Area

Hayden Pb NAA[12]		
Land Owner	Area (square miles)	Area (percentage of NAA total)
Bureau of Land Mgmt.	106.816	39.1%
State Trust Land	96.876	35.5%
Private Land	68.932	25.2%
Bureau of Reclamation	0.499	0.2%

[9] ADOA provided land area estimates and population estimates and projections for ADEQ in an internal report.
[10] ADOA provided land area of Gila & Pinal Counties
[11] ADOA provided population & population projections for Gila & Pinal Counties
[12] Land use information for both Gila County and the Hayden NAA was garnered from the Arizona Land Resource Information System (ALRIS) GIS tool managed by the Arizona State Land Department.

Figure 2-1: Hayden Lead Nonattainment Area Land Use Map



3 Nonattainment Area Meteorology and Monitored Ambient Lead Concentrations

This section discusses the meteorological conditions and ambient air Pb concentrations pertinent to the SIP revision. Since the nonattainment designation was based on data from a monitor adjacent to the ASARCO Hayden smelter, this discussion will focus on the town of Hayden (where the smelter and monitor are located). Section 3.1 describes the network of meteorological monitors present in the NAA. This network is comprised of monitors owned and operated by ADEQ and ASARCO. Section 3.2 discusses the network of ambient air Pb monitors present in the NAA. The meteorological and ambient concentration analysis is described in Section 3.3, and a discussion regarding emission sources from the smelter follows, in Section 3.4.

3.1 Meteorological Monitoring Network

Two networks of meteorological monitors are found within the area of study; one is maintained by ADEQ and the other by ASARCO. The two meteorological monitors maintained by ADEQ are located at the Hayden Old Jail and Globe Highway monitoring sites. The Hayden Old Jail monitor is located approximately 0.66 miles west of the ASARCO concentrator and smelter complexes, and the Globe Highway monitor is located approximately 0.59 miles to the east of the ASARCO Smelter.

The second network of meteorological monitors is run by ASARCO and includes both strictly meteorological monitors and combination (ambient air and meteorological) monitors. These monitors were installed as part of a consent decree between ASARCO and the EPA. Moreover, these monitors do not meet standards described in EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications, February 2000*, or, the requirements to be used for determining NAAQS compliance. However, ADEQ included these ASARCO monitors as supplemental data to give a more holistic view of Pb concentrations and meteorology in the city of Hayden.

Table 3-1: Hayden Meteorology Monitoring Stations

Hayden Meteorology Monitoring Stations				
Site Name	Distance to Smelter (miles)	Latitude	Longitude	Elevation (feet)
ADEQ Monitors				
Globe Highway	0.59	33.00251	-110.76545	1,984.9
Hayden Old Jail	0.66	33.00621	-110.78645	2,044
ASARCO Monitors				
ST-10: Camera Hill	0.22	33.00046	-110.775	2,057.1



Figure 3-1: Hayden Meteorology Stations of Interest

3.2 Ambient Lead Monitoring Network

The following section describes the Pb monitoring networks used in ADEQ's meteorology and ambient air analysis.

3.2.1 CERCLA Settlement Monitoring Network and History

In the Summer of 2013—as a requirement of a 2010 remediation settlement agreement between EPA and ASARCO—ASARCO installed a network of ambient air quality monitors in the Hayden NAA (see Figure 3-2). These monitors were installed to support a CERCLA Remedial Investigation and Feasibility Study (RI/FS), and herein they will be referred to as "CERCLA monitors". Four CERCLA monitors are of particular interest when analyzing ambient air quality; these four monitors collect total suspended particulate (TSP) data, as opposed to the remaining monitors, which only collect $PM_{2.5}$ and PM_{10} data (particulate matter under 2.5 and 10 microns in diameter, respectively). This is important because leaded particles can fall outside the 10 micron particle range, and the NAAQS standard for lead is based on TSP.

In addition, these monitors were analyzed because they report significantly higher lead concentrations than ADEQ's Globe Highway monitor, which suggests ADEQ's monitor is not located in the optimal location to determine ambient air quality. To correct this, ADEQ is collocating a regulatory monitor at the hillcrest (ST-23) monitor. This monitor addition will substantially increase the representativeness of Pb monitoring data available to ADEQ for regulatory purposes.

3.2.2 SLAMS Monitoring Network and History

In October 2010, ADEQ established an air quality monitor at the Globe Highway monitoring site within the Hayden NAA. This monitor is currently the only State and Local Air Monitor System (SLAMS) monitor in the NAA with AQS-certified data that can be used to determine NAAQS compliance. In January of 2016, ADEQ intends to install an additional NAAQS compliant monitor near Hillcrest Avenue, which is roughly located near current CERCLA monitor ST-23 (see Figure 3-2).

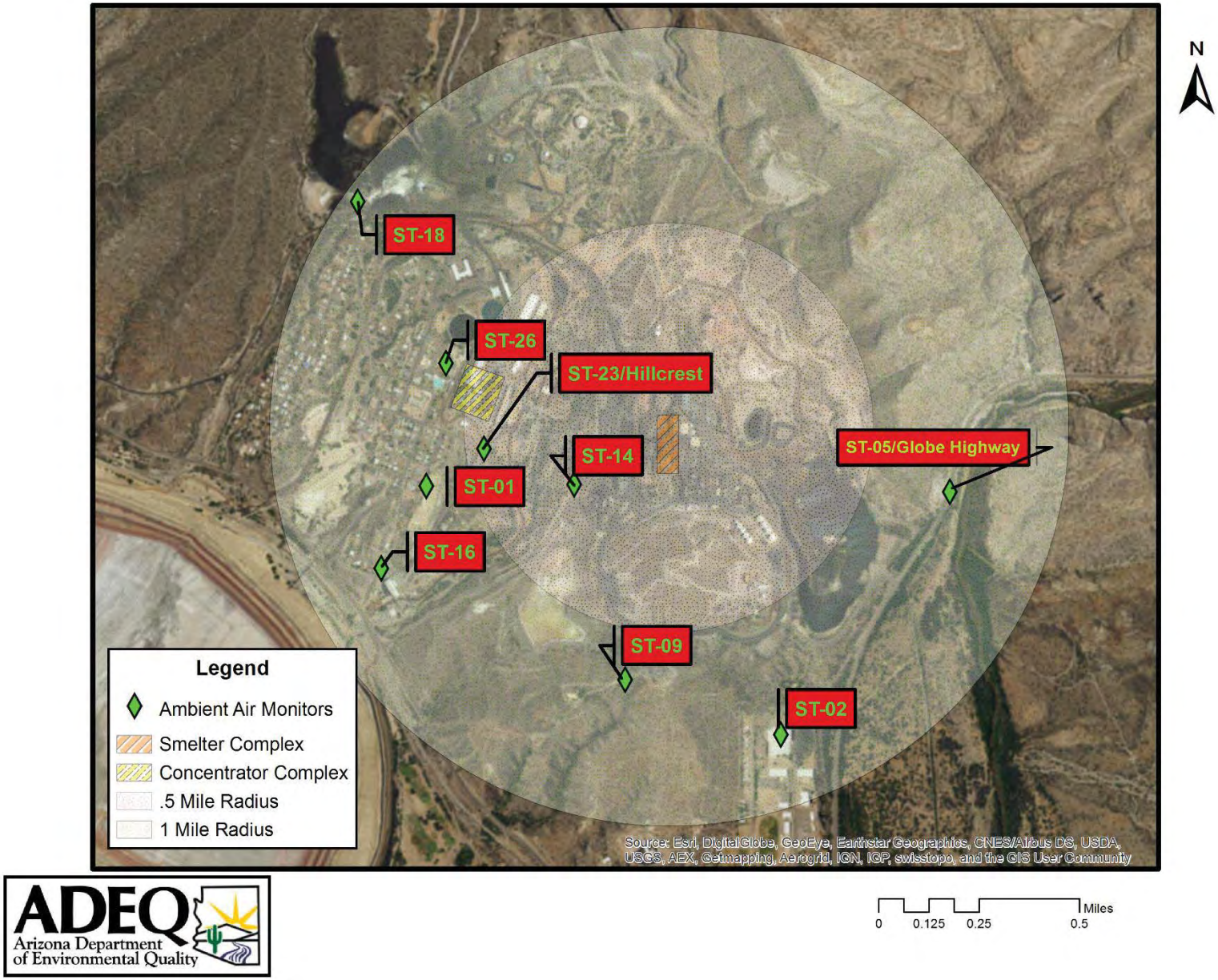


Figure 3-2: Ambient Air Monitors

Table 3-2: Hayden Pb Monitoring Stations

Hayden Pb Monitoring Stations				
Site Name	Distance to Smelter (miles)	Latitude	Longitude	Elevation (feet)
ADEQ Monitors				
Globe Highway	0.59	33.00251	-110.76545	1,968
Hillcrest	.39	33.00363	-110.78232	2,113
ASARCO Monitors				
ST-02: Winkelman High School	0.63	32.99505	-110.77156	2,014
ST-05: Globe Hwy	0.59	33.00254	-110.76542	1,968
ST-09: Reverts Crushing	0.49	32.99670	-110.77734	2,096
ST-14: Smelter Parking Lot	0.22	33.00254	-110.77911	2,096
ST-18: North Hayden Station	0.83	33.01105	-110.78684	2,123
ST-23: Hillcrest Avenue	0.39	33.00363	-110.78232	2,113
ST-26: Concentrator Station	0.50	33.00622	-110.78369	2,096

3.3 Hayden Planning Area Meteorological and Ambient Lead Analyses

The purpose of this analysis is to understand how various meteorological scenarios affect ambient air Pb concentrations within the town of Hayden. This is accomplished by analyzing meteorological patterns within the area and identifying which patterns correspond to high ambient lead concentrations at relevant monitors.

Although the emission inventory base year is 2012, due to data availability, this analysis includes ambient and meteorological data from multiple years. Specifically, meteorological data covers 2012-2014, while the temporal bounds of ambient air data depend on the monitoring network. Data from ADEQ's Globe Highway monitor extends back to 2011, and the CERCLA monitors provide data from to mid-2013 to summer 2015. When comparing monitored concentrations from different years it is important to keep in mind controls ASARCO installed in June of 2012.

3.3.1 Meteorological Profile

Situated in a low-lying portion of a valley, with mountains reaching over 4,000 feet to the north, east and southwest, Hayden is subject to a distinct mountain-valley diurnal wind pattern. Under stable atmospheric conditions, nighttime winds are typically from the southeast with speeds less than 10 miles per hour (4.47 meters per second). These conditions cause air to pool in low-lying areas at night, causing pollutants within the air to settle in these areas. The up-slope air flows and convection that occurs during the day increase dispersion out of the Hayden area. Under normal daytime conditions, surface winds in the Hayden area range from west-southwesterly to west-northwesterly as the atmosphere becomes less stable.

The following subsection describes the meteorological conditions in the area surrounding the ASARCO copper smelter. ADEQ's Globe Highway monitor is analyzed, followed by Camera Hill, and then the CERCLA monitors of interest. The goal of this analysis is to determine the prevailing meteorological conditions at each site,

specifically wind speed and direction. These conditions are then analyzed alongside ambient concentrations to characterize the dispersion of the pollutant.

3.3.1.1 ADEQ Monitor (Globe Highway)

The Globe Highway monitor sits a half mile northeast of the smelter complex and is adjacent to the Gila River (see Figure 3-2). The monitor is located in a river valley with the valley crest roughly 350 feet above the monitor elevation. This river valley runs northeast to southwest. Although there is some seasonal variation, the winds at this monitor follow this same general pattern (see Figure 3-3). This pattern consists of winds out of the northeast in the early to mid-morning hours, and southwesterly winds in the afternoon and into the night. Wind speeds at this monitor are generally low; in 2012 the maximum hourly wind speed reached 8 mph and the average hourly wind speed was 2 mph.

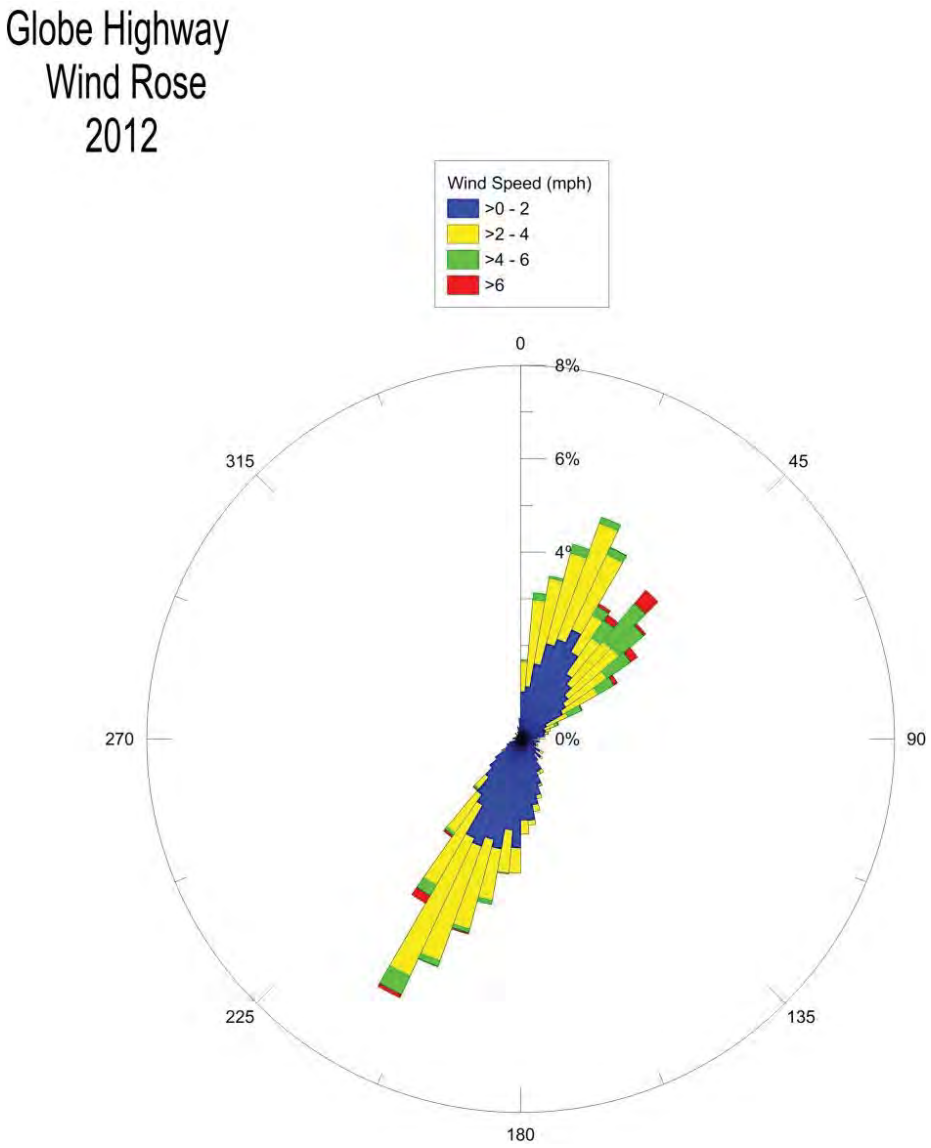


Figure 3-3: Globe Highway Wind Rose

3.3.1.2 ASARCO Monitor (Camera Hill)

The Camera Hill monitor is located approximately 230 feet higher in elevation than the smelter complex (still significantly lower than main stack) and 0.22 miles southeast of the concentrator aisle. This monitor is sited at the highest elevation of all monitors being analyzed and therefore reports the highest wind speeds. In 2014 the max hourly wind speed reached 34.6 mph and the average hourly wind speed was 8.7 mph. The wind rose below illustrates the wind patterns for 2014. In early morning hours the winds are out of the east/southeast and in the afternoon winds out of the west dominate. On average, these western winds are highest in speed. In addition, strong winds are seen out of the northeast. However, these northeasterly winds make up roughly 12% of hourly wind directions seen in 2014.

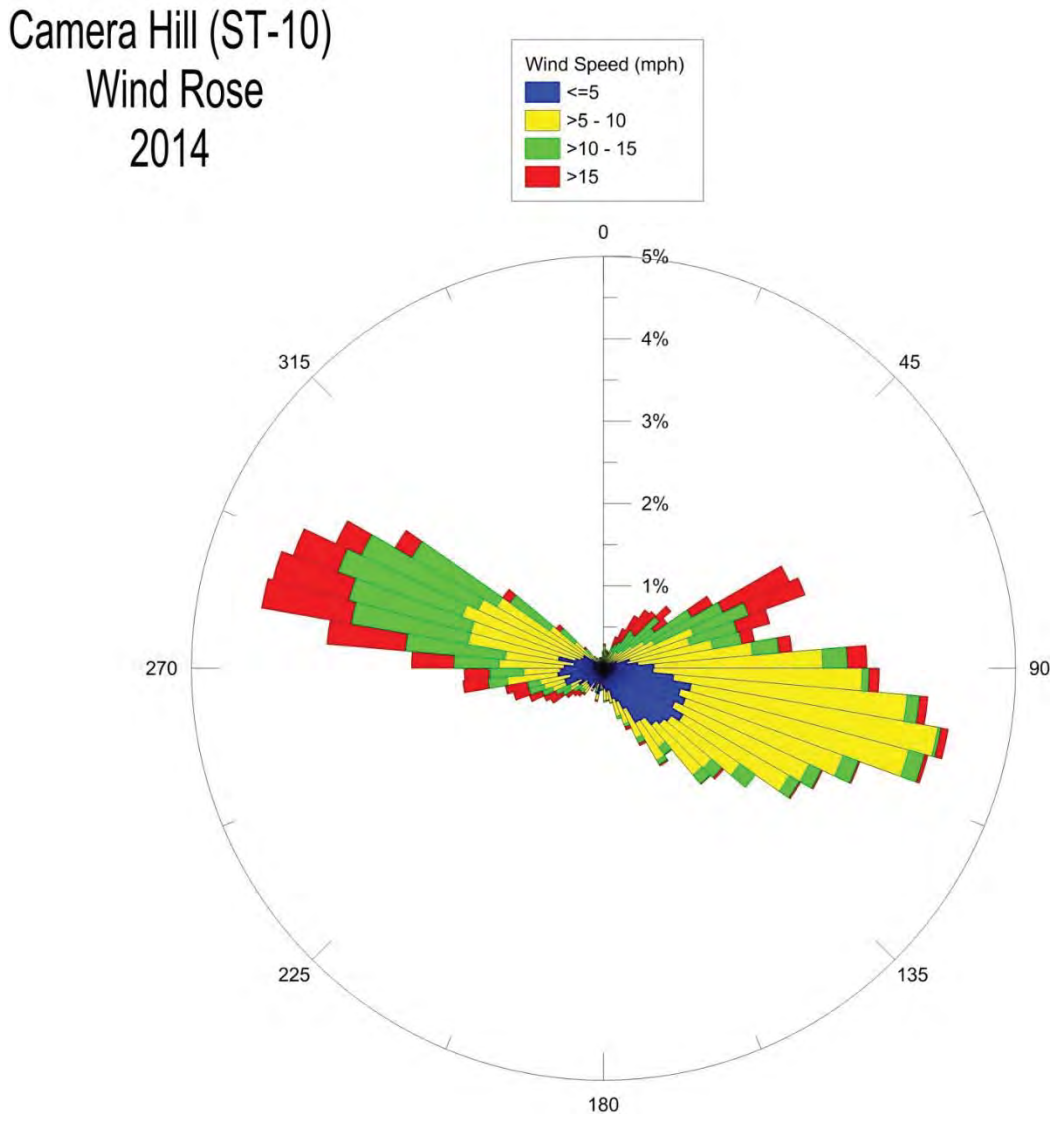
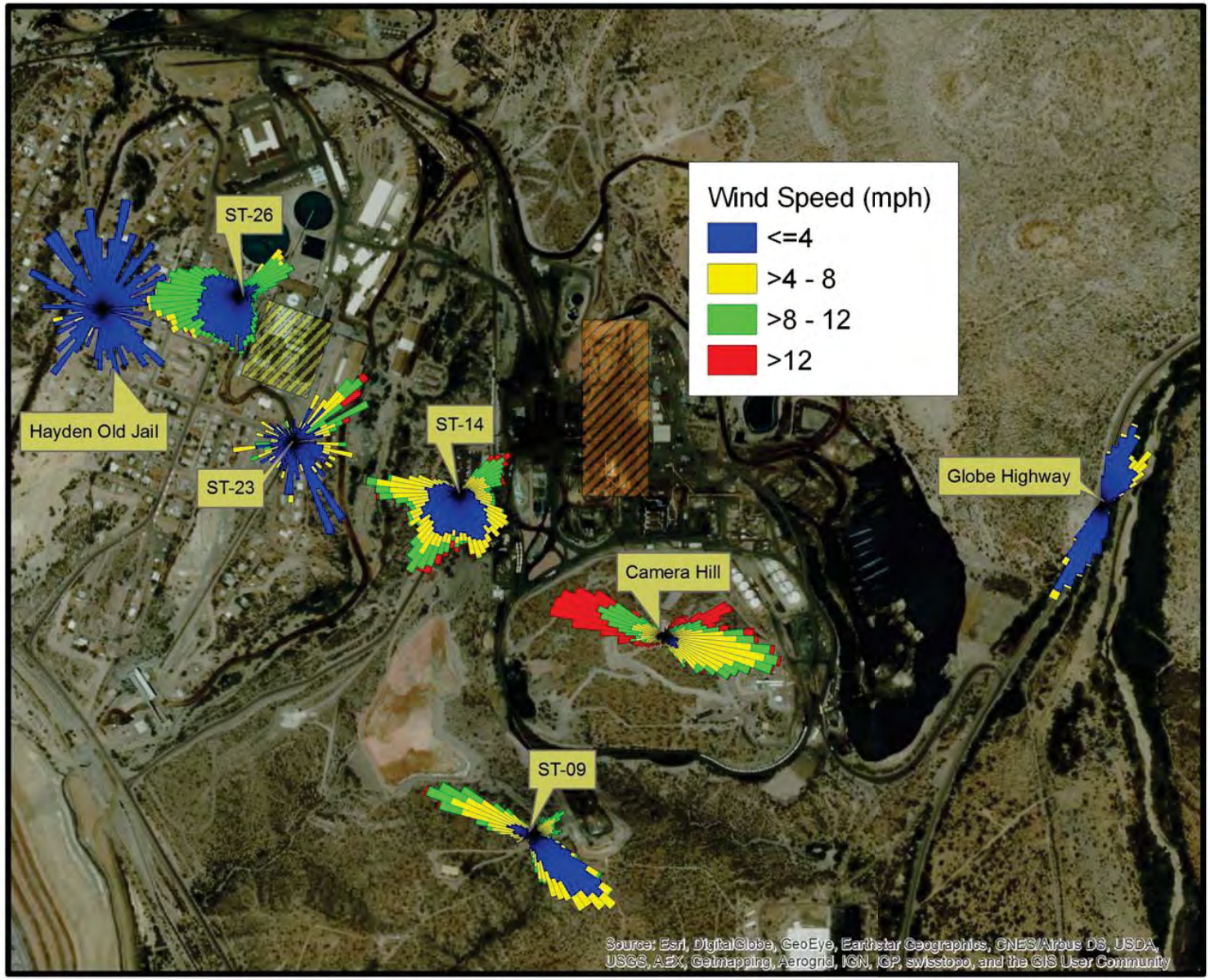


Figure 3-4: Camera Hill Wind Rose

3.3.1.3 CERCLA Monitors

The CERCLA monitors of interest are dispersed throughout the town of Hayden. Due to this dispersal, and varying topography, a variety of wind patterns can be detected. Observe the trend shown in Figure 3-5 on the next page: monitors west of the smelter complex show less defined wind patterns (note that the CERCLA monitors are designated with the prefix “ST”). The influence of topography and structures can be seen at these monitors. For example, at monitor ST-26, the concentrator acts as a windbreak to the east. At monitors ST-23 and ST-14, high winds are generally out of the northeast (the direction of the smelter complex).



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Figure 3-5: CERCLA Monitor Wind Rose

3.3.2 Analysis of Lead Concentrations

The following section describes reported lead concentrations at the Globe Highway regulatory monitor and the CERCLA monitors. Recall that data from the CERCLA monitors are not appropriate for use in NAAQS designations and are only used as supplemental support. However, the Globe Highway monitor is a SLAMS monitor and was used in the nonattainment designation. Herein, when the term "exceedance" is used, it refers to an ambient air lead concentration over the 0.15 µg/m^3 NAAQS level. When the term "violation" is used, it refers to a 3-month average concentration (of lead in ambient air) which exceeded the NAAQS level at a regulatory monitor.

3.3.2.1 Globe Highway Monitor Lead Concentrations

As discussed in previous sections, the Globe Highway monitor is located roughly a half mile east of the smelter in a river valley (see Figure 3-6). Among lead data from the base year (2012), seven of the ten highest average daily concentrations fell between January and June. The reduction in average daily concentrations seen after June coincided with the installation of the anode baghouse discussed in Section 1.3.

In this same year, three monthly averages for ambient air lead concentrations exceeded the NAAQS concentration of 0.15 µg/m^3. These months were February, April, and June, with average concentrations of 0.25, 0.27, and 0.20 µg/m^3, respectively. Data from the following year (2013) showed no NAAQS violations and only one monthly average concentration over the 0.15 µg/m^3 level, which was June.

In 2014 the monitor had two NAAQS violations. The first violation occurred in April, May, and June, with the design value (3-month average ambient lead concentration) of 0.17 µg/m^3. The second violation was comprised of May, June, and July, again with the design value of 0.17 µg/m^3.

3.3.2.2 Parking Lot Monitor (ST-14) Lead Concentrations

Considering that lead and leaded dust are heavy and anticipated to settle out of the atmosphere quickly, ADEQ suspects concentrations are highest next to the facility. High concentrations are likely due to two sources: process fugitive emissions from the three smelting processes (flash furnace, converters, and anode furnace) and materials handling and storage operations, which are more dispersed throughout the facility. The Parking Lot Monitor (ST-14) is of particular interest because both types of sources are within close proximity.

ADEQ has determined samples collected at ST-14 are not ambient air samples. The EPA defines ambient air to be "that portion of the atmosphere external to buildings, to which the general public has access"[13]. The Parking Lot where this monitor is located is private property and the proper signage is present. Given this, ADEQ considers samples taken by this monitor not to be ambient air samples, however, data collected at the monitor will be used for supplemental information.

Of all the CERCLA monitors, ST-14 is the shortest distance from the smelter, approximately 0.25 miles southwest from the smelter complex, and is roughly the same elevation (see Figure 3-7). The sampling schedule for this monitor (and all CERCLA monitors) consists of a 24 hour sample taken every sixth day. No data are available for this monitor in the base year. However, ADEQ has obtained ST-14 data from August 2013 to June 2015.

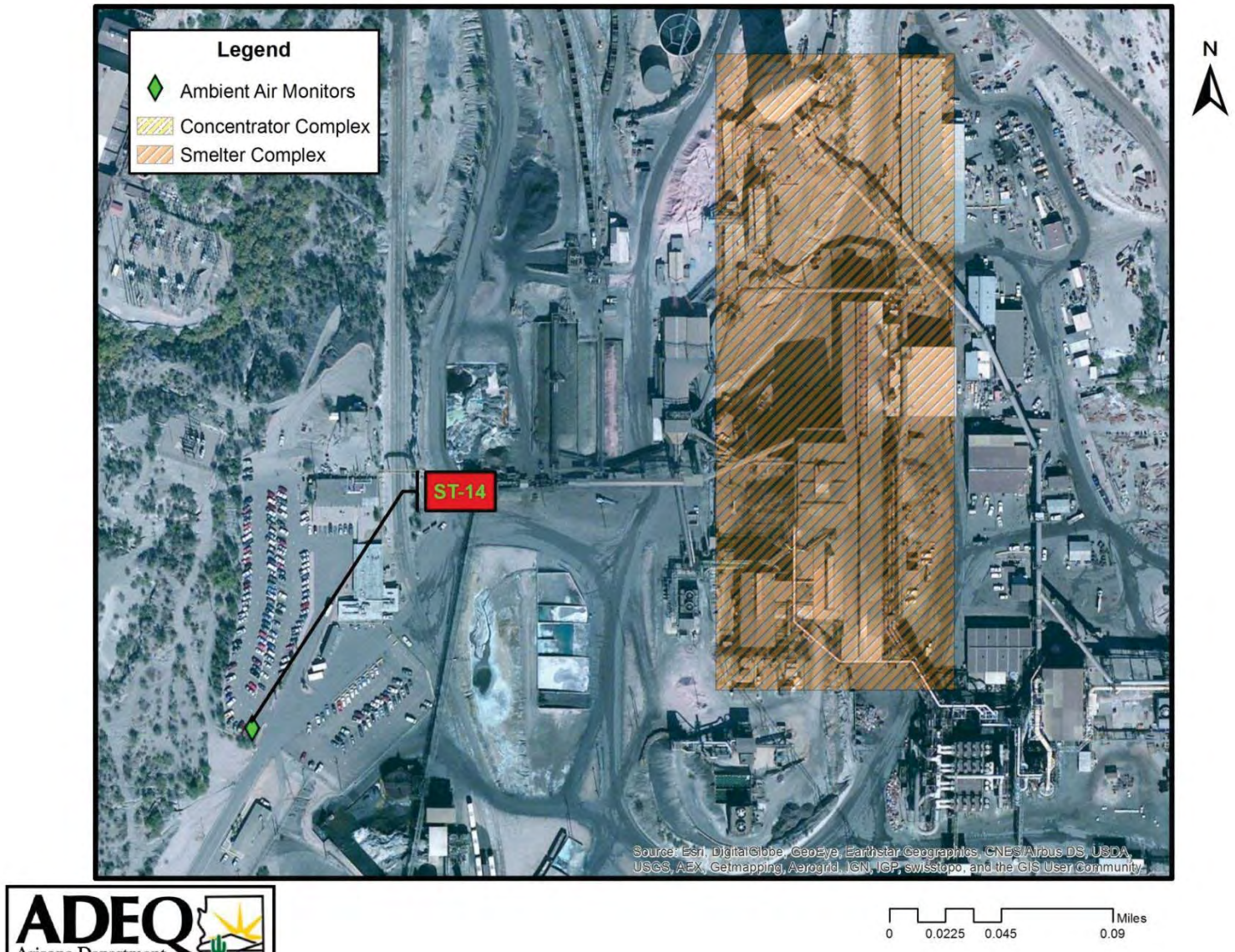
[13] Federal Register Vol. 79, No. 170 pg. 55207

Within this 22-month data set, the average monthly concentration was 0.66 µg/m^3, and the average 24-hour concentration was 0.63 µg/m^3. Each monthly concentration was averaged from between 4 and 6 24-hour ambient air samples.



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Figure 3-6: Globe Highway Monitor



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Figure 3-7: Parking Lot (ST-14) Monitor

The maximum and minimum monthly concentrations were 1.46 and 0.15 µg/m^3, respectively. The maximum and minimum 24-hour concentrations were 3.41 and 0.038 µg/m^3, respectively.

No monthly average concentration at ST-14 was below the NAAQS level of 0.15 µg/m^3. Therefore, no rolling three month average falls below the standard. However, attainment/nonattainment designations are not made based on this monitor.

3.3.2.3 Hillcrest Monitor (ST-23) Lead Concentrations

The Hillcrest Monitor (ST-23) is located half a mile east of the smelter complex, and is roughly the same elevation (see Figure 3-8). No base year data are available for this monitor. However, ADEQ has obtained ST-23 ambient air lead concentrations from July 2013 to June 2015. Like the Parking Lot Monitor, ST-23 is located within a half mile radius of the smelter (see Figure 3-2).

In the 24-month data set, the average monthly concentration was 0.17 µg/m^3, and the average 24-hour concentration was 0.16 µg/m^3. Each monthly concentration was averaged from 5 to 6 24-hour ambient air samples. The maximum and minimum average monthly concentrations were 0.35 and 0.05 µg/m^3, respectively. The maximum and minimum sample concentrations were 1.05 and 0.0156 µg/m^3, respectively. The Hillcrest Monitor shows the highest ambient air lead concentrations occur in the winter months, which is most likely due to inversions[14] typical of the area.

Eighty-two percent of the rolling 3-month design values were over the 0.15 µg/m^3 standard, with an average design value of 0.17 µg/m^3. Although the Parking Lot Monitor, which reported much higher concentrations, is only 0.25 miles away from ST-23, lead concentrations are significantly lower at ST-23. This suggests the lead being emitted from the smelting process settles or disperses significantly in the quarter mile distance between ST-14 and ST-23. In addition this correlation suggests material handling operations occurring near the parking lot monitor are significantly affecting said monitor.

3.3.2.4 Concentrator Monitor (ST-26) Lead Concentrations

The Concentrator Monitor (ST-26) is located roughly 0.6 miles northeast of the smelter complex and is approximately 50 feet lower in elevation (see Figure 3-9). No base year data are available for this monitor. However, ADEQ has obtained ST-26 ambient air lead concentrations from August 2013 to June 2015.

In the 23-month data set, the average monthly concentration was 0.12 µg/m^3, and the average 24-hour concentration was 0.11 µg/m^3. Each monthly concentration was averaged from 5 to 6 24-hour ambient air samples. The maximum and minimum average monthly concentrations were 0.19 and 0.05 µg/m^3, respectively. The maximum and minimum sample concentrations were 0.51 and 0.009 µg/m^3, respectively.

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[14] "**Inversions** occur whenever warm air rises over cold air and "traps" the cold air beneath. Within these inversions there is relatively little air motion, and the air becomes relatively stagnant." – http://yosemite.epa.gov/oaqps/eogtrain.nsf/b81bacb527b016d785256e4a004c0393/59a3adbe2b6fb90885256b6d0064a13b/$FILE/Lesson%203.pdf

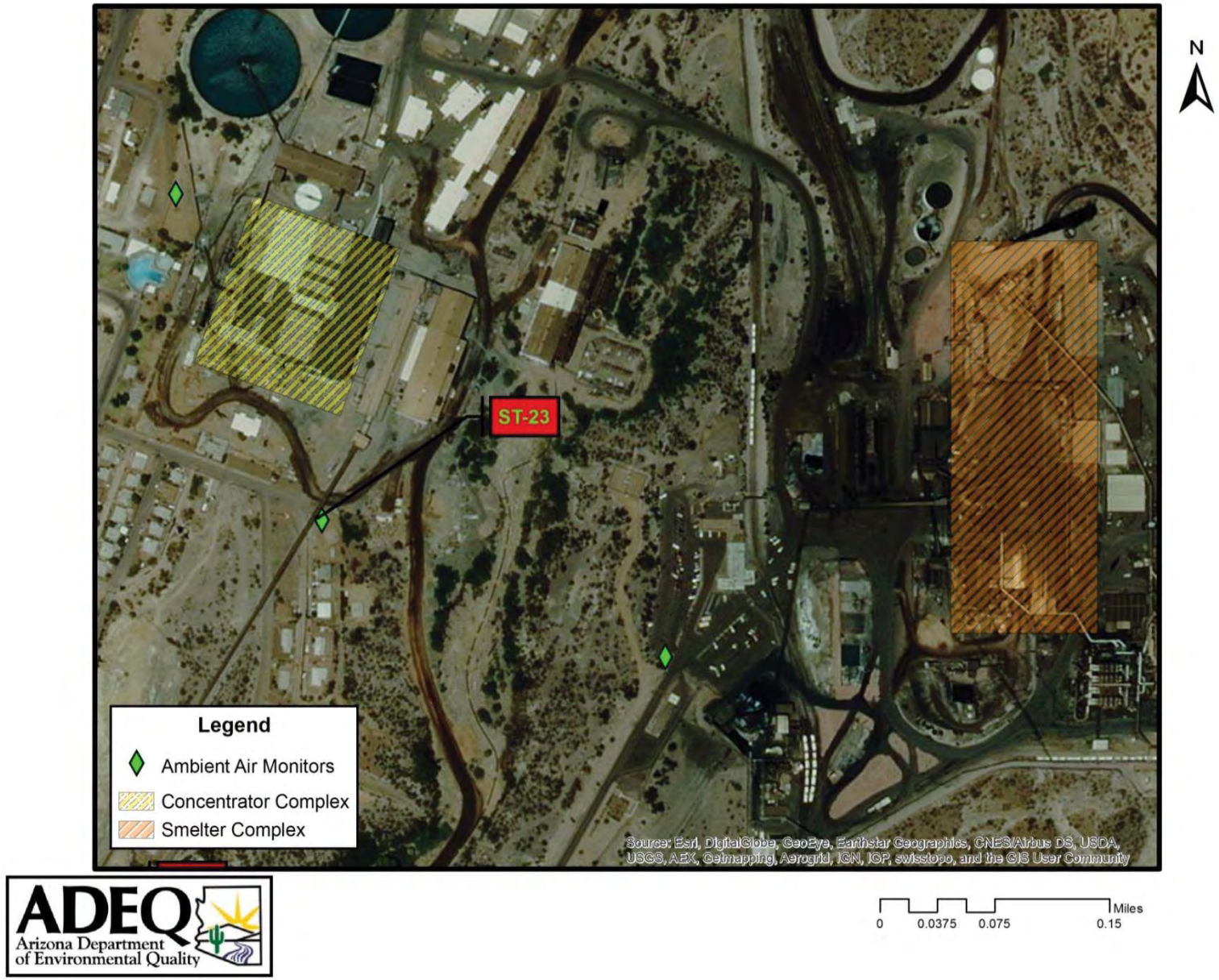
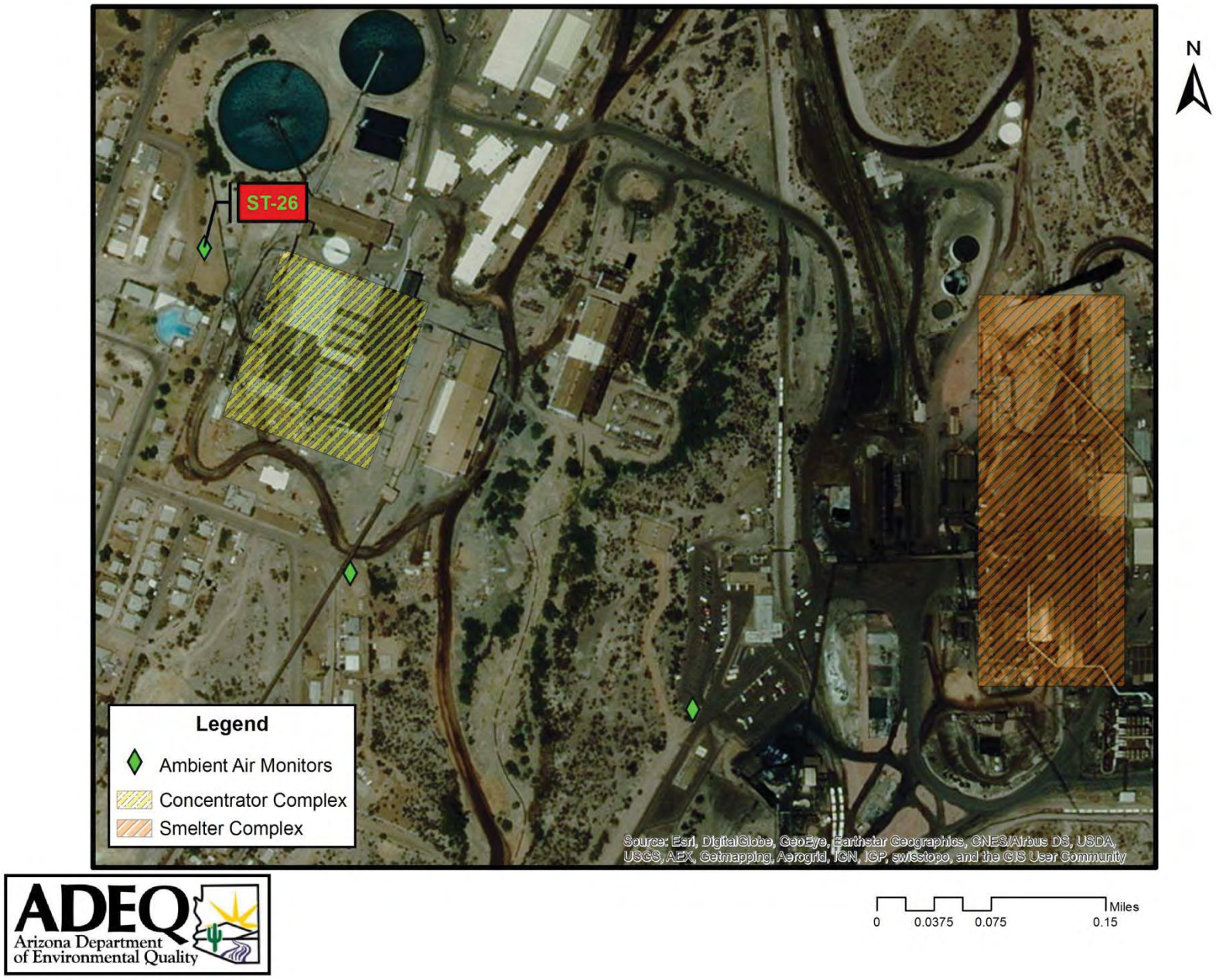


Figure 3-8: Hillcrest (ST-23) Monitor



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Figure 3-9: Concentrator (ST-26) Monitor

3.3.3 Meteorological and Ambient Analysis

The purpose of the following analysis was to determine the approximate area of the significant sources of lead in the city of Hayden. This was accomplished by determining the highest 24-hour ambient air lead concentrations at the monitors of interest, and then analyzing the meteorological conditions for that day. As previously mentioned, possible sources include: stack emissions, process fugitive emissions (smelting process), leaded road dust emissions, materials handling and storage, and re-entrained leaded silts (from the areas surrounding the smelter).

3.3.3.1 Globe Highway

The Globe Highway Monitor recorded its highest ambient lead concentration on February 27th of the base year, with a reported concentration of 0.624 µg/m^3. The wind direction and speed for this day are typical of exceedance days at this particular monitor. For example, in the morning, the wind direction was out of the northeast (aligned with the river valley topography), and around noon the direction reversed to southwesterly (again aligned with the topography). This reversal brought ambient air from the direction of the smelter. Wind speeds associated with the northeastern morning wind pattern are low compared to the southwestern afternoon winds. On February 27th, 2012, the morning winds averaged 3 mph while in the afternoon wind speed averaged 5 mph peaking at 13:00 at 8 mph.

Of the eight maximum daily lead values for 2012, which reported lead concentrations ranging from 0.272 to 0.624 µg/m^3, all days had hourly wind speeds and directions following the general pattern described above. That is, each had low winds coming from north of Hayden in the morning and stronger winds coming from the smelter (south) in the afternoon and into the night.

The lead source nearest to this monitor is the slag dump, which is located southwest of this monitor. Because of the strong southerly winds, this source is likely to have had the largest impact on this monitor.

3.3.3.2 Parking Lot Monitor (ST-14)

Due to the timing of the CERCLA investigation, ST-14 reported no data from the base year. The data used for the following analysis range from 2013 to 2015. As previously mentioned, of all monitors of interest, ST-14 reported the highest ambient air lead concentrations. The highest 24-hour concentration sample at ST-14 occurred on November 12, 2013, which was 3.41 µg/m^3.

On this day, from early to mid-morning (1:00 to 8:00), the wind direction was predominantly out of the southeast, averaging 8º east of south. The average wind speed during this event was 3.7 mph. From 9:00 am to the end of the day, the winds became northeasterly with an average wind direction of 70º east of north. Wind speed increased with this wind direction, averaging 11 mph and peaking at 13 mph. For other high concentration days, wind speed and direction varied slightly from the scenario described above. However, the commonalities between all these high concentration days were strong northeasterly winds.

This meteorological scenario suggests the lead spikes are coming from the smelter complex, however, it does not reveal what the particular source is. Possible lead sources include: stack emissions, fugitive emissions from the smelting process, and/or materials storage piles.

3.3.3.3 Hillcrest Monitor (ST-23)

As with all the CERCLA monitors, the Hillcrest monitor reported no data from 2012, and the following analysis was carried out with data from 2013 to 2015. Ambient air lead data at this particular monitor correlate well with data from ST-14; when an elevated concentration is recorded at ST-14, this monitor most likely records an elevated concentration as well. The Hillcrest monitor is significant because it is located at the edge of a residential area, and is therefore more representative of the quality of the air in said area (as compared to ST-14).

At the Hillcrest monitor, northeasterly winds ranging from 5-10 mph dominate days that record high concentrations. The highest lead concentration of the data set, which was 1.050 µg/m^3, occurred on the same day described in the Parking Lot Monitor section (Section 3.3.2.2, above). The second highest concentration occurred on January 23, 2014, with a reported ambient air lead concentration of 0.697 µg/m^3. This day experienced the same trend in wind direction (southeasterly in the morning and northeasterly in the afternoon) but had lower overall wind speeds. This suggests, as in the case of ST-14, emissions from the smelter complex have the largest impact on this monitor. This is opposed to the concentrator to the north or the historic tailings piles to the south.

3.3.3.4 Concentrator Monitor (ST-26)

The Concentrator Monitor is located within a residential area, and is the CERCLA monitor furthest from the smelter complex. The wind patterns seen at this monitor are influenced by the concentrator to the east which acts as a wind break. High concentration days at ST-26 occurred under two distinct meteorological conditions.

The first condition is characterized by southeasterly winds during the morning hours, then southwesterly winds in the afternoon and into the late afternoon. The second condition too had southeasterly winds during the morning hours, however, the afternoon and late afternoon winds were northeasterly. Possible upwind lead sources for these two conditions include the concentrator complex and re-entrained leaded silts from the residential area in which the monitor is located.

3.4 Asarco LLC Hayden Smelter Emission Source Analysis

The following section describes a high level analysis performed by ADEQ staff to better understand the lead sources at the smelter complex. In the following analysis, the phrase “impact on ambient air” is characterized as contributing to a monitor exceedance (a concentration over the 0.15 µg/m^3 NAAQS level).

Given the height of the stack (1,000 feet), ADEQ excluded stack emissions as a likely cause of exceedances at the nearby monitors. Instead, ADEQ suspects the monitor exceedances are due to a combination of fugitive emissions from the high temperature smelting process and re-entrained leaded silts from a variety of sources. In order to conduct this analysis, an assumption was made as to the size of particles emitted from the aforementioned sources. These two particle sizes are coarse and accumulation mode particles, which are described below.

3.4.1 Particulate Emissions

In this analysis, leaded coarse mode particles are being associated with materials handling and storage piles. This type of particle includes aerosols with a diameter greater than 2.5 µm, which are introduced into the

ambient air through mechanical actions such as windblown dust, grinding operations, and vehicular movement[15]. The mechanism of re-entrainment that ADEQ considered in this analysis was wind.

The fugitive emissions coming from the flash furnace, converters, and anode furnace are likely accumulation mode particles (0.1 to 2.5 µm). This range of particles is primarily attributed to condensation of hot gases and coagulation of ultrafine particles[16]. It is assumed that lead emissions from the smelting process first enter the atmosphere in the gaseous state and then cool to become accumulation mode particles. At this particle size, settling velocities are much lower, making the particle more mobile. However, while suspended, these particles can adhere strongly to coarse mode particles, thus increasing the contaminant's settling velocity. This particle behavior makes an origin and transport analyses difficult. Figure 3-10 below gives an idealized distribution of types of particles and their diameter.

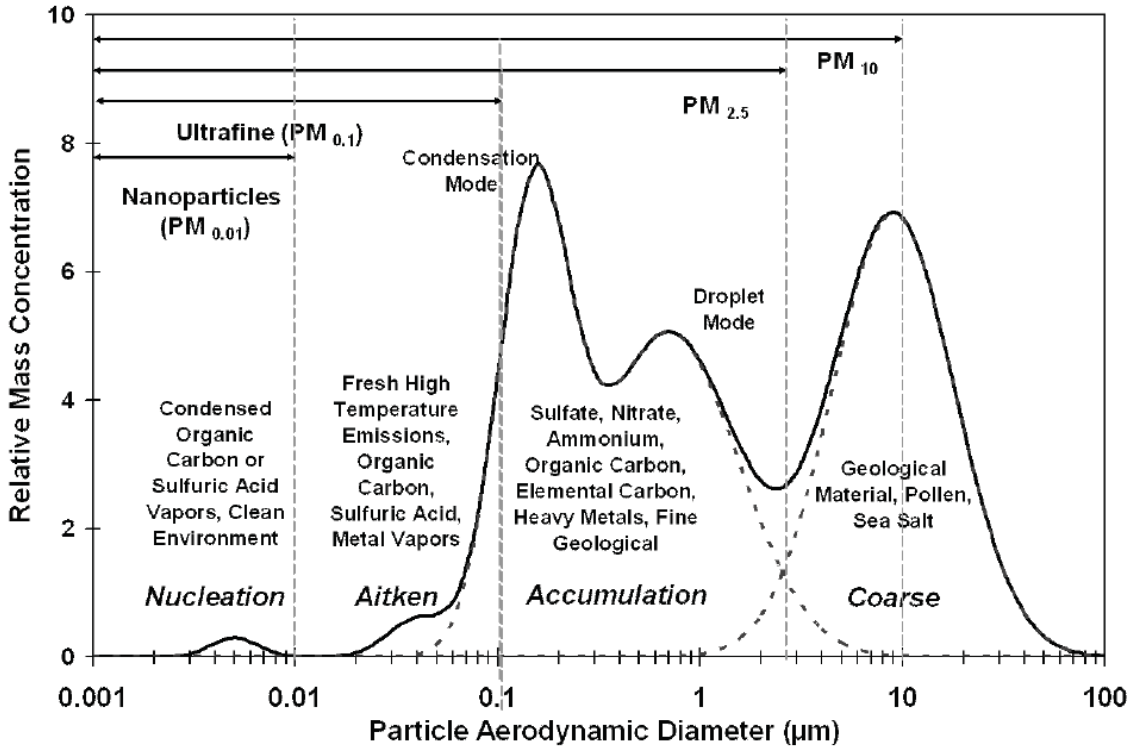


Figure 3-10: Idealized Particle Size Distribution[16]

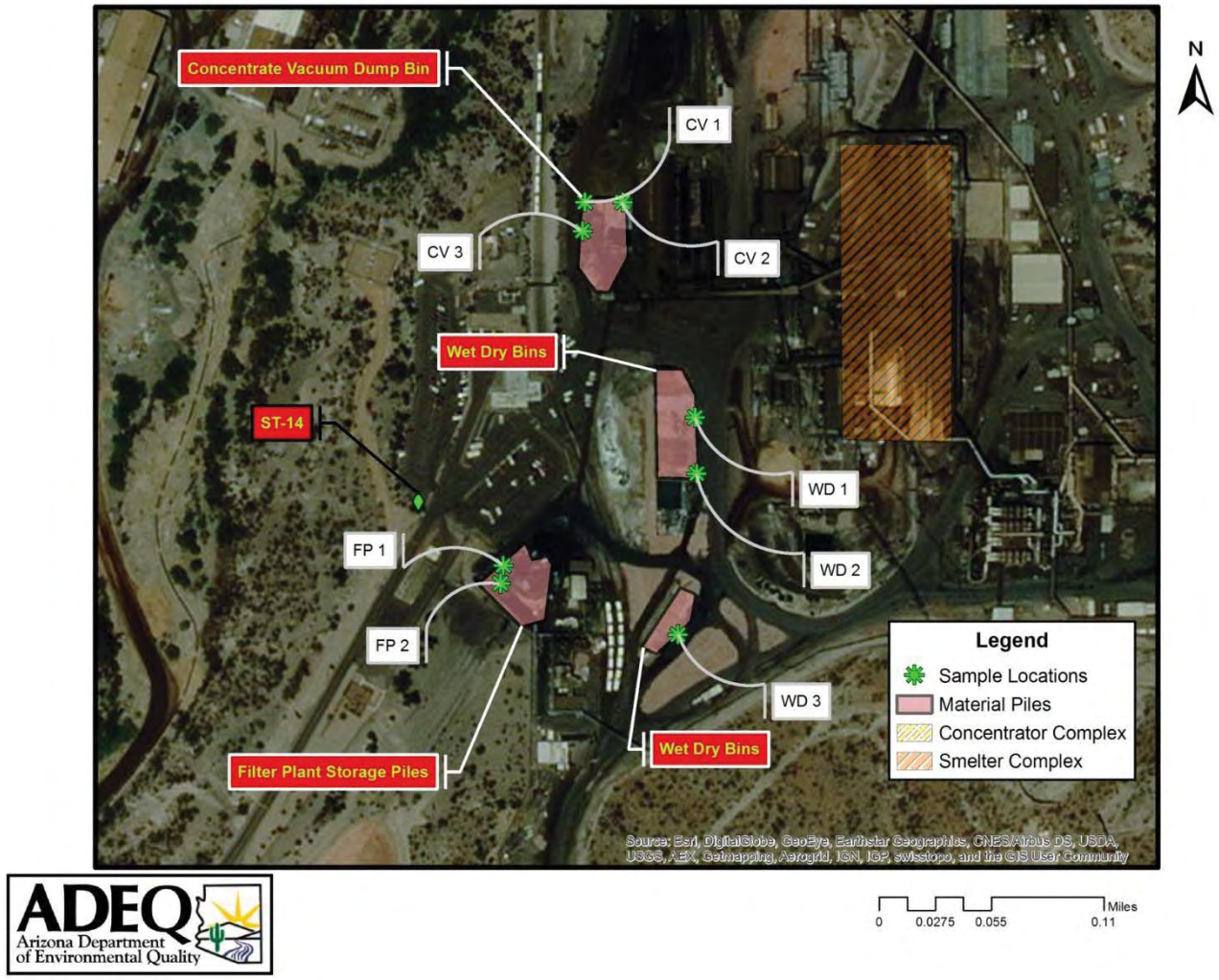
As discussed in the previous paragraph, sources of accumulation mode particles are expected to be the flash furnace, converter, and/or anode furnace. ADEQ has utilized data obtained via the CERCLA investigation to select a few material storage piles believed to be sources of leaded coarse mode particles (see Figure 3-11). ADEQ chose these sources based on soil/sediment samples taken during the CERCLA RI/FS. Eight particular samples were chosen to illustrate the lead concentrations at these materials piles. The concentrations of these samples are given in Table 3-3 below.

[15] U.S. EPA, Final Phase II Remedial Investigation/Feasibility Study (RI/FS) Work Plan, March 2012.
[16] U.S. EPA, Final Phase II Remedial Investigation/Feasibility Study (RI/FS) Work Plan, March 2012.

Table 3-3: Material Storage Lead Concentrations

Sample Lead Concentrations		
Storage Area	Sample ID	Concentration in parts per million (ppm)
Wet/Dry Bins	WD 1	248,000
Wet/Dry Bins	WD 2	128,000
Wet/Dry Bins	WD 3	172,000
Filter Plant	FP 1	12,100
Filter Plant	FP 2	15,600
Concentrate Vacuum Dump	CV 1	9,400
Concentrate Vacuum Dump	CV 2	11,000
Concentrate Vacuum Dump	CV 3	10,000

Figure 3-11: Material Storage Piles



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3.4.2 Scope

The monitor chosen for the bulk of the analysis was the Parking Lot monitor (ST-14). This was due to its close proximity to the smelting process and material piles. The monitor is less than a quarter mile from the three smelting processes, and the closest materials pile (Filter Plant) is less than 300 feet away. Therefore, ADEQ feels ST-14 is within the transport range of both types of particles. In addition to looking at ST-14 in detail, ADEQ also performed supplemental analyses of the remaining monitors of interest. This was done to better understand possible sources throughout the facility.

In order to perform this analysis, ADEQ obtained 15-minute meteorological data and 24 hour lead concentrations for the CERCLA monitors. The lead data analyzed consisted of concentrations for both $PM_{2.5}$ and PM_{10} fractions temporally ranging from August 11th, 2013 to June 29th, 2015. The meteorological data obtained fell within this range as well.

ADEQ first determined the $PM_{2.5}$-to-PM_{10} ratio for every day in the data set. These ratios will herein be referred to as "particle ratios." At ST-14, the particle ratios ranged from 0.96 to 0.16. Based on the discussion in Section 3.4.1, ADEQ hypothesized that the main emission source would be the smelting process on days with high ratios, while it would be the material storage piles on days with low ratios. Therefore, ADEQ suspected that these high ratio days would have meteorological conditions characterized by easterly winds (from the direction of the smelter) at a low to moderate speed. Low to moderate wind speeds are expected due to the low settling velocities associated with accumulation mode particles.

The low ratio days were theorized to feature higher-speed winds from the same direction (the direction of the smelter). This assumption is based on the expectation that lower-speed winds would pick up less material. For the first portion of this analysis (concerning ST-14), easterly winds are referred to as "worst case MET."

Three ranges of ratios were chosen for analysis. The lower range (LR) included ratios below the lower quartile, which include ratios between 0.45 and 0.22. ADEQ theorized the source of the lead associated with these samples to be exclusively materials storage piles. The middle range (MR) included ratios in the interquartile range, which included ratios between 0.69 and 0.47. ADEQ theorizes the source of the lead associated with these samples to be a mixture of material storage piles and smelter fugitive emissions. The upper range (UR) included ratios above the upper quartile, which include ratios between 0.96 and 0.72. ADEQ theorizes the source of the lead associated with these samples to be primarily fugitive emissions from the smelter.

Parameters of concern for this analysis included: the number of hours during a particular day when the meteorology was the worst case condition (between 22.5º east of north and 67.5º east of south from the smelter), the average wind speed and direction during the aforementioned scenario, the max wind speed during the worst case condition, and the PM_{10} lead concentrations for the day of interest.

3.4.3 Methodology and Results

The above parameters were evaluated to answer two questions regarding lead sources at the facility:

1. What source impacts ambient air quality most frequently?
2. Which source has the largest impact on ambient air (characterized by lead concentrations at the monitor)?

Once again, lead samples in the LR were attributed to material storage piles, lead samples in the MR consist of both smelting fugitives and material storage piles, and finally lead samples in the UR were attributed to smelter fugitives.

To answer the first question, the total number of samples and exceedance samples in the ranges were analyzed. As shown in Table 3-4, below. As seen in the table, the percentage of samples over the NAAQS level was the highest in the UR. This implies that, when the source responsible for emissions falling in this range emits, emissions will more frequently contribute to exceedances.

In contrast, the LR had the lowest percent of samples over the NAAQS level, suggesting that the material storage piles have less impact on ambient air than the process fugitives, with respect to lead. From these observations we observe that smelter fugitives play a significant role in determining the frequency of exceedance days.

Table 3-4: Range Exceedance Percentages

Range	Number of Samples	Number of samples >0.15 µg/m³	Percent of Samples >0.15 µg/m³
Lower Range	26	5	19%
Middle Range	53	25	47%
Upper Range	27	19	70%

In order to determine which source has the largest impact on ambient air quality, the parameters of interest were averaged for each of the three ranges. When all samples were included in the averages, the concentrations for the LR, MR, and UR were 0.09, 0.33, and 0.57 µg/m^3 respectively. In order to focus on exceedances, ADEQ also calculated the averages for each range among exceedance days only. These restricted average values are summarized in Table 3-5, below. In both the restricted and unrestricted cases, the average concentration in the UR had the largest value. Based on the assumptions described above, these results suggest that smelter fugitive emissions have the largest impact at this monitor. The following discussion of the remaining monitors depends on the same assumptions about particle sizes.

Table 3-5: Range Parameter Averages

Range	Ratio	Pb Concentration (µg/m³)	Worst Case MET (hours)	Max Wind Speed (mph)	Average Wind Speed (mph)	Average Wind Direction (degrees)
Lower Range	0.33	0.24	4.85	6.6	4.0	69
Middle Range	0.58	0.63	9.91	10	6.4	69
Upper Range	0.80	0.79	12.58	11	6.9	66

Figure 3-12 gives the distribution of the ratios for the four CERCLA monitors of interest. The Parking lot monitor (ST-14) has the largest distribution with the majority of exceedance days falling between 0.50 and 0.80. This suggests both materials handling/re-entrained dust and fugitive emissions play a role in exceedances at ST-14. However, the higher lead concentrations associated with each bin (Figure 3-13) occur on days with higher ratios.

The Globe Highway monitor (ST-05) exceeds 0.15 µg/m^3 exclusively in the higher range, which suggests leaded windblown dust/material has little to no impact at this monitor. It is more probable that accumulation mode particles from slag dumping, an activity that takes place roughly a quarter mile away, is impacting the monitor. The fact that the Globe Highway monitor experiences low wind speeds for the majority of the year further supports this assumption.

Exceedance days at the Hillcrest monitor (ST-23) are concentrated towards the bottom of the ratios, with the highest Pb concentrations in the 0.10 – 0 bin. This suggests that ST-23 is more affected by re-entrained dust than smelter fugitive emissions. The Concentrator monitor (ST-26) does not fall into either of the patterns seen in the other monitors. It has a more split distribution, with 4 exceedance days occurring in the higher ratio bins and 2 occurring in the lower bins. However, the highest concentrations at ST-26 are seen in the lower bins, which suggests, like with ST-23, re-entrained dust has the largest impact.

In short, ADEQ theorizes the accumulation mode particles emitted from the high temperature smelting operations are the major source of ground level lead emissions. Once in the atmosphere, these condensed particles are expected adhere to larger silt particles and settle within a short distance. During strong wind events these leaded silt particles are then likely transported to the areas surrounding the smelter.

The analysis in this section was high level, and only general statements can be made based on the assumptions regarding particle sizes and their likely sources. However, the circumstantial evidence suggests that controls focused on capturing fugitives from the smelting process would have the greatest impact on improving the ambient air quality in the town of Hayden.

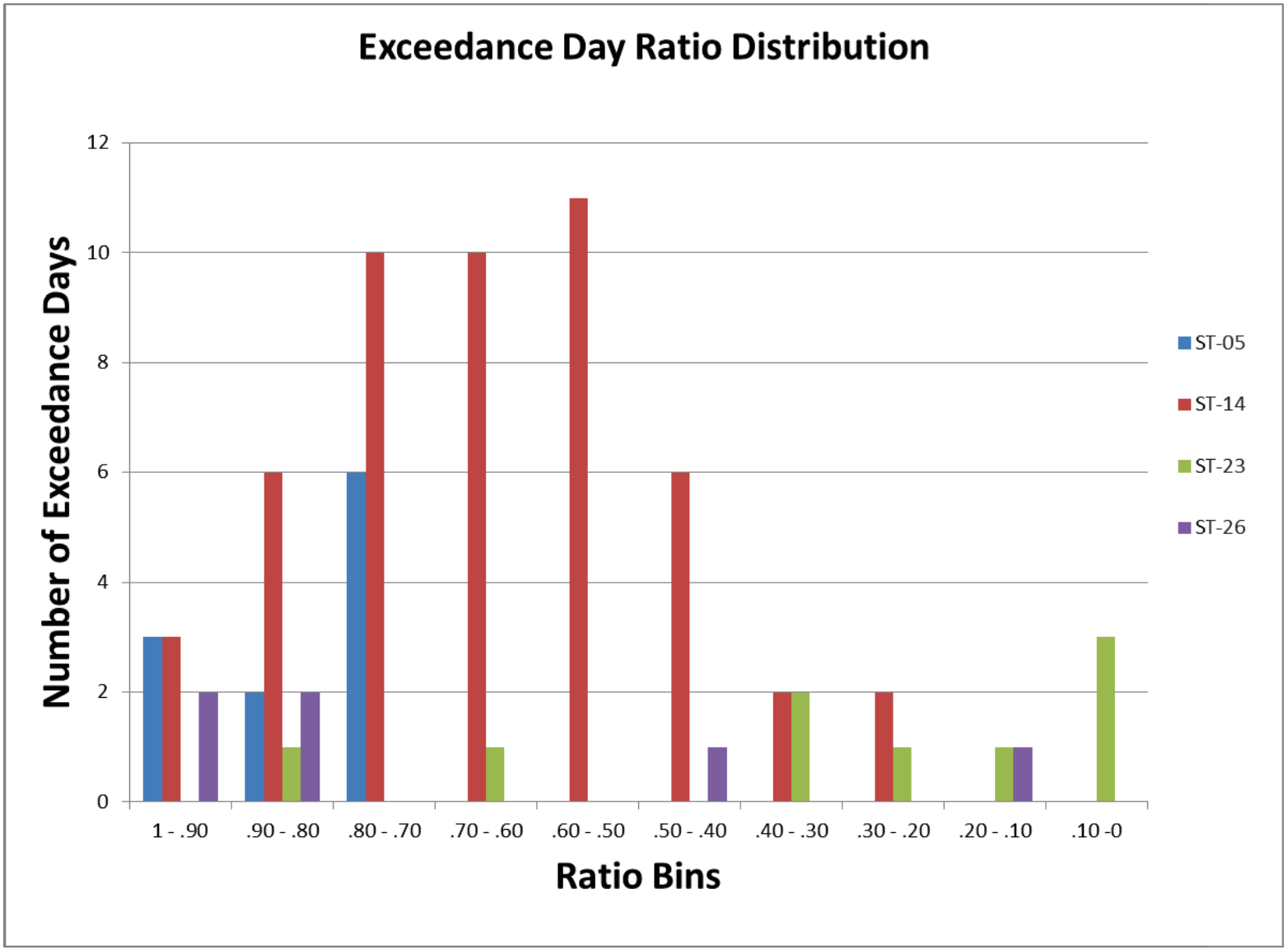


Figure 3-12: Exceedance Day Distribution

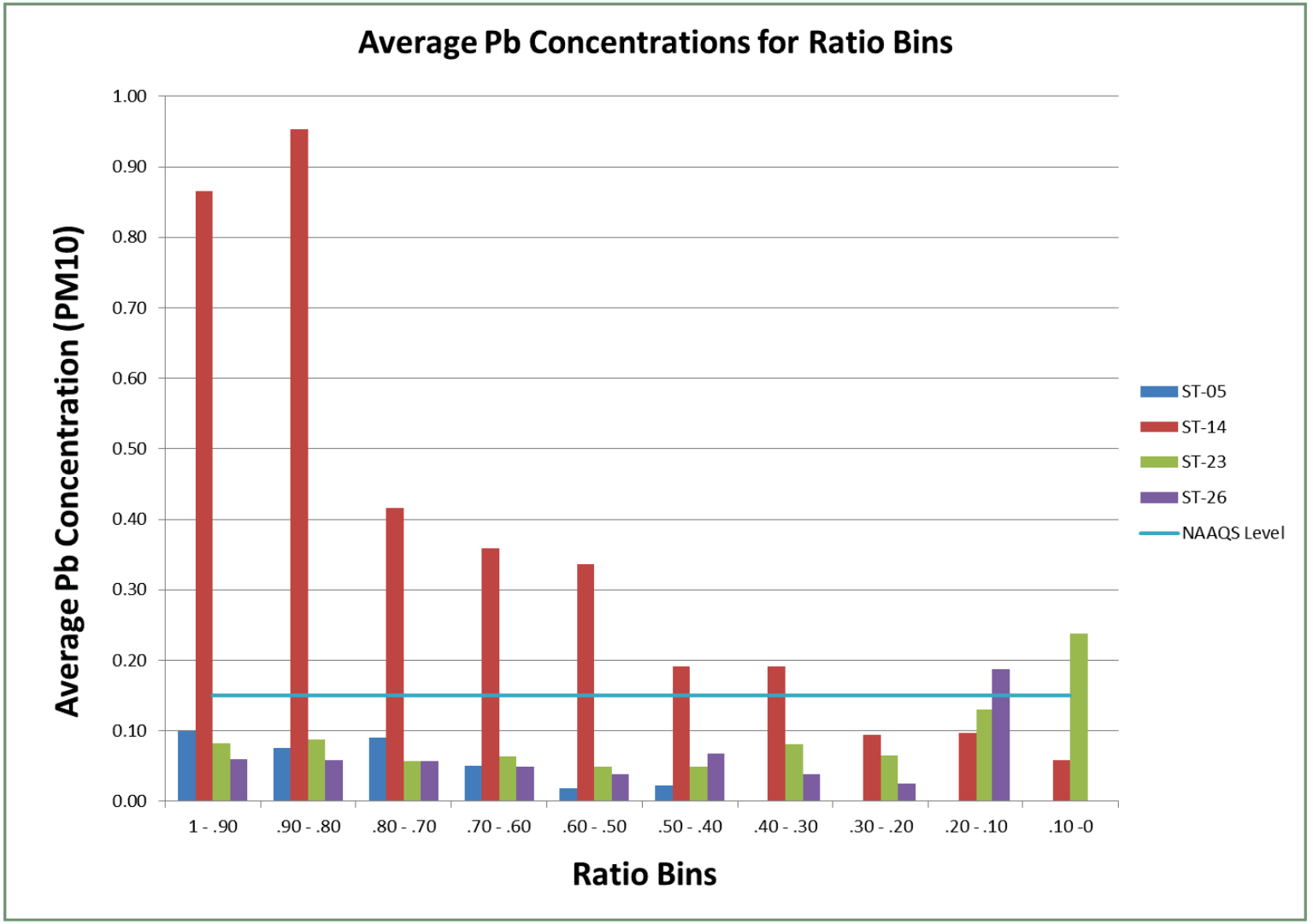


Figure 3-13: Average Bin Pb Concentration

4 Emission Estimation Methodology

ADEQ employed a multi-method approach when compiling the base year and projected attainment year inventories. Table 4-1 is a summary of the approaches used to estimate Pb emissions in the Hayden NAA. ADEQ has taken a bottom up approach to determining point source emissions in the Hayden NAA. ADEQ derived the remaining portions of the inventory from national-level data obtained from EPA's 2011 National Emissions Inventory (NEI) Version 2. ADEQ allocated these data to the Hayden NAA based on various methodologies explained throughout this section of the TSD.

Table 4-1: Emission Inventory Source Category, Approach and Data Source

Emission Inventory Source Category	Inventory Estimation Approach	Primary Data Sources
Point	Bottom-Up	Permit, Annual Emission Inventory Questionnaires, Remedial Investigation & Feasibility Study (RI/FS)
Nonpoint	Top-Down	2011 NEI V2
Mobile On-road	Top-Down	2011 NEI V2
Mobile Nonroad	Top-Down	2011 NEI V2

4.1 Asarco LLC Smelter Lead Emission Estimation Methodologies

As seen in Table 4-1, ADEQ has taken a bottom-up approach to determining the point source category emissions. ADEQ considered point sources which emit more than 0.5 tons of lead in a year. Applying this criterion, ADEQ found that the only point source in the NAA was the ASARCO Copper Smelter. ADEQ's emission inventory sectioned this source into three categories. These are: point sources (including smelter fugitives), road dust, and process fugitives (materials handling emissions). Data sources used include lead data submitted by ASARCO to the State & Local Emissions Inventory System (SLEIS) and data obtained from the RI/FS. The following sections outline ADEQ's approach in quantifying these emissions for the base year (2012).

4.1.1 Point Sources

The copper smelting process consists of a concentrator operation (concentrator complex) and a smelting operation (smelter complex). In short, the concentrator operation processes ore from offsite mines by crushing, chemically concentrating, and then dewatering a product referred to as concentrate. In this process, lead concentrations in the material (crushed ore) start at 17 parts per million (ppm) and are increased to roughly 2,600 ppm[17] (concentrate). In comparison to the smelting operations, this portion of process emits a negligible quantity of lead, and thus was not quantified in the point source inventory.

A brief description of the smelting process is as follows. After the concentrate leaves the concentrator complex, it is taken by rail car to the smelter complex. The rail cars are unloaded into outside storage bins and then dried in the wet feed bins. This dried concentrate is stored in dry feed bins before being introduced into the Inco Flash Furnace; this step starts the "smelting process". From the flash furnace the matte copper (56% copper) is further

[17] U.S. EPA, Final Phase II Remedial Investigation/Feasibility Study (RI/FS) Work Plan, March 2012.

processed in the converters, which are Pierce-Smith converters. This converter step creates blister copper (95% copper), which is then introduced into the anode furnace. The anode furnace further processes the blister copper into anode copper (99% copper). This anode copper is tapped into launders and poured into molds to cool, before being shipped offsite for further processing.

In ADEQ's point source inventory, the following were included:

- Ore Concentrate Dryer – Emission Point: Annulus Main Stack
- Dryer with Flash Furnace and Converter – *Emission Point: Annulus Main Stack*
- Flash Smelting – Emission Point: Flash Furnace Fugitives
- Flash Smelting – Emission Point: Acid Plant Inner Main Stack
- Converter (All Configurations) – Emission Point: Converter Fugitives
- Anode Refining Furnace – Emission Point: Baghouse Stack
- Anode Refining Furnace – Emission Point: Fugitive Emissions

Base year emissions for all sources listed above were supplied to ADEQ by ASARCO in an annual emissions report. For further information regarding ASARCO's annual emissions report for the base year (2012) see the excel reference workbook titled "Facility 2012 Inventory". Emission rates in this workbook are given in either units of pounds per hour or pounds per day. These rates were then multiplied by the hours of operation in the base year. The source subdivided fugitive emissions from the Anode Furnace into three scenarios. These scenarios were no control, partial control, and full control operating days, with operation hours of 60, 72, and 228, respectively. The emission rates for these operating days also varied at 8.085, 4.043, and 0.243 pounds per day, respectively.

Additionally, for detailed calculations concerning the process fugitive sources mentioned at the end of this section see the excel reference workbook titled "NAA Inventory".

4.1.2 Road Dust

Due to the interaction between high temperature atmospheric lead emissions and coarse mode particles, ADEQ decided to quantify leaded road dust emissions from the ASARCO concentrator and smelter complexes. To see detailed calculations regarding this source please see the excel reference workbooks titled "NAA Inventory".

This portion of the inventory was divided into unpaved and paved roads for both the concentrator and smelter. To accomplish this, ADEQ took 2012 SLEIS particulate matter (PM) data submitted by the source and applied road dust lead percentages, which were determined in the RI/FS. These road dust lead percentages can be found in Appendix C in the "Phase II Remedial Investigation Report: Air ASARCO Hayden Plant Site". The particular study from which these road dust factors were taken was the Area Fugitive Dust study (see Appendix C). Table 4-2 gives the specific vehicle traffic associated with road dust emissions for both road types and both the smelter and concentrator.

Leaded concentrations in road dust were obtained via the CERCLA RI/FS study. Specifically, these data were obtained from an area fugitive resuspension study. Concentrations in this study were given as percentages by mass of total $PM_{2.5}$ or PM_{10}. ADEQ's methodology involved determining the mass of PM_{10} emitted by the traffic types listed in Table 4-2 for the base year. The percent Pb PM_{10} mass found in the resuspension study was then

applied to the aforementioned PM_{10} mass. The percent Pb PM_{10} mass for paved roads at the concentrator and smelter were **0.44%** and **2.64%**, respectively; for unpaved roads at the concentrator and smelter the factors were **0.357%** and **1.456%**, respectively. ADEQ would have applied a % Pb value for TSP, however due to project constraints, % Pb PM_{10} values were used instead. This decision was based on the mobility of PM_{10} particles, and because road dust contributes a relatively small portion of lead emissions (compared to smelter fugitives and stack emissions), ADEQ determined that the PM_{10} estimation approach would not introduce significant uncertainty to the emissions estimate total.

Table 4-2: Road Dust Vehicle Traffic Type

Road Dust Emissions: Vehicle Traffic Type			
Smelter Complex		Concentrator Complex	
Paved	Unpaved	Paved	Unpaved
Concentrate, anode, and blister receipts & shipments	Hauling of flux from the crusher to the stockpiles	General Plant Traffic	General Plant Traffic
General Plant Traffic	Hauling of slag from the slag dump to mill for recycling	18 Wheeler Traffic	18 Wheeler Traffic
Water truck	Hauling of slag from the furnace to the slag dump	-	-
Street Sweeper	-	-	-
Plant Service Haul Truck	-	-	-
Scrap handling forklifts	-	-	-
Miscellaneous use forklifts	-	-	-
Miscellaneous Delivery Trucks	-	-	-
Sulfuric acid trucks	-	-	-
Storage pile front-end loaders	-	-	-
Miscellaneous use front-end loaders	-	-	-

4.1.3 Process Fugitives

In ADEQ's EI the term "process fugitives" covers four main activities occurring at the smelter complex. These activities relate to the handling of feed material or byproducts of the smelting process. These activities are:

- Slag Pouring
- Reverts Crushing & Handling
- Concentrate Handling – bedding area & overflow storage
- Dewatering of Venturi Scrubber Slurry – wet/dry bins

4.1.3.1 Slag Pouring

Slag is a byproduct of all three smelting processes and primarily consists of iron silicates. However, heavy metals are also found in this material to varying degrees, with lead concentrations reported to be 1,190 ppm[18]. The slag is created when the concentrate mixture becomes molten and partitions into layers (slag being the top layer), or

[18] U.S. EPA, Final Phase II Remedial Investigation/Feasibility Study (RI/FS) Work Plan, March 2012.

when slag blowing occurs (introduction of oxygen enriched air). Slag is reintroduced into the smelting process if it's still high in copper. Slag with less copper is transported by truck to the slag dump where it is poured and air cooled.

Base year Pb emissions due to slag pouring were provided by the facility in their annual emissions submission. The calculation method used can be found in AP-42 chapter 12.3 using tables 12.3-19. The formula used and exact calculation can be seen below.

Equation 4-1: Slag Pouring Emissions Quantification

$$E = E_1 * E_2 * FT_1 * FT_2 * FT_3$$

where:

- E_1= AP-42 Emission Factor Table 12.3-11 (0.072 lb/ton)
- E_2= Tons of concentrated ore processed (in base year 647,637 tons)
- FT_1= Ratio of slag Pb per ton of anode produced (0.41)
- FT_2= Slag skimming fraction of total smelting furnace emissions (0.02)
- FT_3= Pouring fraction of total slag skimming emissions (0.25).

With the above values,

$$E = 0.072 \frac{\text{lb}}{\text{ton}} * 647{,}637 \frac{\text{tons}}{\text{year}} * 0.41 * 0.02 * 0.25$$

$$= \mathbf{95.59} \frac{\text{lbs}}{\text{year}}.$$

4.1.3.2 Reverts Crushing

Reverts are primarily matte and slag shells which form on the cool surface of the ladles used in the converter aisle. Reverts larger than 24 inches are sent through the reverts crushing process. This process consists of a primary jaw crusher that crushes the reverts to less than one inch[20]. ADEQ has chosen to quantify reverts crushing and handling emissions because previous soil sampling around these operations have shown elevated soil lead concentrations. Therefore, reverts crushing and handling is a quantifiable source of fugitive emissions and windblown leaded dust.

At the smelter complex, reverts crushing operations take place in two areas: reverts crushing north and reverts crushing south. Three emissions scenarios were considered for each reverts handling area: wind erosion, batch drop emissions, and load out emissions. To quantify emissions from these scenarios, ADEQ used two different estimation methods and compared the results. The two approaches were defined by the percent Pb factor applied to PM totals.

In approach 1, a **2.2%** percent Pb factor associated with reverts operations (found by the CERCLA resuspension study, which was the same study used in the road dust quantification) was applied to PM totals submitted in ASARCO's 2012 SLEIS emissions inventory. This particular factor applied to the PM_{10} fraction. Therefore, the factor was applied to the PM_{10} totals for the three scenarios listed above (wind erosion, batch drop emissions, and load out emissions).

In approach 2, a **0.89%** percent Pb factor for reverts crushing was used. This factor was submitted by the source in their 2019 potential to emit (PTE) calculation. Once again this percent Pb factor was applied to PM totals in ASARCO's 2012 SLEIS submission. However, unlike in approach 1, this factor applied to total tonnage of PM emitted (not PM_{10} or $PM_{2.5}$).

After these two approaches were completed, the final Pb emissions were compared to evaluate which approach would be more conservative. The final masses from these two approaches varied by 1.7%. Therefore, ADEQ concluded both approaches are reasonable and the most conservative value was retained.

4.1.3.3 Concentrate Handling

Concentrate is the copper containing material that is mixed with other silica materials (flux) and fed into the smelting process. As previously mentioned, concentrate has been found to have lead concentrations at roughly 2,670 ppm. Therefore, an area where this material is handled is a potential source of lead emissions. Like reverts crushing, the three emissions scenarios ADEQ quantified were: wind erosion, batch drop emissions, and load out emissions. These scenarios were applied to the concentrate bedding and overflow storage areas.

ADEQ quantified these scenarios by applying a percent Pb factor, which was developed from the CERCLA resuspension study, to PM totals reported in the sources 2012 SLEIS submission. The percent lead factor applied to the PM_{10} totals was **0.458%**.

4.1.3.4 Dewatering of Venturi Scrubber Slurry

At the smelter complex, sulfur from process gas is repurposed into 93 – 98% sulfuric acid at the on-site Acid Plant. In order for this plant to operate, the process gas it receives must be relatively free of PM. A venturi and wet scrubber is used to accomplish this. In the base year, slurry from the venturi scrubber was dewatered in the open air wet/dry bins previously mentioned. However, as part of the fugitive dust plan, the acid plant scrubber blowdown material (venturi scrubber slurry) is to be handled in a different manner.

In the new plan, this slurry will first be diverted to a new thickener. From the thickener, the material will be sent to two electric dryers, and the dried cake will then be discharged directly into bags. Because the CERCLA investigation found high lead concentrations in the open air wet/dry bins (see Section 3.4), ADEQ feels this operational change will greatly reduce the ambient air Pb concentrations.

For the sake of consistency, emissions from the wet/dry bins were quantified using the same methods the source used in their 2012 SLEIS report (for materials handling). This particular method can be found in AP-42, section 11.2.3 (May, 1983) Aggregate Handling and Storage Piles.

A sensitivity analysis was performed on the equations and important parameters were retrieved from the source, namely silt % and PM10 fraction. The PM10 fraction was important because the percent lead factor used applied only to PM_{10}. Once again, the percent lead fraction for this specific source was obtained from the CERCLA resuspension investigation, and was **44.1%**.

4.2 EPA 2011 National Emission Inventory Version 2

The EPA's NEI database contains nationwide data on the emissions and sources of emissions of the Criteria Air Pollutants (CAP) as well as hundreds of other Hazardous Air Pollutants (HAP) and greenhouse gases (GHG). The NEI includes estimates of annual air pollutants from all point, nonpoint, mobile and event sources in the United States and its territories. The NEI is a collaborative effort between the states, tribal nations, and federal agencies that provide a snapshot of emissions from the county and tribal to national scale.

EPA estimated 2011 NEI V2 emissions with data from the following sources:

- State, Local, and Tribal (S/L/T) agencies submitted CAP and HAP emissions required and/or enabled under the Air Emissions Reporting Rule (AERR)
- EPA and other federal agency databases (e.g. Toxics Release Inventory)
- MOVES2010b model runs
- EMission FACtor (EMFAC) model runs
- NONROAD model runs
- OFFROAD model runs
- National Mobile Inventory Model (NMIM) model runs
- Academic and private sector research institutes and databases

ADEQ used the 2011 NEI V2 as the basis for the area and mobile nonroad emission estimates in this inventory. Specifically, ADEQ allocated the county level emissions estimates from the NEI down to the NAA based on the allocation methodologies described in the following sections. For detailed calculations concerning area, mobile non-road, and airport emissions see the excel reference workbook titled "NAA Inventory".

4.3 Population Allocation Methodology

ADOA calculated population growth and population estimates for the Hayden Pb NAA using the population methodology attached in Exhibit A. ADEQ used these estimates in creating the population adjustment and population growth-rate factor used in the Hayden Pb NAA base year and projected EIs.

ADEQ utilized the ratio of the NAA population to the county population to allocate emissions tied to population. As 2012 is the base year for the emission inventory, ADEQ used the ADOA county level and NAA level population estimates from 2012 to determine the population allocation factor.

Equation 4-2: Population Allocation Factor

$$\frac{P_{na}}{P_c} = AF_p$$

where:

- P_{na} = ADOA population estimate of county portion of Nonattainment Area
- P_c = ADOA population estimate of entire county
- AF_p = Population allocation factor.

As the Hayden Pb NAA encompasses portions of both Gila and Pinal Counties, ADEQ developed separate allocation factors for each. ADEQ did this to 1) simplify the calculations and 2) provide more accurate future-year projections as each county has drastically different growth estimates.

Equation 4-3: Gila County Population Allocation Factor

$$AF_p = \frac{1{,}280}{53{,}626} \approx \mathbf{0.0239}$$

Equation 4-4: Pinal County Population Allocation Factor

$$AF_p = \frac{3{,}410}{389{,}192} \approx \mathbf{0.00876}$$

Using this method, ADEQ developed a population allocation factor for Gila County of **0.0239** and Pinal County of **0.00876**. In other words, **2.39%** of the population of Gila County and **0.876%** of the population of Pinal County resides within the Hayden Pb NAA. ADEQ multiplied this factor by county-level source category specific emission estimates where population drives emissions.

4.4 Airport Allocation Methodology

In the United States, one hundred octane, low lead aviation gasoline (avgas) is the primary fuel used in piston-engine powered aircraft. This lead is added to boost fuel octane, prevent engine knock, and prevent valve seat recession and subsequent loss of compression for engines without hardened valves[19]. However, in the U.S., this fuel additive constitutes a sizable source of lead emissions. For example, the 2002 National Emissions Inventory (NEI) found 45% of lead emissions were due to leaded avgas[20]. Because of this fuel additive, ADEQ has quantified avgas emissions. The following section outlines ADEQ's approach for quantifying avgas emissions.

ADEQ started by determining the number of airports in the NAA and found that there was only one: the Kearny Airport. Because the Kearny Airport is located in Pinal County, and no Gila County airports are found in the NAA, emissions were allocated based on Pinal County aircraft emissions from the 2011 NEI v2. This allocation was based on annual aircraft operations at all airports located in Pinal County. Total annual aircraft operations (counting landings and takeoffs as separate operations) at the Kearny Airport were divided into the Pinal County total, giving the Kearny airport's percentage of all county operations. This calculation is illustrated below. In order to capture piston powered aircraft and not jet engine powered, the Pinal Airpark was excluded from the Pinal County total. This was because no non-jet engine crafts were located at this Airport, primarily because 86% of operations taking place there are military.

Equation 4-5: Airport Allocation Factor

$$\frac{AO_K}{AO_{PC}} = AF_K$$

[19] EPA, Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory, December 2010.

[20] U.S. Environmental Protection Agency (2008) EPA's Report on the Environment EPA/600/R-07/045F. Available at: http://www.epa.gov/roe

where:

- AO_K = Annual airport operations at the Kearny Airport
- AO_{PC} = Annual airport operations for Pinal County
- AF_K = Allocation factor for the Kearny Airport

Equation 4-6: Kearny Airport Allocation Factor

$$AF_K = \frac{1{,}196}{35{,}092.2} \approx \mathbf{0.0341}$$

Using this method, ADEQ developed an allocation factor for Pinal County of **0.0341**. Therefore, **3.41%** of the total aircraft emissions within Pinal County are contained within the Hayden Pb NAA. ADEQ multiplied this factor by county level airport Pb emissions to provide an estimate of emissions within the Hayden NAA.

4.5 Rail Length Allocation Methodology

ADEQ allocated locomotive emissions based on rail length within the Hayden Pb NAA as a ratio of total rail length within Gila and Pinal County. ADEQ used ArcMap along with a 'rails' shapefile obtained from the Arizona Land Resource Information System to determine rail length in each county and within the Hayden NAA.

Equation 4-7: Rail Length Allocation Factor

$$\frac{RL_{NA}}{RL_C} = AF_{RL}$$

where:

- RL_{NA} = Rail length in miles within county portion of NAA
- RL_C = Rail length in miles of entire county
- AF_{RL} = Rail length allocation factor

Equation 4-8: Gila County Rail Length Allocation Factor

$$AF_{RL} = \frac{9.01164}{64.3990} \approx \mathbf{0.1399}$$

Equation 4-9: Pinal County Rail Length Allocation Factor

$$AF_{RL} = \frac{28.6218}{272.4190} \approx \mathbf{0.1051}$$

Using this method, ADEQ developed a rail-length allocation factor for Gila County of **0.1399** and for Pinal County of **0.1051**. Thus, **13.99%** of the total rail length within Gila County and **10.51%** of the total rail length within Pinal County is contained within the Hayden Pb NAA. ADEQ multiplied these factors by county level locomotive Pb emissions to provide an estimate of locomotive Pb emissions within the Hayden NAA.

5 2012 Base Year Emission Inventory for Lead in the Hayden Planning Area

ADEQ has accounted for all anthropogenic sources of Pb within the Hayden Pb NAA. These sources have been defined as either: point (Section 5.1), area (Section 5.2), or mobile nonroad (Section 5.3). ADEQ has used the 2011 NEI v2 as the basis for area and mobile nonroad sources because it is the most complete and accurate data set available which includes those emissions. For point sources (PTE ≥ 0.5 tons Pb), ADEQ used emissions data collected from annual emission inventory reports and percent lead factors derived from several sources (see Section 4.1 for details).

5.1 Base Year Point Source Emission Inventory

The point source category of the EI is the most significant, making up roughly 99% of emissions in the NAA. The only source in the NAA that ADEQ found which qualifies as a point source was the ASARCO LLC Copper Smelter. In this context, the term "point source" is inclusive of all emissions at the ASARCO Smelter, which includes: stack emissions, smelter fugitives, leaded road dust, and process fugitives (slag pouring, reverts crushing/handling, concentrate handling, and the dewatering of venturi scrubber slurry). The methodology used to determine emissions from this source are covered in Section 4.1.1. In addition Table 5-1 through Table 5-8 summarize the base year emissions from this source.

Table 5-1: Smelter Stack & Fugitive Emissions

Point Source Inventory		
Smelter Stack & Smelting-Process Fugitive Emissions		
Source	Description	2012 Pb Emissions (tons)
Concentrate Dryer	Emission Point #HP-2 Annulus Main Stack-R&R	.082
Flash Furnace, Converter, Anode Furnace	Emission Point #HP-2 Annulus Main Stack & Anode Baghouse Stack	0.998
Acid Plant	Emission Point #HP-1 Acid Plant Inner Main Stack	0.011
Flash Furnace	Emission Point #HP-25 Flash Furnace Fugitives	0.495
Converter (All Configurations)	Emission Point #HP-41 Converter Fugitives	0.968
Anode Refining Furnace: Fugitive Emissions	Emission Point #HP-24 Anode Refining Furnace Fugitives (No Control Operating Days)	0.243
Anode Refining Furnace: Fugitive Emissions	Emission Point #HP-24 Anode Refining Furnace Fugitives (Partial Control Operating Days)	0.146
Anode Refining Furnace: Fugitive Emissions	Emission Point #HP-24 Anode Refining Furnace Fugitives (Full Control Operating Days)	0.028
Smelter Stack & Fugitive Emissions Total		2.97

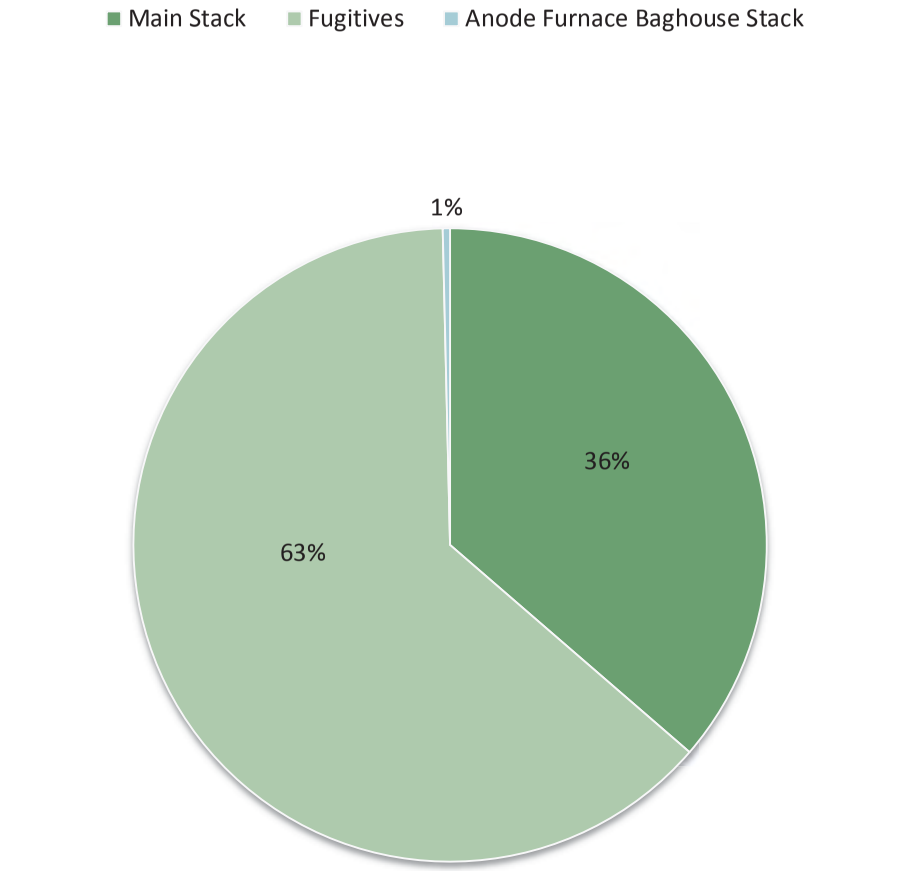


Figure 5-1: Stack & Fugitives Summary

Table 5-2: Smelter (Paved) Road Dust Emissions

Point Source Inventory Cont.		
Smelter (Paved) Road Dust Emissions		
Source	Description	2012 Pb Emissions (tons)
Concentrate, anode, and blister receipts & shipments	Road emissions from the hauling of concentrate, oxygen, anodes, and blister copper	0.00015
General Plant Traffic	Road emissions from the flow of general plant traffic	0.00857
Water truck	Road emissions from the maintenance of roads by water truck	0.01386
Street Sweeper	Road emissions from the maintenance of roads by street sweeper	0.00434
Plant Service Haul Truck	Road emissions from the hauling of material by plant service haul trucks	0.00837
Scrap handling forklifts	Road emissions from the traffic of forklifts	0.01798
Miscellaneous use forklifts	Road emissions from the traffic of forklifts	0.00246
Miscellaneous Delivery Trucks	Road emissions from delivering various items to tanks or heavy items to point of use.	0.00037
Sulfuric acid trucks	Road emissions from the hauling of sulfuric acid	0.00431
Storage pile front-end loaders	Road emissions from the traveling of front-end loaders	0.01650
Miscellaneous use front-end loaders	Road emissions from the traveling of front-end loaders	0.01375
Smelter Paved Roads Emissions Total		0.091

Table 5-3: Smelter (Unpaved) Road Dust Emissions

Point Source Inventory Cont.		
Smelter (Unpaved) Road Dust Emissions		
Source	Description	2012 Pb Emissions (tons)
Slag Trucks	Road emissions from the hauling of slag from the slag dump to mill for recycling	0.007
Slag Trucks	Road emissions from the hauling of slag from the furnace to the slag dump	0.029
Smelter Unpaved Roads Emissions Total		0.036

Table 5-4: Concentrator (Paved) Road Dust Emissions

Point Source Inventory Cont.		
Concentrator (Paved) Road Dust Emissions		
Source	Description	2012 Pb Emissions (tons)
General Plant Traffic (Includes 18 Wheelers)	"the number of concentrator vehicles (61-10 = 51), the number of estimated number of daily miles (6), days of operation (261). Additionally, repaving, and paving small sections took place early 2012. Approximately 19% of the concentrator roads are paved."[21]	0.000024
Concentrator Paved Roads Emissions Total		0.000024

Table 5-5: Concentrator (Unpaved) Road Dust Emissions

Point Source Inventory Cont.		
Concentrator (Unpaved) Road Dust Emissions		
Source	Description	2012 Pb Emissions (tons)
General Plant Traffic (Includes 18 Wheelers)	"the number of concentrator vehicles (61-50 = 51), the number of estimated number of daily miles (6), days of operation (261). Additionally, repaving, and paving small sections took place 2012. Approximately 81% of the concentrator roads are unpaved."[22]	0.0103
Concentrator Unpaved Roads Emissions Total		0.0103

Table 5-6: Road Dust Summary

Point Source Inventory Cont.	
Road Dust Summary	
Source	2012 Pb Emissions (tons)
Smelter Paved	0.091
Smelter Unpaved	0.036
Concentrator Paved	0.000024
Concentrator Unpaved	0.0103
Road Emissions Total	0.137

[21] 2012 SLEIS Annual Emissions Inventory questionnaire
[22] 2012 SLEIS Annual Emissions Inventory questionnaire

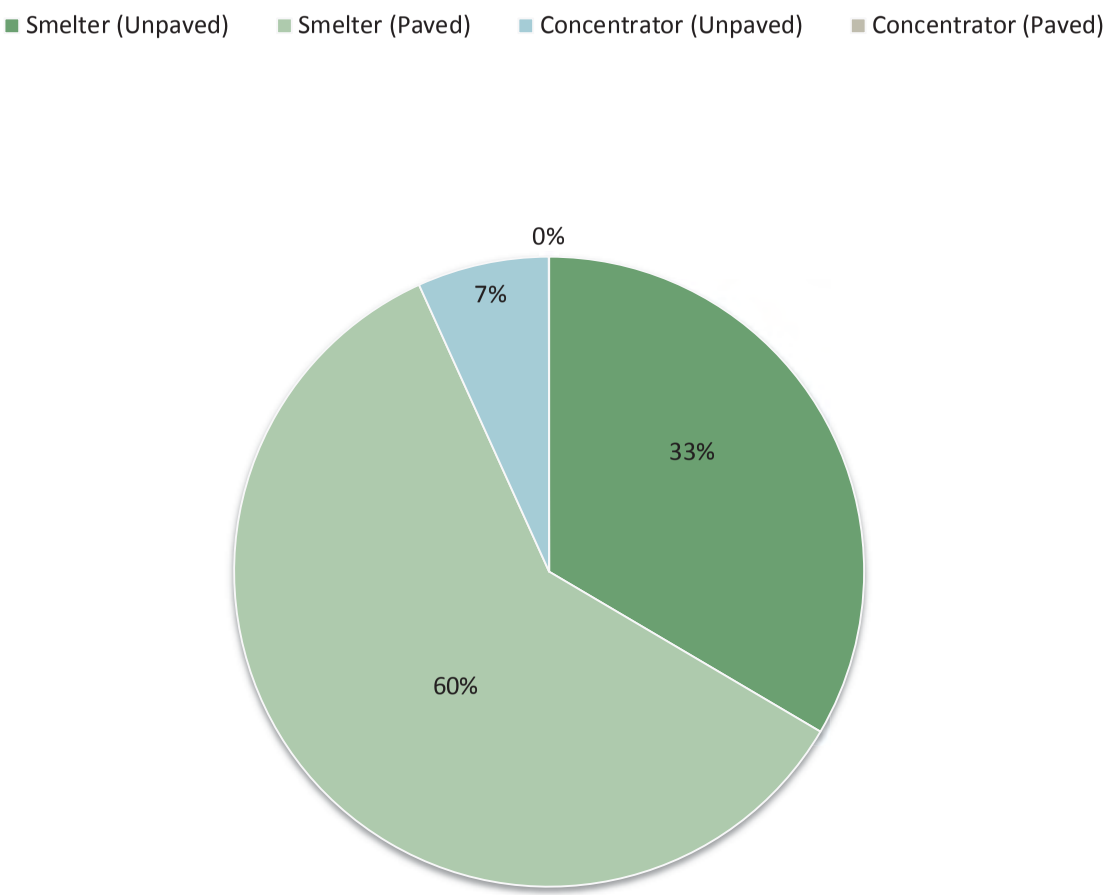


Figure 5-2: Road Dust Summary

Table 5-7: Process Fugitive Emissions

Point Source Inventory Cont.		
Non-Smelting Process Fugitive Emissions		
Source	Description	2012 Pb Emissions (tons)
Pouring of Slag at the Slag Dump	Fugitive emissions are released when molten slag is poured at the dump	0.04780
Pile Bedding Area	Emissions resulting from wind erosion	0.00005
Batch drop from truck/rail to bedding area	Unloading of copper concentrate and by-products from truck or rail to the hopper which feeds into the dryers.	0.00001
Load out from storage piles onto belt	Emissions from load out of concentrate in outdoor storage	0.00011
Overflow concentrate storage	Emissions resulting from wind erosion	0.00097
Batch drop from truck concentrate storage	Emissions from transfer of copper concentrate to storage	0.00001
Load out from storage piles/overflow storage	Emissions from the load out of copper concentrate in outdoor storage	0.00002
South Reverts	Wind erosion at the south reverts crushing area	0.00193
South Reverts	Reverts transfer from truck to storage piles-south	0.00059
South Reverts	Reverts load out from storage piles-south	0.00468
North Reverts	Wind erosion at the North reverts area	0.00001
North Reverts	Reverts transfer from truck to storage piles-north	0.00029
North Reverts	Reverts load out from storage piles north by converter area	0.00468
SmithCo Reverts	Reverts operations carried out by contractor	0.00311
Wet/Dry Bins #1	Emissions resulting from wind erosion	0.129
Wet/Dry Bins #1	Emissions from load out of scrubber slurry	0.0001
Wet/Dry Bins #2	Emissions resulting from wind erosion	0.097
Filter Plant	Emissions resulting from wind erosion	0.035
Process Fugitive Emissions Total		0.322

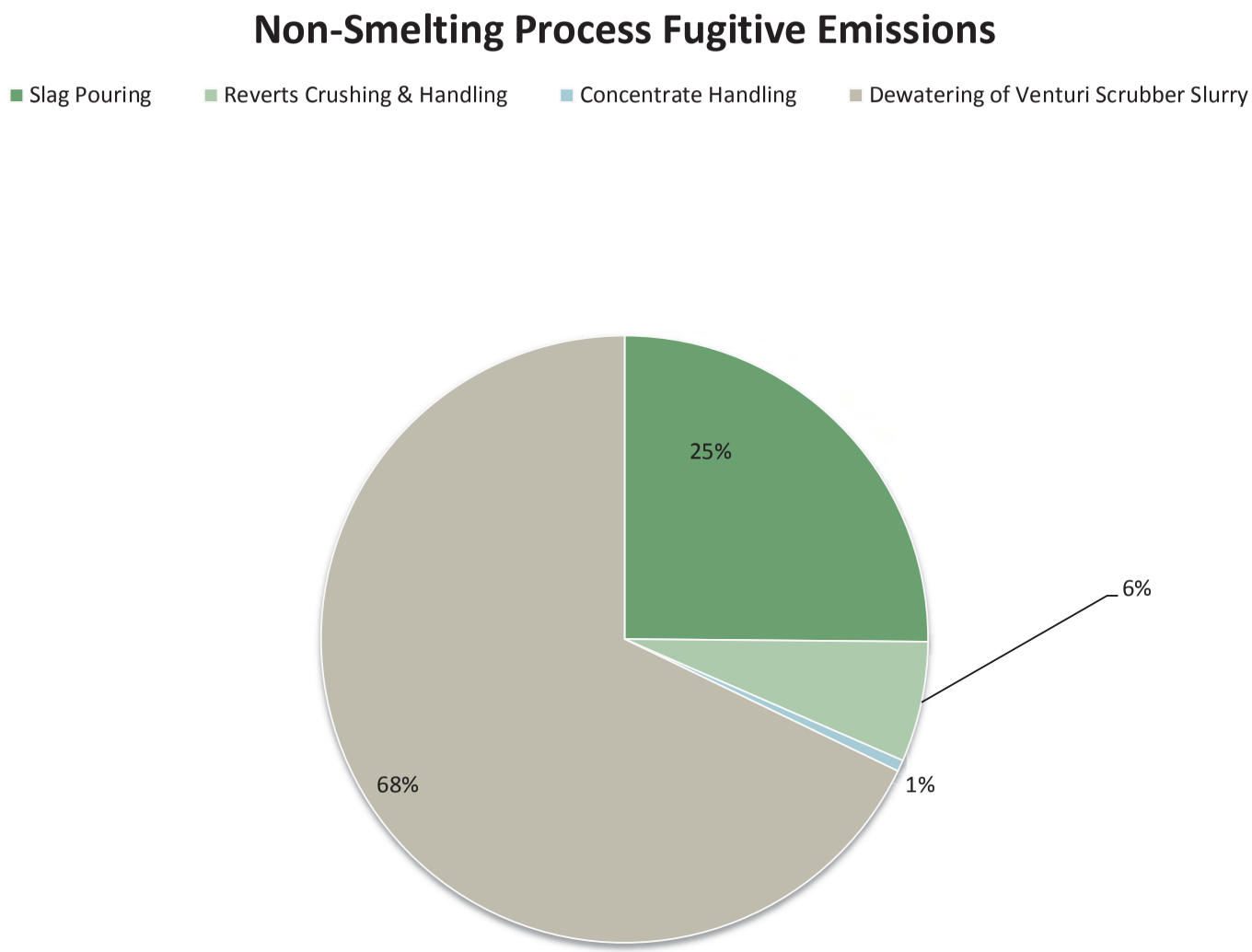


Figure 5-3: Process Fugitives Summary

Table 5-8: Point Source Inventory Summary

Point Source Inventory Summary	
Source	2012 Pb Emissions (tons)
Smelter Stack & Fugitive	2.97
Roads	0.137
Process Fugitive	0.322
ASARCO Smelter Emissions Total	3.4

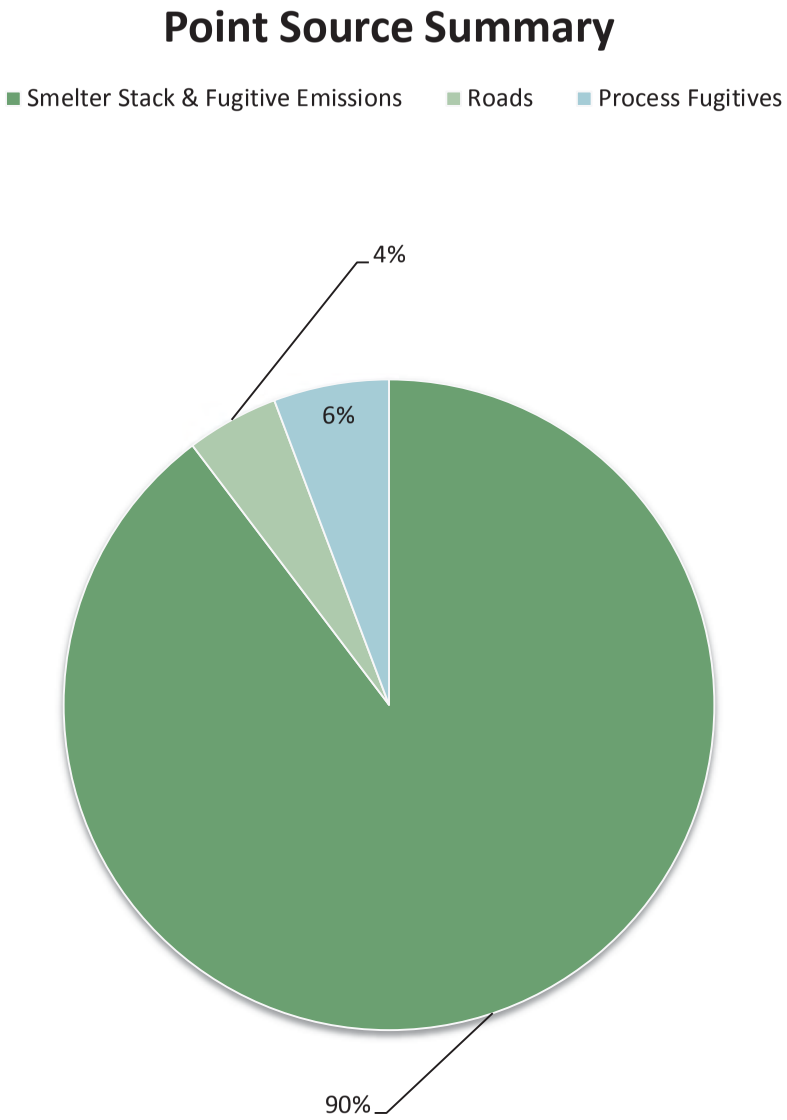


Figure 5-4: Point Source Summary

5.2 Base Year Area Source Emission Inventory

Area sources in the NAA are relatively insignificant when compared to the remaining source categories, making up roughly 0.00014% of the NAA emissions. ADEQ quantified the area source category using 2011 NEI data, and the allocation methodology is discussed in Section 4.3. Table 5-9 summarizes the base year emissions from this source category.

Table 5-9: Area Source Inventory Summary

Area Source Inventory		
Source	Description	2012 Pb Emissions (tons)
Residential-Kerosene-Total: All Heater Types	Stationary Source Fuel Combustion	0.0000000136
Residential-Distillate Oil-Total: All Combustor Types	Stationary Source Fuel Combustion	0.0000001393
Cremation-Humans	Miscellaneous Area Sources	0.0000044837
Airports : Aviation Gasoline-Stage 2: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000004568
Airports : Aviation Gasoline-Stage 1: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000088307
Area Source Emissions Total		0.0000139

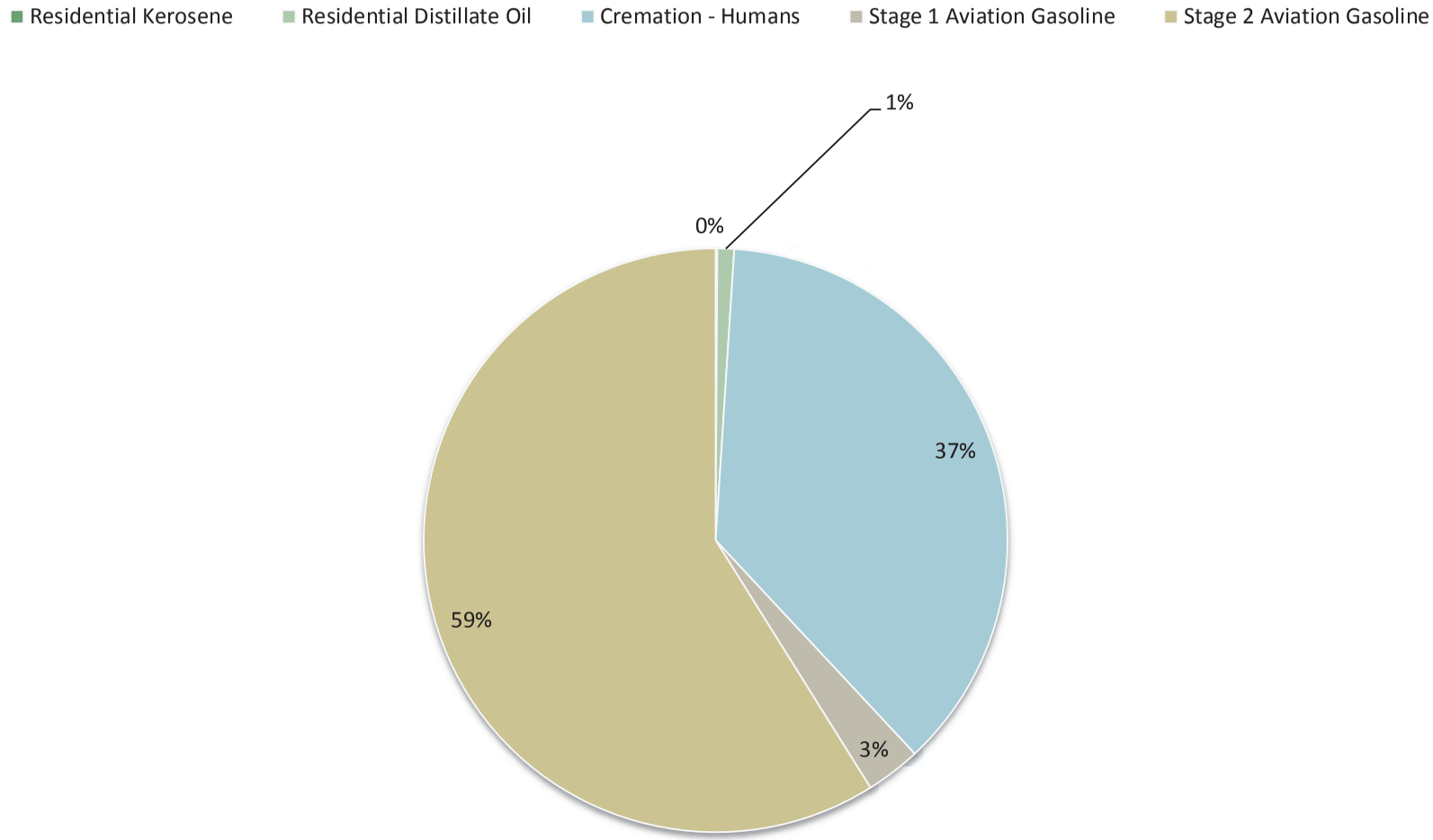


Figure 5-5: Area Source Summary

5.3 Base Year Mobile Nonroad Emission Inventory

The nonroad source category consists of emissions from locomotives and piston aircraft and makes up 0.47% of the NAA emissions. The methodology used to quantify nonroad emissions can be found in Sections 4.4 and 4.5. Table 5-10 summarizes the base year emissions from this source category.

Table 5-10: Nonroad Source Inventory Summary

Nonroad Source Inventory		
Source	Description	2012 Pb Emissions (tons)
Locomotives	Gila County Portion of NAA	0.0000087
Locomotives	Pinal County Portion of NAA	0.0005060
Aircraft	Pinal County Portion of NAA	0.0146623
Nonroad Source Emissions Total		0.0152

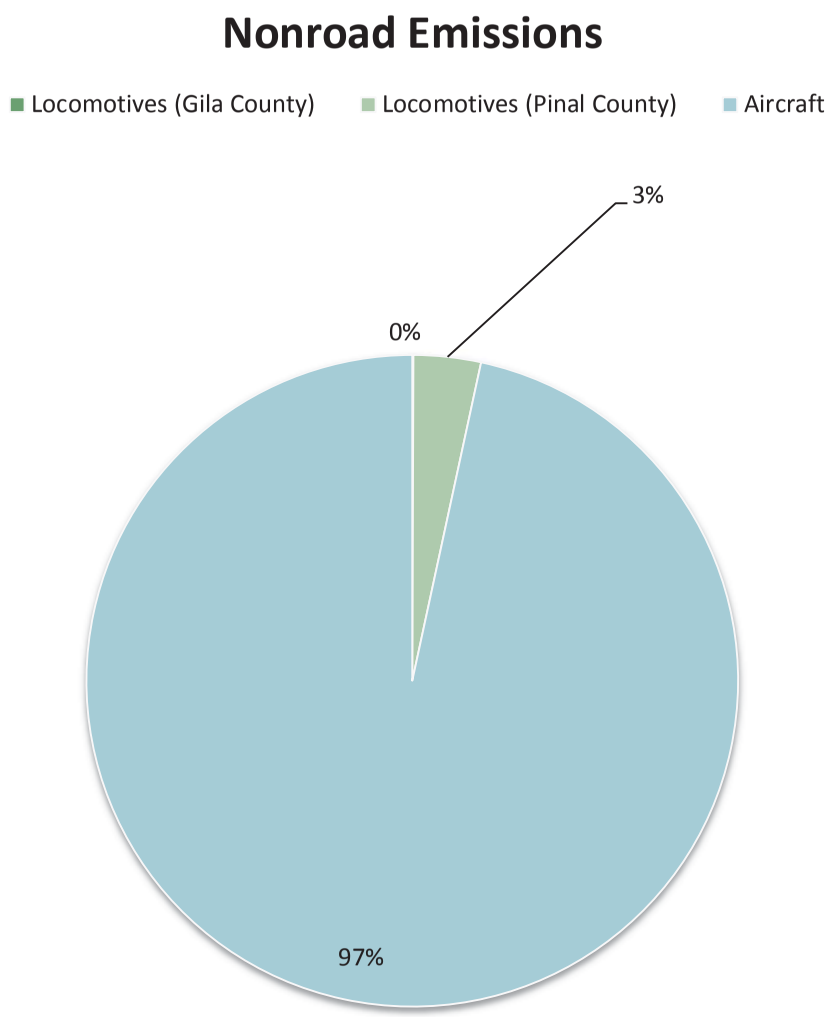


Figure 5-6: Nonroad Source Summary

5.4 Summary of 2012 Base Year Emission Inventories

Table 5-11 below summarizes the Hayden Pb NAA emission inventory. The calculation methodology used to obtain these values can be found in Section 4.

Table 5-11: Hayden Pb NAA Emission Inventory Summary

Emission Inventory Summary	
Source Category	2012 Pb Emissions (tons)
Point Source	3.4
Area Source	0.0000139
Mobile Nonroad	0.0152
Hayden Pb NAA Emissions Total	3.42

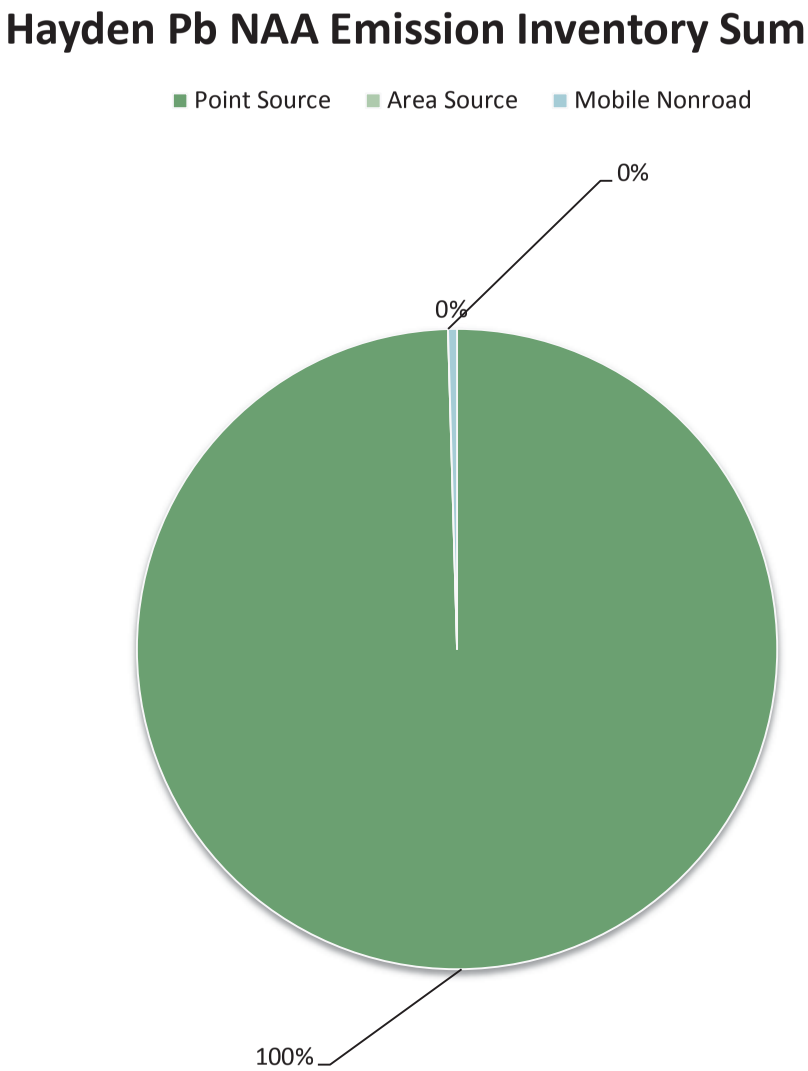


Figure 5-7: Hayden Pb NAA Emission Inventory Summary

6 Emission Projection Methodologies

ADEQ developed a number of growth factors to project emissions to the 2019 attainment year. In addition, ADEQ examined any known regulations that would affect projected emissions and developed control factors from these regulations to determine how said regulations would influence future emissions. These projected emissions will inform planning decisions, including what Reasonably Available Control Measures (RACM) or Reasonably Available Control Technologies (RACT) ADEQ may need to apply. ADEQ has summarized the methodology for projecting emissions to the attainment year in the remainder of this section.

6.1 Point Source Emission Projection Methodology

ADEQ conservatively assumes that in any future year, point sources will emit the maximum allowable quantity of Pb emissions, that is, their permitted (and federally enforceable) Potential To Emit (PTE). ADEQ consulted the permitting authorities and representatives of the point source to identify any anticipated permit revisions. ADEQ focused on revisions that would impact the Pb emissions limits or Pb PTE between the base year and the attainment year. For sources ADEQ anticipates will change emissions limits or facility PTE before the attainment date, ADEQ used the new or expected emission limits or PTE to project future year emissions.

Due to the ASARCO smelter being the only point source in the inventory, ADEQ's point source projection efforts centered on this facility. As mentioned throughout this document, as part of the consent decree, ASARCO will be making numerous changes to its operations. Specific smelter operations quantified in this EI and applicable controls to be in place in the attainment year include:

- Main Stack Emissions
    - vent gas baghouse (replacing current electrostatic precipitator)

- Converter Aisle Fugitives
    - tertiary hood
    - improved primary and secondary hood capture systems

- Flash Furnace Fugitives
    - tapping ventilation system

- Reverts Crushing & Handling
    - wind fence (designed to have a 75% control efficiency)
    - sprayers (maintain 10% surface moisture content)

- Concentrate Handling
    - wind fence (designed to have a 75% control efficiency)
    - sprayers (maintain 10% surface moisture content)
    - daily rinsing of spillage/trackout areas
    - rumble grates

- Dewatering of Venturi Scrubber Slurry
    - slurry to be sent to new thickener
    - resulting filter cake sent to two electric dryers
    - dried cake discharged directly into bags

- Leaded Road Dust
    - chemical dust suppressant application intensity to meet a 90% control efficiency (PM_{10} emissions)
    - if visible breakdown in suppressant covering is observed the source will immediately apply water and/or chemical dust suppressant where applicable

6.1.1 Smelter Stack & Fugitive Emissions Projection

ADEQ projected smelter stack and fugitive emissions based on Pb PTEs established in the facility's permit. Modeling the maximum allowable emissions provides an opportunity to determine ambient air quality under the highest emissions condition. However, if the PTE supplied by the facility fails to show attainment (via computer modeling), ADEQ will work with the facility to determine appropriate steps forward.

6.1.2 Leaded Road Dust Emissions Projection

ADEQ's approach to projecting road dust emissions to the attainment year involved the controls outlined in the consent decree's fugitive dust plan. Regarding unpaved road dust, the plan requires the source to create a chemical dust suppressant application schedule that will have a 90% control efficiency for PM_{10} emissions.

This is applicable in ADEQ's EI, because the percent Pb fraction applied to the 2012 unpaved road dust emissions was PM_{10} specific. Therefore, ADEQ applied this 90% control efficiency to unpaved road dust in its 2019 emissions projection. As Figure 5-2 shows, unpaved road emissions make up 47% of road dust emissions, with the other portion being paved roads at the smelter.

No control efficiencies were mandated for paved roads in the fugitive dust plan. The paved roads section states ASARCO must clean roads with sweepers or vacuum/wet broom vehicles no less frequently than daily. In addition, the facility will be required to pave certain roads. ADEQ's attainment year paved road emissions are based on 2019 PTE calculations provided by Asarco for PM_{10} emitted from the activities in table 5-2.

ADEQ then determined a representative lead factor that would apply to paved road emissions in the attainment year. The lead factor ADEQ used was from the RI/FS, which took place between 2013 and 2015. During this time, high lead sources associated with filter plant activities (wet dry bins) were in operation. Additionally, the consent decree wind fences, material pile water sprays, and thickener project controls we're not being

implemented during said study. This is significant because fugitive and track out emissions from the wet dry bins, and other materials handling operations, have a large impact on the lead content of smelter road dust. By the attainment date thickener project controls (replacing wet dry bins), wind fences, and waters sprays will be implemented. This application of controls is anticipated to impact the future state leaded silt loading on smelter paved roads.

The previously mentioned controls are intended to reduce fugitive and track out emissions from the concentrate bedding area and wet dry bins (also called solar drying pads). Both of these sources are located adjacent to a heavily trafficked paved road in the center of the smelter complex. Given this, the mass fraction of lead in road dust is anticipated to decrease, changing the attainment year paved road dust Pb factor.

ADEQ's approach for determining an appropriate future state lead factor involved using a paved road lead sample from the RI/FS that was spatially removed from the materials handling sources previously mentioned. ADEQ's chosen factor was derived from sample SP09.5, more specifically. This sample was taken from a paved road near the concentrator.

ADEQ feels this sample is representative of the smelters future state due to its distance from sources either not present, or, heavily controlled in 2019. However, the sample location is still within close proximity to other Pb sources at the facility, such as:

- slag loading (takes place roughly .1 miles east)
- concentrate over flow storage (takes place roughly .25 miles north)
- smelter fugitives (the smelter is roughly .5 miles southeast).

ADEQ's calculation methodology involved applying the SP09.5 percent mass result (for lead) to 2019 PM_{10} paved road dust totals. A comparison of the 2012 and 2019 smelter paved road emissions can be seen in Table 7-3. For more on this calculation see the reference workbook titled "Facility PTE".

6.1.3 Process Fugitives Emissions Projection

ADEQ projected process fugitive emissions to the attainment year in the same manner as unpaved road dust, discussed above. That is, new control efficiencies outlined in the fugitive dust plan were applied to base year calculations. Three of the four processes quantified in the EI (reverts crushing & handling, concentrate handling, and the dewatering of scrubber slurry) have prescribed controls; slag pouring was the only activity left uncontrolled. The only mention of slag pouring in the fugitive dust plan pertained to limiting where slag could be dumped (cooled in the open air).

For reverts crushing and concentrate handling, the source is required to design and install wind screens and a system of sprayers. In short, the wind screens must have a control efficiency of 75% and the sprayers must maintain surface moisture content at 10%. To project to the attainment year, ADEQ applied these changes to the emission factors used in the base year calculations.

Finally, the dewatering of scrubber slurry, as it occurred in the base year, will drastically change in the attainment year. In the base year, this slurry was dewatered in open-air, 3-walled concrete bins; in the attainment year, the dewatering of scrubber slurry will be done as follows:

1. Scrubber blowdown will be sent to a stripping tower.
2. After stripping, and the addition of polymers, the slurry will be sent to a new thickener. In addition to scrubber blow down, the source will be sending vacuum truck station material to the thickener.
3. Underflow diaphragm and filter press feed pumps will send the mixture to a 53 ft^3 capacity filter press.
4. From the press, the material will be sent to a new dryer (which must operate under negative pressure) with a supersack filling station, where the cake will be bagged.

This process of creating filter cake from the scrubber blowdown will increase the percent weight of the slurry from 1.4% (scrubber blowdown) to 86% (at bag station).

Because the wet/dry bins will not be in operation in the attainment year, ADEQ did not project emissions from this source. Instead, ADEQ used a facility-provided thickener operation PTE to project the emissions from the dewatering of scrubber slurry.

6.2 Area and Mobile Nonroad Source Emission Projection Methodologies

ADEQ developed growth factors to project emissions to the 2019 attainment year. These projected emissions will inform planning decisions, including what Reasonably Available Control Measures (RACM) or Reasonably Available Control Technologies (RACT) ADEQ may need to apply to other sources (besides the Asarco Hayden smelter) that may contribute significantly to Pb emissions in the Hayden NAA. ADEQ has summarized the methodology for projecting emissions to the attainment year in the remainder of this section.

6.2.1 Area & Mobile Nonroad Source Emissions Projection

The approach ADEQ took to project emissions from both the area and mobile nonroad categories was based on population growth from 2012 to 2019 in the NAA. Because the base year EI quantified sources based on counties, the projections are based on population growth in the respective county. The calculations for developing these population growth factors are illustrated below.

Equation 6-1: Pinal County Population Growth Factor for Projecting Attainment Year Emissions

$$GF_P = \frac{P_{2019}}{P_{2012}} = \frac{4{,}180}{3{,}410} \approx \mathbf{1.226}$$

where:

- GF_P = Pinal Population Growth Factor
- P_{2019} = ADOA 2019 Population Projection for the Pinal County portion of the NAA
- P_{2012} = ADOA 2012 Population Estimate for the Pinal County portion of the NAA

Based on the calculation above, ADEQ applied the population growth factor of **1.226** to project emissions tied to population in the 2019 attainment year.

Equation 6-2: Gila County Population Growth Factor for Projecting Attainment Year Emissions

$$GF_P = \frac{P_{2019}}{P_{2012}} = \frac{1{,}322}{1{,}280} \approx \mathbf{1.033}$$

where:

- GF_P = Gila Population Growth Factor
- P_{2019} = ADOA 2019 Population Projection for the Gila County portion of the NAA
- P_{2012} = ADOA 2012 Population Estimate for the Gila County portion of the NAA

Based on the calculation above, ADEQ applied the population growth factor of **1.033** to project emissions tied to population in the 2019 attainment year.

7 2019 Projected Attainment Year Emission Inventory

The following series of tables contain ADEQ projections of maximum potential Pb emissions from all source categories within the Hayden Pb NAA for the year 2019. ADEQ made attainment year projections using the methodologies outlined in Section 6 of this document.

7.1 Attainment Year Projected Point Source Emission Inventory

ADEQ intends to perform AERMOD dispersion modeling to demonstrate attainment. ADEQ will use the results from this modeling demonstration to determine an emission limit that will allow the source to comply with the 2008 Pb NAAQS (if current PTEs do not suffice). ADEQ used one of two projection methods for each source of Pb emissions in the point source category. If facility-supplied PTEs for 2019 were appropriate, then they were used. To see detailed calculations regarding the 2019 PTEs see the excel reference workbook titled "Facility PTE". Otherwise, ADEQ calculated the impact of planned controls (laid out in the consent decree). Tables 7-1 through 7-4 contain the projected maximum potential emissions from the point source within the Hayden NAA for the attainment year.

Table 7-1: Projected Smelter Stack & Fugitive Emissions

2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory			
Smelter Stack & Fugitive Emissions			
Source	Description	2012 Emissions (tons)	2019 Facility Potential to Emit (tons)
Main Stack			
Dryer with Flash Furnace and Converter	Emission Point: Annulus Main Stack-R&R	1.06	2.99
Acid Plant	Emission Point: Acid Plant Inner Main Stack	0.011	
Anode Furnace Baghouse	Emission Point: Anode Baghouse Stack	.0113	
Flash Furnace & Converter Fugitives			
Flash Smelting	Emission Point: Flash Furnace Fugitives	0.495	1.4
Converter	Emission Point: Converter Fugitives	0.968	
Anode Furnace			
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (No Control Operating Days)	0.243	0.04
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (Partial Control Operating Days)	0.146	
Anode Refining Furnace: Fugitive Emissions	Emission Point: Furnace Fugitives (Full Control Operating Days)	0.028	
Smelter Stack & Fugitive Emissions Total		2.97	4.43

Table 7-2: Projected Process Fugitive Emissions

2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory			
Process Fugitive Emissions			
Source	Description	2012 Emissions (tons)	2019 Facility Potential to Emit (tons)
Pouring of Slag at the Slag Dump	fugitive emissions are released when molten slag is poured at the dump	0.04780	0.047795
Pile-Unloading bedding area	Emissions resulting from wind erosion	0.00005	0.00009
Unloading from truck/rail to bedding area	unloading of copper concentrate and by-products from truck or rail to unloading dump hopper	0.00001	0.00001
Load out from storage piles onto belt	Emissions from load out of concentrate in outdoor storage	0.00011	0.00006
Overflow concentrate storage	Emissions resulting from wind erosion	0.00097	0.00079
Transfer from truck to overflow concentrate storage	Emissions from transfer of copper concentrate to outdoor storage	0.00001	0.00003
Load out from overflow storage	Emissions from the load out of copper concentrate in outdoor storage	0.00002	0.00006
South Reverts	Wind erosion at the south reverts crushing area	0.00193	0.00024
South Reverts	Reverts transfer from truck to storage piles-south	0.00059	0.00022
South Reverts	Reverts load out from storage piles-south	0.00468	0.00177
North Reverts	Wind erosion at the North reverts area	0.00001	0.0000004
North Reverts	Reverts transfer from truck to storage piles-north	0.00029	0.0001106
North Reverts	Reverts load out from storage piles north by converter area	0.00468	0.00177
SmithCo Reverts	Reverts operations carried out by contractor	.00311	.008
Wet/Dry Bins #1	Emissions resulting from wind erosion	0.12900	0.07
Wet/Dry Bins #1	Emissions from load out of scrubber slurry	0.00010	
Wet/Dry Bins #2	Emissions resulting from wind erosion	.097	
Filter Plant	Emissions resulting from wind erosion	.035	
Process Fugitive Emissions Total		0.32	0.13

Table 7-3: Projected Facility Road Emissions

2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory		
Facility Road Emissions		
Source	2012 Emissions (tons)	2019 Facility Potential to Emit (tons)
Paved Roads	0.091	0.016
Unpaved Roads	.0458	0.027
Facility Road Emissions Total	0.137	0.043

Table 7-4: Projected Point Source Emissions Summary

2019 Projected Hayden Pb Nonattainment Point Source Emission Inventory		
Point Source Emissions		
Source	2012 Emissions (tons)	2019 Facility Potential to Emit (tons)
Smelter Stack & Fugitive Emissions	2.97	4.43
Process Fugitive Emissions	0.322	0.13
Facility Road Emissions	0.137	0.043
Point Source Emissions Total	3.4	4.60

7.2 Attainment Year Projected Area Source Emission Inventory

ADEQ employed a population allocation method to all of the area sources within the NAA to determine their estimated future contribution to Pb emissions in the NAA. The projection method used gave approximately a 291.3% increase in emissions to the attainment year. Even though this source category is projected to increase by 291.3%, the projected area source category effectively makes up 0% of the NAA EI. Table 7-5 represents ADEQ's estimates of projected emissions for area sources within the Hayden NAA in 2019. For detailed calculations regarding this source category see the excel reference workbook titled "NAA Inventory".

Table 7-5: Projected Area Source Emissions

2019 Projected Hayden Pb Nonattainment Area Source Emission Inventory			
Area Source Emissions			
Source	Description	2012 Emissions (tons)	2019 Projected Emissions (tons)
Residential-Kerosene-Total: All Heater Types	Stationary Source Fuel Combustion	0.0000000089	0.0000000091
Residential-Distillate Oil-Total: All Combustor Types	Stationary Source Fuel Combustion	0.0000000914	0.0000000935
Cremation-Humans	Miscellaneous Area Sources	0.0000013558	0.0000013861
Cremation-Humans	Miscellaneous Area Sources	0.0000031279	0.0000041664
Residential-Distillate Oil-Total: All Combustor Types	Stationary Source Fuel Combustion	0.0000000479	0.0000000638
Residential-Kerosene-Total: All Heater Types	Stationary Source Fuel Combustion	0.0000000047	0.0000000062
Airports : Aviation Gasoline-Stage 2: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000004568	0.0000006084
Airports : Aviation Gasoline-Stage 1: Total	Storage and Transport-Petroleum and Petroleum Product Storage	0.0000088307	0.0000117625
Area Source Emissions Total		0.0000139	0.000018

7.3 Attainment Year Projected Mobile Nonroad Emission Inventory

ADEQ employed population and landing/takeoff allocation methodologies to the mobile nonroad source category to determine the estimated future contribution to Pb emissions in the NAA. The projection method used gave approximately a 32% increase in emissions to the attainment year. Even with this source category projected to grow in emissions by 32%, nonroad mobile sources make up approximately 0.42% of the NAA EI. For detailed calculations regarding this source category see the excel reference workbook titled “NAA Inventory”.

Table 7-6: Projected Mobile Nonroad Emissions

2019 Projected Hayden Pb Nonattainment Area Source Emission Inventory			
Mobile Nonroad Emissions			
Source	Description	2012 Emissions (tons)	2019 Projected Emissions (tons)
Locomotives	Gila County Portion of NAA	0.0000087	0.0000089
Aircraft	Pinal County Portion of NAA	0.0146623	0.0195302
Locomotives	Pinal County Portion of NAA	0.0005060	0.0006740
Mobile Nonroad Emissions Total		0.0152	0.02

7.4 Summary of Attainment Year Projected Emission Inventory Summary

From 2012 to 2019, the percent change in emissions contributed from each source is relatively stable, with roughly 99% of emissions occurring at the ASAROC copper smelter in the base and attainment years. The expected increase in emissions from the area and mobile nonroad source categories were 291.3% and 32%, respectively. The point source category (ASARCO smelter) has the potential to increase emissions by roughly 41% in the attainment year. However, this increase is based on a comparison between actual emissions in the base year and what the facility is permitted to emit in the attainment year. ADEQ only used these permit maxima in order to produce conservative projections; there is no specific reason to believe that the facility will approach its permitted limit. Therefore, the comparison of actual and potential emissions should be done with reservation.

ADEQ feels with the changes brought on by the converter retrofit project and fugitive dust plan are likely to significantly improve the ambient air quality in the town of Hayden. Computer modeling in the attainment demonstration will evaluate the extent of this improvement. Table 7-7 below summarizes the emissions from each source category in the attainment year.

Table 7-7: Projected Hayden Pb NAA Emissions Summary

2019 Projected Hayden Pb Nonattainment Emission Inventory Summary		
Projected Hayden Pb NAA Emissions Summary		
Source	2012 Emissions (tons)	2019 Projected Emissions (tons)
Point	3.4	4.60
Area	0.0000139	0.000018
Mobile Nonroad	0.0152	0.020
Hayden Pb NAA Emissions Total	3.42	4.85

8 Closing Remarks

To recap, EPA designated the Hayden area of Gila and Pinal Counties in Central Arizona as not attaining the 2008 Pb NAAQS on October 3, 2014. ADEQ is developing a plan to implement the controls necessary to bring the area back into attainment with the NAAQS. ADEQ developed this TSD as a supplement to the SIP to inform stakeholders about the following:

- The local geography in the Hayden Pb NAA
- The meteorological conditions in the Hayden Pb NAA
- The ambient air quality issues in the Hayden Pb NAA
- The effect meteorology has on ambient air quality
- The major sources of Pb in the Hayden NAA
- ADEQ's projection of Pb emissions in the attainment year (2019)

The analyses within this TSD are focused on the ASARCO smelter due to this facility providing approximately 99% of lead emissions in the Hayden Pb NAA. ADEQ's analysis of the meteorology of the Hayden area found a general diurnal pattern. Specifically, winds in the NAA tend to come from the southeast at night and westerly winds prevail during the afternoon. However, due to the complex terrain, not all study monitors showed this particular trend. For example, the Globe Highway monitor, which is located in a river valley, is subjected to winds blowing from the northeast (brining in ambient air from outside the town of Hayden) in the morning hours and winds from the smelter in the afternoon. In addition, monitors located on the west side of Hayden experience more random wind patterns, which again is a product of local topography.

Ambient air lead concentrations were found to decrease with distance from the smelter, and were higher at the monitors west of the smelter. This is a concern because the residents of Hayden live west of the smelter. Moreover, the only regulatory monitor in the area is the Globe Highway monitor, which is roughly 0.6 miles northeast of the smelter. The EPA's TSD regarding the designation of the Hayden area asserted that the Globe Highway monitor does not represent the ambient air in the Town of Hayden. However, ADEQ plans to install a SLAMS monitor, which can be used for regulatory purposes, near the Hillcrest RI/FS monitor. This monitor is expected to provide more representative ambient air data moving forward.

ADEQ staff, informed by the analysis found in Section 3.4, found fugitive emissions resulting from the smelting process (Flash Furnace, Converter Aisle, and Anode furnace) likely have the largest impact on ambient air within the town of Hayden. Re-entrained dust from on-site material storage areas are theorized to impact ambient air as well, but at higher wind speeds, which are not common in the area.

The EI contained within the document found source categories in the NAA area to be point (ASARCO Smelter), area, and mobile nonroad. The base year inventory totaled 3.4 tons of lead with approximately 99% of emissions coming from the point source category. This finding implies SIP revision efforts that focus on the ASARCO smelter will have the largest impact on ambient air quality in the NAA.

9 References

ADEQ staff referred to the following documents as guidance in the development of the Hayden Pb NAA Emission Inventory and this TSD.

US EPA. (September, 1992). *Protocol for Determining the Best Performing Model.* Office of Air Quality Planning and Standards. Research Triangle Park. NC.

US EPA. (February, 2000). *Meteorological Modeling Guidance for Regulatory Modeling Applications.* Office of Air Quality Planning and Standards. Research Triangle Park. NC.

US EPA. (March, 1983). *AP-42 Section 11.2 Fugitive Dust Sources.* Office of Air Quality Planning and Standards. Research Triangle Park. NC.

US EPA. (July, 2011). *2008 Lead (Pb) NAAQS Implementation Questions and Answers.* Office of Air Quality Planning and Standards. Research Triangle Park. NC.

US EPA. (August, 2012). *Addendum to the 2008 Lead NAAQS Implementation Questions and Answers.* Office of Air Quality Planning and Standards. Research Triangle Park. NC.

US EPA. (January, 1995). *AP-42 Section 12.3 Primary Copper Smelting.* Office of Air Quality Planning and Standards. Research Triangle Park

Exhibit A ADOA Population Estimation Methodology

Shapefiles:

- Hayden SO_2 nonattainment boundary shapefile
- Gila & Pinal County 2010 block/population shapefile

Population Data Source:

- ADOA Internal Population Report

Method:

The ADOA methodology determines population from an internal population report that contains census population figures from 1990 through 2010 as well as ADOA intercensal population estimates and projections.

1. ADOA uses ArcGIS Geoprocessing tools to calculate the population of the incorporated places and unincorporated areas (including CDP and Non-CDP areas) within the Hayden NAA. ADOA used the following method to calculate the total population inside of the Hayden NAA:
    a. Calculate the area of the census block using the calculate “areas” tool
    b. Merge the two shapefiles using the “union” tool
    c. Determine the proportion of each census block within the Hayden NAA using the “calculate areas” tool.
    d. Calculate the area weighted population for each census block
    e. Aggregate the population for each incorporated and unincorporated place within the Hayden NAA using the Dissolve Tool
2. In step 1, ADOA derived their population for all incorporated places (or their respective parts), Census Designated Places (CDP) and unincorporated non-CDP areas in the Hayden area from the 2010 Census. ADOA used the following steps to estimate population figures for all areas of each year from 1990-2018:
    a. Apply the Constant-Share ratio of the population for each year for Gila and Pinal Counties
    b. Apply the ratio to each year for the total population in the CDPs and unincorporated non-CDPs in Hayden NAA
    c. Multiply the population of the CDPs and unincorporated non-CDPs in the Hayden NAA by the 2010 Census population ratio for each year

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ADEQ
Arizona Department
of Environmental Quality

Appendix B:
Modeling Technical Support Document (TSD): Hayden Pb State Implementation Plan Revision

Air Quality Division
March 03, 2017 FINAL

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1.0 Introduction

The United States Environmental Protection Agency (EPA) established a new more stringent National Ambient Air Quality Standard (NAAQS) for lead of 0.15 microgram per cubic meter ($\mu g/m^3$) in total suspended particles as a 3-monht rolling average, on November 12, 2008.[1] EPA designated the Hayden area of Gila and Pinal Counties as a nonattainment area (NAA) for the 2008 Pb NAAQS effective as of October 3, 2014. Because of this designation, the Arizona Department of Environmental Quality (ADEQ) must develop a State Implementation Plan (SIP) revision to demonstrate future attainment of the NAAQS within five years of the effective date of designation. An attainment demonstration using an EPA approved air quality dispersion model is a core piece of Pb NAA SIP submittals.

As described in this modeling Technical Support Document (TSD), the modeling was performed in accordance with the EPA's Guideline on Air Quality Models (GAQM) (40 CFR 51, Appendix W) (U.S. EPA, 2005). Additionally, where needed, ADEQ employed additional clarification regarding modeling from "2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers" (U.S. EPA, 2011).

ADEQ closely followed EPA's modeling guidance in performing dispersion modeling for this SIP. ADEQ has also incorporated the EPA's comments and recommendations on the modeling protocol into this TSD.

This TSD, presents the modeling methodologies that ADEQ followed in completing the ambient air quality analysis of the Hayden planning area. ADEQ was the lead modeler for the attainment demonstration and Asarco has reviewed the modeling documents. The TSD is organized as follows:

- Section 2 provides an overview of the general regional characteristics of the Hayden Pb NAA, including topography, land use, and climate;
- Section 3 provides a discussion on the determination of the modeling domain, sources to explicitly model and the receptor grid;
- Section 4 provides a discussion on the model selection;
- Section 5 provides detailed source inputs, including source configuration, source emissions, source release parameters, Good Engineering Practice (GEP) stack height, and urban/rural determination;
- Section 6 provides a discussion on the selection and processing of meteorological data;
- Section 7 provides a discussion on the determination of background concentrations;
- Section 8 provides a discussion on modeling results and emission limits.

Along with the TSD, ADEQ has also provided an enclosed CD-ROM, including the modeling files. The contents of this enclosed CD-ROM are detailed in Appendix B of this document.

Since the NAA boundaries and most of the emissions sources and modeling parameters are the same as the ones defined in the Hayden SO_2 nonattainment SIP project, ADEQ used some of the modeling information that was provided by ASARCO LLC (Asarco) for the SO_2 project as the base information to avoid duplicating efforts. For any parameters that differed from the SO_2 project, Asarco provided the needed information.

[1] 73 Fed. Reg. 66964 (November 12, 2008)

2.0 Overview of Hayden Nonattainment Area (NAA) for Pb

The Hayden Pb NAA is located in Southeastern Arizona and encompasses roughly 275 square miles. Directly east of the NAA is the San Carlos Reservation, no major sources of lead are found in said reservation, therefore transport from the reservation into the NAA was not considered. The major source of lead in the NAA is the Asarco's Primary Copper Smelter located adjacent to the Town of Hayden. The smelter's location is depicted in Figure 2-1 below.

2.1 Population

The Hayden Pb NAA has been codified in 40 CFR 81.303 and is comprised of the portions of Gila County and Pinal County bound by the townships and ranges listed in Table 2-1 and represented geographically in Figure 2-1. Population estimates for the entire Hayden Pb NAA as well as the respective proportions of Gila and Pinal Counties are also presented in Table 2-1. The Hayden NAA encompasses the Towns of Hayden, Winkelman and Kearny, for which population data has been included in Table 2-2.

Table 2-1: Geographic Location and Population

Hayden Pb NAA[2,3]			
Land Area	275 square miles		
2010 Population	4,571		
2020 Projected Population	5,787		
Gila County Portion		**Pinal County Portion**	
Land Area	58 square miles	Land Area	217 square miles
2010 Population	1,279	2010 Population	3,292
2020 Projected Population	1,329	2020 Projected Population	4,458
Township, Range		**Township, Range**	
4S, 14E		4S, 14E	
4S, 15E		4S, 15E	
4S, 16E		4S, 16E	
5S, 15E		5S, 14E	
5S, 16E		5S, 15E	
-		5S, 16E	
-		6S, 14E	
-		6S, 15E	
-		6S, 16E	

[2] ADOA calculated the land area of Gila County and Pinal County based on 2010 department of Census TIGER/Line shapefiles.

[3] ADOA provided the population projections for both Gila County and Pinal County. ADOA's projection methodologies are presented in Appendix A.

Table 2-2: Towns within Hayden PB NAA

Location	2010 Population[4]
Town of Hayden	662
Town of Winkelman	353
Town of Kearny	1,950

2.2 Land use

The Hayden NAA area encompasses portions of two counties: Gila and Pinal. The Gila County portion of the NAA is approximately 58 square miles[5] while the Pinal County portion is approximately 217 square miles[6]. The majority of the land within the NAA is owned and managed by the either the Bureau of Land Management (39.1%) or the Arizona State Land Department (35.5%). The remainder of the land within the NAA is comprised of privately held land along with a small area of land located to the east of Winkelman, which the Bureau of Reclamation manages. A breakdown of the land owners in the Hayden Pb NAA are presented in Table 2-3 and Figure 2-2.

Table 2-3: Land Use Area

Hayden Pb NAA[7]		
Land Owner	Area (square miles)	Percentage
Bureau of Land Mgmt.	106.816	39.1%
State Trust Land	96.876	35.5%
Private Land	68.932	25.2%
Bureau of Reclamation	0.499	0.2%

Industrial sources within the Hayden Pb NAA are provided in Section 3.1.1 of this TSD. Further discussion of land use, as it pertains to dispersion modeling and meteorological processing inputs, is provided in Sections 5 and 6.

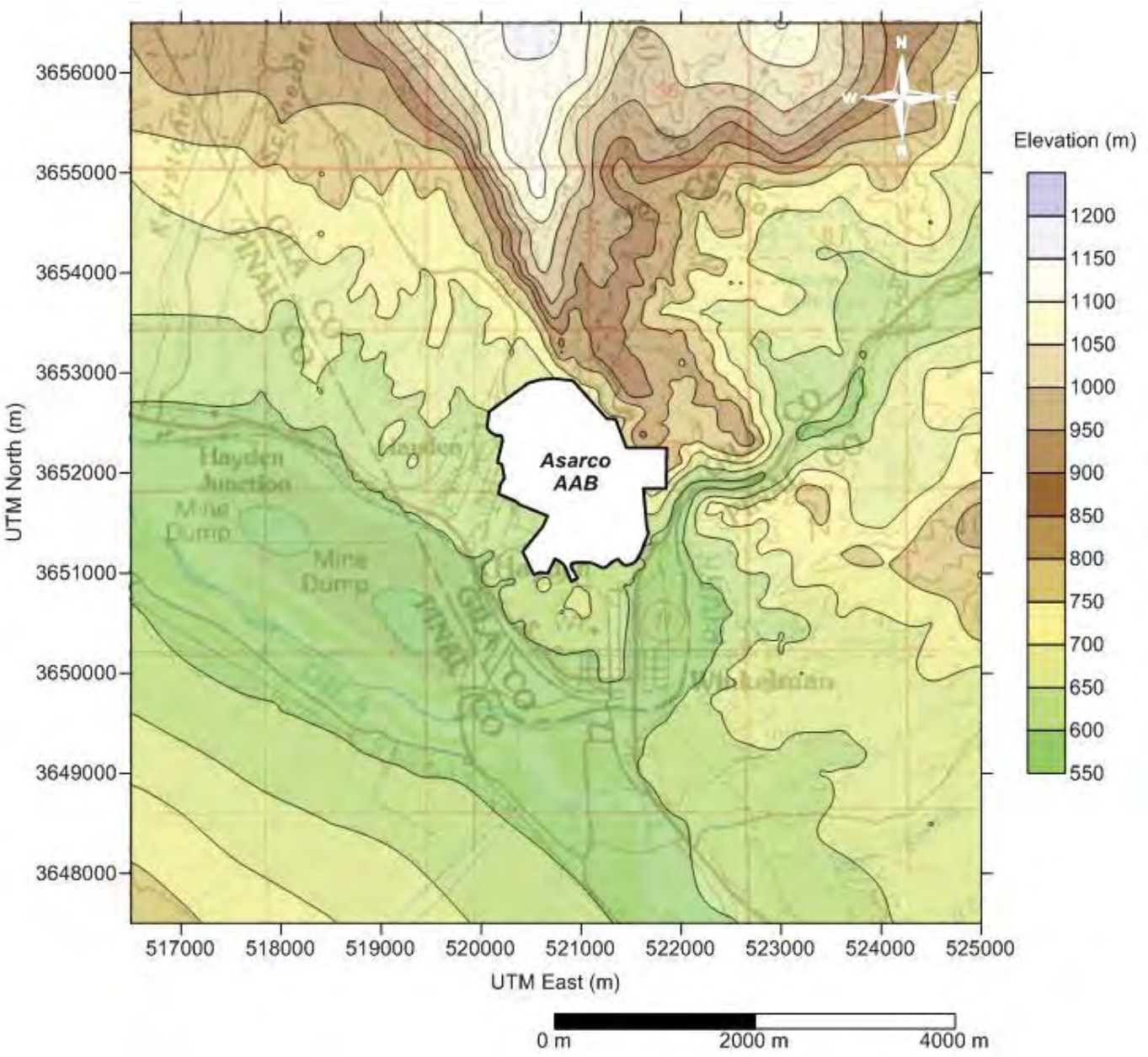
2.3 Topography

Asarco operations in Hayden, Arizona are located on the southwestern flank of the Dripping Spring Mountains, a range rising rapidly just to the north and east of Asarco. Bisected by numerous northeast-southwest oriented arroyos, this terrain in the immediate vicinity of the Asarco Hayden Operations is rugged and variable in elevation. To the south of Asarco the terrain is smoother, dominated by the northwest-southeast aligned valley of the Gila and San Pedro Rivers. The Tortilla Mountains, which form the western border of the Gila River Valley, are located several miles to the west of Asarco. The

[4] U.S. Census Bureau; Census 2010, Profile of General Population and Housing Characteristics: 2010; generated using American FactFinder; <http://factfinder2.census.gov>; (17 July 2014)
[5] ADOA calculated the land area of the Miami NA based on 2010 department of Census TIGER/Line shapefiles.
[6] ADOA calculated the land area of the Hayden NA based on 2010 department of Census TIGER/Line shapefiles.
[7] Land use information for both Gila County and the Hayden NA was garnered from the Arizona Land Resource Information System (ALRIS) GIS tool managed by the Arizona State Land Department.

topography of the local area, along with the location of Asarco's Hayden Operations, is depicted in Figure 2-1.

Figure 2-1: Topography of Area Surrounding Asarco



2.4 Climate

Both desert terrain and mountain ranges are found across the southern Gila County and eastern Pinal County landscape. Elevations range from near 1,800 feet to more than 4,400 feet above sea level in the NAA with the Town of Hayden situated at an elevation near 2,050 feet. This unique environment experiences both warm desert and cool alpine climates. The climate of the area is arid, with annual average precipitation of about 14 inches. Temperatures range from an average low in the winter of 31°F to an average high of 99°F in the summer. Wind directions in the area generally conform to the river valley orientations, with westerly and southeasterly winds predominating in Hayden.

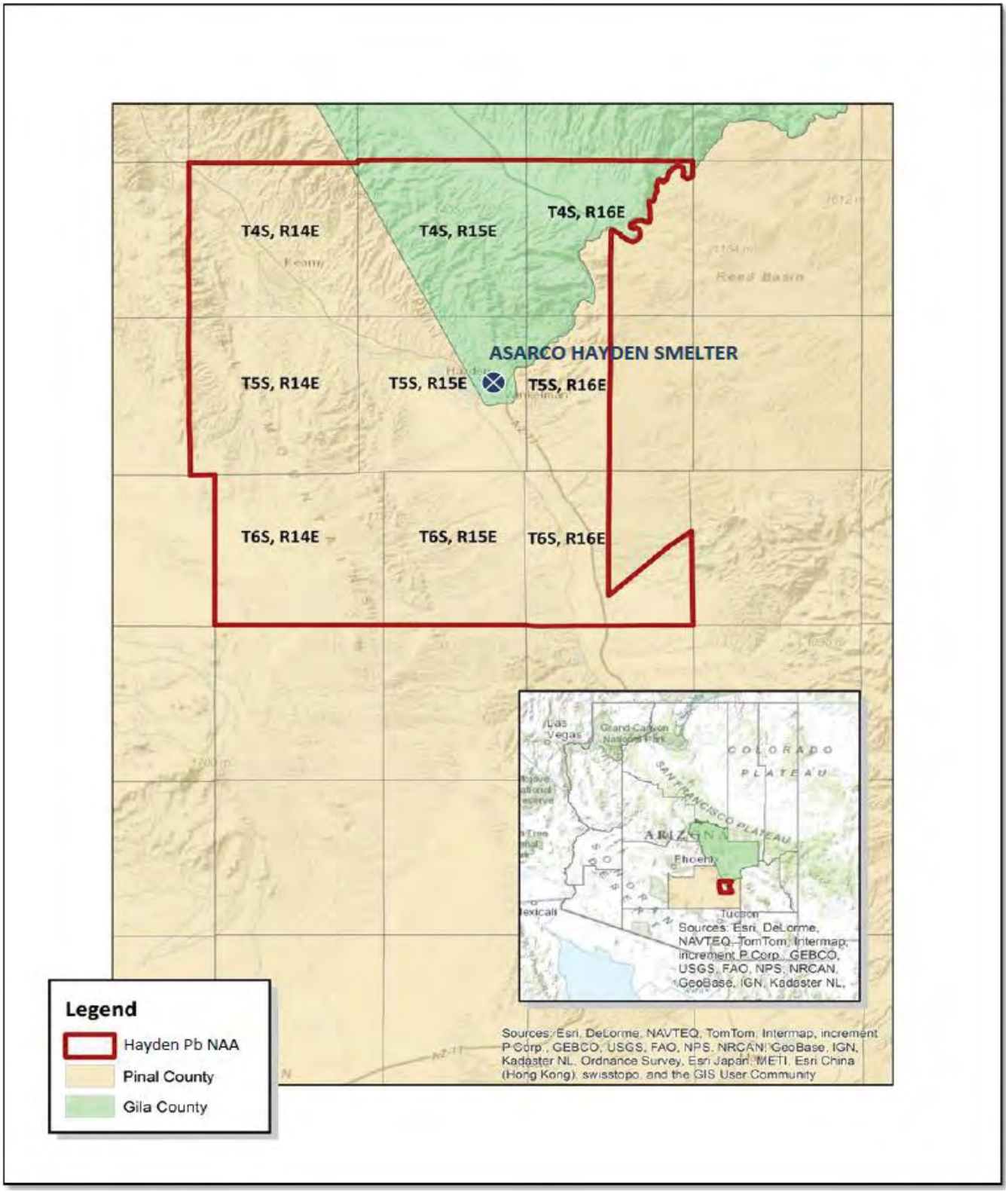
2.5 Summary of Attainment Status for Criteria Pollutants

In addition to the 2008 Pb NAAQS, portions of the Hayden NAA are classified for other NAAQS. Gila County is designated as "unclassified" or in "attainment" for the 8-hour ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$) NAAQS.

The EPA designated a portion of Gila County as "nonattainment" for the PM_{10} NAAQS, specifically the Miami and Hayden planning areas. The Asarco Smelter is located in the Hayden planning area. In July 2006, ADEQ requested the EPA split the Hayden/Miami PM_{10} NAA into separate nonattainment areas. EPA concurred with this request in January 2007.

The EPA also designated the Hayden planning area as nonattainment for the 2010 SO_2 NAAQS, effective October 4, 2013.

Figure 2-2: Map of the Hayden Nonattainment Area Including Townships and Ranges



3.0 Modeling Domain

The first step of the SIP modeling exercise is to determine the size of the modeling domain, which depends on the number of sources to explicitly model and size of the receptor network in order to account for the areas of impact (U.S. EPA, 2014a). The modeling domain should at a minimum encompass the nonattainment area and include the sources thought most likely to cause or contribute to NAAQS violations in and around the nonattainment area. In the modeling exercise, all modeled receptors should exhibit modeled attainment of the NAAQS.

3.1 Emission Sources

ADEQ's Emissions Inventory (EI) for the Hayden Pb NAA includes point, area, and mobile nonroad sources. In said inventory the point source category contributes 99% of the Pb emissions in the NAA. Moreover, the only facility in this category is the Asarco Hayden Copper Smelter. Due to this inventory make up, ADEQ has focused its contributing sources analysis on the aforementioned facility.

At the Asarco facility, ADEQ has determined the following processes/emissions points to be the contributors of Pb emissions:

- Main stack emissions
- Fugitive emissions from the smelting process
- Slag dumping
- Re-entrained leaded silts/material

Of the sources listed above, ADEQ believes that the main stack emissions to contribute the least to ambient air lead concentrations. This is due to the amount of dispersion possible when the plume is emitted at 1000 feet (304 m), which is the height of the stack at this facility.

In ADEQ's Emissions Inventory TSD, in section 3.4 titled "Asarco LLC Hayden Smelter Emission Source Analysis", an analysis is presented that looks at the impact of smelter fugitives and materials handling emissions at various monitors near the smelter. The names and geographical locations of the monitors are presented in Table 4-1 and Figure 4-1.

The conclusion of the analysis was, some monitors are impacted more by smelter fugitives, while others are impacted more by materials handling sources. Specifically, the closest monitor to the smelter, ST-14 or parking lot monitor, is impacted more frequently by materials handling sources (more NAAQS exceedances are a result of materials handling sources). However, the monitor shows higher concentrations when impacted by smelter fugitives. As a note, the parking lot monitor is not a State or Local Air Monitoring Station (SLAMS) nor is it located within ambient air.

The two SLAMS monitors are colocated with the Hillcrest (ST-23) and the Globe Highway (ST-05) monitors. These monitors are located in the ambient air. At the Hillcrest monitor the analysis shows materials handling sources contribute the most to NAAQS exceedances (or concentrations greater than 0.15 $\mu g/m^3$). ADEQ theorizes this is due to the filter plant activities that take place east of the monitor, which will be consolidated into the wet gas cleaning project (also known as thickener project) by the attainment year.

At the Globe Highway monitor the analysis concluded hot gaseous Pb emissions (accumulation mode particles) have the largest contribution to NAAQS exceedances. The sources impacting this monitor are likely slag dumping and smelter process fugitives. For more information on smelter emission sources please refer to section 3.4 of ADEQ's emissions inventory.

3.2 Ambient Air Boundary and Receptor Grid

The land owned by Asarco contiguous to and including Asarco's Hayden Operations covers an area in excess of 15 square miles. This area extends along and on either side of the Gila River Valley approximately 4-1/2 miles to the west of the plant and extends into the Dripping Spring Mountains to the north and northwest. In addition, much of the area is inaccessible to the general public, either because it is fenced or because of the steep and rugged nature of the terrain. Consequently, much of Asarco's property is not considered ambient air. The area encompassing the actual processes and industrial activities associated with the Asarco Hayden Operations is considerably smaller and is located immediately to the north and east of the Town of Hayden.

Asarco followed guidance in Section 3.4.3 of the ADEQ's Air Dispersion Modeling Guidelines (ADMG) about how to identify, for permitting modeling purposes, the Ambient Air Boundary (AAB), outside of which modeling receptors are to be placed. This perimeter consists of fencing, steep/rugged terrain, and what ADEQ designates as the "process area boundary" or PAB.

In defining the PAB, Asarco included only areas where processes, operations, and activities associated with and supporting Asarco's concentrating and smelting operations occur. As such, the PAB included the locations of equipment and operations where the handling, processing, movement, and management of feed materials, products, and byproducts are conducted. Asarco properties connected to the Hayden Operations but not part of the PAB, were treated as "ambient air" for modeling purposes. After discussions between Asarco, ADEQ and EPA, Asarco revised its AAB. Figure 3-1 shows the updated AAB.

A modeling domain with a total coverage of approximately 33 kilometers by 34 kilometers, centered on the Asarco Smelter facility was developed. The modeling domain covers portions of Gila and Pinal Counties and encompasses the entire Hayden NAA. A total of 2,753 receptors were placed in the modeling domain. Spacing of the receptors is as follows:

- every 25 m along the AAB;
- every 100 m from the AAB to a distance of 1 km (including the Towns of Hayden and Winkelman);
- every 500 m from 1 km out to a distance of 4 km;
- every 1000 m from 4 km to the NAA boundary; and
- every 2500 m along the NAA.

Asarco used EPA's AERMAP software tool (version 11103; U.S. EPA, 2011b) to estimate receptor elevations and hill heights. AERMAP is the terrain preprocessor for AERMOD (discussed in Section 4) and uses the following procedure to assign elevations to a receptor:

- For each receptor, the program searches through the U.S. Geological Survey (USGS) input files to determine the two profiles (longitude or easting) that straddle this receptor;
- For each of these two profiles, the program then searches through the nodes in the USGS input files to determine which two rows (latitudes or northings) straddle the receptor;
- The program then calculates the coordinates of these four points and reads the elevations for these four points;
- A 2-dimensional distance-weighted interpolation is used to determine the elevation at the receptor location based on the elevations at the four nodes determined above.

Asarco used ten (10) meter USGS National Elevation Dataset (NED) data as inputs to AERMAP. The NED data are produced from digitized map contours or from manual or automated scanning of aerial photographs. A 1/3 arc-second NED data file consists of a regular array of elevations referenced

horizontally in the UTM coordinate system, with a uniform horizontal spacing of approximately 10 meters. The NED data used for this analysis are based on the 1983 North American Datum (NAD83). ADEQ/Asarco has provided AERMAP input and output files on CD-ROM per the nomenclature described in Appendix B. The modeled receptors are depicted in Figure 3-3.

During the preparation of this TSD, EPA requested more clarifications on the methodology that was used to define the process air boundary, which is also known as the "ambient air boundary" or AAB. EPA also requested revisions or justification of the portions of the boundary that were not defined based on installation of physical barriers such as fence lines.

Asarco submitted additional data and submitted a revised PAB to ADEQ to be included in the modeling. Figure 3-1 shows the revised Asraco's ambient air boundary.

Figure 3-1: Asarco Ambient Air Boundary



In January 2017, Asarco informed ADEQ that they had purchased land to the east of the smelter, which was previously excluded from the AAB. ADEQ included this land to Asarco's AAB and updated the modeling information. However, it did not change the final modeling results. Figure 3-2 shows the updated AAB.

Figure 3-2: Asarco's Updated Ambient Air Boundary



On Thursday, February 23rd Arizona Department of Environmental Quality (ADEQ) personnel performed an on-site tour of the ambient air boundary (AAB) used for the Hayden SO_2 and Pb nonattainment plans. During this tour ADEQ personnel traveled and documented the portions of the AAB that were reasonably accessible. In general, upon visiting the site and inspecting the AAB, ADEQ concurs with the AAB assessment provided by Asarco[8] and agrees that the boundary represents a practical ability to preclude public access. More details and photographs of the survey are provided in Appendix H of this TSD.

[8] See Hayden SO_2 Modeling Technical Support Document Appendix C.

Figure 3-3: Modeled Receptors



4.0 Model Selection

As outlined in the EPA's Guideline on Air Quality Models (Appendix W to 40 CFR Part 51), the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) is the recommended model to demonstrate attainment under 2008 Pb NAAQS. As stated in Section 4.2.2.1 of Appendix W, for a wide range of regulatory applications in all types of terrain, and for aerodynamic building downwash, the recommended model is AERMOD.

4.1 AERMOD

ADEQ used the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), version 15181 to predict ambient concentrations in simple, complex and intermediate terrain. AERMOD is the recommended sequential model in EPA's GAQM (40 CFR 51, Appendix W) (U.S. EPA, 2005) for near-field analysis.

There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET (version 15181), a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP (version 11103), a terrain data preprocessor that incorporates complex terrain using USGS Digital Elevation Data. Other non-regulatory components of this system include: AERSURFACE (Version 13016), a surface characteristics preprocessor, and BPIPPRIM, a multi-building dimensions program incorporating the Good Engineering Practice technical procedures for PRIME applications (U.S. EPA, 2004a).

ADEQ used the regulatory default option. This option commands AERMOD to:

- Use the elevated terrain algorithms requiring input of terrain height data for receptors and emission sources;
- Use stack tip downwash (building downwash automatically overrides);
- Use the calms processing routines;
- Use buoyancy-induced dispersion;
- Use the missing meteorological data processing routines.

4.1.1 Hybrid Approach

Situated in a low-lying portion of a valley, with mountains reaching over 4,000 feet to the north, east and southwest, Hayden is subject to a distinct mountain-valley diurnal wind pattern. Under stable atmospheric conditions, nighttime winds are typically from the southeast with speeds less than 10 miles per hour. These conditions cause air to pool in low-lying areas at night, causing pollutants within the air to settle in these areas. The up-slope air flows and convection that occur during the day increase dispersion out of the Hayden area. Under normal daytime conditions, surface winds in the Hayden area range from west-southwesterly to west-northwesterly as the atmosphere becomes less stable.

In the Hayden SO_2 SIP, Camera Hill MET data was used because it best represented MET conditions seen at the main stack, which has the highest impact on ambient SO_2 concentrations. However, for the Hayden Pb SIP a large number of sources exist near ground level, with a significant elevation difference with Camera Hill. Using the Camera Hill MET data to model these emission sources may not be representative of the actual Pb concentrations in the modeling area. Additionally, the very complex terrain in the Hayden area causes the monitoring stations to experience different wind speeds and wind directions for a given

time period. Considering all these issues, ADEQ decided to use a hybrid approach to model Asarco's Pb emissions. In this approach two different MET data sets were used to run AERMOD. Camera Hill MET data were used to model the emissions from the main stack and roofline fugitives and Hayden Old Jail MET data were used to model the emissions from near ground sources such as material storage and handling and road dust emissions.

4.1.1.1 Performance Evaluation of the Hybrid Approach

To demonstrate that the hybrid approach, which uses MET data from two different on-site stations, performs better than modeling all the sources using the MET data from one station, ADEQ conducted a performance evaluation to compare predicted ambient concentrations measured at the five monitoring sites listed in Table 4-1 and shown in Figure 4-1.

Table 4-1: Coordinates for Air Monitoring Sites

Monitor*	UTM Easting (m)	UTM Northing (m)
ST-02	521341.1	3650761.4
ST-05	521912.9	3651593
ST-14	520634.1	3651590.2
ST-23	520333.9	3651710.4
ST-26	520205.4	3651997.3

* Regulatory monitors are co-located with ST-05 (SLAMS monitor Globe Highway) and ST-23 (SLAMS monitor Hillcrest)

The following approaches were evaluated:

- Modeling all the emission sources in AERMOD with Camera Hill on-site MET data
- Modeling all the emission sources in AERMOD with Hayden Old Jail on-site MET data
- Use AERMOD to model the main stack and rooflines with Camera Hill MET data and model the rest of the emission sources with Hayden Old Jail MET data. Because AERMOD cannot handle multiple MET data sources at the same time, two runs were made and the results combined in post-processing, as described below.

The results showed that the hybrid approach had the highest predicted and over predicted data points than the remaining approaches. In addition, the hybrid approach offered a margin of safety at the highest violating SLAMS monitor termed Hillcrest (or ST-23).

A detailed discussion on the model performance evaluation methodology and results including quantile-quantile plots (q-q- plots) is included in a technical memorandum provided in Appendix C.

Figure 4-1: Geographical Representation of Ambient Air Monitors



4.1.2 LEADPOST

The National Ambient Air Quality Standards (NAAQS) for lead is defined as 0.15 µg/m^3 for rolling 3-month averaging time. Therefore, the modeled design value is calculated as the rolling 3-month average concentration at each receptor. AERMOD does not calculate the design value, so post-processing is required. The EPA post-processor, LEADPOST, can be used to calculate the design values.

LEADPOST is a FORTRAN program designed to read monthly concentration output from AERMOD or an alternative model and calculate rolling 3-month averages by receptor and source group.

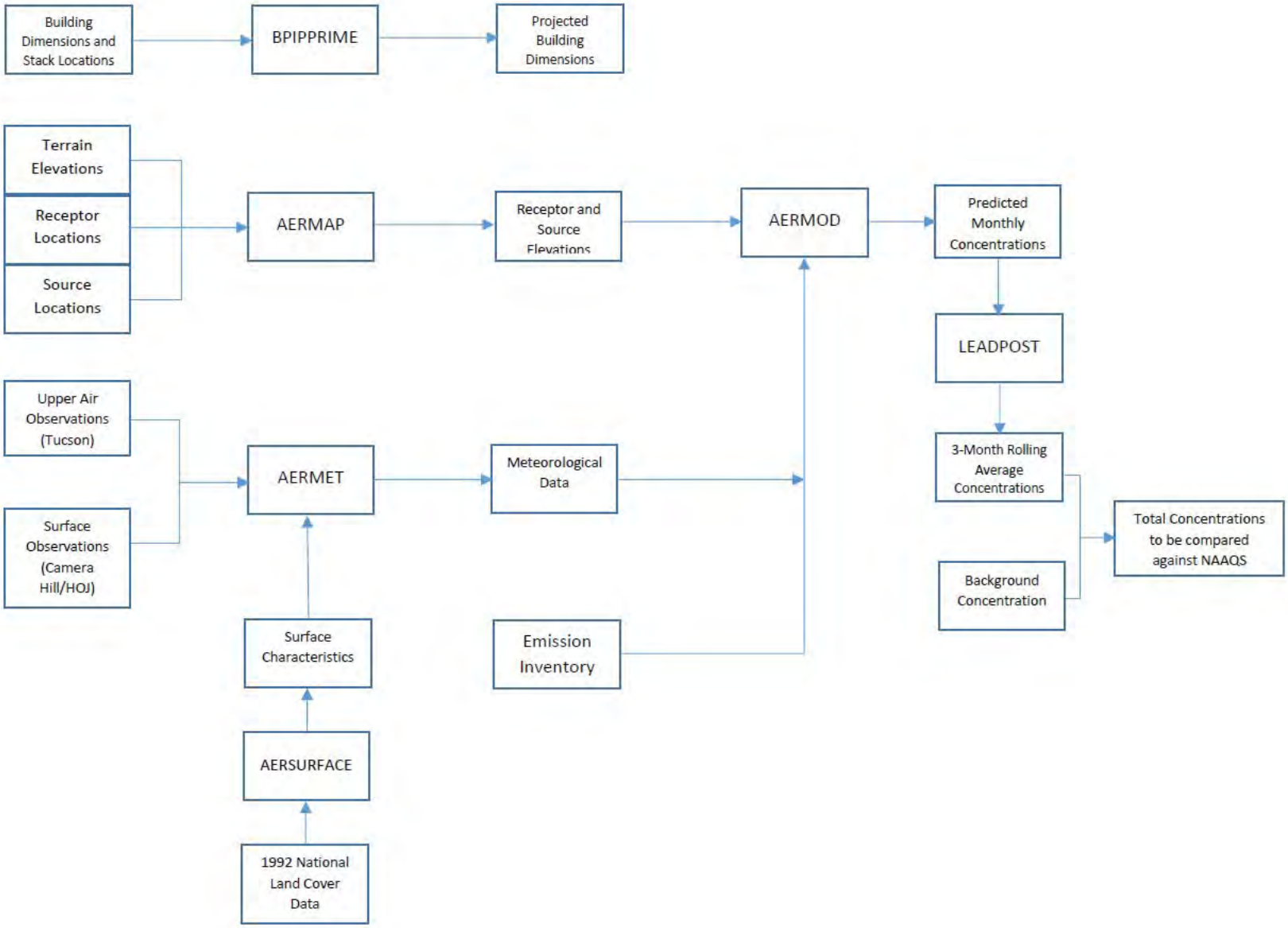
This program was used to calculate the maximum rolling 3-month average concentration for each receptor and overall maximum concentration (across all receptors and source groups).[9]

[9] EPA's User instructions for LEADPOST (Version 11237) program.

In the hybrid approach, AERMOD was run separately using each of the MET data sets and their associated emission sources. Post-processing files containing highest monthly concentrations were generated for each run. Post-processing files were then processed to combine the concentrations predicted at each receptor. The combined Post-processing file was then used as an input to LEADPOST to calculate the maximum rolling 3-month average concentration.

A flowchart of the general approach to this modeling analysis is presented in Figure 4-2.

Figure 4-2: Flowchart of Proposed Modeling System



5.0 Source Inputs

This section discusses source characterization to develop appropriate source inputs for dispersion modeling with AERMOD.

5.1 Asarco Smelter Operations and Proposed Converter Retrofit Project

The copper smelting facility in Hayden, AZ, operated by Asarco, consists of a flash furnace, five (5) Peirce-Smith converters, three (3) anode furnaces, an acid plant and other support equipment. A plot plan of the facility as proposed is provided in Figure 5-1.

ADEQ classifies the Hayden Smelter as a major source pursuant to A.A.C. R18-2-101.61. The potential emission rates of the following pollutants are greater than major source thresholds: (i) particulate matter with an aerodynamic diameter less than 10 microns, (ii) sulfur dioxide, and (iii) nitrogen oxides.

On June 24th, 2014 Asarco submitted a Class I Significant Permit Application to ADEQ, proposing upgrades to enhance emission capture and control systems at its Hayden Smelter facility (hereafter referred to as the "Converter Retrofit Project"). The following list summarizes the enhancements Asarco has proposed for the Converter Retrofit Project (CRP):

- The five existing converters will be replaced with three larger converters. This change allows a single converter to blow at a time, better matching the process gas volume from the converters to the gas processing capacity of the acid plant;
- The better matching of the gas volumes from the converters with the processing capacity of the acid plant, in combination with new, improved primary and secondary hoods, will reduce the volume of process gas spillage from the primary hood system to the secondary hood system during blowing operations. Additionally, the proposed tertiary ventilation system will capture other converter aisle emissions, e.g., emissions from ladle movements of molten material along the aisle, for routing to the annulus of the main stack;
- Process gas captured by the secondary hood during blowing, which is presently routed to the secondary hood baghouse, will be rerouted to the acid plant, providing for substantial control of the sulfur dioxide that presently contributes the majority of the sulfur dioxide in the main stack emissions, additionally the slag return ventilation hoods will be re-routed to the secondary hood baghouse;
- A tertiary ventilation system will be installed over the converter aisle. While this system will not reduce emissions, it will capture any converter aisle emissions not collected by the primary and secondary systems and route them to the main stack instead of allowing them to escape as fugitive emissions to the atmosphere at roof level.
- Improvements will be made to the matte tapping, slag skimming ventilation system to reduce fugitives and to direct emissions to a new vent gas baghouse, which will replace the current ESP. The new vent gas baghouse has a higher control efficiency than the current ESP and will further reduce particulate emissions;

More details concerning the CRP are provided in the Asarco Converter Retrofit Permit application (Significant Permit Revision No. 60647).

5.2 Fugitive Dust Plan

Asarco has also proposed a Fugitive Dust Plan to reduce the Pb emissions from fugitive dust sources. Specific smelter operations quantified in the EI TSD and applicable controls to be in place as part of the Fugitive Dust Plan include:

- Reverts Crushing & Handling:
  - wind fence (designed to have a 75% control efficiency)
  - sprayers (maintain 10% surface moisture content)

- Concentrate Handling:
  - wind fence (designed to have a 75% control efficiency)
  - sprayers (maintain 10% surface moisture content)
  - daily rinsing of spillage/trackout areas
  - rumble grates

- Dewatering of Venturi Scrubber Slurry:
  - slurry to be sent to new thickener
  - resulting filter cake sent to two electric dryers
  - dried cake discharged directly into bags

- Lead-containing Road Dust:
  - Prompt clean up of material that is tracked out from material storage areas onto paved roadways and daily sweeping of road surfaces.
  - chemical dust suppressant application intensity to meet a 90% control efficiency (PM_{10} emissions)

Tables 5-1 and 5-2 provide a comparison (supplied by Asarco) of base year and attainment year emissions. The emissions reductions account for both CRP and fugitive dust plan. As it can be seen, the Pb emissions are expected to decrease from 3.43 t/y in 2012 to 1.58 t/y in 2019.

Table 5-1: Actual Pb Emissions in 2012

Source	2012 Actual Pb Emission, t/y
Main Stack Emissions (Acid Plant + Converters Secondary Hood Baghouse + Flash Furnace Vent Gas ESP (RR Cottrell))	1.08
Process Fugitives (Anode + Flash + Converter)	1.88
Anode Baghouse Stack	0.01
Slag Dump	0.05
Material Storage & Handling (smelter)	0.322
Paved Roads (smelter)	0.091
Paved Roads (concentrator)	0.00002446
Total Pb Actual Emissions	**3.43**

Table 5-2: Estimated Actual Pb Emissions in 2019

Source	2019 Est. Actual Pb Emission, t/y
Main Stack Emissions (Acid Plant + Converters Secondary Hood Baghouse + Flash Furnace Vent Baghouse + Tertiary Hood + Anode Baghouse)	1.35
Process Fugitives (Anode + Flash + Converter)	0.17
Slag Dump	0.05
Material Storage & Handling (smelter)	0.0006
Paved Roads (smelter)	0.011
Paved Roads (concentrator)	0.000046
Total Pb Actual Emissions	**1.58**

5.3 Source Configuration, Types and Release Parameters

Lead emissions will be released to the atmosphere from the following sources at Asarco's Hayden Operations: the main smelter stack, the anode furnace roof line vents, the converter aisle roof line vents, the flash furnace roof line vents, the outdoor slag pouring, materials storage and handling, paved roads, unpaved roads, crushing and screening facility, and Wet Gas Cleaning project. The locations of these sources, which were modeled in the Pb air dispersion modeling analysis, are depicted in Figures 5-1. Figure 5-2 shows the location of the modeled paved and unpaved roads.

Figure 5-1: Modeled Emission Sources for Attainment Year



Figure 5-2: Modeled Paved and Unpaved Roads



5.3.1 Stacks (Point Sources)

5.3.1.1 Main Stack

The main smelter stack, which is comprised of an inner stack and an outer annulus, exhausts almost all emissions from the smelting processes at Hayden. With the proposed design changes, the acid plant tail gas will continue to be directed to the inner stack, and secondary and tertiary converter ventilation gases, and the (new) vent gas baghouse emissions (flash furnace matte tapping, slag skimming, and concentrate dryers) will be vented to the annulus. Additionally the anode baghouse emissions will be rerouted to the inner stack.

To properly account for the main stack plume rise in the dispersion modeling, a combined exhaust stream was defined for the stack's two emissions streams. The calculation of this combined stream's parameters, presented in Appendix D, is based on conservation of the total stack flow rate and release area, and calculation of an equivalent exhaust temperature, stack diameter, and exit velocity. The PTE (Potential to Emit) emissions calculated for the post-CRP implementation were used to model the main stack.

5.3.1.2 Good Engineering Practice (GEP) Stack Height

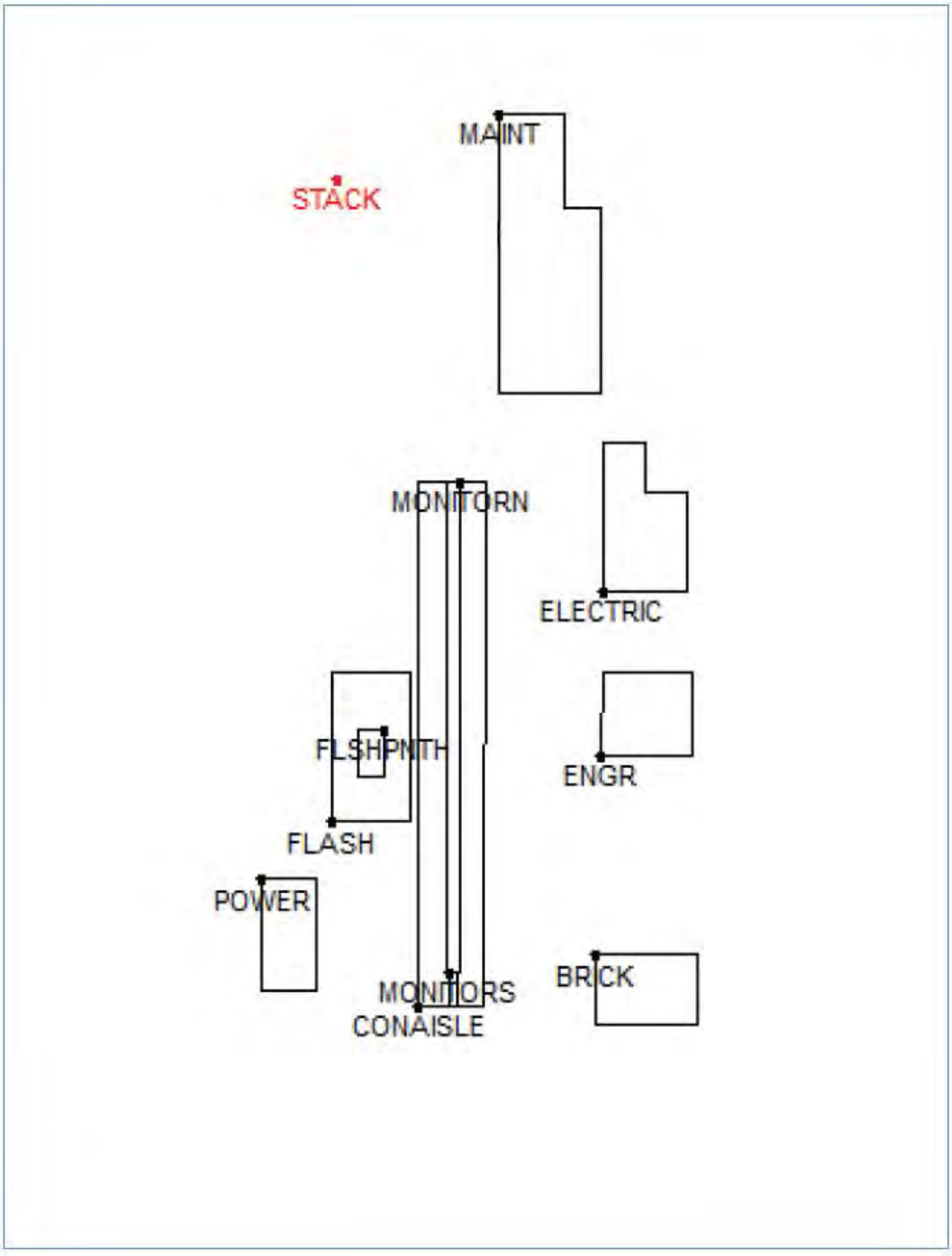
There are two definitions of Good Engineering Practice (GEP) stack height: (i) formula GEP stack height and (ii) regulatory GEP stack height. EPA requires sources to evaluate building downwash effects when a stack is less than formula GEP stack height. Regulatory GEP stack height is either 65 meters or formula GEP stack height, whichever is greater. The EPA does not allow sources to take credit for ambient air concentrations that result from stacks that are higher than regulatory GEP stack height unless they meet the formula stack height criteria.

EPA's Building Profile Input Program for PRIME (BPIPPRM, version 04274; U.S. EPA, 2004a) was used to compute the formula GEP stack height and to generate wind-direction specific building profiles for the main stack for the purpose of sequential modeling. For stacks in existence on January 12, 1979, and which the owner or operator has obtained all applicable preconstruction permits of approvals required under 40 CFR 51 and 52 and AAC R18-2-403, the GEP stack height is 2.5 times the height of the nearby building.

BPIPPRM requires a digitized footprint of the facility's buildings and stacks. The source must evaluate the position and height of buildings relative to the stack position in the building wake effects analysis. Asarco obtained the building positions from a site plan of the proposed changes and identified coordinates for each of the existing building tier corners by mapping the site plan to rectified aerial photographs of the site. Asarco obtained roof heights for the proposed changes from preliminary designs of proposed facility structures and actual heights of existing structures. One can find simplified layouts of the facility in Figure 5-3. This figure also identifies stack's location. The calculated formula GEP height for the main stack was 81.9 m, however the preliminary modeling runs used a stack height of 65 meters and showed that the main stack emissions were not a major contributor to ambient air Pb concentrations. Therefore, the main stack was modeled with a height of 65 meters.

The entire BPIPPRIM output is provided in the enclosed CD-ROM per the nomenclature described in Appendix B.

Figure 5-3: Simplified Facility Layouts



5.3.1.3 Anode Furnace Baghouse Stack

Currently, the emissions from the anode aisle are captured and directed to the anode furnace baghouse stack. After CRP implementation, the emissions will be directed to the main stack (inner stack) and the anode baghouse stack will no longer exist.

5.3.1.4 Slag Pouring

Pb can be released to the atmosphere as molten slag is poured on the ground outdoors. PTE emissions were modeled for this source.

Due to the high temperature of the molten slag at the point of pouring (about 2000^{o}F), the gas rises rapidly into the air. Recognizing that such heat results in a rising buoyant plume, regulatory agencies have approved methods for calculating equivalent stack parameters for the purposes of the dispersion modeling of slag pouring gases. In particular, the Texas Air Control Board, a predecessor agency to the Texas Commission on Environmental Quality, approved such an approach, involving the use of equivalent exhaust parameters, to account for plume rise in the modeling of slag pouring at Asarco's El Paso Smelter in 1992 and 2006 air quality permit reviews. Similarly, the ADEQ has described in Section 3.3.6 of its ADMG the calculation and use of equivalent release parameters for modeling flares, a category of non-standard sources with heat release that cannot be treated in a straightforward way in dispersion models.

Following a methodology with similarities to the one ADEQ applies to flares, Asarco has calculated, for use in the modeling, an effective upward velocity for emissions arising from the pouring of the slag. This calculation, based on the physical properties of the slag and the nature and dimensions of the pour, is presented in Appendix D.

5.3.2 Point Source Release Parameters

Table 5-3 presents the stack and exhaust parameters modeled for the stacks associated with the proposed changes. Asarco identified coordinates for the stacks by mapping the site plan to rectified aerial photographs of the site. ADEQ and Asarco projected UTM coordinates of each stack to UTM Zone 12. These coordinates are based on the NAD83. For the purposes of this modeling analysis the PTE emissions calculated for the post-CRP implementation were applied.

Table 5-3: Stack and Exhaust Parameters- Proposed (Post-CRP)

Stack	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Exit Diameter (m)	Exit Velocity (m/s)	Exhaust Temp. (ºK)	Pb PTE Emissions (t/y)
Main Stack	520929	3651932	650.8	304.8	8.88	10.67	346.48	2.99
Slag Pouring	521458	3651636	626.9	0	13.3	1.45	1333	0.05

5.3.3 Ridge Vents (Roofline Fugitives)

5.3.3.1 Ridge Vents Configuration

ADEQ and Asarco identified coordinates for the ridge vents by mapping the site plan to rectified aerial photographs of the site and adjusting the building footprint to site Computer Assisted Drafting (CAD) drawings. ADEQ and Asarco projected the Universal Transverse Mercator (UTM) coordinates of each vent to UTM Zone 12, 1983 North American Datum (NAD83). Figures 5-4 and 5-5 show each vent location (pre- and post-CRP, respectively) on the simplified plot plan and the representative volume sources used in AERMOD. Table 5-4 lists vent-specific parameters for the post-CRP configurations of the ridge vents.

Figure 5-4:Ridge Vents Volume Sources, Pre-CRP

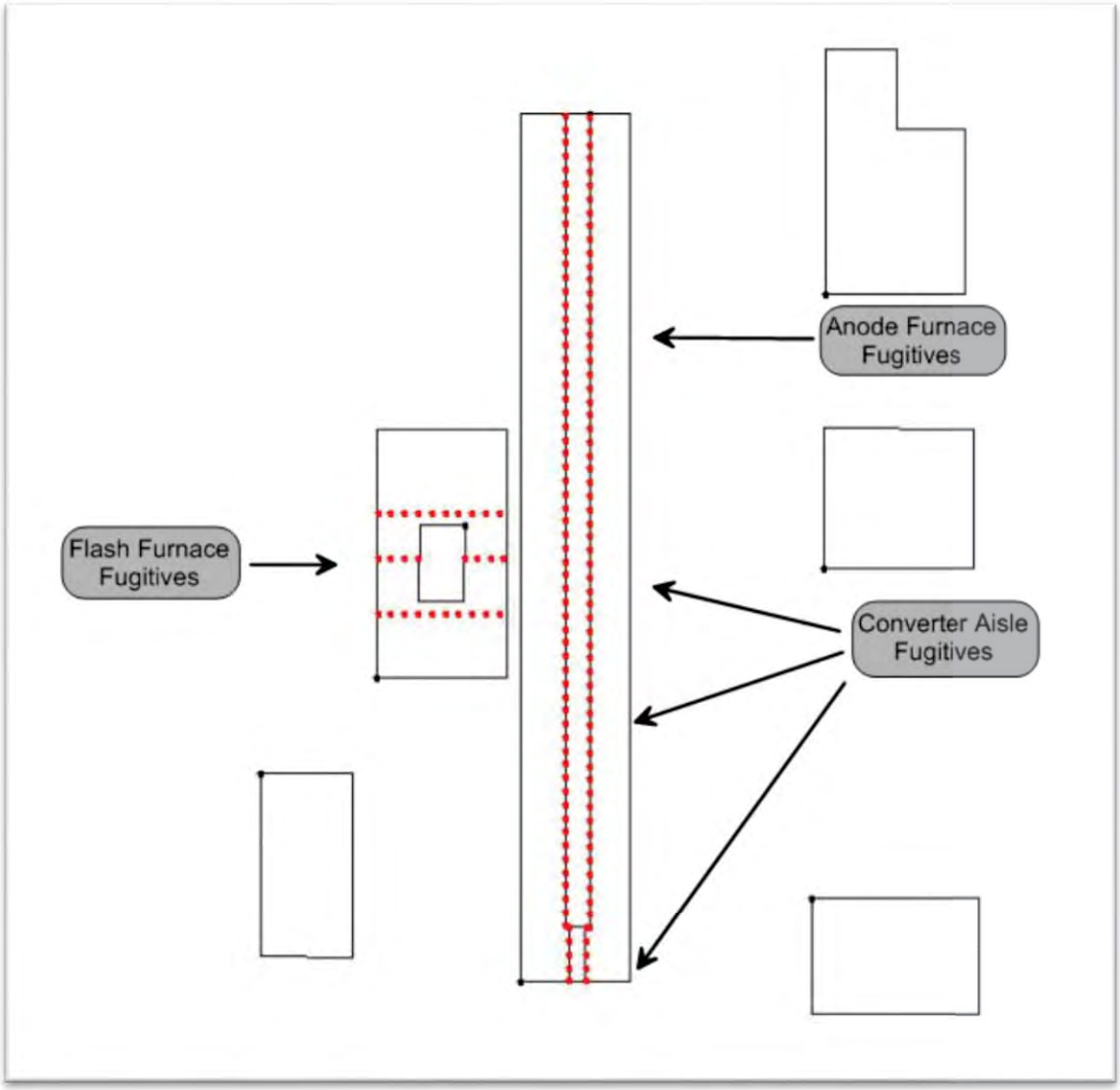
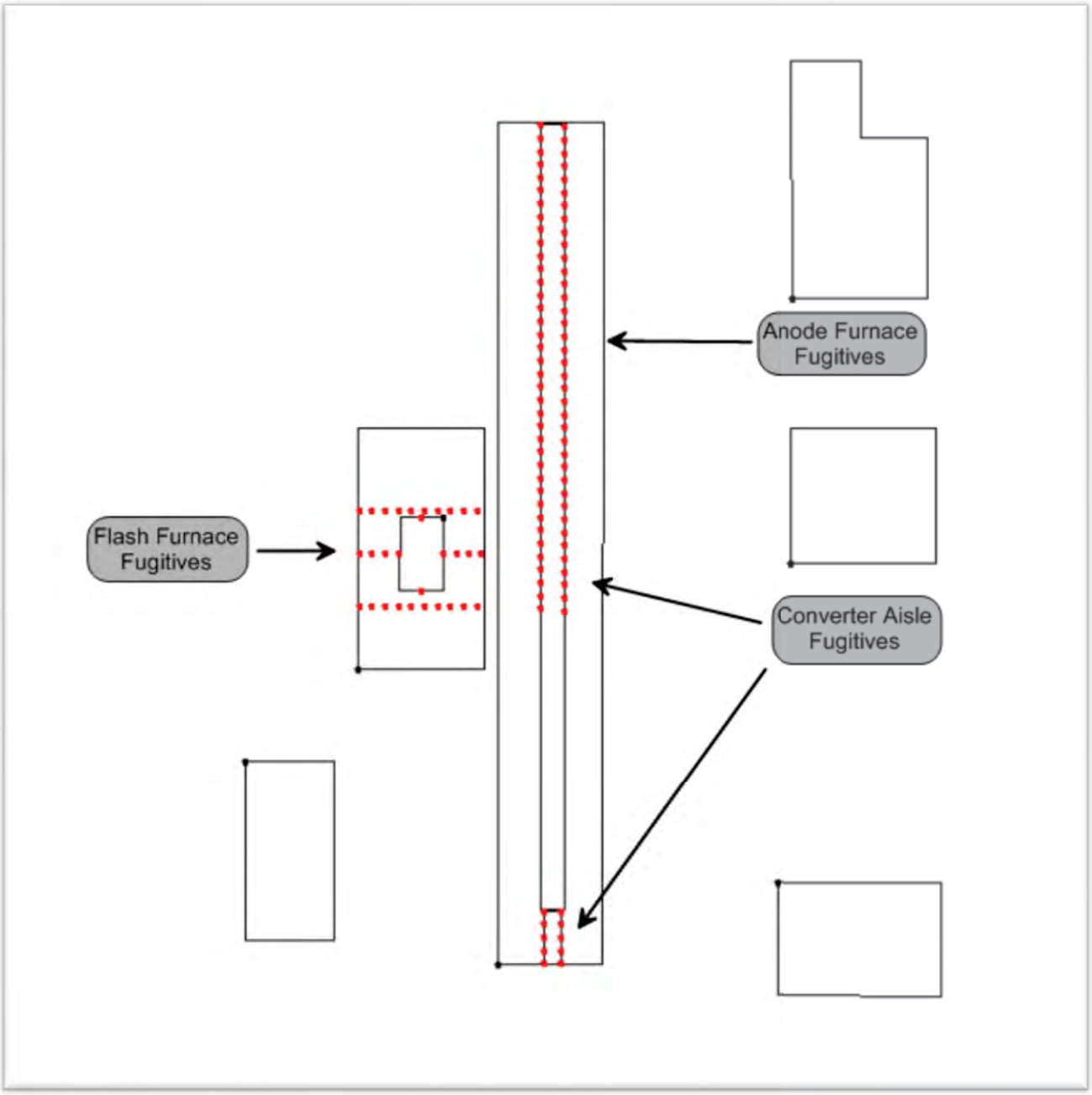


Figure 5-5: Ridge Vents Modeled Volume Sources, Post-CRP



5.3.3.2 Flash Furnace Fugitive Emissions

Emissions not captured from the flash furnace operations and directed to the acid plant are released through roof lines that run east-west across the top of the flash furnace building. To simulate the roof line vent emissions sources in the dispersion modeling, they were represented as a series of volume sources (32 total). For modeling purposes, the total fugitive emission rate from the flash furnace building was distributed evenly among the 32 individual volume sources.

The derivation of the initial horizontal and vertical dimensions is presented in Appendix D.

5.3.3.3 Converter Aisle Fugitive Emissions

Emissions from the converter aisle that are not captured by the ventilation hooding, or directed to the acid plant, are vented through roof line vents on each side of the penthouses which extend along the north-south axis of the converter building ridge line. To simulate the roof line vents emissions sources in the dispersion modeling, they were represented as a series of volume sources (46 total). For modeling purposes, the total fugitive emission rate from the converter aisle building was distributed evenly among the 46 individual volume sources.

The derivation of the initial horizontal and vertical dimensions is presented in Appendix D.

5.3.3.4 Anode Furnace Fugitive Emissions

Emissions from the anode aisle that are not captured and directed to the baghouse are vented through roof lines on the penthouses which extend along the north-south axis of the anode building ridge line. To simulate the roof monitor emissions sources in the dispersion modeling, they were represented as a series of volume sources (40 total). For modeling purposes, the total fugitive emission rate from the anode aisle building was distributed evenly among the 40 individual volume sources.

The derivation of the initial horizontal and vertical dimensions is presented in Appendix D.

The modeled emission rates are based on the PTE emissions calculated for the post-CRP implementation.

Table 5-4: Ridge Vent (Roof Line) Parameters- Proposed (Post CRP)

Ridge Vent	UTM Coordinates (m)		Base Elev. (m)	Release Height (m)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (m)	Pb PTE Emissions (t/y)
	East	North					
Converter Aisle	Varies[a]	Varies[a]	634.11	31.4/25.4[b]	0.7[c]	11.34/10.63[c,d]	0.37
Anode Furnace	Varies[a]	Varies[a]	635.86	31.4	0.7[c]	11.34c	0.04
Flash Furnace	Varies[a]	Varies[a]	635.86	43.6	0.7[c]	19.85c	1.03

a. Varies with each modeled source
b. Release height provided for Roof Monitor above (existing) Converters Nos. 1 and 2 and then for Roof Monitor to south of (new) Converter No. 5, respectively
c. Based on Table 3-1 of AERMOD Guidance
d. Initial vertical dimension provided for Roof Monitor above Converter Nos. 1 and 2 and then for Roof Monitor to south of (new) Converter No. 5

5.3.4 Fugitive Dust Emissions

Fugitive dust Pb emissions are due to processes and activities relevant to materials storage and handling and road dust emissions. The main modeled fugitive dust emissions are based on the proposed Fugitive Dust Plan and are described in this section.

5.3.4.1 Materials Storage and Handling

Concentrate Storage Area

Concentrate produced by the Hayden Concentrator is conveyed from the filter plant to the concentrate storage concrete pad below #27 belt. This concentrate storage area is a component of the new larger concentrate storage area concrete pad. Concentrate from Asarco's other mining operations and purchased concentrate will be unloaded onto the new concentrate storage concrete pad. Loaders will then transfer the material from the storage area to the rail car loading dock all of which will occur on a concreted area. The concentrate is then sent to the bedding plant by railcars. Additionally this entire area will be surrounded by a wind fence to reduce any fugitive emissions from wind erosion. The modeled Pb emissions for this process include:

- Dust emissions resulting from wind erosion
- Dust emissions from transferring copper concentrate from semi-trucks to storage piles
- Dust emissions from the load out of copper concentrate from storage area to rail cars

Bedding Plant Area

This is the area where the flash furnace feed mix is prepared. Copper concentrate, silica flux and by-products are transferred from truck or rail to unloading dump hopper. The material is then transferred by belt to the bedding area into one of four bins where the flash furnace feed mix is prepared. The top of the dump hopper is at ground level and the rest of the hopper and conveyor belts are below ground in a concreted tunnel. A front-end loader then dumps the material into a hopper which feeds the belt lines to the dryers. As a part of the fugitive dust plan, this area will be surrounded by a wind fence to reduce any fugitive emissions from wind erosion. The Pb emissions for this process that are included in the modeling are as follows:

- Dust emissions resulting from wind erosion
- Dust emissions from the unloading of copper concentrate and by-products from truck or rail to unloading dump hopper
- Dust emissions from transferring the materials from the hopper to the #2 belt that goes to dryers

Reverts Pile -South Storage

This is a storage area for fine revert materials. This area will also be surrounded by a wind fence to reduce any fugitive emissions from wind erosion. The modeled Pb emissions for this process include:

- Dust emissions from wind erosion
- Dust emissions from the transfer of reverts to outdoor storage via MACK truck
- Dust emissions from the load out of reverts in outdoor storage

Reverts Pile- North Storage

This is a storage area for coarse revert materials. This area will also be surrounded by a wind fence to reduce any fugitive emissions from wind erosion. The modeled Pb emissions for this process include:

- Dust emissions from wind erosion
- Dust emissions from the transfer of reverts to outdoor storage
- Dust emissions from the load out of reverts in outdoor storage

To model the fugitive dust emissions from storage piles due to wind erosion, the storage piles were modeled as polygon area source (defined as AREAPOLY) in AERMOD. Table 5-5 presents the modeling parameters for these sources[10].

Table 5-5: Modeling Parameters for Storage Piles as Area Sources

Storage Pile	UTM Coordinates (m)		Base Elev. (m)	Release Height (m)	Estimated Area (m^2)	Pb PTE Emissions (g/sec)
	East	North				
Concentrate Storage	Varies[a]	Varies[a]	655.36	3.048[b]	4168	0.0000226
Bedding Area	Varies[a]	Varies[a]	647.33	6.096[b]	5300	0.0000027
Revert Pile-North	Varies[a]	Varies[a]	633.98	1.295[b]	121	0.000000011
Revert Pile-South	Varies[a]	Varies[a]	645.09	2.134[b]	2752	0.0000069

a. Varies with each vertex defined for the polygon area source
b. Release height is calculated as 1/2 average pile height

All fugitive dust emissions generated from loading and unloading processes were modeled as volume sources. The modeling parameters for loading/unloading activities are summarized in Table 5-6[11].

[10] Modeling Fugitive Dust Sources, National Stone, Sand & Gravel Association (NSSGA), 2004
[11] Modeling Fugitive Dust Sources, National Stone, Sand & Gravel Association (NSSGA), 2004

Table 5-6: Modeling Parameters for Loading and Unloading Activities as Volume Sources

Volume Source	UTM East (m)	UTM North (m)	Release Height (m)	Initial Lateral Dimension(m)	Initial Vertical Dimension (m)	Pb PTE Emission Rate (g/s)
Loading Trucks by a Loader	Varies[a]	Varies[a]	2.6 - 4.0 [b]	0.8 [c]	0.3-0.5 [d]	0.00000042 to 0.0000064
Unloading Trucks	Varies[a]	Varies[a]	1.0 -3.3[e]	0.5[f]	0.3-2.7[g]	0.0000017 to 0.000051

a. Varies with each activity point defined in the model
b. Release height is the height above ground of the midpoint of the drop distance to the haul truck bed
c. Sigma-y = width of the front-end loader bucket/4.3
d. Sigma-z = Height of the sidewall of the truck bed/4.3
e. Release height is the height from the back end of the truck bed to the ground or feeder (whichever is greater)
f. Sigma-y = truck bed width/4.3
g. Sigma-z = Maximum height of the top of the open truck bed to the ground or feeder (whichever is greater)/2.15

5.3.4.2 Road Dust

Paved Roads

Pb emissions from paved roads are due to vehicle traffic for the following activities:

- concentrate, anode, and blister receipts and shipments
- general plant traffic
- maintenance of roads by water truck
- maintenance of roads by street sweeper
- hauling of material by plant service haul trucks
- scrap handling forklifts
- miscellaneous use forklifts
- miscellaneous delivery trucks
- hauling of sulfuric acid
- travelling of front-end loaders

The paved roads were modeled as Line Volume sources. Adjacent configuration was considered for the volume sources on each line. The total emissions for the paved roads and the parameters used to model the paved roads are presented in Table 5-7. The emissions allocated to each segment of the paved roads were defined based on the type of the activities taking place on each segment.

Table 5-7: Modeling Parameters for Paved Roads as Line Volume Sources

Paved Roads	UTM East (m)	UTM North (m)	Lane Type	Vehicle Height (m)	Vehicle Width (m)	Plume Height (m)	Release Height (m)	Initial Sigma Z (m)	Plume Width (m)	Initial Sigma Y (m)	Projected Emission Rate (g/s)
Haul Roads	Varies[a]	Varies[a]	Two Lanes	1.93[b]	1.88[c]	3.28	1.64	1.53[d]	15.14	7.04[e]	0.00043

a. Varies with each road segment defined in the model
b,c. Vehicle height and width are defined for the most common vehicle travelling on the paved roads
d. Initial sigma-z = plume height/2.15
e. Initial sigma-y= plume width/2.15

Unpaved Roads

Similar to the description above, the unpaved roads were modeled as line volume sources as well. The parameters used to model the unpaved roads are presented in Table 5-8. ADEQ did not model every unpaved road at the Asarco facility. For information regarding how ADEQ seleted the unpaved roads included in the model, see Appendix G.

Table 5-8: Modeling Parameters for Unpaved Roads as Line Volume Sources

Paved Roads	UTM East (m)	UTM North (m)	Lane Type	Vehicle Height (m)	Vehicle Width (m)	Plume Height (m)	Release Height (m)	Initial Sigma Z (m)	Plume Width (m)	Initial sigma-y (m)	Projected Emission Rate (g/s)
Haul Roads	Varies[a]	Varies[a]	Two Lanes	4.11[b]	1.88[c]	7.0	3.5	3.25[d]	15.14	7.04[e]	0.00081

a. Varies with each road segment defined in the model
b,c. Vehicle height and width are defined for the most common vehicle travelling on the unpaved roads
d. Initial sigma-z = plume height/2.15
e. Initial sigma-y= plume width/2.15

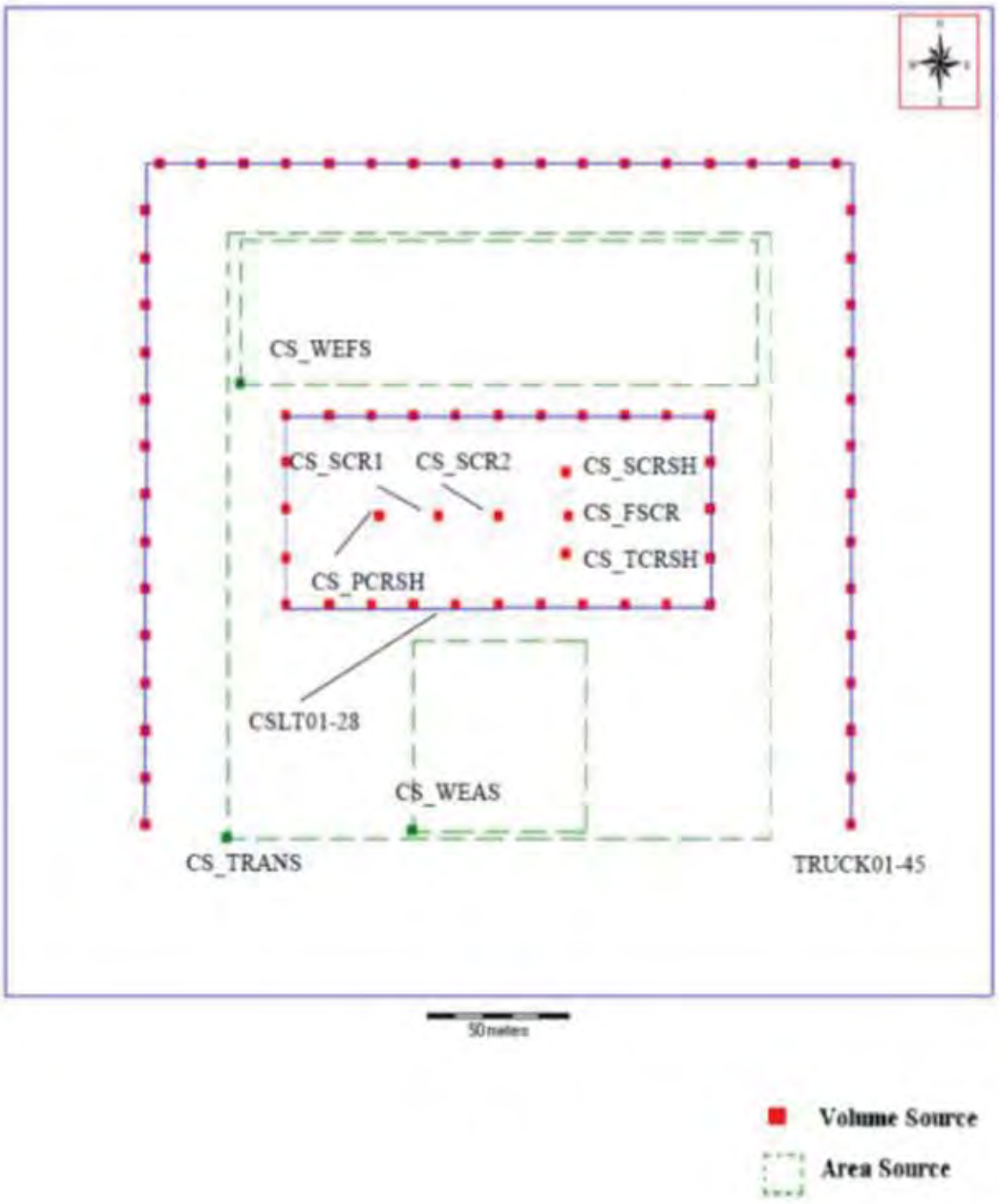
5.3.4.3 Smithco Crushing and Screening Processes

The layout of crushing & screening plants generally differs from one site to another. To simplify the modeling analysis, a generic site plan was used for a crushing & screening plant and the modeling parameters were calculated. The detailed methodology is described in ADEQ's Technical Review and Evaluation of the Crushing and Screening General Permit, which is presented in Appendix E. This layout of sources was determined according to the site plans of several existing plants (see figure 5-6).

The emission sources include materials storage wind erosion, combined transfer points, crushing and screening operations, batch drop operations, material transfer operations, and trucks/front-end loaders traveling on unpaved roads.

The facility was modeled as a volume source. This assumption seems to be valid because the footprint of this facility is very small as compared with Asarco site. Using modeling parameters information in ADEQ's document (see Appendix E), the weighted average release height was calculated for the crushing and screening processes and was used in the modeling as the release height of the defined volume source. Table 5-9 shows the estimated source parameters for this source.

Figure 5-6: Source Layout of a Generic Crushing and Screening Plant



Abbreviations:

CS_WEFS: Fines Storage Pile, **CS_WEAS**: Aggregate Storage Pile, **CS_TRANS**: Transfer Points, **CS_PCRSH**: Primary Crusher-Jaw, **CS_SCR**: Screens, **CS_SCRSH**: Secondary Crusher –Core, **CS_TCRSH**: Tertiary Crusher, **CS_FSCR**: Fine Screen, **CSLT**: Crushing & Screening Loader Traffic (28 total), **TRUCK**: Truck Traffic (45 total)

Table 5-9: Source Parameters as Described in ADEQ General Permit TSD

Process	Release Height, m	PM Emission, g/s
Aggregate Storage Pile	1.83	0.0000116
Fines Storage Pile	1.83	0.0000261
Transfer Points	1.52	0.0252
Primary Crusher- Jaw	5.18	0.0215
Screen #1	7.62	0.0294
Screen #2	7.62	0.0294
Fine Screen	7.62	0.0875
Secondary Crusher- Core	7.62	0.0215
Tertiary Crusher	6.1	0.0155
Loader Traffic (28 sources)	3.0	0.12152
Truck Traffic (45 sources)	3.0	0.1125
Weighted Average Release Height	**4.79**	—

As mentioned above, this source was modeled as a volume source with a square base. The modeling parameters are listed in Table 5-10.

Table 5-10: Modeling Parameters for Smithco. Crushing and Screening Processes

Source	UTM East (m)	UTM North (m)	Area (m2)	Release Height(m)	Length of side (m)	Initial Sigma-y (m)	Initial Sigma-z (m)	PTE Emission Rate (g/s)
Smithco.	521094.62	3652112.10	16718	4.79	129.3	30.07 [a]	3.75 [b]	0.0012

a. Length of side/4.3
b. Release height*2/2.15

5.3.4.4 Wet Gas Cleaning Plant (WGC)

Concurrent with the Converter Retrofit Project, Asarco has identified certain changes to the Wet Gas Cleaning (WGC) plant that would facilitate handling of process solids removed from the ventilation gases prior to introduction to the acid plant. In the final design, Asarco identified that it is preferable to dry and package the process solids in a contained batch process rather than managing them in solar drying concrete pads. In the new gas cleaning process, the acid plant scrubber blowdown material (venturi scrubber slurry) will be diverted to a new thickener. From the thickener, the material will be sent to a filter press followed by two electric dryers, and the dried cake will then be discharged directly into bags.

Three lead emission points were identified for this process:

- Material transfer from filter press to dryer
- Drying operation

- Material transfer from dryer to bagging

The above processes are contained in a building and the emissions were modeled as a roof building vent (volume source). Emissions from roof building vents are created when PM inside a building is vented to the outside through an opening in the building. The emissions are not forced out through a confined stack, but rather disperse from a vent in the building roof, and are therefore fugitive. The emission rates of the individual sources inside the building are combined and the overall emission rate for the structure is used for the volume source.

The release height is then calculated as the height of the building plus half the height of the roof vent from the eaves (the full height is not used in an attempt to account for stack tip downwash that is also not calculated for volume sources). As will be simulated in the model with this calculated release height, the maximum amount of emissions will occur at the roof vent opening, and will disperse once the plume exits the vent.

In order to simulate the initial width of the plume in the model, the initial lateral dimension should be equal to the width of the building/4.3 (indicating that the plume's initial width is approximately the width of the building). The initial vertical dimension of a roof building vent equals the building height plus half the height of the roof vent from the eave/2.15 (indicating that, due to downwash effects, the plume's initial thickness is greater than the height of the building, however, since the extent beyond the top of the building is not easily determined, it is assumed that the height of the building plus half the height of the roof vent above the eave is approximately half of the plume thickness. The modeling parameters for the Thickener Project are summarized in Table 5-11[12].

Table 5-11: Modeling Parameters for Gas Cleaning Plant

Source	UTM East (m)	UTM North (m)	Base Elev. (m)	Building Height (m)	Building Width (m)	Height of the Roof Vent (m)	Release Height (m)	Initial Sigma-y (m)	Initial Sigma-z (m)	PTE Emission Rate (g/s)
Wet Gas Cleaning Plant	521040.7	3651568.4	638.0	15.3	7.9	1.2	15.84 [a]	1.84 [b]	7.38 [c]	0.00204

a. Release Height = the height of the builind + half the height of the roof vent
b. Sigma-y= building width/4.3
c. Sigma-z= building height + half the height of the roof vent above the top of the roof/2.15

[12] Modeling Fugitive Dust Sources, National Stone, Sand & Gravel Association (NSSGA), 2004

5.4 Urban/Rural Determination

Dispersion coefficients for air quality modeling are selected based on the land use classification technique suggested by Auer (Auer, 1978), which is EPA's preferred method. The classification determination involves assessing land use by Auer's categories within a 3-kilometer radius of the proposed site. A source should select urban dispersion coefficients if greater than 50 percent of the area consists of urban land use types; otherwise, rural coefficients apply.

Following Section 3.7 of the ADEQ Modeling Guidelines, Asarco classified the land use of the area using the land-use procedure set forth in EPA's "Guideline on Air Quality Models" (GAQM). This approach requires determining the amount of specific types of land use categories within a 3-km radius circle centered on the source; if the total land use (as defined by Auer6) is classified as 50% or more "urban" then the area is designated as urban; otherwise it is designated as rural.

Land use (taken from the U.S. Geological Survey (USGS) National Land Cover Data (NLCD) 1992 archives) was examined for the 3-km radius circle, and totals of each land use category were calculated. These land use categories were then correlated to the categories as established by Auer, and the amount of urban and rural land use within 3 km of Asarco was calculated. The area near Asarco that was examined is depicted in Figure 5-7, while the results of the analysis are presented in Table 5-9.

Figure 5-7: Land Use near Asarco Smelter

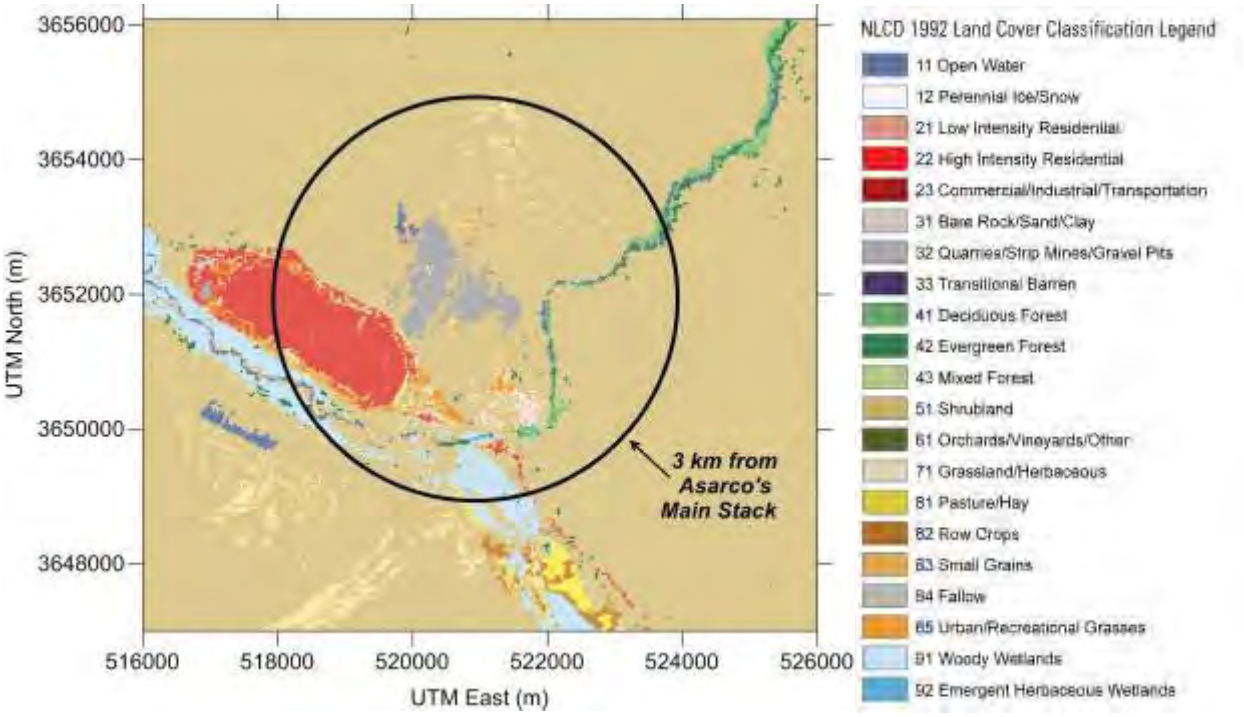


Table 5-12: Land Use Analysis within 3 km of Asarco Smelter

1992 NLCD Land Use Category		% of Total Land Use within 3 km of Asarco	Auer Land Use Category		
Code	Description		Code	Description	Rural/Urban
11	Open Water	0.7	A5	Water Surfaces	Rural
12	Perennial Ice/Snow	0	A5	Water Surfaces	Rural
21	Low Intensity Residential	0.5	R1 / R4	Common/Estate Residential	Rural
22	High Intensity Residential	0	R2 / R3	Compact Residential	Urban
23	Commercial / Industrial / Transportation	7.4	C1 / I1 / I2	Commercial/Heavy Industrial/Light-Moderate Industrial	Urban
31	Bare Rock / Sand / Clay	0.1	A	N/A	Rural
32	Quarries / Strip Mines / Gravel Pits	3.9	A	N/A	Rural
33	Transitional	0	A	N/A	Rural
41	Deciduous Forest	0.8	A4	Undeveloped Rural	Rural
42	Evergreen Forest	0.7	A4	Undeveloped Rural	Rural
43	Mixed Forest	0	A4	Undeveloped Rural	Rural
51	Shrubland	79.8	A3	Undeveloped	Rural
61	Orchards / Vineyards / Other	0	A2 / A3 / A4	Agricultural Rural / Undeveloped / Undeveloped Rural	Rural
71	Grasslands / Herbaceous	2.5	A3	Undeveloped	Rural
81	Pasture / Hay	0	A2	Agricultural Rural	Rural
82	Row Crops	0	A2	Agricultural Rural	Rural
83	Small Grains	0	A2	Agricultural Rural	Rural
84	Fallow	0	A2	Agricultural Rural	Rural
85	Urban / Recreational Grasses	1.0	A1	Metropolitan Natural	Rural
91	Woody Wetlands	2.5	A3 / A4 / A5	Undeveloped / Undeveloped Rural / Water	Rural
92	Emergent Herbaceous Wetlands	0	A3 / A5	Undeveloped / Water Surfaces	Rural

Nearly 80% of the land use within 3 km of Asarco is “shrubland” according to the NLCD92 classification scheme. Under the Auer scheme the sum of the percentage of land use categories classified as urban (R2, R2, C1, I1, and I2) is 7.4%; accordingly, the sum of the rural categories is 92.6%. Therefore, the area around Asarco is defined as “rural” and identified as such in the AERMOD input.

6.0 Meteorological Data

6.1 AERMET

EPA's AERMET tool (version 15181) was used to process meteorological data for use with AERMOD. AERMET merges National Weather Service (NWS) surface observations with NWS upper air observations and performs calculations of meteorological parameters required by AERMOD. Surface observations from on-site instruments can optionally be included. The latter can be useful because the data are more relevant to the site being modeled and in cases where on-site data are collected at multiple elevations above ground, AERMET can construct a more accurate vertical profile of meteorological data. In addition to the meteorological observations, AERMET further requires the inclusion of the characteristics of land use surfaces that Asarco calculated using EPA's AERSURFACE tool.

6.1.1 Surface Observations

EPA recommends that AERMOD be run with a minimum of 5 years of NWS data or 1 year of on-site meteorological data. As described in Section 4, a hybrid modeling approach was used for this project. The meteorological data used in the sequential modeling consists of on-site hourly surface observations collected by Asarco from a 10-meter tower located approximately 0.35 kilometers south of the smelter building, on Camera Hill and also on-site hourly surface observations collected by ADEQ's Hayden Old Jail 10-meter station located approximately 1.06 kilometers west of the Asarco concentrator and smelter complexes.

The Camera Hill met data were used to model the Pb emissions from the main stack and fugitive rooflines and Hayden Old Jail met data were used to model the emissions from lower elevation sources such as material storage and handling sources, paved roads, unpaved roads, etc.

The meteorological data used in the modeling cover the period from August 2013 to August 2014, with the raw on-site data provided by Asarco and ADEQ.

The Camera Hill monitoring station is equipped with the following instrumentation:

- Wind speed, wind direction, standard deviation of horizontal wind, and ambient temperature at 10 meters;
- Ambient temperature at 2 meters;
- Atmospheric pressure;
- Relative humidity;
- Solar radiation; and
- Precipitation.

The Hayden Old Jail station is equipped with the following instrumentation:

- Wind speed and wind direction at 10 meters;
- Ambient temperature and relative humidity at 2.1 meters.

The installation for both stations meets the requirements of ADEQ and EPA's recommendations available at the time of installation. Instrument performance is audited on a regular basis in accordance with ADEQ and EPA requirements.

Table 6-1 lists the geographic locations of the met stations. Figure 6-1 shows the location of the on-site met stations relative to the proposed project.

Table 6-1: Geographical Location of the on-site Meteorological Stations

Station	UTM, m		Base Elevation, m
	East	North	
Camera Hill	521018.35	3651420.28	699.5
Hayden Old Jail	519947.57	3651995.64	623.0

Figure 6-1: Onsite Meteorological Stations



6.1.2 Upper Air Observations

Upper air data were taken from the Tucson International Airport (WBAN 23160) in Tucson, Arizona.

6.1.3 AERSURFACE

EPA's AERSURFACE tool was used to calculate the surface roughness length, albedo and Bowen ratio inputs required by AERMET. EPA developed AERSURFACE to identify these parameters within a defined radius from a specified point. In this case, ADEQ input the UTM coordinates of the on-site meteorological stations to AERSURFACE along with a 1-kilometer radius per EPA guidance. USGS National Land Cover Data (NLCD) for the area were used as inputs to AERSURFACE. The parameters for twelve compass sectors of 30° each and by month were calculated. In original Met data processing for Hayden Pb SIP, the user-defined seasonal categories were assigned as follows per ADEQ guidance:

- Late autumn after frost and harvest, or winter with no snow: December, January, February, March;
- Winter with continuous snow on the ground: none;
- Transitional spring (partial green coverage, short annuals): April, May, June;
- Midsummer with lush vegetation: July, August, September; and
- Autumn with un-harvested cropland: October, November.

However, Asarco clodely examined the area within 1 km of the Camera Hill meteorological tower afterwards and assigned the seasonal categories as follows:

- Late autumn after frost and harvest, or winter with no snow: none;
- Winter with continuous snow on the ground: none;
- Transitional spring (partial green coverage, short annuals): January – December;
- Midsummer with lush vegetation: none;
- Autumn with un-harvested cropland: none.

In particular, the Hayden Nonattainment Area does not see the wide seasonal fluctuation in vegetation seen in many other areas of the country. After discussions with ADEQ, Asarco adjusted the month-to-season definitions to reflect low level vegetation throughout the year.

Because Hayden Old Jail Met station is located about 1.2 km from Camera Hill Met tower, ADEQ used the same seasonal assignment for Hayden Old Jail as well.

Surface moisture characteristics were selected based on a comparison of the precipitation measured at Camera Hill during the meteorological monitoring period and the 30-year average value from 1980 to 2013 (data from 1994, 1995, and 1996 were missing) at the monitoring station in Safford, Arizona.

The amount of precipitation at Camera Hill during the monitoring period would have qualified as the 11th-most dry year at Safford, or well within the 50th percentile of the distribution of the 30 years of precipitation data from Safford. This means that the moisture level for the Camera Hill data is defined as average. The same assumption was used for Hayden Old Jail station.

The AERSURFACE input and output files are provided on CD-ROM per the nomenclature described in Appendix B.

6.1.4 Processed Data Completeness

Section 5.3.2 of "Meteorological Monitoring Guidance for Regulatory Modeling Applications" states that to be acceptable for use in regulatory dispersion modeling a meteorological dataset must be 90% complete on a quarterly basis. The 90% requirement applies to wind direction, wind speed, and temperature. The data completeness for each year of processed data for input to AERMOD are presented in Table 6-2 and 6-3.

Table 6-2: Camera Hill Data Completeness

Year	Quarter	Wind Speed	Wind Direction	Sigma Theta	Temp. (10 m)	Temp. (2 m)	Pressure
2013	Q1	N/A	N/A	N/A	N/A	N/A	N/A
	Q2	N/A	N/A	N/A	N/A	N/A	N/A
	Q3	100%	100%	100%	100%	100%	100%
	Q4	100%	100%	100%	100%	100%	100%
2014	Q1	99%	99%	99%	99%	99%	100%
	Q2	100%	100%	100%	100%	100%	100%
	Q3	99%	99%	99%	99%	99%	99%
	Q4	N/A	N/A	N/A	N/A	N/A	N/A

Table 6-3: Hayden Old Jail Data Completeness

Year	Quarter	Wind Speed	Wind Direction	Temperature
2013	Q1	N/A	N/A	N/A
	Q2	N/A	N/A	N/A
	Q3	100%	100%	100%
	Q4	100%	100%	100%
2014	Q1	94.9%	94.9%	94.9%
	Q2	100%	100%	100%
	Q3	100%	100%	100%
	Q4	N/A	N/A	N/A

6.1.5 Determination of Representativeness

Section 8.3 of GAQM stipulates that the representativeness of a meteorological dataset depends on four criteria:

- Spatial proximity
- Complexity of terrain
- Exposure of the meteorological monitoring site
- Period of time during which data are collected

These four criteria are examined below:

Spatial Proximity

Both Camera Hill and Hayden Old Jail meteorological stations are located on or near Asarco's property. Camera Hill station is located on Asraco property and Hayden Old Jail station is located outside Asarco AAB, about 1.2 km north west of Camera Hill. As such, there is not a large distance between the location of meteorological data and either the sources of emissions or receptors being modeled. Therefore, these data satisfy the spatial proximity requirements of Section 8.3 of 40 CFR 51 Appendix W.

Complexity of Terrain

Because the Camera Hill and Hayden Old Jail meteorological stations are located close to Asarco emission sources, the meteorological conditions at that locations are influenced by the complexity of the terrain in a similar manner as are the sources of emissions being modeled. Therefore, these data satisfy the complexity of terrain requirements of Section 8.3 of 40 CFR 51 Appendix W.

Exposure of the Meteorological Monitoring Site

The Camera Hill meteorological monitoring tower is located at the top of Camera Hill, with no structures or significant vegetation in the area. Similar conditions are applicable for Hayden Old Jail station. Therefore, these data satisfy the exposure requirements of Section 8.3 of 40 CFR 51 Appendix W.

Period of time during which data are collected

The first full year of data available at Camera Hill were used in this analysis. Therefore, these data satisfy the temporal requirements of Section 8.3 of 40 CFR 51 Appendix W. For Hayden Old Jail, one full year of data from the same time period as Camera Hill's were used.

6.1.6 AERMET Processing

The on-site surface data and the Tucson upper air data were processed using AERMET (Version 15181). Note that because cloud cover was not measured at Camera Hill, theT Bulk Richardson method was used to estimate the heat flux under stable conditions, based on the low-level delta-temperature measurement. For Hayden Old Jail, the cloud cover data from Safford Regional Airport were used.

7.0 Background Air Quality

EPA requires background air quality estimates to be added to modeling results for comparison to the NAAQS. For the Hayden Pb project ADEQ determined a background concentration based on a regional monitor to be more appropriate than local monitors. This determination was based on the nature of lead emissions from the facility.

Initially ADEQ followed Appendix W guidance to determine a background concentration for the model. Specifically, ADEQ analyzed local monitor data during facility shutdowns. The years analyzed ranged from 2013 to 2015. This analysis showed when the facility was shut down the nearby monitors were still being impacted. Specifically, monitors closest to materials handling operations showed elevated lead concentrations.

ADEQ brought this topic up with Asarco, which confirmed that during plant shutdowns there is an increased amount of materials handling operations occurring throughout the facility. Given this, and after reaching out to EPA Region 9, ADEQ decided to use a nearby regional monitor to calculate a background concentration for the model.

For this demonstration ADEQ based its background ambient air lead concentration on data collected from the Pima County Department of Environmental Quality's State or Local Air Monitoring Station (SLAMS) termed Children's Park monitor located in Tucson. This monitor began collecting data on February 27, 2012, and collects total suspended particle (TSP) data over a 24 hour period. More Information regarding this monitor is presented in Table 7-1.

Table 7-1: Air Monitoring Station Information

Site ID (AQS)	04-019-1028
County	Pima
City	Tucson
Site Address	400 W River Road
Latitude	32.29515
Longitude	-110.9823

The methodology used to calculate the background concentration involved taking all measurements during 2013 and calculating a mean concentration. The year 2013 was chosen rather than the base year due to completeness of data (two months of data were missing in the base year). Using the 59 observations in 2013 an annual mean of 0.0028 $\mu g/m^3$ was calculated. This value was then added to the modeled concentration as background Pb.

8.0 Modeling Results and Emission Limits

This section provides a discussion on the control efficiencies, air quality modeling results, and emission limits for Hayden Pb project.

8.1 Attainment Demonstration

As described in Sections 5-1 and 5-2 of this TSD, the Pb emission reductions will be achieved through the implementation of Converter Retrofit Project and Fugitive Dust Plan. Table 8-1 shows the current and future Pb emissions along with the reductions associated with each source.

ADEQ performed dispersion modeling using AERMOD with hybrid MET data (as described in section 4) to demonstrate attainment. ADEQ will use the results from this modeling to determine an emission limit that will allow the source to comply with the 2008 Pb NAAQS.

The emissions listed in the last column of Table 8-1 were input to the AERMOD and the 3-month rolling average concentrations were calculated using LEADPOST post-processor. The modeling results are presented in Table 8-2. As the table shows, attainment with the 3-month rolling average Pb NAAQS can be demonstrated.

It should be noted that the emissions used in the model were a combination of what the source requested for a permit limit (main stack and smelter fugitives) and conservative calculation methodologies. For more information on these calculation methodologies please see the Emissions Inventory TSD for Hayden Pb SIP. For more information on the requested permit limits see Appendix F.

In Table 8-1, 2019 projected actual emissions are also listed for each source. These values were supplied by the facility and used the same calculation menthodologies that were used for 2012 actual emission as well as PTEs.

For the main stack and roofline fugitive emissions, anticipated emission reductions (from future state controls) were applied to historic data. Emissions from materials handling operations and roads were calculated using more realistic throughput and lead factors. This is opposed to the conservative assumptions made when calculating modeled PTE emissions.

Table 8-1: Current and Future Pb Emissions

Modeled Source	Controls Applied	2012 Actual Emissions, t/y	2019 Projected Actual Emissions, t/y	Projected Reductions	Modeled Emissions, t/y[13]
Main Stack	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding.	1.08	0.889	17%	2.99 (PTE)
Flash Furnace Fugitives	Matte Tapping Ventilation System	0.495	0.1025	79.3%	1.03 (PTE)
Convereter Isle Fugitives	Secondary Hood Baghouse, Improved Primary and Secondary Hooding, Tertiary Hooding	0.968	0.024	97.5%	0.37 (PTE)
Anode Furnace Fugitives	Improved Ventilation Sysytem	0.417	0.0431	89.7%	0.04 (PTE)
Anode Baghouse Stack	Sent to the main stack	0.0113	0.0145	N/A	Included in main stack
Slag Dump	Restrictions on slag dumping location	0.05	0.05	—	0.05
Gas Cleaning Waste Material	Thickener Project	0.26	0.07	73%	0.07 (PTE)
Concentrate storage area	Wind fence, water sprays	0.001	0.000056	94%	0.00088 (PTE)
Bedding area	Wind fence, water sprays	0.00017	0.000015	91%	0.00016 (PTE)
Reverts operations	Wind fence, water sprays	0.0122	0.00042	97%	0.0041 (PTE)
Paved Roads	Sweepers	0.091	0.015	84%	0.015
Unpaved Roads	Chemical Dust Suppresent (on a schedule achieving 90% control effiency)	0.046	0.028	39%	0.028

Table 8-2: Maximum 3-month Averaged Concentration

Modeled Source	Design Concentration, µg/m^3	Background Concentration, µg/m^3	Total Concentration, µg/m^3	NAAQS, µg/m^3
Asarco Smelter Facility	0.1198 [a]	0.0028	0.1226	0.15

a. Predicted to occur at (520655.09375 m, 3651578.00 m)

[13] Potential to Emit (PTE) values for the concentrate storage area, bedding area, and reverts operations were derived using the same calculation methods that were applied to calculate 2019 projected actuals. However, for PTE values, Asarco supplied more conservative throughput. Also the lead factors used for PTE calculations were based on mean lead assay values (source specific) plus two standard deveations.

8.2 Emision Limits

ADEQ modeled Asarco's requested permit limits (PTEs for the main stack and smelter fugitives) for 2019 to determine if they would provide attainment of the NAAQS. All measures necessary to meet these emission limits and to attain the NAAQS are included in this SIP and incorporated in rules R18-2-B1301 and R18-2-B1301.01 to ensure that even after the termination of the Consent Decree, the Hayden planning area will continue to attain.

In addition to the main stack emission limit, the rule also specifies a limit for process-related fugitives from the converters, flash furnace, and anode furnaces. These limits are the maximum allowable emissions that provide adequate protection of the NAAQS. They are measured in pounds per hour. The mainstack limit, as determined by the attainment model, is 0.683 lb/hr. While there is no numerical limit for smelting process fugitive emissions, control is achieved through requirements in the Operations and Maintenance Plan (O&M Plan), in addition to fugitive emissions studies conducted to verify operational limits that protect the NAAQS.

9.0 References

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National Stone, Sand and Gravel Association (NSSGA) 2004 Modeling Fugitive Dust Sources.

10.0 Appendices

10.1 Appendix A: ADOA Population Estimation Methodology

Shapefiles:

- Miami Pb nonattainment boundary shapefile
- Gila County 2010 block/population shapefile

Population Data Source:

- ADOA Internal Population Report

Method:

The ADOA methodology determines population from an internal population report that contains census population figures from 1990 through 2010 as well as ADOA interscensal population estimates and projections.

1. ADOA uses ArcGIS Geoprocessing tools to calculate the population of the incorporated places and unincorporated areas (including CDP and Non-CDP areas) within the Hayden NAA. ADOA used the following method to calculate the total population inside of the Hayden NAA:
    a. Calculate the area of the census block using the calculate "areas" tool
    b. Merge the two shapefiles using the "union" tool
    c. Determine the proportion of each census block within the Hayden NAA using the "calculate areas" tool.
    d. Calculate the area weighted population for each census block
    e. Aggregate the population for each incorporated and unincorporated place within the Hayden NAA using the Dissolve Tool
2. In step 1, ADOA derived their population for all incorporated places (or their respective parts), Census Designated Places (CDP) and unincorporated non-CDP areas in the Hayden area from the 2010 Census. ADOA used the following steps to estimate population figures for all areas of each year from 1990-2018:
    a. Apply the Constant-Share ratio of the population for each year for Gila and Pinal Counties
    b. Apply the ratio to each year for the total population in the CDPs and unincorporated non-CDPs in Hayden NAA
    c. Multiply the population of the CDPs and unincorporated non-CDPs in the Hayden NAA by the 2010 Census population ratio for each year

10.2 Appendix B: CD-ROM File Nomenclature

Due to their large size and cumbersome format, certain supporting documentation has been included in an enclosed CD-ROM. The contents of this CD-ROM are listed below:

- AERMAP.zip
- Main Stack Exit Conditions
- Structure Downwash Analysis.zip
- AERMET, Camera Hill.zip
- AERMET, Hayden Old Jail.zip
- Attainment Modeling.zip
- Model Performance Evaluation.zip

10.3 Appendix C: Performance Evaluation of the Hybrid Approach

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY TECHNICAL MEMORANDUM

HAYDEN PB MODEL PERFORMANCE EVALUATION

SEPTEMBER 26, 2016

The following memorandum presents a comparison of three modeling approaches available for the Arizona Department of Environmental Quality's (ADEQ) Lead (Pb) State Implementation Plan (SIP) attainment model. The three approaches differ in the meteorological (MET) conditions used, said approaches are: a hybrid approach using both the Camera Hill (CH) and Hayden Old Jail (HOJ) MET station, using only the HOJ station, and using only the CH station.

Background

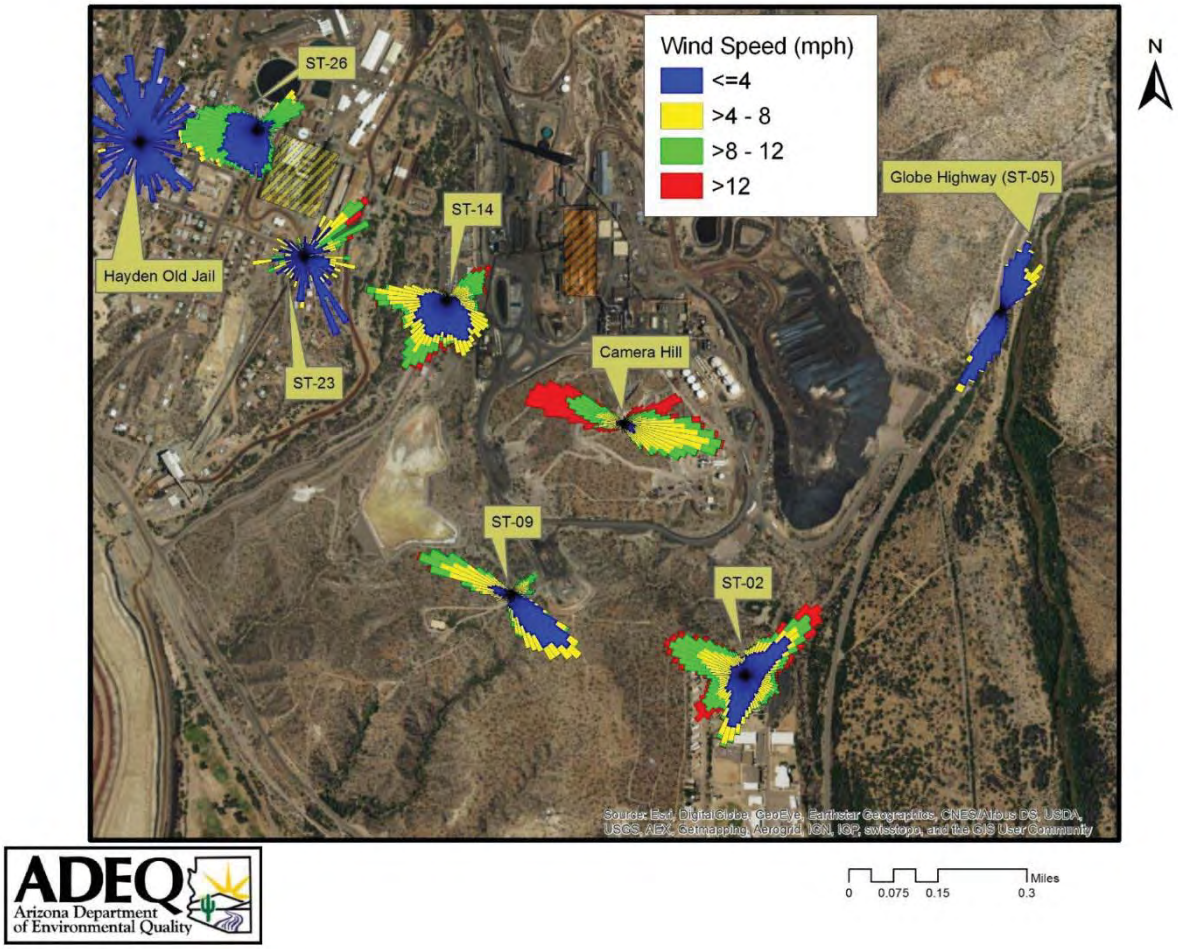
Situated in a low-lying portion of a valley, with mountains reaching over 4,000 feet to the north, east and southwest, Hayden is subject to a distinct mountain-valley diurnal wind pattern. Under stable atmospheric conditions, nighttime winds are typically from the southeast with speeds less than 10 miles per hour. These conditions cause air to pool in low-lying areas at night, causing pollutants within the air to settle in these areas. The up-slope air flows and convection that occur during the day increase dispersion out of the Hayden area. Under normal daytime conditions, surface winds in the Hayden area range from west-southwesterly to west-northwesterly as the atmosphere becomes less stable.

Two networks of meteorological (MET) monitors exist within Hayden. The first includes the Hayden Old Jail (HOJ) and Globe Highway monitor, which are maintained by ADEQ. The other network includes monitors installed as part of the Remedial Investigation & Feasibility Study (RI/FS) (indicated as ST- # and includes the Camera Hill monitor). These monitors are maintained by Haley & Aldrich, the firm retained by Asarco to conduct the RI/FS. The locations, wind speed, and wind directions seen at all the aforementioned monitors are shown in Figure 1.

Due to QA/QC and monitor siting requirements for attainment modeling, ADEQ considered only the Camera Hill and HOJ monitors for the following Model Performance Evaluation (MPE). As seen in Figure 1, these monitors vary significantly regarding both wind speed and direction. This is due to the elevation difference between the two monitors, which is roughly 300 feet, and the local topography.

In past Hayden SIP modeling efforts, Camera Hill was used because it best represented MET conditions seen at the main stack (Hayden SO_2 SIP). However, for the Hayden Pb SIP a large number of sources exist near ground level, because of this difference ADEQ has used a hybrid approach to model the Pb emissions and conducted the following MPE.

Figure 1 - Process Fugitive Sources



Approach

ADEQ started by collecting emissions data from the facility's annual emissions inventory and other related sources. The existing source categories represented in this study included:

- Point Sources
  - Main Stack (inner & annulus)
  - Anode Baghouse Stack
  - Roofline Fugitives (anode, converter, and flash furnace)
- Roads
  - Smelter (paved & unpaved)
  - Concentrator (paved & unpaved)

- Process Fugitives

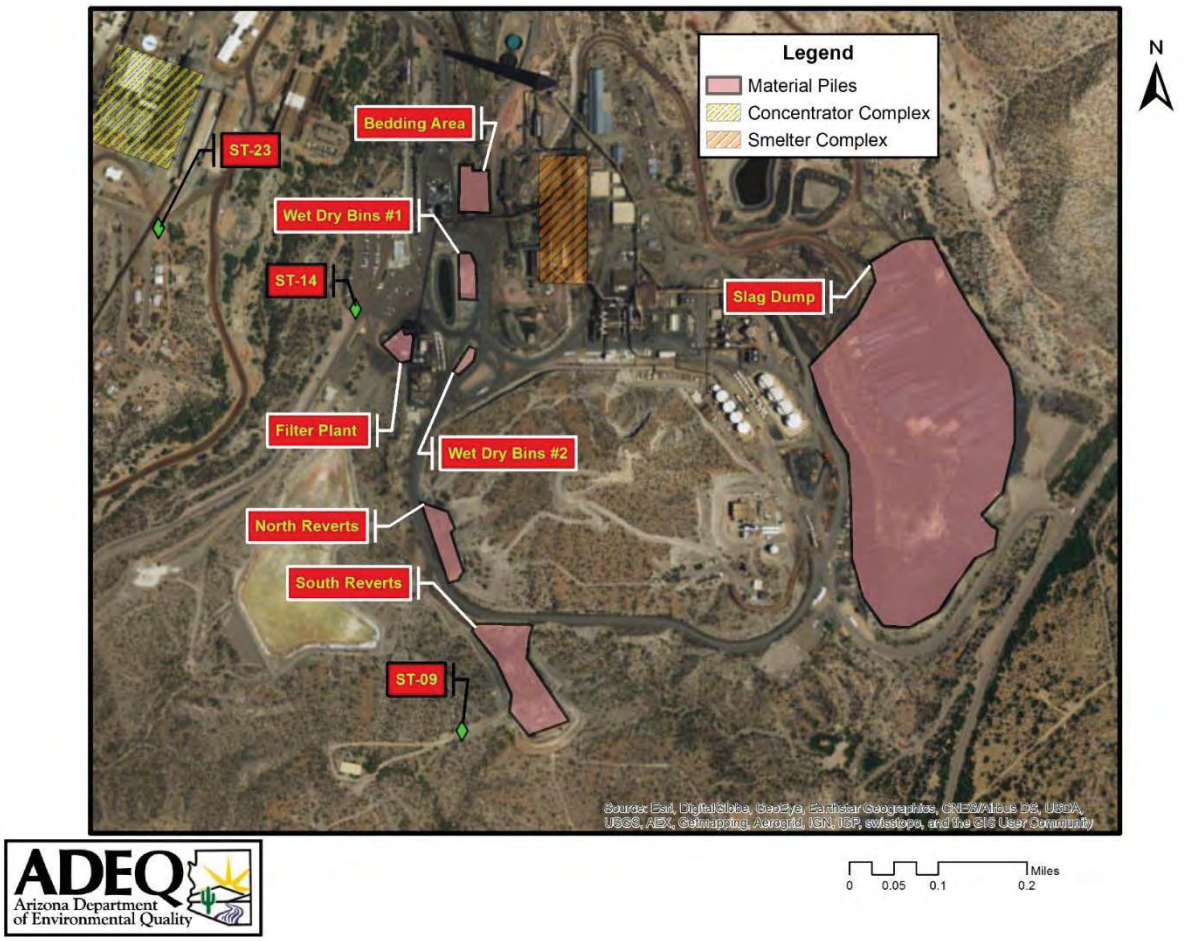
- Bedding Area
- Slag Dump
- Concentrate Storage Area
- South Reverts Storage Area
- North Reverts Storage Area
- Wet Dry Bins
- Filter Plant Area
- Smithco Crusher

The locations of the above process fugitive sources are shown in Figure 2. Sources missing from Figure 2 include the concentrate storage area and Smithco Crusher. These sources are located north of the area shown in said figure. Moreover, emission rates for all sources were the same between the three approaches.

For all three scenarios (hybrid, HOJ only, and CH only), one year of MET data was used. Specifically, the runs started on August 16, 2013 and ended on August 15, 2014. This period of time coincided with approximately 250 ambient air monitor samples collected at ST-02, 05, 14, 23, and 26 (see Figure 1 for location). As a note, all RI/FS monitors did not start collected Pb data until October 2013. In AERMOD, about 100 flagpole receptors were placed around each of these five monitor locations for model performance evaluation purposes.

The hybrid approach involved creating two identical AERMOD runs, however, emissions and the MET data used differed between the two runs. One run used the HOJ MET data and had roofline fugitive (flash furnace, converter, and anode furnace) and main stack emission rates be zero. The second run used CH MET data and had emission rates for process fugitives, roads, and slag dumping be zero. This effectively paired ground level sources with the HOJ monitor and elevated sources with the CH station.

Figure 2: Process Fugitive Sources



Results & Discussion

In order to obtain a general comparison of the three approaches, ADEQ - Technical Analysis Unit (TAU) staff started by calculating the model to monitor concentration ratio (R) for each month at all five stations (Equation 1).

$$R = \frac{Pb_{model}}{Pb_{observed}} \qquad e.q.1$$

This was done by averaging the modeled concentrations of roughly 150 flagpole receptors, per monitor, for each day the RI/FS monitors collected a sample. This gave an average modeled concentration for every sample day (at all monitors). A sample calculation is shown below where the modeled daily concentration 0.0973 µg/m^3.

$$\mathbf{0.0973} = \frac{1}{N_F}\left(0.0965 + 0.0924 + \cdots + c_n\right)$$

c_n = nth modeled concentration for a given flagpole receptor

N_F = number of flagpole receptors at a given monitor

After determining an R value for all sample days at all monitors, TAU determined the performance of each model approach. This was done by specifying three categories to compare calculated R values to. These categories were under predicted, predicted, and over predicted. R values between 0 and 0.8 were defined as under predicted, between 0.8 and 1.2 were predicted, and ratios greater than 1.2 were considered over predicted. The results of this analysis are shown below.

Table 1 - Hybrid Approach Prediction Analysis

Hybrid Approach Sample Prediction				
Monitor	**Under**	**Predicted**	**Over**	**Station Total**
ST-02	7	1	44	52
ST-05	19	4	19	42
ST-14	22	9	17	48
ST-23	18	8	23	49
ST-26	10	17	24	51
Total	**76**	**39**	**127**	**242**
Monitor	**Under**	**Predicted or Over**	**Predicted**	**Over**
ST-02	13%	87%	2%	85%
ST-05	45%	55%	10%	45%
ST-14	46%	54%	19%	35%
ST-23	37%	63%	16%	47%
ST-26	20%	80%	33%	47%
Model Performance	**31%**	**69%**	**16%**	**52%**

Table 2- Hayden Old Jail Prediction Analysis

Hayden Old Jail Sample Prediction				
Monitor	**Under**	**Predicted**	**Over**	**Total**
ST-02	5	0	44	49
ST-05	20	5	17	42
ST-14	24	8	15	47
ST-23	25	7	17	49
ST-26	23	6	22	51
Total	**97**	**26**	**115**	**238**
Monitor	**Under**	**Predicted or Over**	**Predicted**	**Over**
ST-02	10%	90%	0%	90%
ST-05	48%	52%	12%	40%
ST-14	51%	49%	17%	32%
ST-23	51%	49%	14%	35%
ST-26	45%	55%	12%	43%
Model Performance	**41%**	**59%**	**11%**	**48%**

Table 3 - Camera Hill Prediction Analysis

Camera Hill Sample Prediction				
Monitor	**Under**	**Predicted**	**Over**	**Station Total**
ST-02	51	0	1	52
ST-05	41	1	0	42
ST-14	40	5	3	48
ST-23	37	3	9	49
ST-26	39	7	5	51
Total	**208**	**16**	**18**	**242**
Monitor	**Under**	**Predicted or Over**	**Predicted**	**Over**
ST-02	98%	2%	0%	2%
ST-05	98%	2%	2%	0%
ST-14	83%	17%	10%	6%
ST-23	76%	24%	6%	18%
ST-26	76%	24%	14%	10%
Model Performance	**86%**	**14%**	**7%**	**7%**

As can be seen in the tables above, the hybrid approach had the lowest percent of sample days that were under predicted at 31%. The modeling approach which resulted in the most under prediction was the CH approach with under predicted sample days at 86%.

When comparing the hybrid and HOJ approaches the largest difference is seen at the monitors west of the smelter. These monitors are ST-14, 23, and 26. The model performance at these three monitors is significant because the highest ambient air concentrations are seen at said monitors.

The biggest discrepancy involved the ST-26 monitor. Using the hybrid approach 17 sample days fell within the predicted range, while only 6 samples were accurately predicted using the HOJ approach. Moreover, aggregating the results from these three monitors gives: 50 samples under predicted using the hybrid approach, while 72 samples were under predicted using HOJ; 98 samples were either accurately predicted or over predicted using the hybrid approach, while 75 samples fell into the same category using HOJ.

The monitor of most interest to ADEQ is ST-23. This is because the location of ST-23 is adjacent to the SLAMS monitor measuring the highest impact (Hillcrest). Using the hybrid approach ST-23 predicted or over predicted 63% (16% predicted and 47% over predicted) of sample days. Using the HOJ approach 49% (14% predicted and 35% over predicted) of sample days were predicted or over predicted. Given this, TAU is most comfortable moving forward with the attainment demonstration with the hybrid approach, due to the margin of safety provided.

TAU theorizes the hybrid approach shows better performance because of the wind pattern discrepancy between the HOJ and CH monitors. As seen in Figure 1, wind directions observed at HOJ are not defined and sporadic. Conversely, wind directions observed at CH follow a defined east west pattern. Specifically, the easterly winds align with the CERCLA monitors resulting in better prediction in terms of roofline

fugitive sources. While roofline fugitives in the HOJ model are not being directed towards the monitors resulting in lower prediction/over prediction results seen in table 2.

In addition to model to monitor ratios, quantile-quantile plots (q-q plots) were created (Figures 3 – 17). In these figures the orange line represents a perfect fit between the model and monitor. Data points above the line correspond with under prediction by the model, while data points under the line represent over prediction.

In the figures below the CH approach consistently under predicts at monitors east of the smelter. However, monitors west of the smelter predict reasonably well (although not as well as the hybrid and HOJ approaches). The exception is the higher sample days at ST-14. These western monitor predictions further reinforce what TAU theorized in the previous paragraphs regarding roofline fugitive behavior.

To better understand how the viable approaches (hybrid and HOJ) performed near the NAAQS concentration of .15 $\mu g/m^3$ TAU staff narrowed the Q-Q plot scales, as seen in Figures 18 - 27. For the eastern monitors (ST-02 and 05) there is little difference between predicted values at this scale. However, there are variations between the two approaches at the western monitors. The Hybrid approach over predicts at ST-26 and ST-23, while at ST-14 the HOJ over predicts.

Again, given the SLAMS monitor showing the highest exceedance of the NAAQS is located adjacent to ST-23, and the hybrid approach gives slightly more conservative predictions in this area. In order to build a margin of safety in the attainment model, TAU is most comfortable moving forward using the hybrid approach.

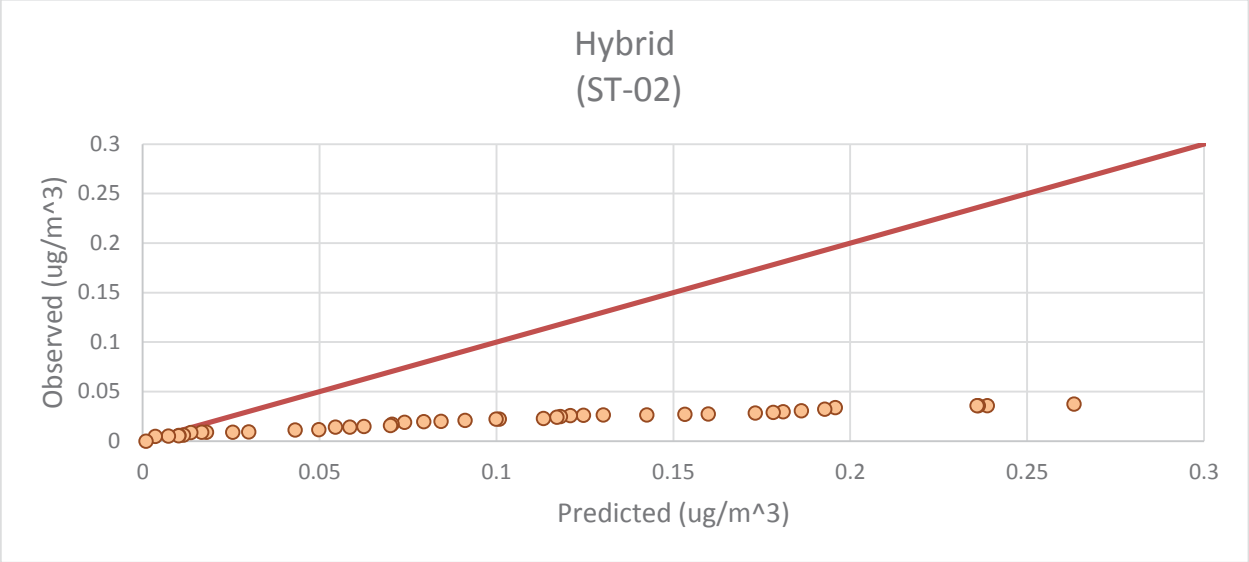


Figure 3 - Q-Q Plot Hybrid ST-02

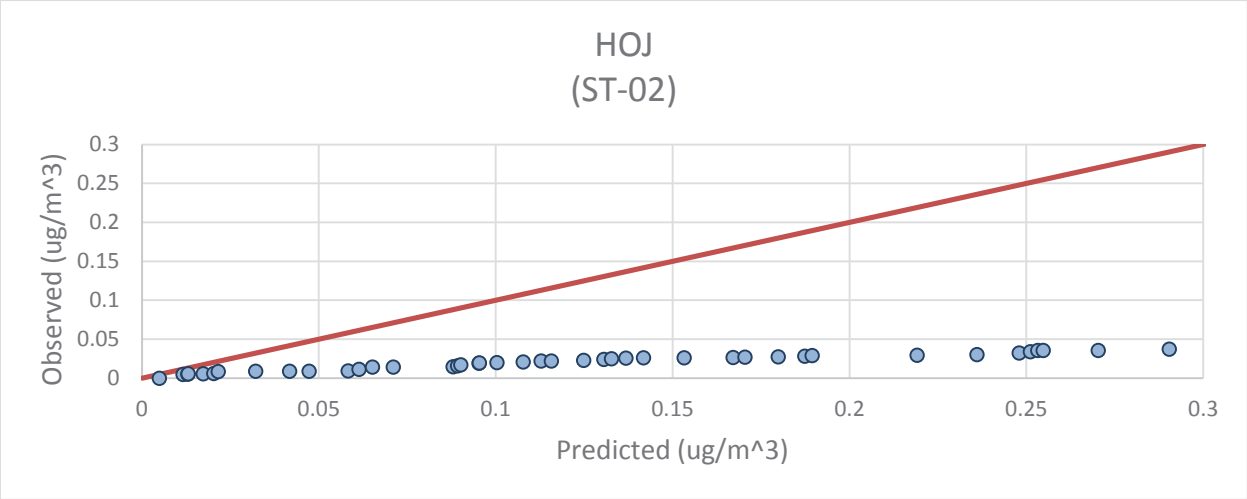


Figure 4 - Q-Q Plot HOJ ST-02

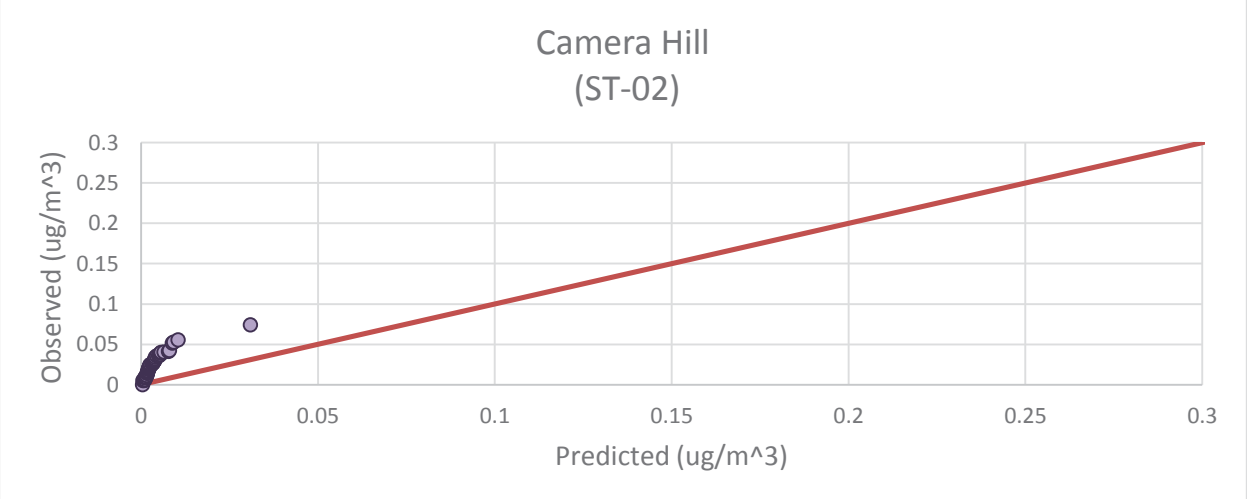


Figure 5 - Q-Q Plot CH ST-02

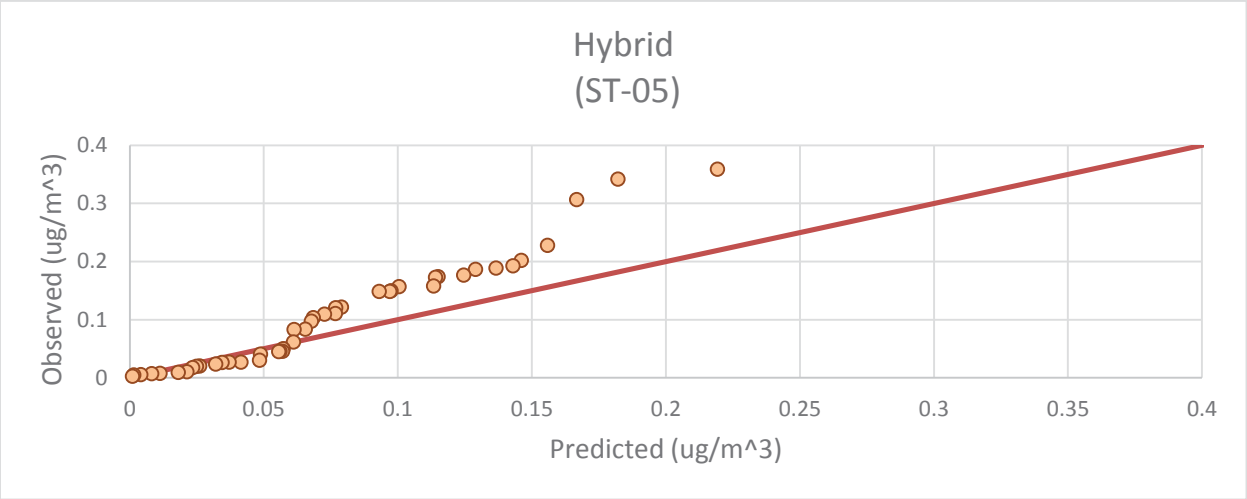


Figure 6 - Q-Q Plot Hybrid ST-05

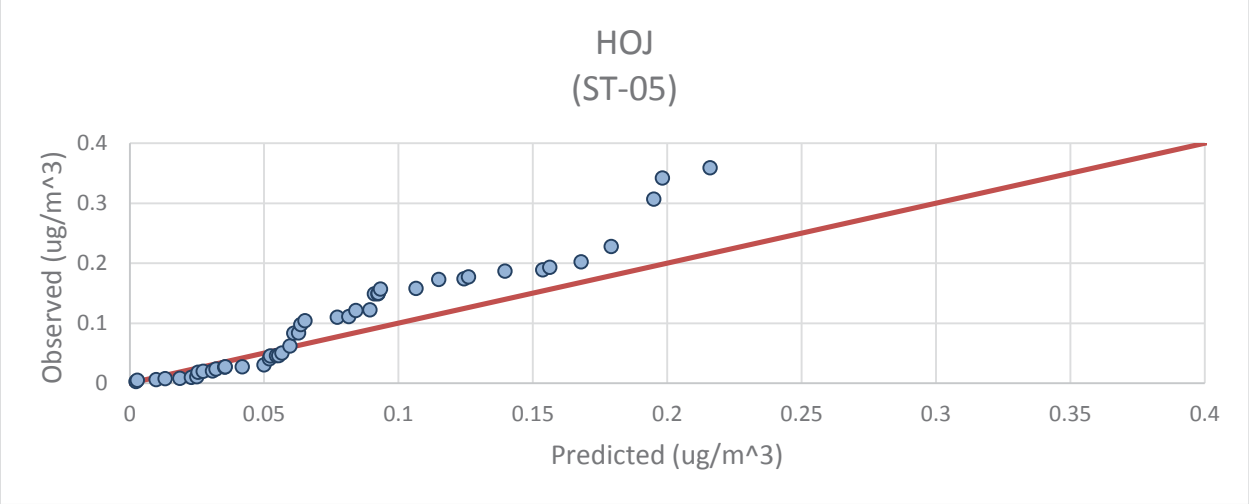


Figure 7 - Q-Q Plot HOJ ST-05

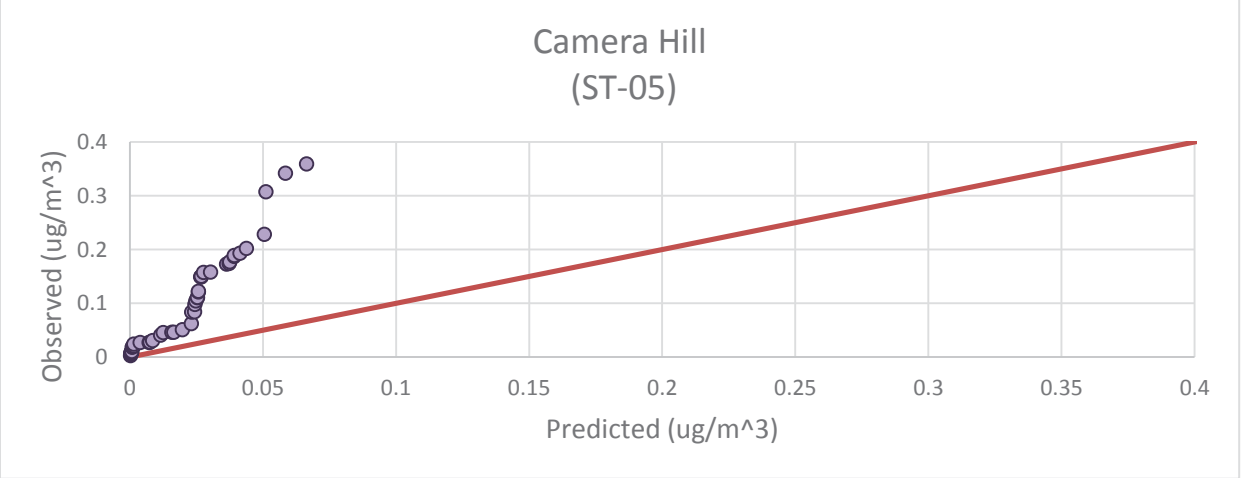


Figure 8 - Q-Q Plot CH ST-05

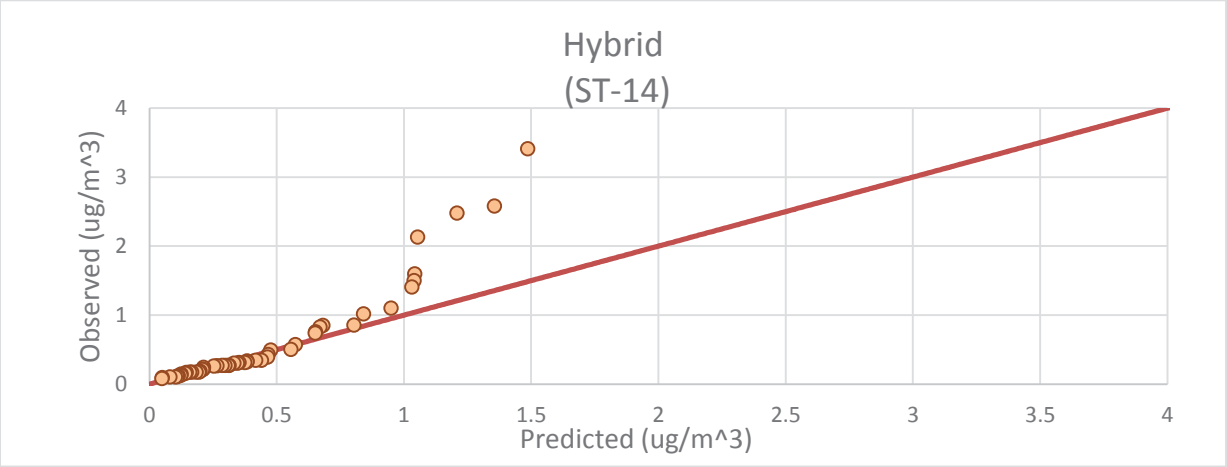


Figure 9 - Q-Q Plot Hybrid ST-14

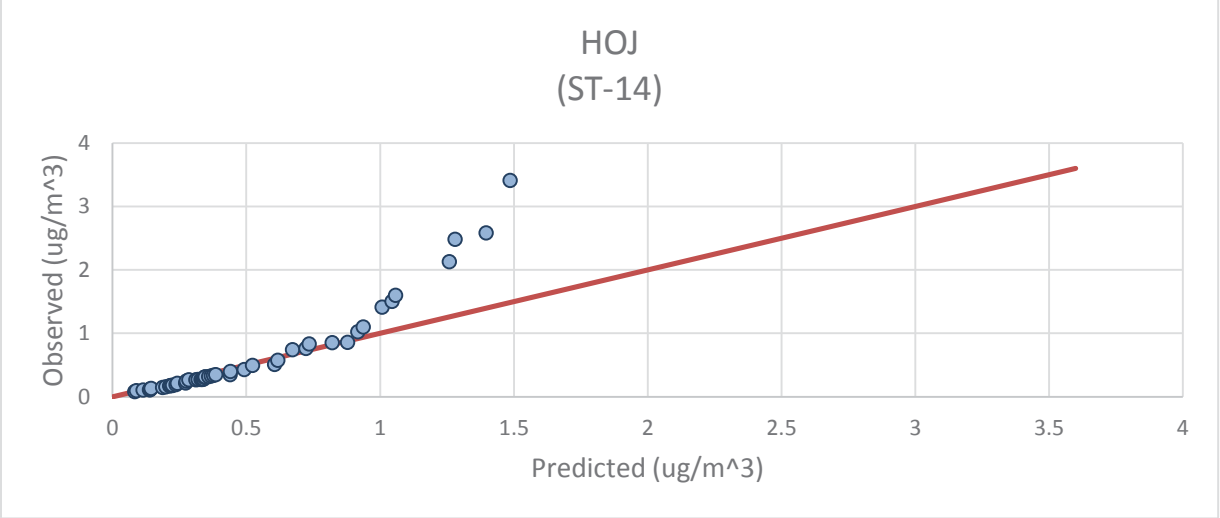


Figure 10 - Q-Q Plot HOJ ST-14

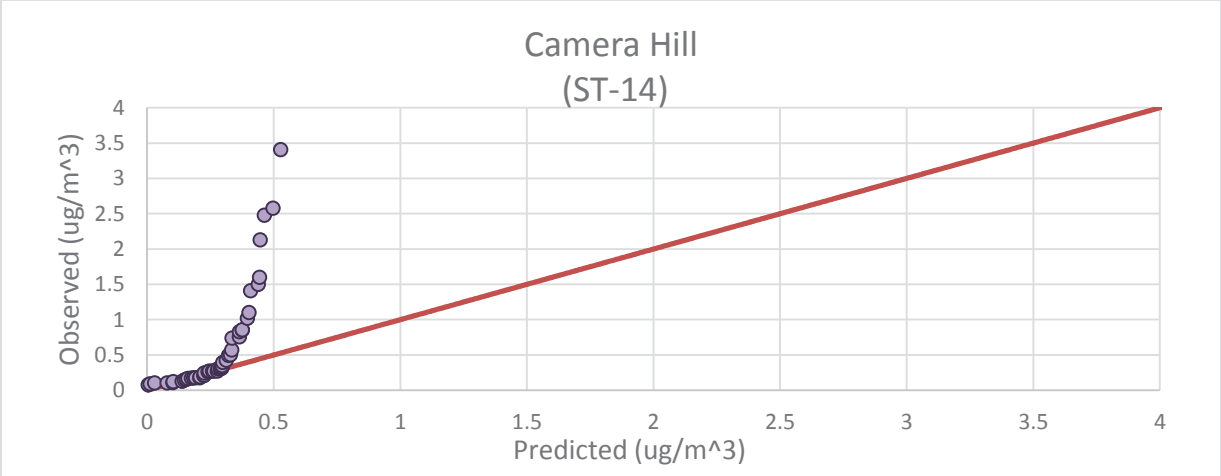


Figure 11 - Q-Q Plot CH ST-14

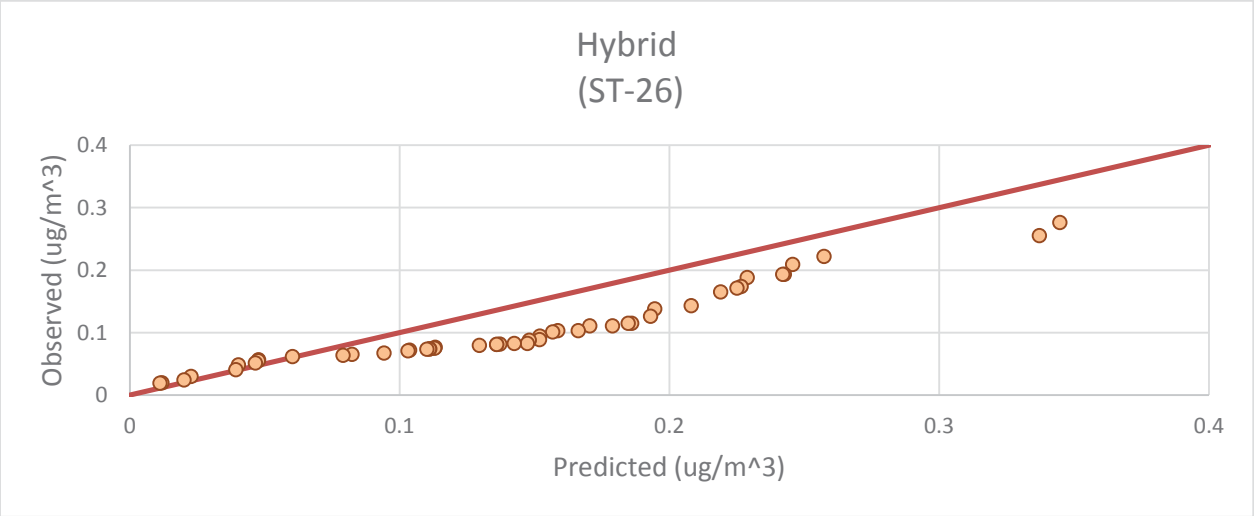


Figure 12 - Q-Q Plot Hybrid ST-26

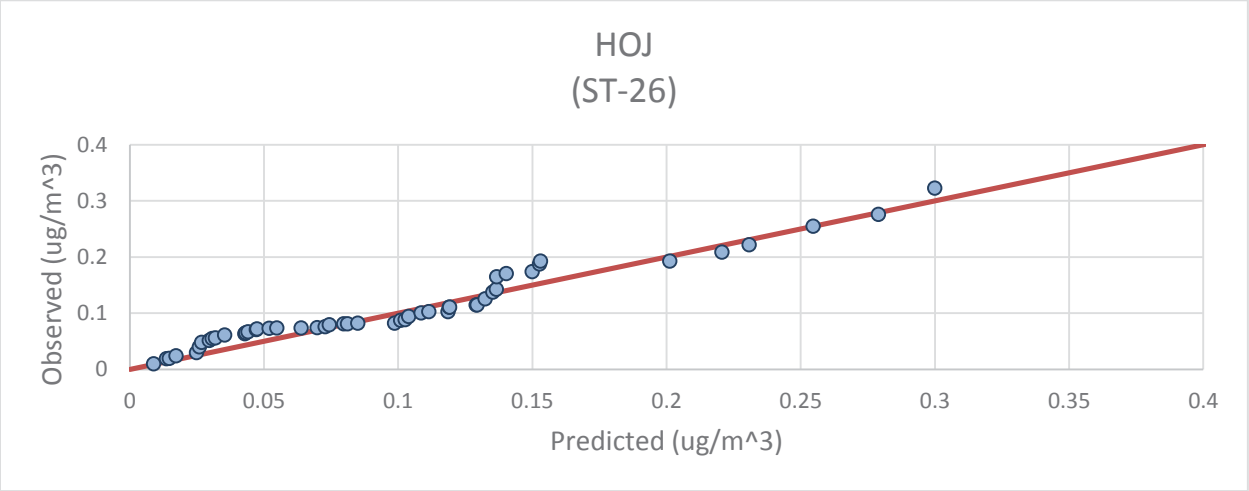


Figure 13 - Q-Q Plot HOJ ST-26

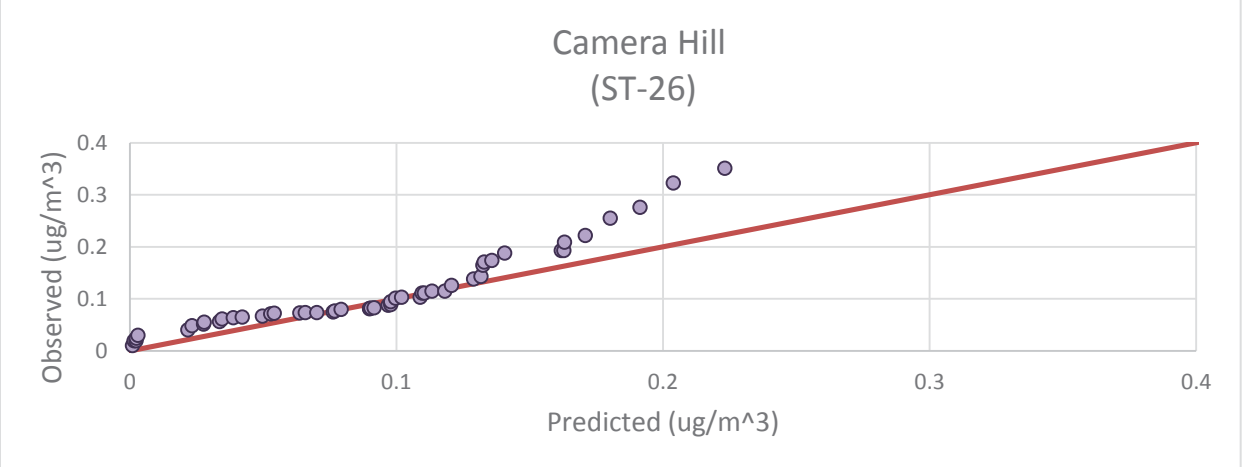


Figure 14 - Q-Q Plot CH ST-26

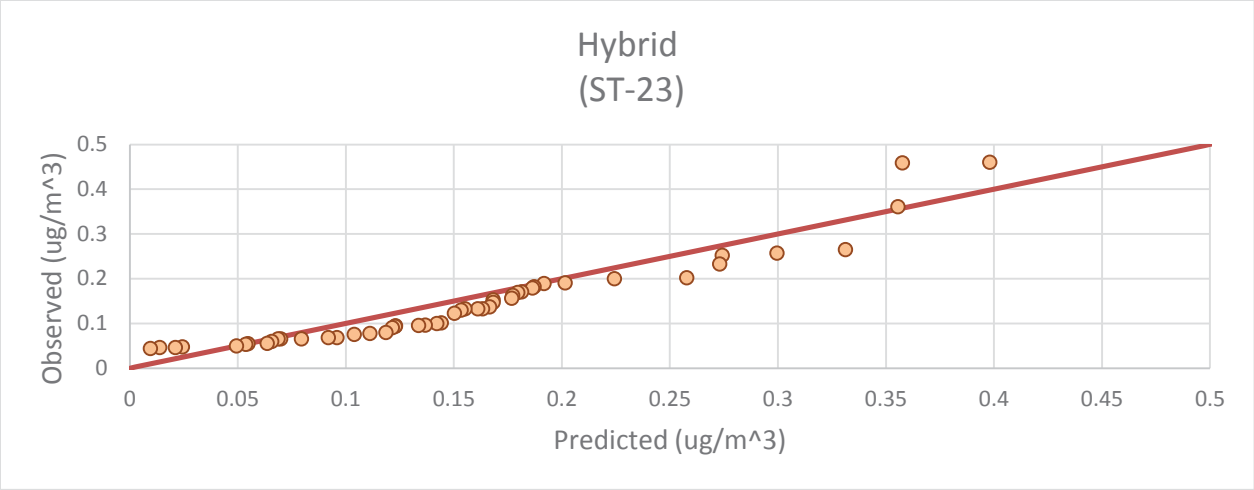


Figure 15 - Q-Q Plot Hybrid ST-23

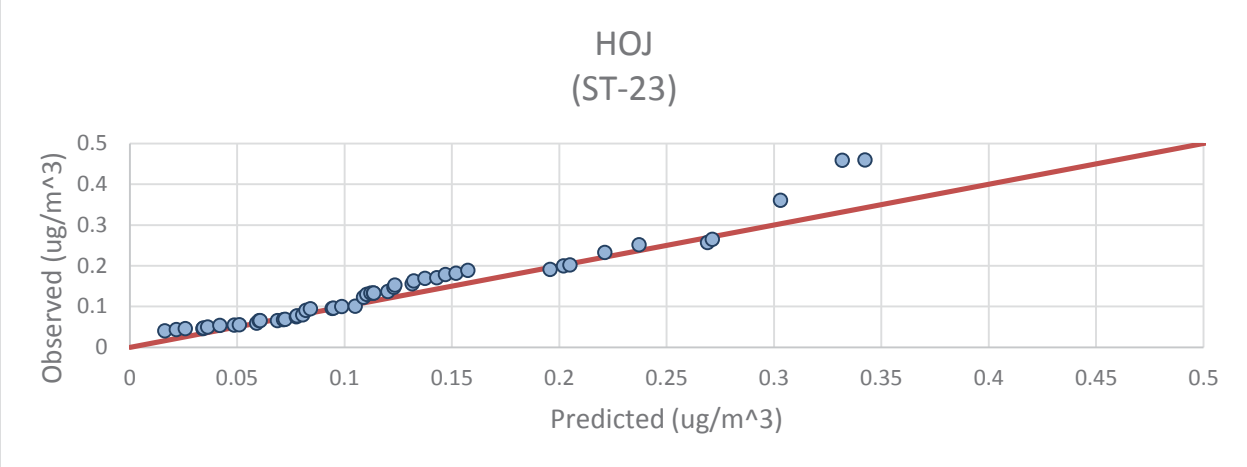


Figure 16 - Q-Q Plot HOJ ST-23

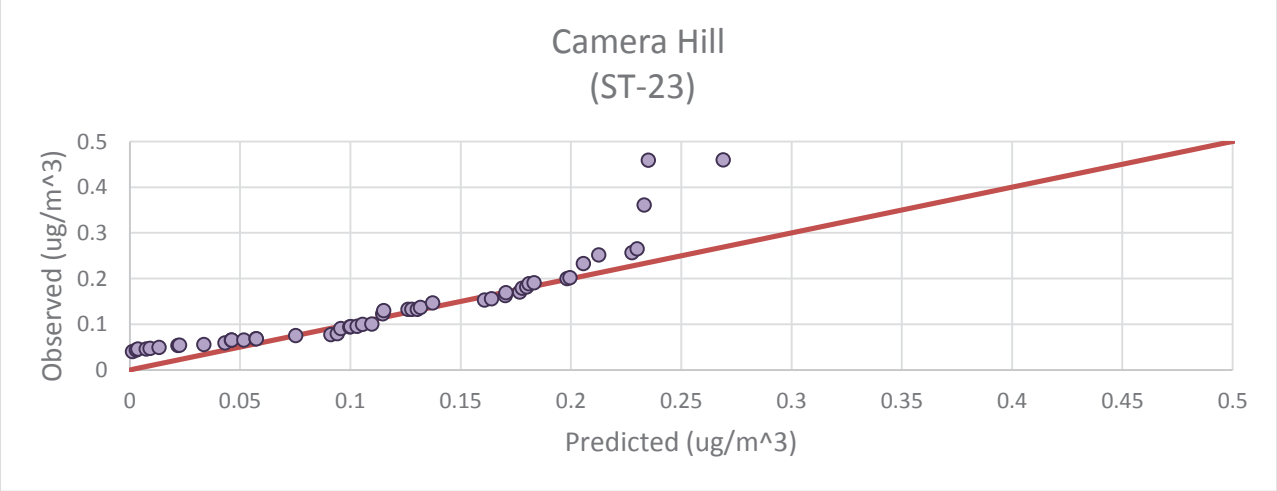


Figure 17 - Q-Q Plot CH ST-23

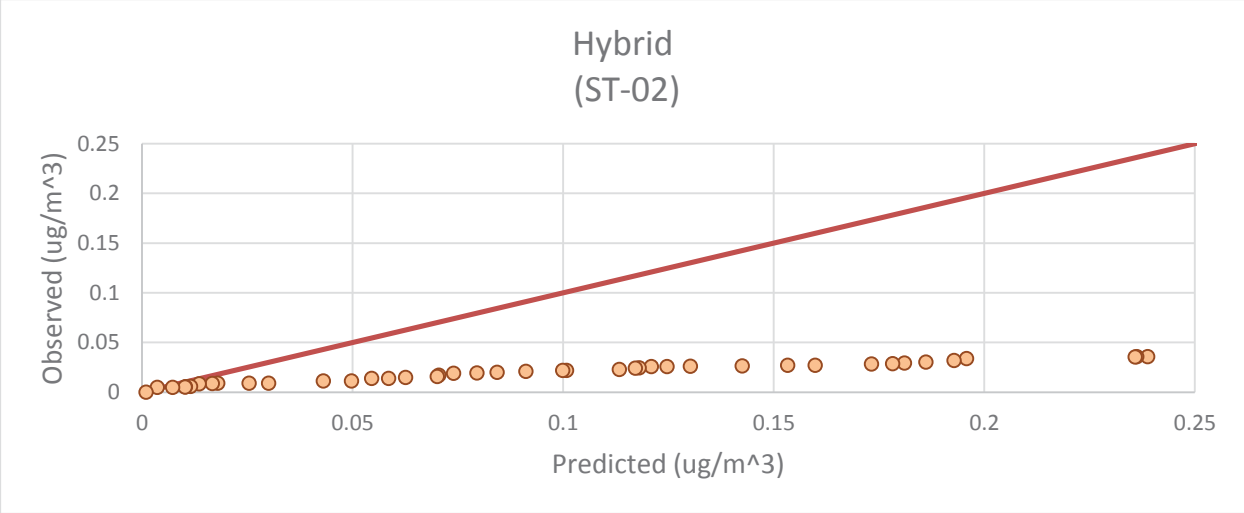


Figure 18 - Q-Q Plot Hybrid ST-02 (NAAQS Scale)

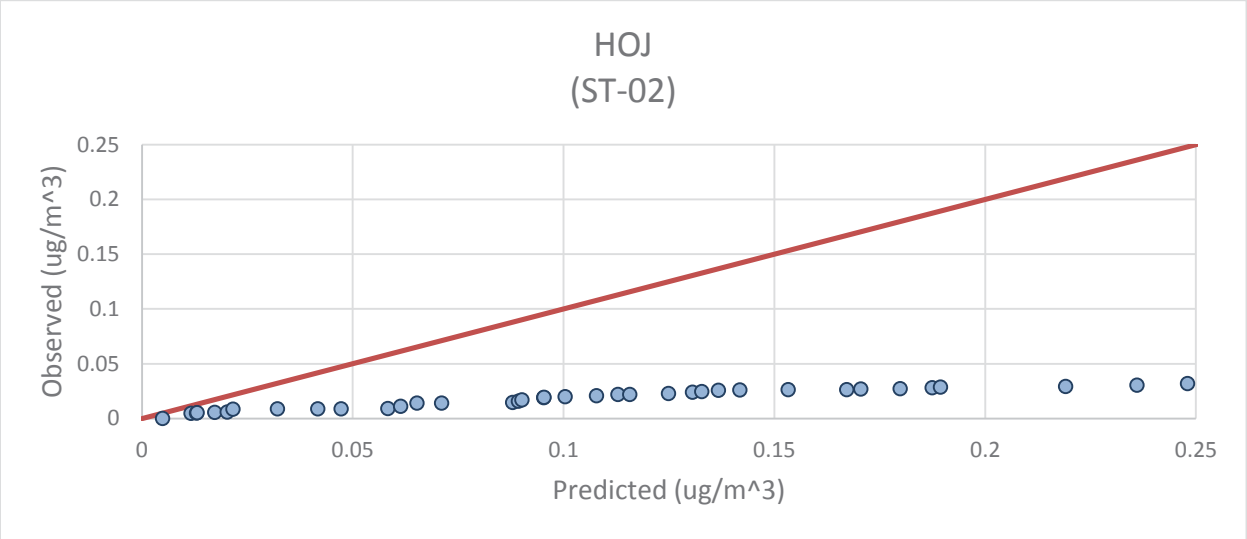


Figure 19 - Q-Q Plot HOJ ST-02 (NAAQS Scale)

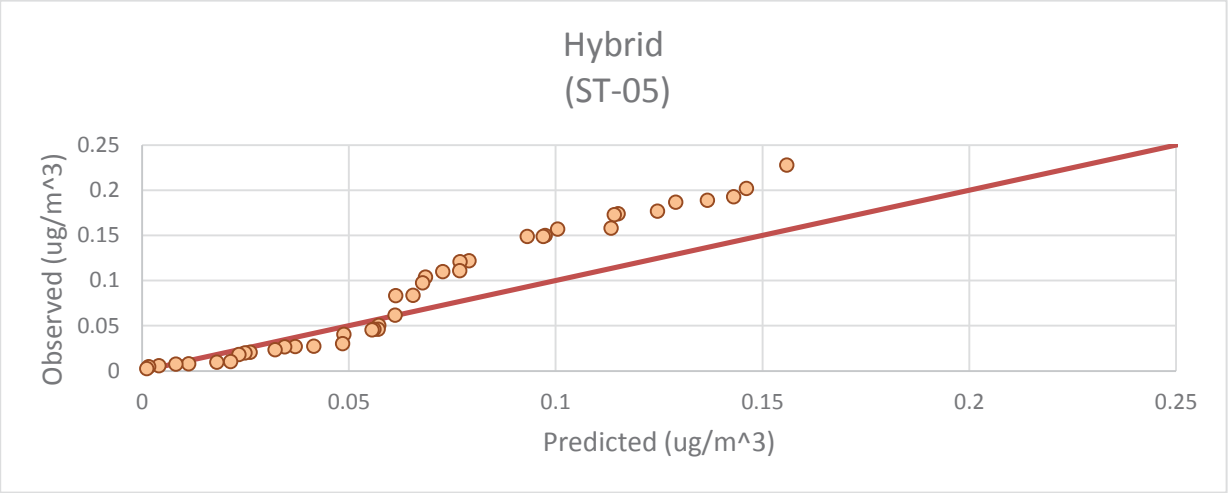


Figure 20 - Q-Q Plot Hybrid ST-05 (NAAQS Scale)

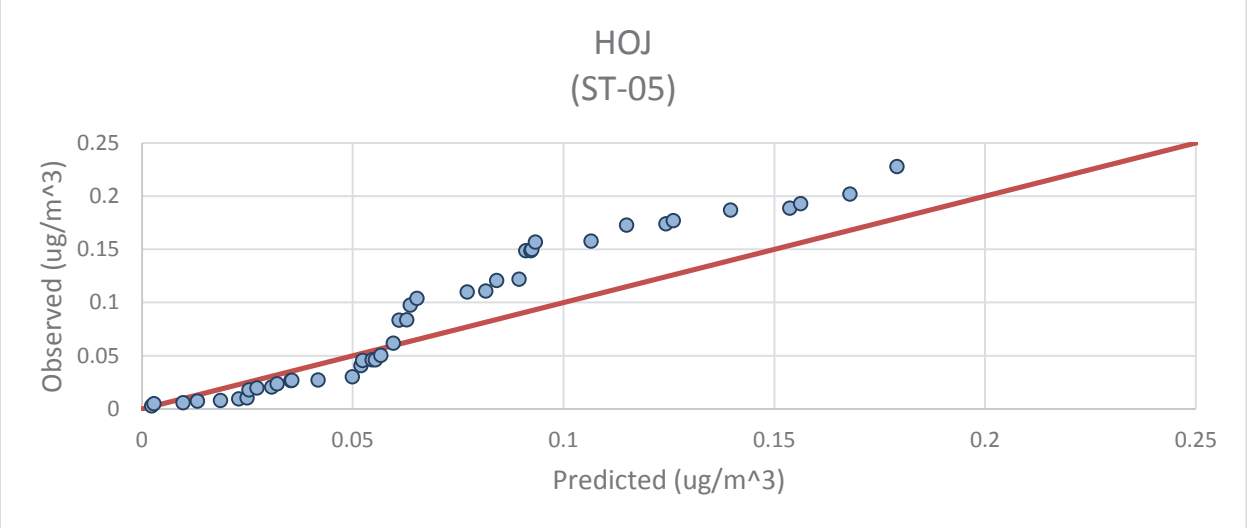


Figure 21 - Q-Q Plot HOJ ST-05 (NAAQS Scale)

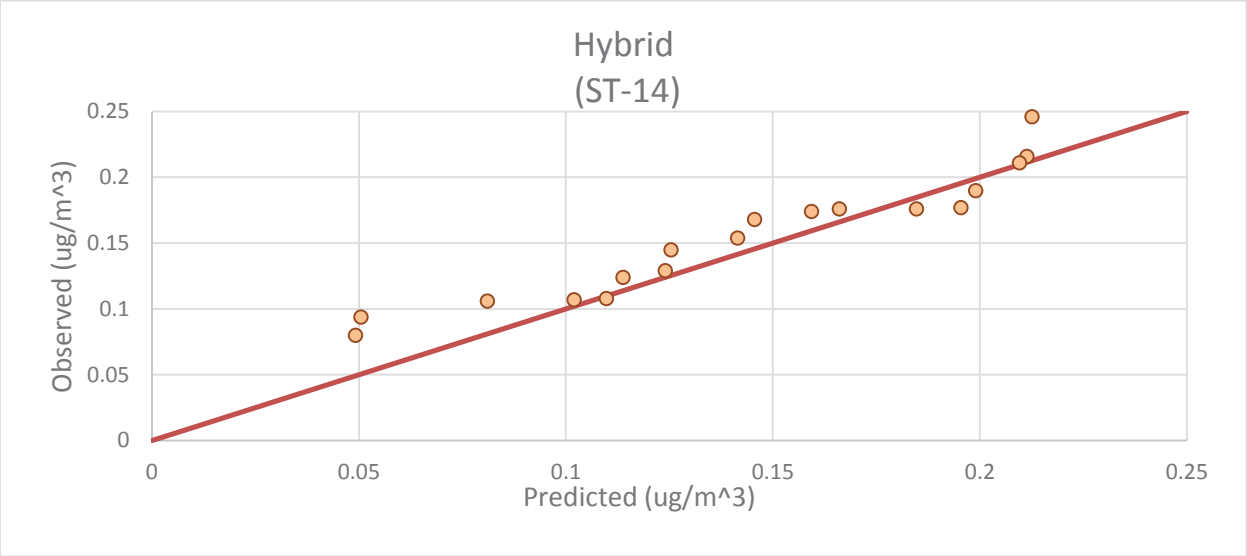


Figure 22 - Q-Q Plot Hybrid ST-14 (NAAQS Scale)

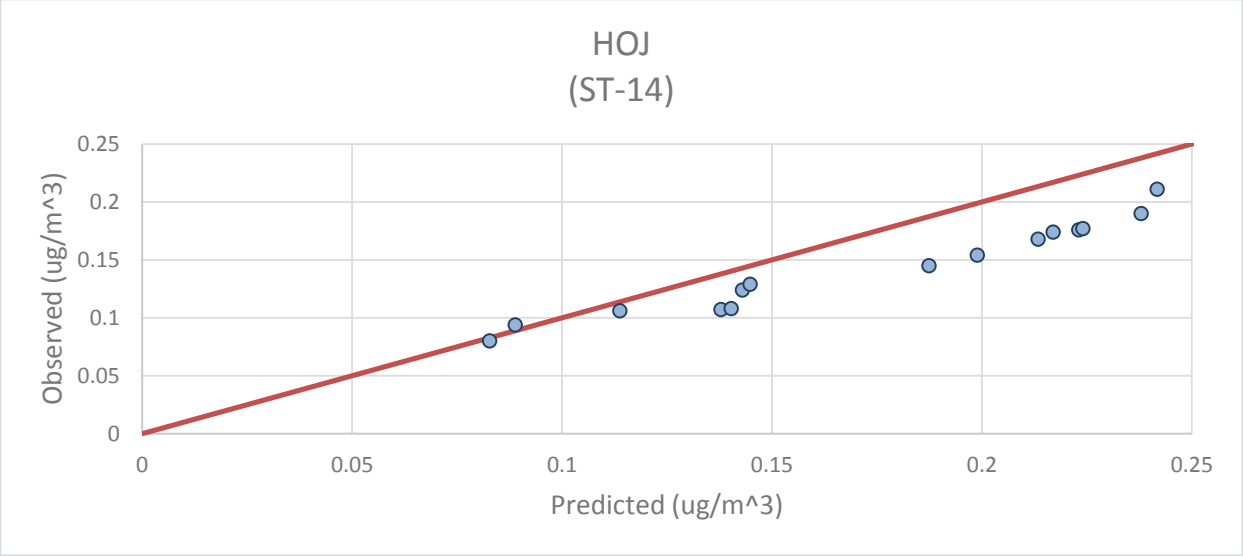


Figure 23 - Q-Q Plot HOJ ST-14 (NAAQS Scale)

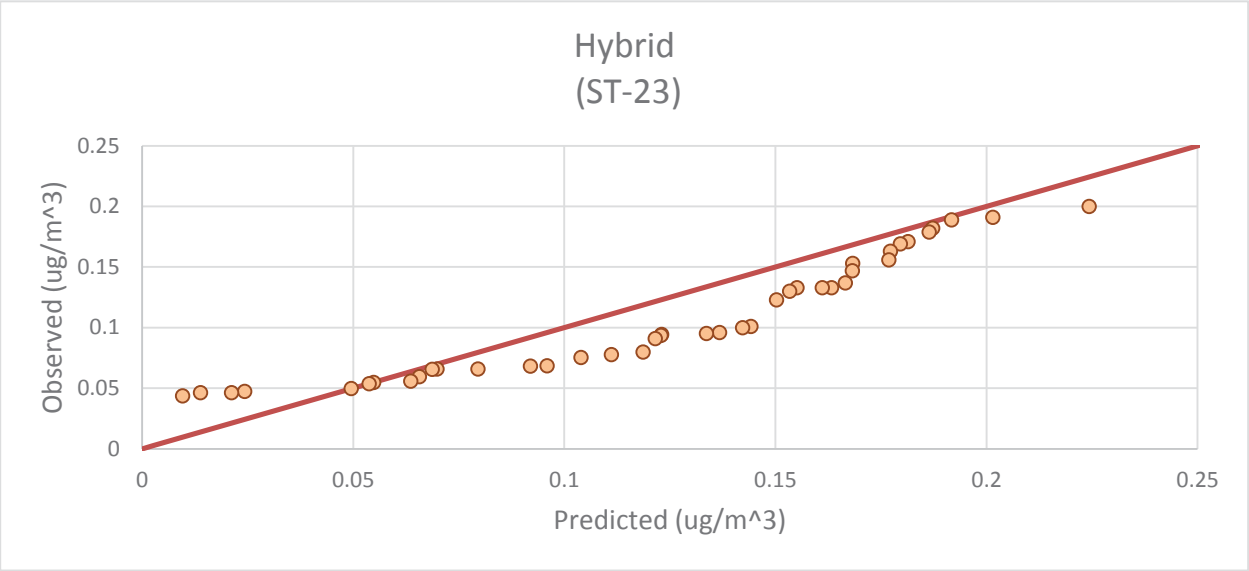


Figure 24 - Q-Q Plot Hybrid ST-23 (NAAQS Scale)

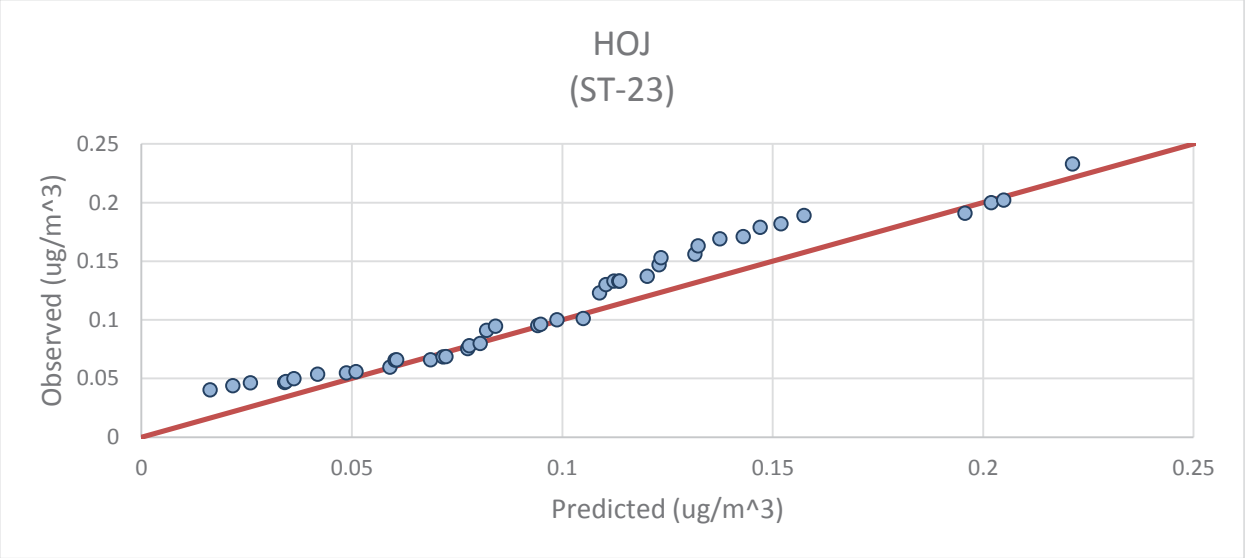


Figure 25 - Q-Q Plot HOJ ST-23 (NAAQS Scale)

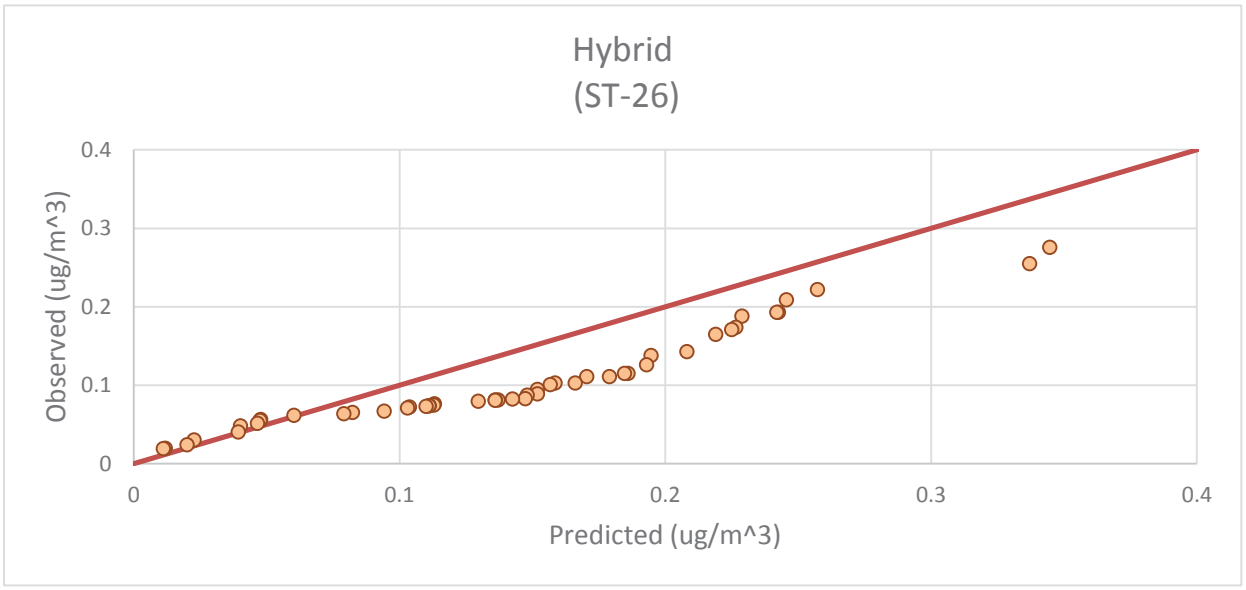


Figure 26 - Q-Q Plot Hybrid ST-26 (NAAQS Scale)

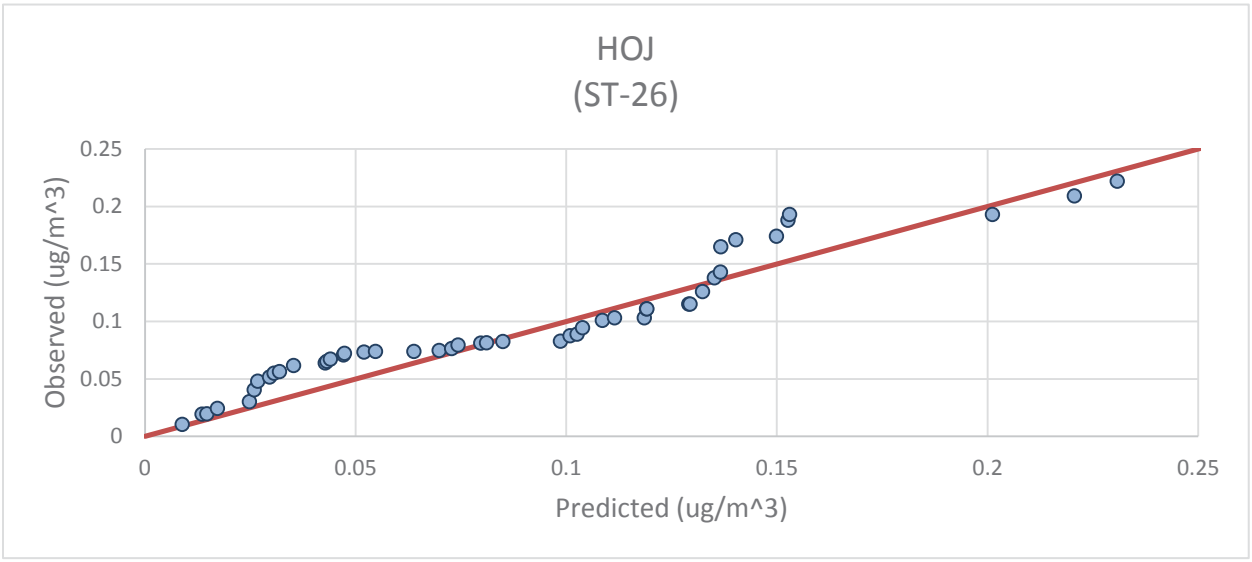


Figure 27 - Q-Q Plot HOJ ST-26 (NAAQS Scale)

10.4 Appendix D: Calculation of Source Parameters

Main Stack Source Parameters

Stack Center	
Flow (scfm)	98,500
Temp (F)	400
Diameter (ft)	17.0
Area (ft2)	227
Stack Annulus	
Flow (scfm)	925,000
Temp (F)	139
Diameter (ft)	30.3
Area (ft2)	448
For Combined Annulus and Center	
Equivalent Diameter (ft)	29.3
Flow Rated-Weighted Temperature (F)	164
Total Flow (acfm)	1,388,663
Equivalent Velocity (ft/sec)	34.3

Volume Source Characteristics

Flash Furnace

Roof Lines (Ridge Vents)

Assumptions
Initial lateral Dimesion (Yo): Line Source Represented by Adjacent Volume Sources
Initial Vertical Dimension (Zo): Elevated Sources (h > 0) on or Adjacent to a Building

Length of side:	1.5 m
Building height:	42.67 m
Sigma Y:	0.70 m
Sigma Z:	19.85 m
Release Height:	43.67m

Penthouse

Assumptions
Initial lateral dimension (Yo): Line Source Represented by Adjacent Volume Sources
Initial Vertical Dimension (Zo): Elevated Sources (h > 0) on or Adjacent to a Building

Length of side:	16 m
Building height:	44.5 m
Sigma Y:	7.44
m Sigma Z:	20.70 m
Release Height:	43.59 m

Volume Source Characteristics

Converter Aisle

Assumptions

Initial lateral dimension (Yo): Line Source Represented by Adjacent Volume Sources

Initial vertical dimension (Zo): Elevated Sources (h>0) on or adjacent to a building

Length of side:	1.5
m Building height, Monitor N:	24.38
m Building height, Monitor S:	22.86
	m
Sigma Y:	0.70
m Sigma Z, Monitor N:	11.34
m Sigma Z, Monitor S:	10.63
	m
Release Height, Monitor N:	31.35 m
Release Height, Monitor S:	25.40 m

Anode Furnace

Assumptions

Initial lateral dimension (Yo): Line Source Represented by Adjacent Volume Sources

Initial vertical dimension (Zo): Elevated Sources (h>0) on or adjacent to a building

Length of side:	1.5
m Building height, Monitor N:	24.38
m Building height, Monitor S:	22.86
	m
Sigma Y:	0.70
m Sigma Z, Monitor N:	11.34
	m
Release Height, Monitor N:	31.35 m

Slag Pouring Heat Release Calculations

Assumptions/Inputs

Density of slag (ρ)	132	lb/ft^3
Surface area of poured slag (A)	1500	ft^2
Volume of poured slag (V)	600	ft^3
Temp of slag at start of pour (Ti)	2120	°F
Temp of slag at end of pour (Tf)	1760	°F
Average temp of slag during pour (T)	2400	°R
Specific heat of slag (c_p)	0.239	Btu/lb-^oF
Time for slag to crust (ΔT)	0.025	hr
Stefan/Boltzmann constant (σ)	1.713E-09	$Btu/ft^2\text{-}hr\text{-}^oR^4$

Radiative Heat Loss Calculations

Assuming that slag radiates as a black body and that the radiative heat loss can be defined by the Stefan Boltzman Law, as follows:

Radiative heat loss (QR) =	$\sigma T^4 A \Delta T$ Btu
Radiative heat loss (QR) =	2.13E+06 Btu

Calculation of Total Heat Release Rate

Total heat release (QT) =	$\rho V c_p (Ti-Tf)$ Btu
Total heat release (QT) =	6.81E+06 Btu

Calculation of Net Heat Release Rate

Net heat release after radiative heat loss (QN) =	QT - QR
Btu Net heat release after radiative heat loss (QN) =	4.68E+06 Btu
Net heat release after radiative heat loss (QN) =	1.18E+09 cal
Net heat release rate (QN/sec) =	1.31E+07 cal/sec

Slag Pouring Equivalent Stack Parameters Calculations

Assumptions/Inputs

Ambient temperature (T_a)	308 °K	Average
Temp of slag and pour gases during pour (T)	1333 °K	Acceleration of
gravity (g)	9.807 m/s	Effective diameter of the
poured slag area (D)	13.3 m	
Net heat release rate (QN/sec)	1.31E+07 cal/sec	

Methodology

According to Briggs (1969), the plume rise of a non-stack release can be estimated by calculating equivalent stack parameters when the buoyancy flux is known.
The buoyancy flux can be described by the following equations"

EQN1: F= $(gvd^2)/4[(T\text{-}a)/T]$

EQN2: F= 3.7×10^{-5} Q_N/sec

where

v = the effective upward velocity of the release (m/s)

Setting Equations 1 and 2 equal:

Effective upward velocity (v) = $(3.7 \times 10^{-5})\ (4)\ (T)\ (QN)\ /\ (gd^2(T\text{-}T_a))$

Effective upward velocity (v) = 1.45

10.5 Appendix E: ADEQ TSD on Technical Review and Evaluation of the Crushing and Screening General Permit

ADEQ Arizona Department of Environmental Quality
Janice K. Brewer, Governor
Henry R. Darwin, Director

TECHNICAL SUPPORT DOCUMENT

TECHNICAL REVIEW AND EVALUATION OF THE CRUSHING AND SCREENING GENERAL PERMIT

I. INTRODUCTION

The Crushing and Screening General Permit is a permit for a facility class (crushing and screening plants) that contains 10 or more facilities that are similar in nature, have substantially similar emissions, and would be subject to the same or substantially similar requirements. The general permit will last for 5 years from the date of its issuance. Equipment that is covered under the general permit will be required to have an "Authorization to Operate" (ATO). The ATO will identify the piece of equipment by having the manufacture, date of manufacture, maximum capacity, and serial number and /or equipment number along with the hours of operation limitation depending on the equipment and the county it is operating in. This general permit allows for portable crushing and screening plants to move to other locations statewide. This general permit also allows the Permittee to co-locate a concrete batch plant with the crushing and screening plant.

The Permittee that applies for an ATO under the general permit shall pay to the Department a flat permit processing fee of $500 with the submittal of the permit application. The Permittee must also pay, for each calendar year, the applicable administrative or inspection fees as described in the Arizona Administrative Code Title 18, Chapter 2, Article 5, section 511 (A.A.C. R18-2-511).

Due the fact that this is a statewide general permit there is the potential that the Permittee may operate in a PM_{10} or $PM_{2.5}$ non-attainment area in the state of Arizona. The $PM_{10/2.5}$ non-attainment areas for purposes of this permit are listed in Table 1 below:

Table 1: Non-Attainment Area Summary

County	Townships	Section Where Visual Representation Is Shown
Maricopa	All	N/A
Pinal County and the Phoenix Planning Area	T1S, R8E, T2S, R8E, T3S, R7E, T3S, R8E, T4S, R8E, (excluding all lands within the Gila River Indian Community). T5S, R5E – R8E (excluding all lands within the Gila River Indian Community). T6S, R3E – R8E, T7S, R3E – R8E Sections 1-6. Phoenix Planning Area: T1N, R8E.	Appendix A
Santa Cruz	The portions of the following Townships which are within the State of Arizona and lie east of 111 degrees longitude:T23S-R13E, T23S-R14E, T24S-R13E and T24S-R14E	Appendix B

County	Townships	Section Where Visual Representation Is Shown
Gila and Pinal	T1S-R13E (sections 7–36); T1S-R14E (sections 25–36);T2S-R13E; T2S-R14E; T2S-R15E; T3S-R13E; T3S-R14E; T3S-R15E; T3S-R16E (except that portion in the San Carlos Apache Indian Reservation); T4S-R13E; T4S-R14E; T4S-R15E; T4S-R16E; T5S-R13E; T5S-R14E; T5S-R15E; T5S-R16E; T6S-R13E; T6S-R14E; T6S-R15E; and T6S-R16E. Miami planning area T1N-R13E; T1N-R14E; T1N-R15E; T1S-R13E (sections 1–6); T1S-R14E (sections 1-24); T1S-R14 1/2E; and T1S-R15E.	Appendix C
Pima	T11S-R9E, T11S-R10E, T11S-R11E, T11S-R12E, T12S-R8E, T12S-R9E, T12S-R10E, T12S-R11E and T12S-R12E. The Ajo planning area Township T12S, R6W, T12S, R5W (Sections 6–8, 17-20, and 29-32).	Appendix D
Yuma	T7S-R21W, T7S-R22W, T8S-R21W, T8S-R22W, T8S-R23W, T8S-R24W, T9S-R21W, T9S-R22W, T9S-R23W, T9S-R24W, T9S-R25W, T10S-R21W, T10S-R22W, T10S-R23W, T10S-R24W, and T10S-R25W	Appendix E
Cochise	T23S, R25E, T23S-R26E, T23S-R27E, T23S-R28E, T24S-R25E, T24S-R26E, T24S-R27E, and T24S-R28E	Appendix F

Notes: 1. No operations are permitted within the portion of Pinal County: T4S, R3E – R4E, T5S, R3E – R4E (excluding sections 12, 13, 24, and 25) identified as "Prohibited Area" in Appendix "A" of the general permit.

2. No operations are permitted in the portions of Santa Cruz County, identified as a non-attainment area in Appendix "B", on any day that the Nogales particle pollution risk forecast at http://www.azdeq.gov/environ/air/ozone/nogales.pdf shows the risk of unhealthy particulate matter concentration to be High or if the Air Quality Index (AQI) for $PM_{2.5}$ is forecast as Unhealthy for Sensitive Groups.

II. OPERATING LIMITS AND ASSOCIATED EMISSIONS

Based on the modeled results (refer to Section V for detailed modeling analysis), the production limitations for crushing and screening plants along with collocated concrete batch plants have been established. Table 2 on the following page below summarizes the production limitations:

Table 2: Modeling - Based Production Limitations

Facility	Maximum Daily Operation	
	PM_{10} Attainment Area	PM_{10} Nonattainment Area
Stand-alone crushing and screening plant	6,500 tons per day	4,410 tons per day
Crushing and screening plant collocated with concrete batch plants	C&S: 6,500 tons per day CBP: 1,275 yd^3 per day	C&S: 4,095 tons per day CBP: 1,275 yd^3 per day

In addition to the above limitations, the Permittee may also be subject to operating hour limitations in the ATOs. These limits shall be calculated based on the potential to emit calculations. In no case shall the emissions from the facility exceed the statewide emission limits required to stay below major source thresholds, or the Maricopa County emissions limits which is required to avoid BACT review under Maricopa County Rule 241. These limitations are identified in Table 3 below:

Table 3: Emission Limitations

Pollutants	Statewide Emission limit (excluding Maricopa County)	Emission Limit in Maricopa County	
	(ton/yr)	(lb/day)	(ton/yr)
PM	90	135	22.5
PM_{10}	90	76.5	13.5
CO	90	495	90
NO_x	90	135	22.5
SO_2	90	135	22.5
VOC	90	135	22.5

III. APPLICABLE REGULATIONS

The Department has identified the applicable regulations that apply to each unit at a crushing and screening facility. Table 4 on the following page summarizes the findings of the Department with respect to the regulations that are applicable to each emissions unit.

Table 4: Applicable Regulations Statewide

Unit ID	Control Equipment	Applicable Regulations	Verification
Crushing and Screening Plants (NSPS)	Wet Scrubbers, Spray Bars, wet suppressant, and enclosures.	40 CFR 60 Subpart OOO	New Source Performance Standards Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants. Affected facilities include crushers, grinding mill, screening operation, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck or railcar loading stations built or reconstructed after August 31, 1983.
Crushing and Screening Plants (Non-NSPS)	Wet Scrubbers, Spray Bars, wet suppressant, and enclosures	A.A.C. R18-2-722	Standards of Performance for Existing or Crushed Stone Processing Plants.
Internal Combustion Engines	None	A.A.C. R18-2-719 40 CFR 63 Subpart ZZZZ	Standards of Performance for Existing Stationary Rotating Machinery.
Internal Combustion Engines (NSPS)	None	40 CFR 60 Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.
Internal Combustion Engines (NSPS)	None	40 CFR 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.
Concrete Batch Plants	Baghouses and wet suppressants	A.A.C. R18-2-702.B A.A.C. R18-2-723	The conditions stated here are the opacity limitations.
Boilers	Not Applicable	A.A.C. R18-2-724	Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment.
Fugitive Dust	Control Measures	A.A.C. R18-2-604 through R18-2-607.	Emissions from Fugitive Dust Sources.

Unit ID	Control Equipment	Applicable Regulations	Verification
Mobile Sources	None	A.A.C. R18-2-801 through A.A.C R18-2-806	Emissions from Mobile Source

Table 5: Applicable Regulations for Maricopa County

Unit ID	Start-up date	Control Equipment	Applicable Regulations	Verification
Facility Wide Requirements	Not Applicable	None	Maricopa County Rule 100	General Provisions and Definitions
			Maricopa County Rule 200	Permit Requirements
			Maricopa County Rule 220	Non-Title V Permit Provisions
			Maricopa County Rule 230	General Permits
			Maricopa County Rule 300	Visible Emissions
			Maricopa County Rule 310	Fugitive Dust from Dust-Generating Operations
			Maricopa County Rule 312	Abrasive Blasting
			Maricopa County Rule 315	Spray Coating Operations
			Maricopa County Rule 320	Odors And Gaseous Air Contaminants
Crushing and Screening Operation Concrete Batch Plants Fugitive Dust	Not Applicable	Wet Scrubbers, Spray Bars, wet suppressants, and enclosures	Maricopa County Rule 316	Nonmetallic Mineral Processing located in Maricopa County
Internal Combustion Engines	Not Applicable	None	Maricopa County Rule 324	Stationary Rotating Machinery subject to State rules located in Maricopa County.

IV. PERIODIC MONITORING, RECORDKEEPING AND REPORTING REQUIREMENTS

A. Facility wide General Requirements

1. The Permittee must maintain daily records of the operating hours of the equipment covered under the General Permit which are subject to an hourly restriction.

2. The Permittee must maintain records of the total daily throughput of material for the crushing and screening plant (in tons per day) and for the concrete batch plant (in cubic yards per day) covered under this General Permit.

3. The Permittee must keep on-site records of maintenance performed on all emission related equipment.

4. At the time the compliance certifications are submitted, the Permittee must submit reports of all monitoring, recordkeeping, and testing activities required by the permit within during that period.

5. The Permittee is required to conduct a monthly visual survey on all process equipment and all fugitive dust sources. If the source appears to exceed the standard, the Permittee must conduct an EPA Reference Method 9 observation. The Permittee must keep records of all surveys and EPA Reference Method 9 observations performed. These records will include the emission point observed, location of observer, name of observer, date and time of observation, and the results of the observation. If the observation shows a Method 9 opacity reading in excess of the opacity standard, the Permittee will be required to initiate appropriate corrective action to reduce the opacity below the standard. The Permittee will keep a record of the corrective action performed. These logs must be maintained on-site and be available to ADEQ representative upon request.

V. AIR DISPERSION MODELING ANALYSIS

A. Model Selection

The most recent version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD, version 11103) was used in this modeling analysis. AERMOD is the EPA's preferred near-field dispersion modeling system for a wide range of regulatory applications. The AERMOD modeling system includes four regulatory components:

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BRIPPRIME: the building input processor

The terrain processor (AERMAP) and the building input processor (BRIPPRIME) were not used in this analysis because both of them require site-specific information. Moreover, an assumption of "Flat Terrain" was believed to be reasonable.

The terrain processor (AERMAP) and the building input processor (BRIPPRIME) were not used in this analysis because both of them require site-specific information. Additionally, an assumption of "Flat Terrain" was determined to be acceptable, since the emission sources of a crushing & screening plant or a concrete batch plant are mainly ground level sources and the worst-case impacts are expected to occur in or near the process area boundary.

B. Model Source Input

The model source input involves the development of appropriate inputs for dispersion modeling with the AERMOD modeling system.

1. Emission Rate Methodology

Particulate Matter (PM) is the primary pollutant emitted from a crushing & screening plant as well as a concrete batch plant. If there are internal combustion engines (generators) or boilers in the facility, gaseous pollutants such as SO_2, NO_x, and CO are also generated.

a. Determining Emission Rate

Emission rates were estimated according to latest AP-42 emission factors for concrete batching, crushing & screening, internal combustion engines, boilers, wind erosion and unpaved roads. In particular, a consistent approach was developed for estimating $PM_{2.5}$ and PM_{10} emissions for batch drop operations and material transfer operations. This approach was based on AP-42 Section 13.2.4 Equation 1:

$$E = k(0.032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad \text{(Equation 1)}$$

Where:
E = emission factor (lb/ton) k = particle size multiplier (dimensionless), 0.35 for PM_{10} and 0.053 for $PM_{2.5}$
U = mean wind speed (miles per hour)
M = material moisture content (%)

State-wide meteorological data sets were reviewed and a mean wind speed of 7.5 miles per hour was determined. Due to very limited data available for the parameter M, the moisture content was set as 5% for controlled emissions.

b. Emission Inventory

A comprehensive emission inventory was developed for a crushing & screening plant with an operating capacity of 315 tons per hour (Table 7). *Note that this capacity is used for the convenience of emission estimation only, and it may not represent the maximum allowable throughput for a crushing & screening plant in the General Permit.* To model the operating capacity other than 315 tons per hour, the emission rates listed in Table 7 were adjusted. Comparatively, the operating capacity for a concrete batch plant in this modeling analysis was fixed at 1275 yd^3 per day, which was previously determined in the General Permit for Concrete Batch Plants. Table 8 lists the corresponding emission rates for all sources in the concrete batch plant. Besides the sources above, emissions from unpaved roads and a large internal combustion engine (generator) were also modeled. The emission rates of pollutants from the two sources are summarized in Table 9.

c. Modeled Emission Rates

Emissions used for modeling must be matched to the averaging time being assessed. For 24-hour PM_{10} and 24-hour $PM_{2.5}$, if a crushing & screening plant was modeled to run at a specific capacity (tons/hour) at a certain hours per day, the modeled hourly emission rates for applicable sources were adjusted by using Emission Rate Flag HROFDY in AERMOD:

$$HROFDY = \frac{\text{Modeled operating capacity (tons/hour)}}{315 \text{ tons/hour}} \times \frac{\text{Modeled operating hours}}{24} \quad \text{(Equation 2)}$$

Most of operations in concrete batch plants and crushing & screening plants are not continuous and the emission sources are typically characterized as intermittent sources. The Emission Rate Flag approach substitutes an intermittent source with a continuous source that emits an identical amount of PM_{10} or $PM_{2.5}$ over a 24-hour time period. Such treatment should provide a reasonable approximation of 24-hour average impact. For SO_2 and CO, maximum hourly emission rates were modeled for comparisons to their short-term air quality standards. As the SO_2 emissions are relatively small, maximum hourly emission rates were also used to provide a conservative estimation for annual impacts. To model annual average NO_2 concentrations, annual averaging hourly emission rates were used. Moreover, the NO_2/NOx ratio was set as 0.75, the national annual default value.

Table 7: Maximum Hourly Emission Rates for Crushing & Screening Plant*

Area Source			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05
CS_WEFS	Fines Storage Pile	2.61E-05	2.61E-05
CS_TRANS	Transfer Points	5.10E-03	2.52E-02
Volume Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_PCRSH	Primary Crusher-Jaw	3.98E-03	2.15E-02

CS_SCR1	Screen #1	1.99E-03	2.94E-02
CS_SCR2	Screen #2	1.99E-03	2.94E-02
CS_FSCR	Fine Screen	4.41E-03	8.75E-02
CS_SCRSH	Secondary Crusher -Core	3.98E-03	2.15E-02
CS_TCRSH	Tertiary Crusher	2.87E-03	1.55E-02
CSLT01	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT02	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT03	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT04	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT05	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT06	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT07	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT08	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT09	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT10	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT11	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT12	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT13	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT14	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT15	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT16	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT17	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT18	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT19	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT20	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT21	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT22	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT23	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT24	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT25	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT26	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT27	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT28	C&S Loader Traffic	5.70E-04	4.34E-03

Table 8: Maximum Hourly Emission Rates for Concrete Batch Plant*

Point Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	1.80E-04	1.20E-03	-	-	-
CBP_CTCS	Cement Transfer to Cement Silo	8.40E-05	5.60E-04	-	-	-
CBP_BOIL	Boiler	1.17E-02	1.17E-02	1.80E-01	1.92E-03	4.51E-02

Area Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CBP_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05
CBP_WESS	Sand Storage Pile	6.53E-06	6.53E-06

Volume Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CBP_ADGS	Aggregate Delivery to Ground Storage	4.98E-04	3.29E-03
CBP_SDGS	Sand Delivery to Ground Storage	3.81E-04	2.52E-03
CBP_ATC	Aggregate Transfer to Conveyor	4.98E-04	3.29E-03
CBP_STC	Sand Transfer to Conveyor	3.81E-04	2.52E-03
CBP_ATEB	Aggregate Transfer to Elevation Bins	4.98E-04	3.29E-03
CBP_STEB	Sand Transfer to Elevation Bins	3.81E-04	2.52E-03
CBP_WHL	Weigh Hopper Loading	3.98E-04	2.65E-03
CBP_TML	Truck Mix Loading (controlled)	1.56E-03	1.04E-02
CBPLT01	CBP Loader Traffic	5.70E-04	4.34E-03
CBPLT02	CBP Loader Traffic	5.70E-04	4.34E-03
CBPLT03	CBP Loader Traffic	5.70E-04	4.34E-03

Table 9 Maximum Hourly Emission Rates for Other Sources

Point Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
GEN_LAR	Generator >= 600 hp	8.84E-02	8.84E-02	3.03E+00	1.53E-03	6.95E-01
Volume Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*			
TRUCK01	Truck Traffic	3.05E-04	2.50E-03			
TRUCK02	Truck Traffic	3.05E-04	2.50E-03			
TRUCK03	Truck Traffic	3.05E-04	2.50E-03			
TRUCK04	Truck Traffic	3.05E-04	2.50E-03			
TRUCK05	Truck Traffic	3.05E-04	2.50E-03			
TRUCK06	Truck Traffic	3.05E-04	2.50E-03			
TRUCK07	Truck Traffic	3.05E-04	2.50E-03			
TRUCK08	Truck Traffic	3.05E-04	2.50E-03			
TRUCK09	Truck Traffic	3.05E-04	2.50E-03			
TRUCK10	Truck Traffic	3.05E-04	2.50E-03			
TRUCK11	Truck Traffic	3.05E-04	2.50E-03			
TRUCK12	Truck Traffic	3.05E-04	2.50E-03			
TRUCK13	Truck Traffic	3.05E-04	2.50E-03			
TRUCK14	Truck Traffic	3.05E-04	2.50E-03			
TRUCK15	Truck Traffic	3.05E-04	2.50E-03			
TRUCK16	Truck Traffic	3.05E-04	2.50E-03			
TRUCK17	Truck Traffic	3.05E-04	2.50E-03			
TRUCK18	Truck Traffic	3.05E-04	2.50E-03			
TRUCK19	Truck Traffic	3.05E-04	2.50E-03			
TRUCK20	Truck Traffic	3.05E-04	2.50E-03			
TRUCK21	Truck Traffic	3.05E-04	2.50E-03			
TRUCK22	Truck Traffic	3.05E-04	2.50E-03			
TRUCK23	Truck Traffic	3.05E-04	2.50E-03			
TRUCK24	Truck Traffic	3.05E-04	2.50E-03			
TRUCK25	Truck Traffic	3.05E-04	2.50E-03			
TRUCK26	Truck Traffic	3.05E-04	2.50E-03			
TRUCK27	Truck Traffic	3.05E-04	2.50E-03			
TRUCK28	Truck Traffic	3.05E-04	2.50E-03			
TRUCK29	Truck Traffic	3.05E-04	2.50E-03			
TRUCK30	Truck Traffic	3.05E-04	2.50E-03			
TRUCK31	Truck Traffic	3.05E-04	2.50E-03			
TRUCK32	Truck Traffic	3.05E-04	2.50E-03			
TRUCK33	Truck Traffic	3.05E-04	2.50E-03			
TRUCK34	Truck Traffic	3.05E-04	2.50E-03			
TRUCK35	Truck Traffic	3.05E-04	2.50E-03			
TRUCK36	Truck Traffic	3.05E-04	2.50E-03			
TRUCK37	Truck Traffic	3.05E-04	2.50E-03			
TRUCK38	Truck Traffic	3.05E-04	2.50E-03			
TRUCK39	Truck Traffic	3.05E-04	2.50E-03			

Table 9 (continued)

Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
TRUCK40	Truck Traffic	3.05E-04	2.50E-03
TRUCK41	Truck Traffic	3.05E-04	2.50E-03
TRUCK42	Truck Traffic	3.05E-04	2.50E-03
TRUCK43	Truck Traffic	3.05E-04	2.50E-03
TRUCK44	Truck Traffic	3.05E-04	2.50E-03
TRUCK45	Truck Traffic	3.05E-04	2.50E-03
TRUCK46	Truck Traffic	3.05E-04	2.50E-03
TRUCK47	Truck Traffic	3.05E-04	2.50E-03
TRUCK48	Truck Traffic	3.05E-04	2.50E-03
TRUCK49	Truck Traffic	3.05E-04	2.50E-03
TRUCK50	Truck Traffic	3.05E-04	2.50E-03
TRUCK51	Truck Traffic	3.05E-04	2.50E-03
TRUCK52	Truck Traffic	3.05E-04	2.50E-03
TRUCK53	Truck Traffic	3.05E-04	2.50E-03
TRUCK54	Truck Traffic	3.05E-04	2.50E-03

C. Source Layout

The layout of crushing & screening plants generally differs from one site to another. To simplify the modeling analysis, a generic site plan was developed for a crushing & screening plant alone or co-located with a concrete batch plant, as shown in Figure 1 and Figure 2 on the following page, respectively. The layout of sources was determined according to the site plans of several existing plants.

D. Source Release Parameters

The emission sources, categorized by source type (release characteristics), are as follows:

Point Sources: cement silo, boiler, and generator;

Area Sources: aggregate storage pile wind erosion, sand storage pile wind erosion, combined transfer points in crushing & screening plants;

Volume Sources: crushing & screening operations, batch drop operations, material transfer operations, trucks/front-end loaders traveling on unpaved roads.

Tables 10-12 summarize the source release parameters used in the modeling analysis. These parameters were determined following the ADEQ air modeling guidelines as well as the methodology for modeling fugitive dust sources developed by National Stone, Sand & Gravel Association. The representative physical dimensions for stacks, crushers, screens, storage piles, hoppers, bins, silos, trucks, and front-end loaders were determined on the basis of actual measurements or testing data from three facilities in Maricopa County.

Figure 1: Source Layout of a Generic Crushing & Screening Plant (refer to Table 8 and Table 9 for detailed source descriptions)

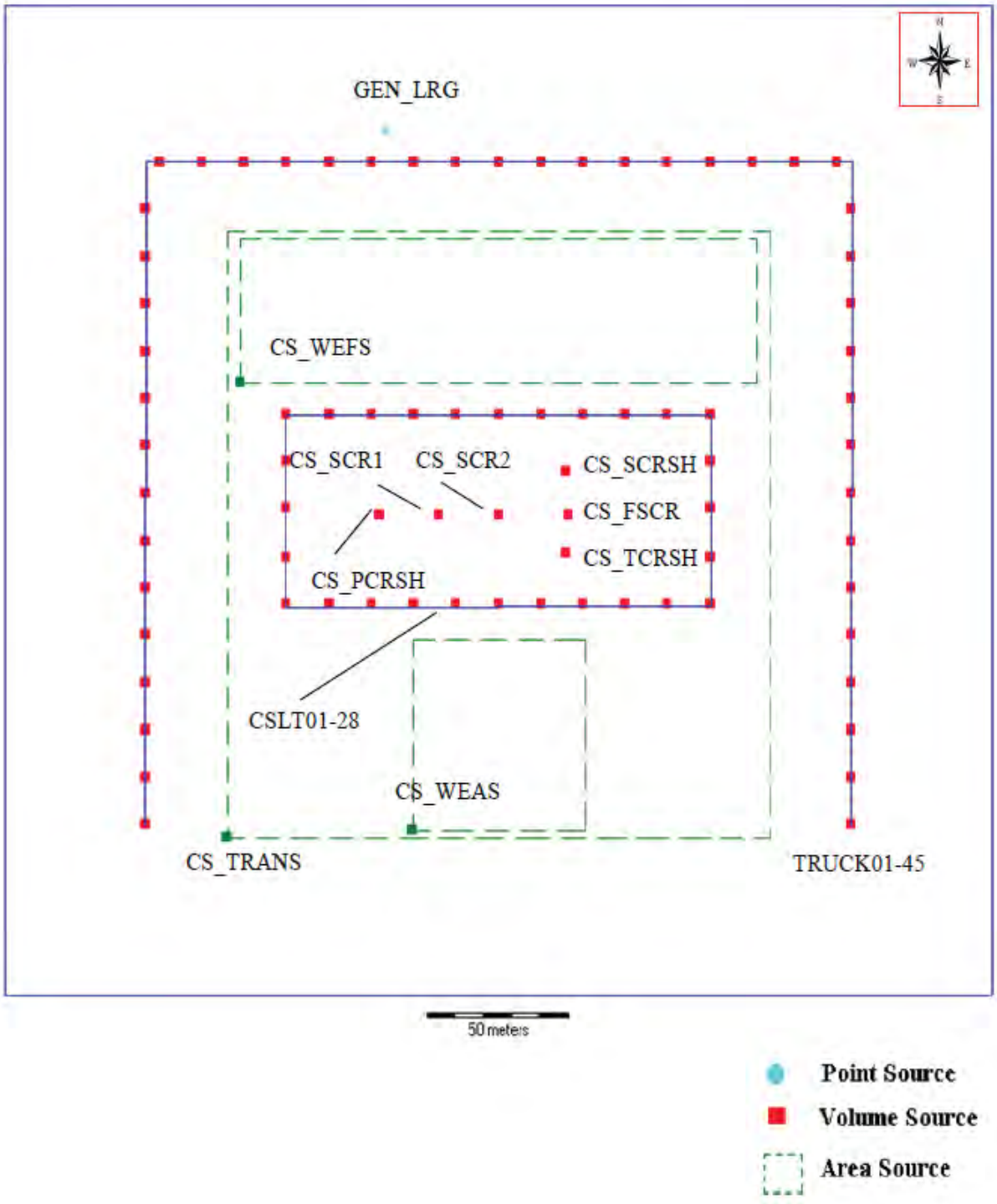


Figure 2: Source Layout of a Generic Crushing and Screening Plant Co-located with a Concrete Batch Plant (refer to Tables 7-9 for detailed source descriptions)

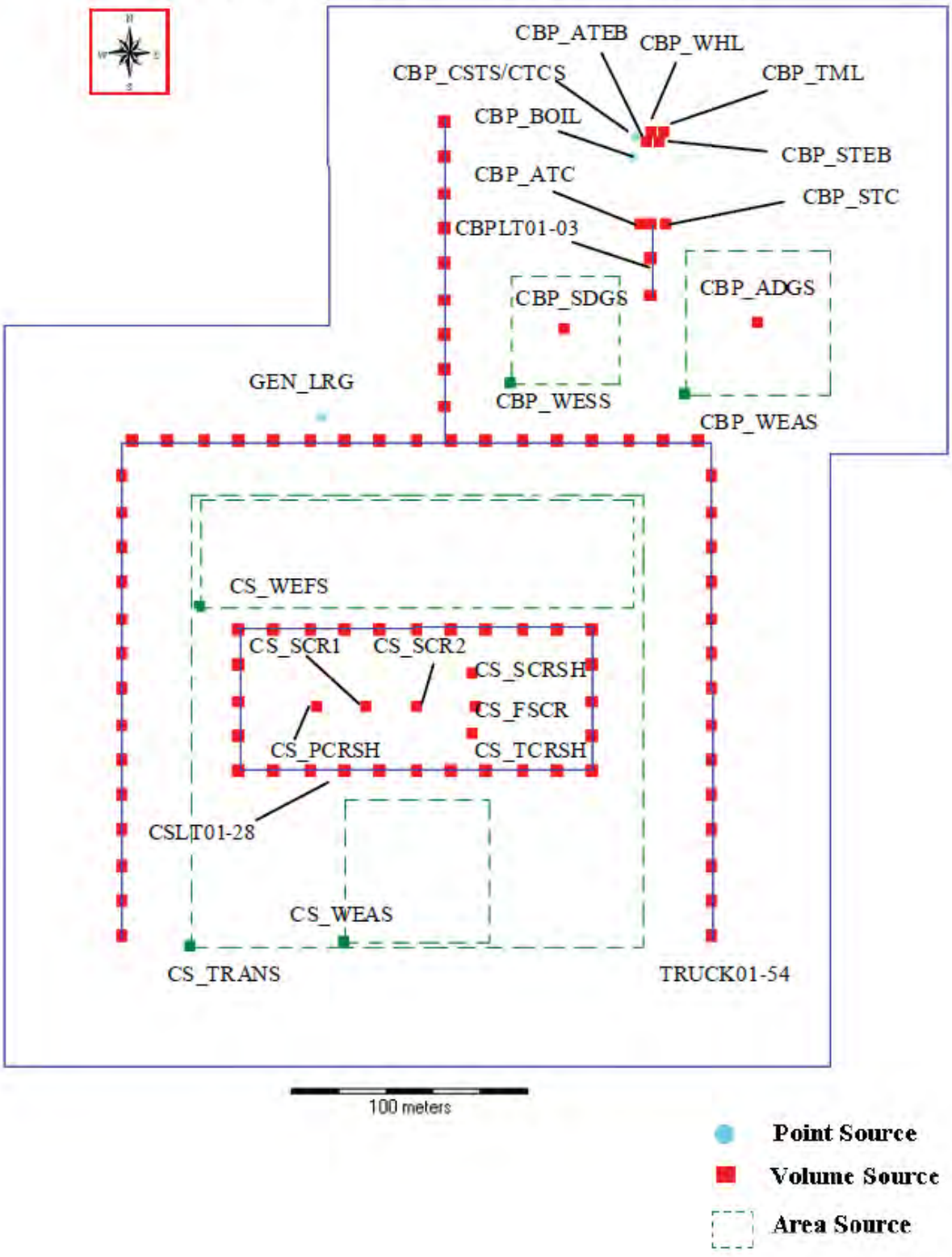


Table 10: Modeling Source Parameters for Crushing & Screening Plant

Area Source					
Source ID	*Source Description*	*Release Height (m)*	X-Length (m)	Y-Length (m)	Angel (degree)
CS_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CS_WEFS	Fines Storage Pile	1.83	182.88	45.72	0.00
CS_TRANS	Transfer Points	1.52	192.02	192.02	0.00

Volume Sources				
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
CS_PCRSH	Primary Crusher-Jaw	5.18	0.43	2.41
CS_SCR1	Screen #1	7.62	0.85	3.54
CS_SCR2	Screen #2	7.62	0.85	3.54
CS_FSCR	Fine Screen	7.62	0.85	3.54
CS_SCRSH	Secondary Crusher -Core	7.62	0.37	3.54
CS_TCRSH	Tertiary Crusher	6.10	0.27	2.83
CSLT01	C&S Loader Traffic	3.00	7.00	2.80
CSLT02	C&S Loader Traffic	3.00	7.00	2.80
CSLT03	C&S Loader Traffic	3.00	7.00	2.80
CSLT04	C&S Loader Traffic	3.00	7.00	2.80
CSLT05	C&S Loader Traffic	3.00	7.00	2.80
CSLT06	C&S Loader Traffic	3.00	7.00	2.80
CSLT07	C&S Loader Traffic	3.00	7.00	2.80
CSLT08	C&S Loader Traffic	3.00	7.00	2.80
CSLT09	C&S Loader Traffic	3.00	7.00	2.80
CSLT10	C&S Loader Traffic	3.00	7.00	2.80
CSLT11	C&S Loader Traffic	3.00	7.00	2.80
CSLT12	C&S Loader Traffic	3.00	7.00	2.80
CSLT13	C&S Loader Traffic	3.00	7.00	2.80
CSLT14	C&S Loader Traffic	3.00	7.00	2.80
CSLT15	C&S Loader Traffic	3.00	7.00	2.80
CSLT16	C&S Loader Traffic	3.00	7.00	2.80
CSLT17	C&S Loader Traffic	3.00	7.00	2.80
CSLT18	C&S Loader Traffic	3.00	7.00	2.80
CSLT19	C&S Loader Traffic	3.00	7.00	2.80
CSLT20	C&S Loader Traffic	3.00	7.00	2.80
CSLT21	C&S Loader Traffic	3.00	7.00	2.80
CSLT22	C&S Loader Traffic	3.00	7.00	2.80
CSLT23	C&S Loader Traffic	3.00	7.00	2.80
CSLT24	C&S Loader Traffic	3.00	7.00	2.80
CSLT25	C&S Loader Traffic	3.00	7.00	2.80
CSLT26	C&S Loader Traffic	3.00	7.00	2.80

CSLT27	C&S Loader Traffic	3.00	7.00	2.80
CSLT28	C&S Loader Traffic	3.00	7.00	2.80

Table 11: Modeling Source Parameters for Concrete Batch Plants

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	12.20	408.00	4.00	0.32
CBP_CTCS	Cement Transfer to Cement Silo	12.20	408.00	4.00	0.32
CBP_BOIL	Boiler	12.19	533.00	7.62	0.30
Area Sources					
Source ID	*Source Description*	*Release Height (m)*	*X-length*	*Y-length*	*Angel (degree)*
CBP_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CBP_WESS	Sand Storage Pile	1.83	45.72	45.72	0.00
Volume Sources					
Source ID	*Source Description*	*Release Height (m)*	*Initial Horizontal Dimensions (m)*	*Initial Vertical Dimensions (m)*	
CBP_ADGS	Aggregate Delivery to Ground Storage	6.17	1.60	2.20	
CBP_SDGS	Sand Delivery to Ground Storage	6.17	1.60	2.20	
CBP_ATC	Aggregate Transfer to Conveyor	3.51	0.85	0.43	
CBP_STC	Sand Transfer to Conveyor	3.51	0.85	0.43	
CBP_ATEB	Aggregate Transfer to Elevation Bins	8.08	0.71	0.43	
CBP_STEB	Sand Transfer to Elevation Bins	8.08	0.71	0.43	
CBP_WHL	Weigh Hopper Loading	4.72	0.85	0.14	
CBP_TML	Truck Mix Loading (controlled)	3.05	0.25	0.50	
CBPLT01	CBP Loader Traffic	3.00	7.00	2.80	

CBPLT02	CBP Loader Traffic	3.00	7.00	2.80
CBPLT03	CBP Loader Traffic	3.00	7.00	2.80

Table 12: Modeling Source Parameters for Other Sources

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
GEN_LAR	Generator >= 600 hp	6.71	783.00	30.50	0.20
Volume Sources					
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)	
TRUCK01	Truck Traffic	3.00	7.00	2.80	
TRUCK02	Truck Traffic	3.00	7.00	2.80	
TRUCK03	Truck Traffic	3.00	7.00	2.80	
TRUCK04	Truck Traffic	3.00	7.00	2.80	
TRUCK05	Truck Traffic	3.00	7.00	2.80	
TRUCK06	Truck Traffic	3.00	7.00	2.80	
TRUCK07	Truck Traffic	3.00	7.00	2.80	
TRUCK08	Truck Traffic	3.00	7.00	2.80	
TRUCK09	Truck Traffic	3.00	7.00	2.80	
TRUCK10	Truck Traffic	3.00	7.00	2.80	
TRUCK11	Truck Traffic	3.00	7.00	2.80	
TRUCK12	Truck Traffic	3.00	7.00	2.80	
TRUCK13	Truck Traffic	3.00	7.00	2.80	
TRUCK14	Truck Traffic	3.00	7.00	2.80	
TRUCK15	Truck Traffic	3.00	7.00	2.80	
TRUCK16	Truck Traffic	3.00	7.00	2.80	
TRUCK17	Truck Traffic	3.00	7.00	2.80	
TRUCK18	Truck Traffic	3.00	7.00	2.80	
TRUCK19	Truck Traffic	3.00	7.00	2.80	
TRUCK20	Truck Traffic	3.00	7.00	2.80	
TRUCK21	Truck Traffic	3.00	7.00	2.80	
TRUCK22	Truck Traffic	3.00	7.00	2.80	
TRUCK23	Truck Traffic	3.00	7.00	2.80	
TRUCK24	Truck Traffic	3.00	7.00	2.80	
TRUCK25	Truck Traffic	3.00	7.00	2.80	
TRUCK26	Truck Traffic	3.00	7.00	2.80	
TRUCK27	Truck Traffic	3.00	7.00	2.80	
TRUCK28	Truck Traffic	3.00	7.00	2.80	
TRUCK29	Truck Traffic	3.00	7.00	2.80	

TRUCK30	Truck Traffic	3.00	7.00	2.80
TRUCK31	Truck Traffic	3.00	7.00	2.80
TRUCK32	Truck Traffic	3.00	7.00	2.80
TRUCK33	Truck Traffic	3.00	7.00	2.80
TRUCK34	Truck Traffic	3.00	7.00	2.80
TRUCK35	Truck Traffic	3.00	7.00	2.80
TRUCK36	Truck Traffic	3.00	7.00	2.80
TRUCK37	Truck Traffic	3.00	7.00	2.80
TRUCK38	Truck Traffic	3.00	7.00	2.80
TRUCK39	Truck Traffic	3.00	7.00	2.80
TRUCK40	Truck Traffic	3.00	7.00	2.80
TRUCK41	Truck Traffic	3.00	7.00	2.80
TRUCK42	Truck Traffic	3.00	7.00	2.80
TRUCK43	Truck Traffic	3.00	7.00	2.80
TRUCK44	Truck Traffic	3.00	7.00	2.80
TRUCK45	Truck Traffic	3.00	7.00	2.80
TRUCK46	Truck Traffic	3.00	7.00	2.80
TRUCK47	Truck Traffic	3.00	7.00	2.80
TRUCK48	Truck Traffic	3.00	7.00	2.80
TRUCK49	Truck Traffic	3.00	7.00	2.80
TRUCK50	Truck Traffic	3.00	7.00	2.80
TRUCK51	Truck Traffic	3.00	7.00	2.80
TRUCK52	Truck Traffic	3.00	7.00	2.80
TRUCK53	Truck Traffic	3.00	7.00	2.80
TRUCK54	Truck Traffic	3.00	7.00	2.80

10.6 Appendix F: Basis for Future Pb Potential to Emit

LAW OFFICES
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MEMORANDUM

TO: Marina Mejia, ADEQ SIP Manager

FROM: Eric L. Hiser

DATE: May 31, 2016

SUBJECT: Basis for future lead potential to emit

You asked Asarco to provide the basis for the estimated lead potential to emit. This memorandum addresses the lead potential to emit from the smelting process sources (e.g., concentrate dryers, flash furnace, converters, anode furnaces and casting). Amy Veek has previously provided information on all of the material handling and concentrator operations.

In its December 22, 2014 supplemental permit application for the converter retrofit project (CRP), Asarco proposed, in response to a request from ADEQ, to "net down" emissions from the smelter primary process equipment to allow the CRP to proceed to permitting more expeditiously. Asarco proposed the following lead limit for the non-anode sources:

- Main stack 12 month rolling emission limits as follows:
  - Lead: 2.9 tons, an increase of 1.731 tons from 1.169 tons in 2011-2012, but this increase is netted out by reductions from the Anode Furnace Baghouse project (see netting discussion below)

Asarco, CRP Application, 4 (Dec. 22, 2014). The netting discussion stated as follows in relevant parts:

> As outlined above, Asarco is proposing a small net down for this permit. All pollutants show an actual to potential increase of less than zero except for particulate matter and lead. These will net out of NNSR review when the emissions decreases associated with the Anode Furnace Baghouse installation are considered.
>
> There are two projects within the contemporaneous period: the addition of Revert Screen #3 and its associated diesel engine and the Anode Furnace Baghouse project. … For the Anode Furnace Baghouse project, Asarco counted the difference between the new potential to emit and past actual emissions (65.02 tons/year) and treated this decrease as a contemporaneous emissions decrease because it is enforceable as a practical matter (Asarco took specific emissions limitations in the Anode Furnace Baghouse permit, No. 54251, for this purpose).

Accounting for these increases and decreases results in the following conclusion:
Estimated Net Emissions Impact (all in tons/year):

Pollutant	New Limit	Past Actual	Revert Anode BH	Net Change
Lead:	2.91	1.169	0.00 -1.79	-0.049

Asarco, CRP Application, 6. Because the anode furnace baghouse is now being routed to the main stack, the lead emissions from the anode furnace, as limited by Permit No. 54251, need to be added to the main stack. While Permit No. 54251 does not establish a lead limit per se, it limits stack emissions to 0.003 gr/scf and estimated total metal HAPs at 0.39 tons (down from 5.33 tons). ADEQ, Permit No. 54251 Technical Support Document, at 2. Looking at the permit application submitted in support of the anode furnace baghouse project gives the following data:

Current (2009-2010) lead emissions:	1.20 ton/year
Controlled (future limit) lead emissions:	0.089 ton/year
Fugitive lead (after controls) emissions:	0.036 ton/year

Asarco, Anode Furnace Baghouse permit application, at D.1-4 (May 19, 2011). Based on the application, then 0.089 ton/year should be added to the 2.91 ton/year in the CRP application to reflect the relocation of the anode furnace baghouse stack emissions to the main stack. The new main stack limit would be 2.91 + 0.089 = 2.999 ton/year of lead, which Asarco proposes to round to 3.0 ton/year of lead.

Similarly, the fugitive limits from the CRP were set at 1.400 ton/year from the flash furnace and converter aisle in 2011-2012. Asarco, CRP application at C, Lead 16. To this should be added the 0.036 ton/year from the anode furnace fugitives. The total lead fugitive limit from the process sources would be 1.400 + 0.036 = 1.436 ton/year of lead. For post-CRP modeling purposes, Asarco recommends a ratio of SHBH = 26.5%, VGBH = 73.5% of the 1.400 tons/year, with the anode furnace fugitives carried at 0.036 ton/yr.

As noted above, the material handling emissions for concentrate prior to processing and post-processing, as well as road emissions, are addressed in materials provided by Amy Veek. Please review this discussion and let us know if it answers your questions.

Cc: J. Garrity, Asarco, Hayden Operations
A. Veek, Asarco, Hayden Operations

10.7 Appendix G: Unpaved Roads De Minimis Analysis

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY TECHNICAL MEMORANDUM

UNPAVED ROADS DE MINIMIS ANALYSIS

OCTOBER 20, 2016

The following memorandum presents an analysis performed by the Technical Analysis Unit (TAU) for the Arizona Department of Environmental Quality's (ADEQ) Lead (Pb) State Implementation Plan (SIP) revision. The goal of this analysis was to determine which unpaved roads at the Asarco facility are likely contributing to elevated ambient air lead concentrations.

Background

TAU started its analysis by collecting information regarding which roads within Asarco's ambient air boundary are paved and unpaved. Figure 1 on the following page was created based on data supplied by the source. Although more unpaved roads exist north of the smelter, these roads are less traveled and further from high lead sources, and therefore were not included in the de minimis analysis.

The unpaved roads shown in the figure were selected due to their proximity to high lead sources and trips per day, these high lead sources include: wet dry bin activities, concentrate handling activities (both bedding area and overflow storage), and slag dump activities. In Figure 1 on the next page four unpaved road segments are identified. These segments are termed, slag dump (green), smelter support area (orange), concentrator access road (gold), and concentrate storage (blue).

To determine which segments were significant, and should be included in ADEQ's SIP efforts, soil sample data was collected from the Remedial Investigation and Feasibility Study (RI/FS), which was performed from 2013 to 2015. TAU then set a criteria for determine if a road was a significant contributor. This criteria was based on the Arizona residential soil remediation level (SRL).

The residential SRL (as defined in A.A.C. R18-7-205 Appendix A) sets a standard of 400 parts per million (ppm). Chronic exposure to leaded soils greater than 400 ppm result in a cumulative excess lifetime cancer risk between 1×10^{-6} and 1×10^{-4} and a Hazard Index number greater than 1 (based on residential exposure assumptions)[14]. Although the general public does not have access to these roads, and therefore chronic exposure is not likely, the residential SRL sets a conservative criteria for the purposes of this analysis.

[14] A.A.C. R18-7-201



Figure 10-1: Facility Roads

Slag Dump

The slag dump area is located east of the smelter (green road in Figure 1). All RI/FS sampling locations are shown in Figure 2.

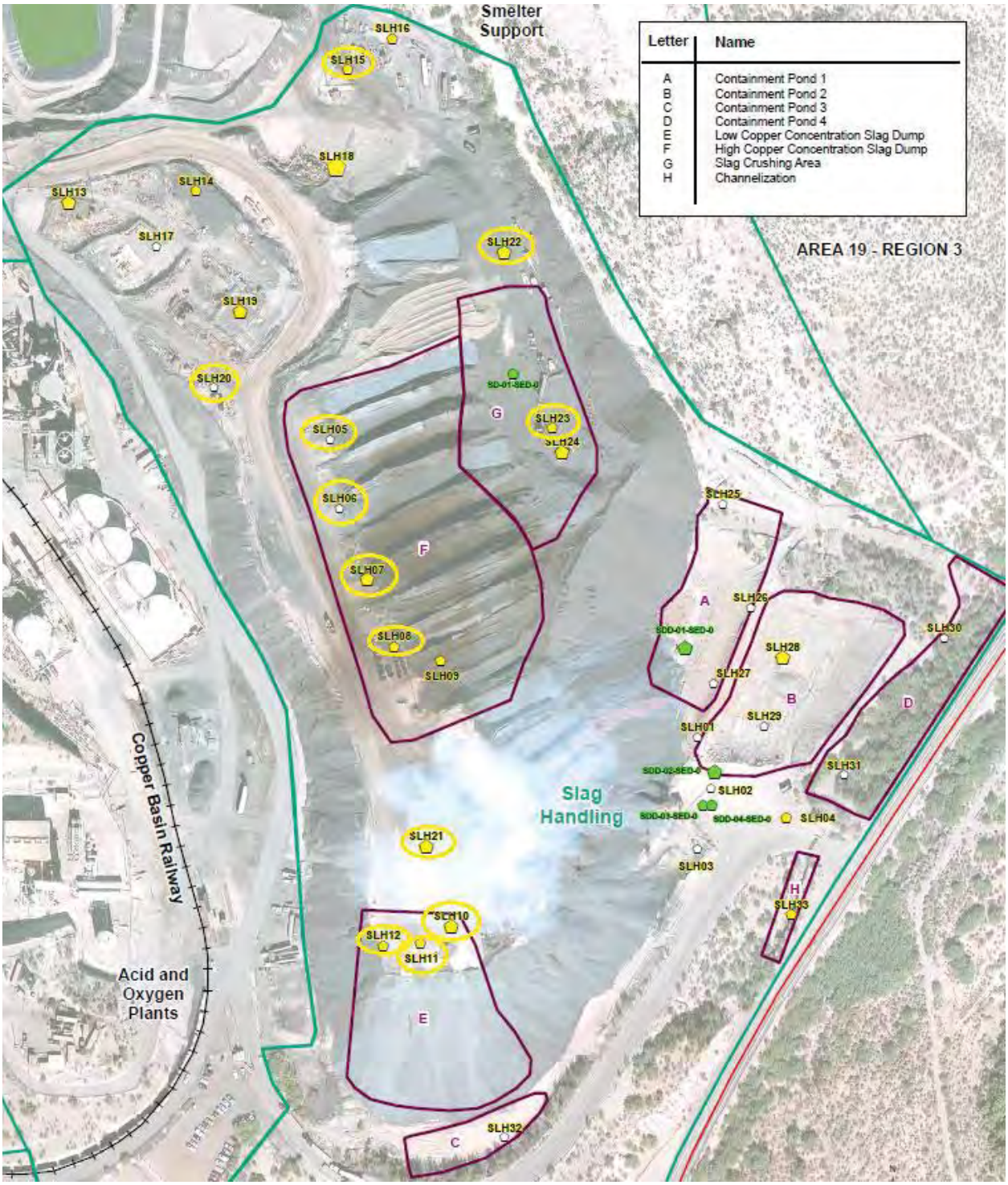


Figure 10-2: Slag Dump Sampling

The sample locations chosen for this analysis are circled in yellow. No direct samples were taken of the slag haul road, therefore, samples adjacent to this road are considered surrogates. Although the slag haul road is located on top of the slag dump, vehicle traffic does occur at the bottom of the dump, which is why several RI/FS samples were chosen in that area (SLH23, SLH22, and SLH15).

As seen in the table, SLH21 is significantly higher than the surrounding samples. TAU is not aware of why there is such a large discrepancy between 21 and the remaining samples. If 21 was excluded the new average would be 453 ppm.

Table 4: Slag Dump Sample Results

Slag Dump	
Sample ID	**Concentration (ppm)**
SLH12	420
SLH11	440
SLH10	380
SLH21	3800
SLH08	390
SLH07	550
SLH06	460
SLH05	290
SLH20	14
SLH23	810
SLH22	830
SLH15	400
Max Sample	**3800**
Min Sample	**14**
Average	**732.0**
Samples ≥ 400 ppm	**67%**

Concentrate Storage

The concentrate storage area is located north of the concentrator and northeast of the smelter (blue road in Figure 1). All RI/FS sampling locations are shown in Figure 3.

The sample locations chosen for this analysis are circled in yellow. Unlike the slag dump, the RI/FS sampling did appear to take samples directly on the unpaved road, for example LFP 12, 13, 14, and 15.

Table 5: Concentrate Storage Sample Results

Concentrate Storage	
Sample ID	**Concentration (ppm)**
LFP11	67
LFP12	1700
LFP14	3100
LFP15	590
LFP13	1800
LFP16	590
LFP17	870
LFP18	3900
LFP20	670
LFP19	640
LFP21	450
LFP30	230
Max Sample	**3900**
Min Sample	**67**
Average	**1217.3**
Samples ≥ 400 ppm	**83%**

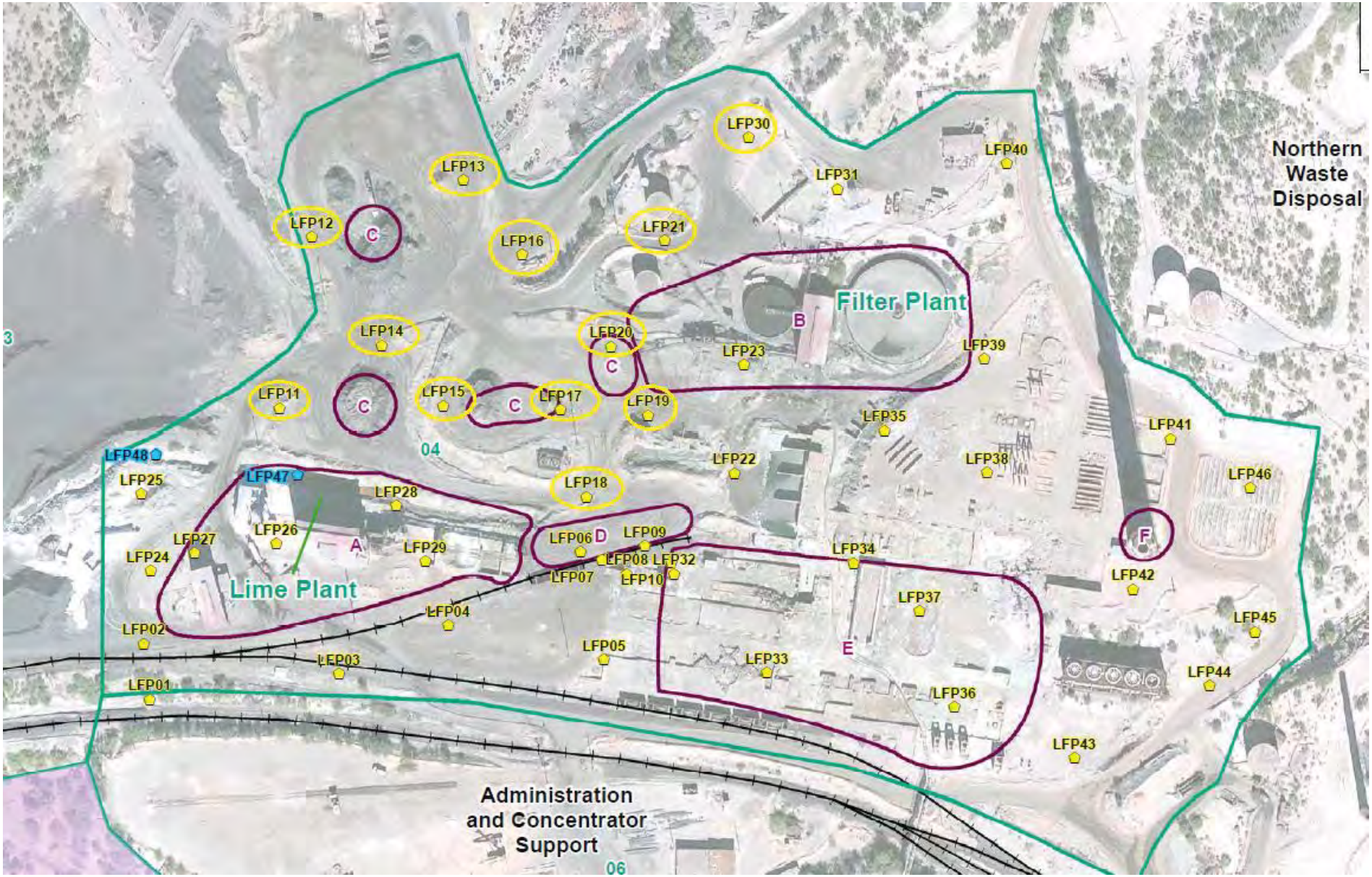


Figure 10-3: Concentrate Storage Sampling

Smelter Support Area

The smelter support area is located northeast of the smelter (orange road in Figure 1). All RI/FS sample locations are shown in Figure 4.

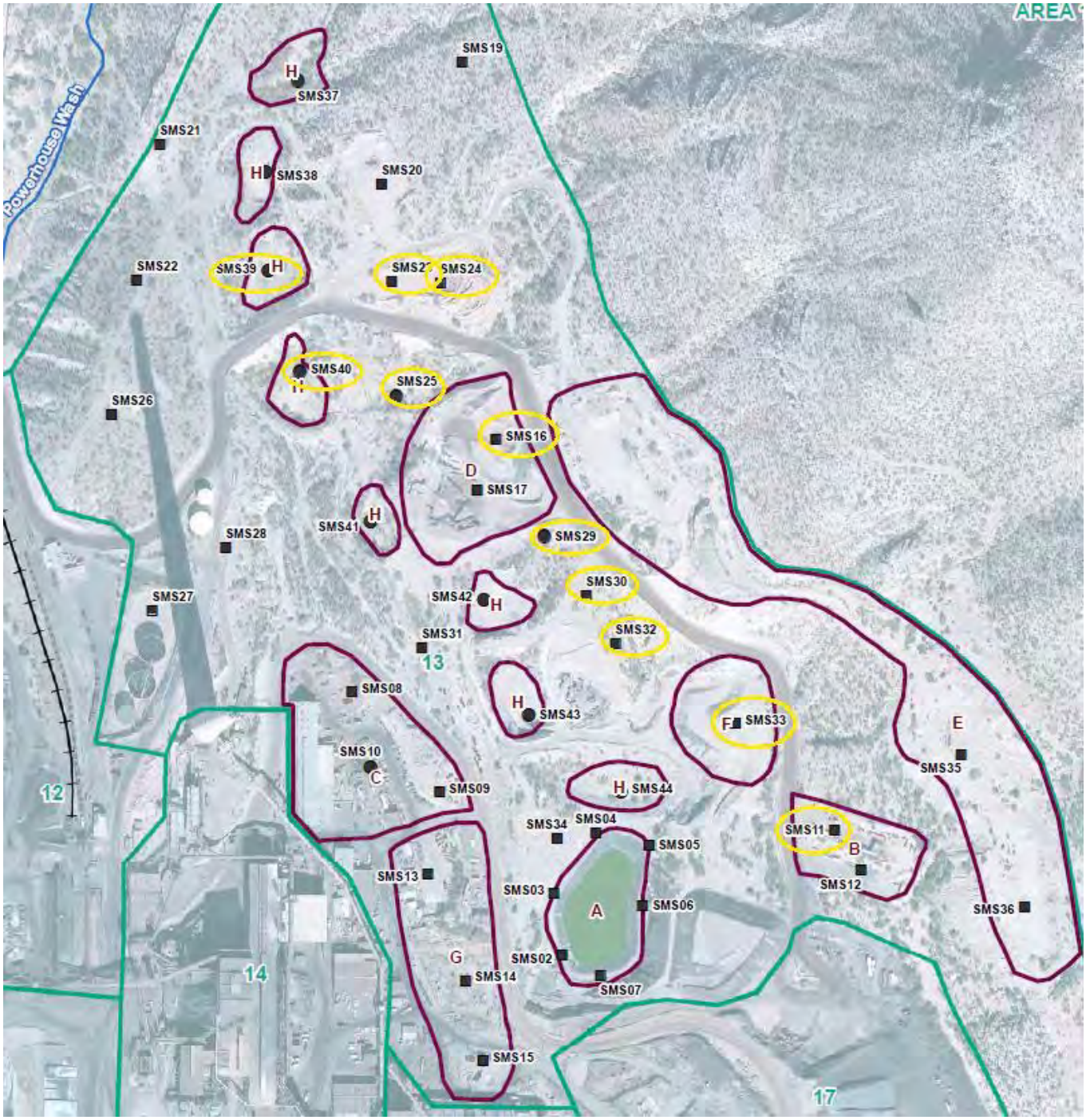


Figure 10-4: Smelter Support Sampling

The sample locations chosen for this analysis are circled in yellow. Like the slag haul road, no samples were directly taken from the unpaved road, therefore, the samples adjacent to the unpaved road are surrogates. In the table below, sample SMS33 is roughly three times higher than the other samples. After reviewing technical memos for this area, TAU discovered the area from which SMS33 was taken is a historic solid waste landfill.

Table 6: Smelter Support Sample Results

Smelter Support Area	
Sample ID	**Concentration (ppm)**
SMS39	230
SMS40	190
SMS23	180
SMS24	25
SMS25	140
SMS16	13
SMS29	240
SMS30	250
SMS32	82
SMS33	900
SMS11	350
Max Sample	**900**
Min Sample	**13**
Average	**236.4**
Samples ≥ 400 ppm	**9%**

Concentrator Access Road

The concentrator access road is located east of the concentrator (gold road in Figure 1). All RI/FS samples are shown in Figures 5 & 6.

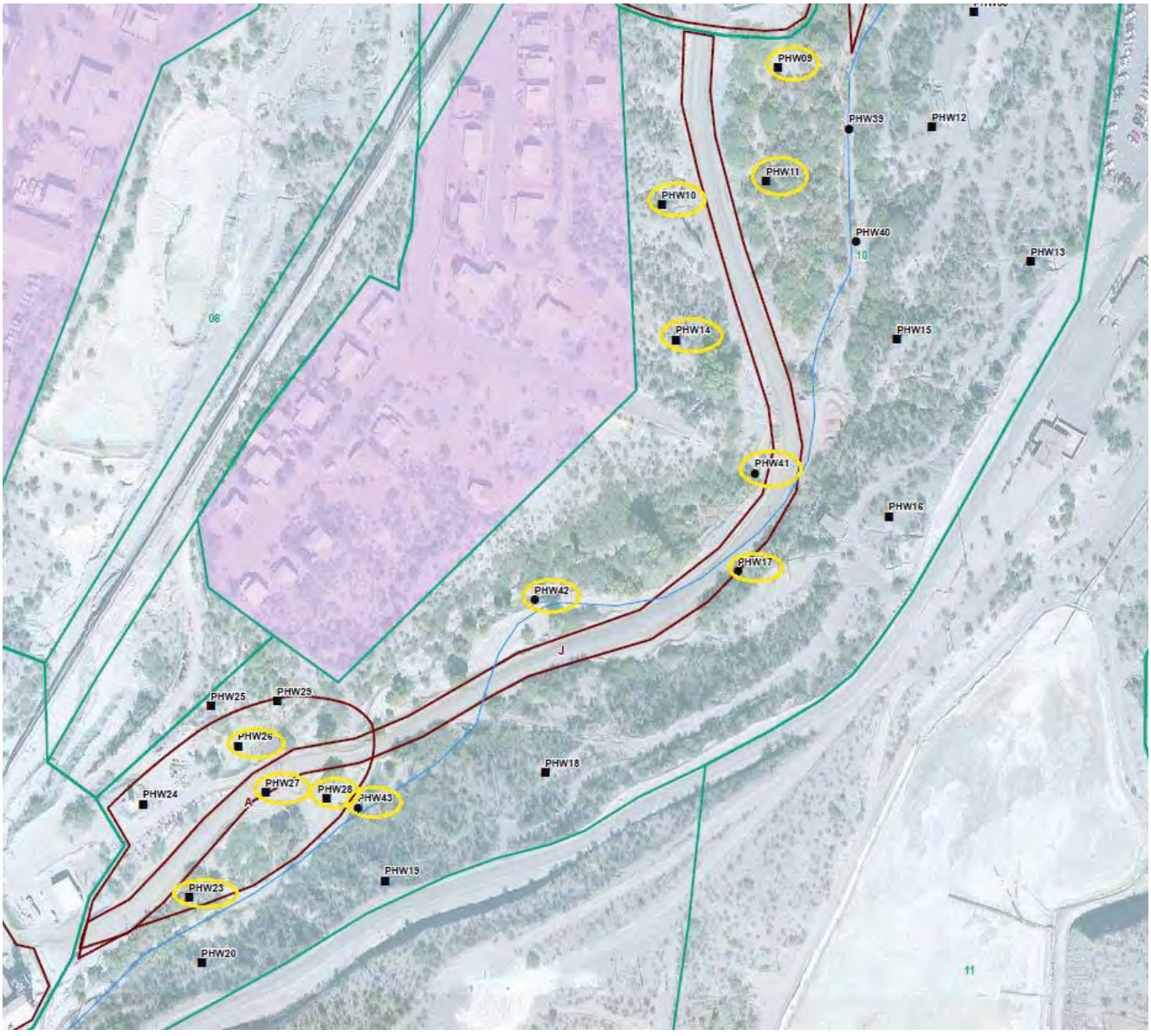


Figure 10-5: Concentrator Access Road (1/2)

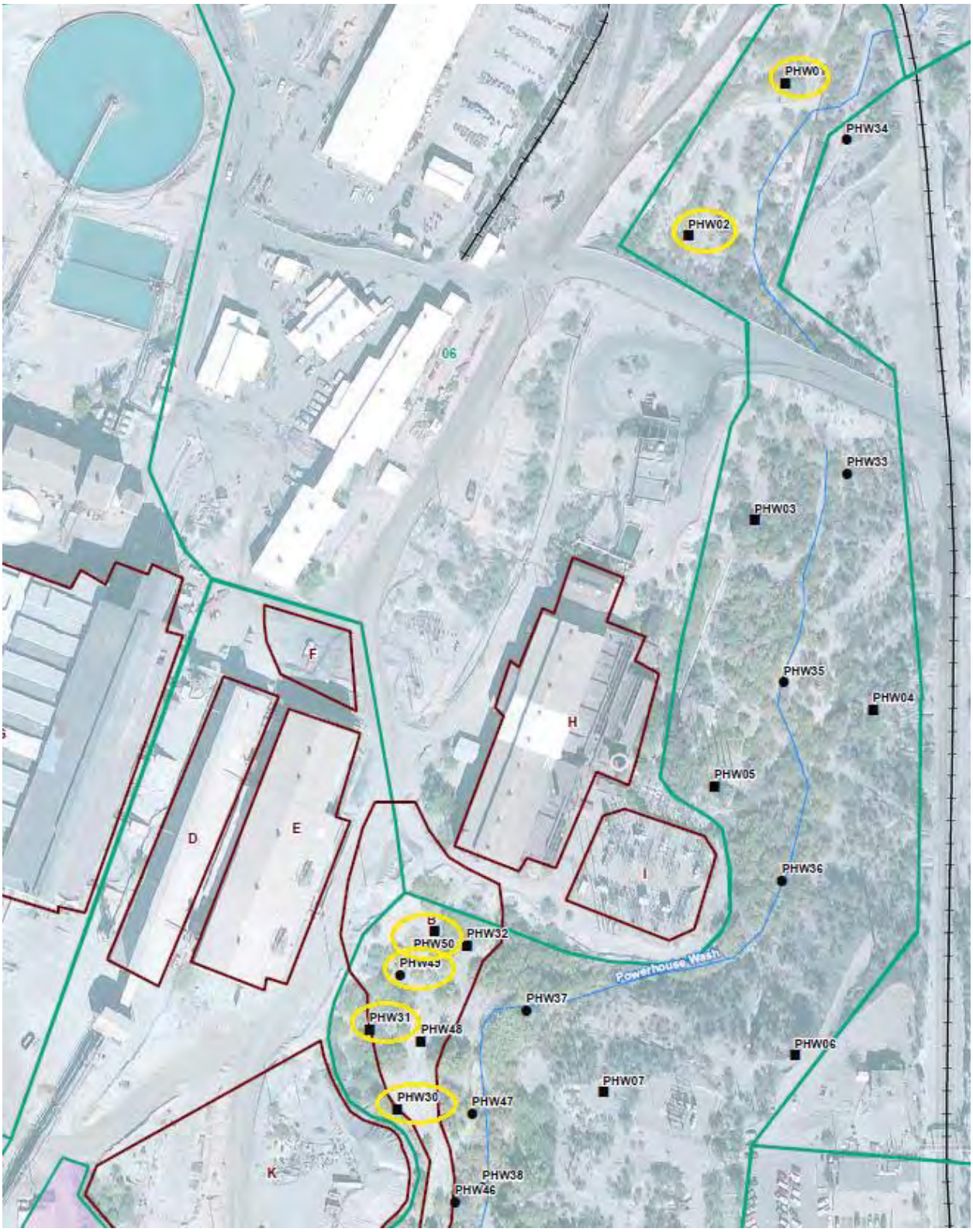


Figure 10-6: Concentrator Access Road (2/2)

The sample locations chosen for this analysis are circled in yellow. In the figures above, the area shown in Figure 5 is located south of the area in Figure 6. The only RI/FS sample taken directly from the paved road was PHW27 (based on aerial photography), all other samples are surrogates.

Table 7: Concentrator Unpaved Road Sample Results

Concentrator Unpaved Access Road	
Sample ID	**Concentration (ppm)**
PHW23	321
PHW27	77.2
PHW26	244
PHW28	153
PHW43	167
PHW42	211
PHW17	171
PHW41	213
PHW14	473
PHW11	159
PHW10	362
PHW09	125
PHW30	54.5
PHW31	78.4
PHW49	185
PHW50	85.2
PHW02	432
PHW01	210
Max Sample	**473**
Min Sample	**54.5**
Average	**206.7**
Samples ≥ 400 ppm	**11%**

Results & Conclusion

As seen in table 5, the majority of adjacent/on road samples at the slag dump and concentrate storage area are over the 400 ppm criteria. In addition, the average of the adjacent/on road samples from the smelter support area and concentrator access road are roughly half of the 400 ppm criteria.

A limitation of this analysis is relating soil concentrations to ambient air concentrations. A more accurate way to conduct this analysis would have been to use results from the resuspension analysis done for the RI/FS. This analysis found the percent mass of lead in the 10 and 2.5 micron range, after a sample had been artificially re-suspended in a lab. However, not all roads (and no unpaved roads) were considered in said analysis. The connection made between the two mediums (soil and air) in this analysis is more simplified. And can be summarized as, the higher the lead concentration in the soil, the more of a threat said soil poses to ambient air.

TAU believes the results in Table 5 are a product of proximity to high lead sources. Moreover, given these results, TAU is comfortable moving forward with its SIP model including the slag dump and concentrate storage area and considering the remaining two unpaved roads de minimis.

Table 8: Summary Table

Summary Table				
Unpaved Road	**Samples ≥ 400 ppm**	**Average**	**Max Sample**	**Min Sample**
Slag Dump	67%	732.0	3800	14
Concentrate Storage	83%	1217.3	3900	67
Smelter Support Area	9%	236.4	900	13
Concentrator Access Road	11%	206.7	473	54.5

10.8 Appendix H: Ambient Air Boundary

1. Overview

On Thursday, February 23rd Arizona Department of Environmental Quality (ADEQ) personnel performed an on-site tour of the ambient air boundary (AAB) used for the Hayden SO_2 and Pb nonattainment plans. During this tour ADEQ personnel traveled and documented the portions of the AAB that were reasonably accessible. Figure 1-1 details the approximate locations along the AAB that were visited. Section 2 provides some of the photographs taken during this visit along with descriptive annotations. The location numbers correspond to the locations displayed in Figure 1-1 and indicate the approximate location where the photos were taken. Also, where appropriate ADEQ has included drawings on the photos to indicate the approximate location of the AAB where no fencing is present.

In general, upon visiting the site and inspecting the AAB, ADEQ concurs with the AAB assessment provided by Asarco[15] and agrees that the boundary represents a practical ability to preclude public access. The portions of the AAB that are nearest to the town of Hayden are fenced, and the portions of the AAB that are not fenced are remote and far from any publicly accessed road.

In evaluating the AAB, ADEQ considered the definition of "ambient air" as "that portion of the atmosphere, external to buildings, to which the general public has access[16]". ADEQ believes that the combination of fencing, terrain, and remoteness is appropriate for delineating the AAB as it precludes access by the general public. Additionally, any individual attempting to gain access would have to scale fences or traverse difficult terrain and open desert. Furthermore, such individual would be intercepted by Asarco security and removed from the site immediately.

[15] See Hayden SO_2 Modeling Technical Support Document Appendix C.
[16] A.A.C. R18-2-101(14)

Figure 1: Approximate Locations Along the AAB that Were Visited



2. Annotated Photos

Figure 2-1: Location #1

	Looking north-northeast. Shows general location where fencing ends. Fence continues down slope and terminates at a set of railroad tracks. AAB runs along fence line.
	Looking north. View from location where fencing ends showing railroad tracks and current concentrate storage area in background. Yellow dotted line added to indicate approximate location of AAB.

	Looking south. Typical fencing used along AAB through the town of Hayden. AAB runs along fence line.

Figure 2-2: Location #2

	Looking north. Located just east of Hayden Post Office. Typical fencing used along AAB through the town of Hayden. AAB runs along fence line.

Figure 2-3: Location #3



Looking east. Fencing runs from left side of image (obscured by bush) and continues downslope into thick vegetation.

Yellow dotted line added to indicate approximate location of fence and AAB.

Figure 2-4: Location #4

	Looking west. Fencing and gate leading to secondary crusher. AAB not visible in this view, as boundary is located further north (right side of image). The AAB runs across a ravine and this location represented the nearest ingress point.
	Looking east. Main entrance to the secondary crusher. AAB not visible in this view, as boundary is located further north (left side of image). The AAB runs across a ravine and this location represented the nearest ingress point.

Figure 2-5: Location #5

	Looking northeast. Fencing ends at drainage pipe located at bottom of ravine. AAB not visible in this view, as boundary is located further north (left side of image). The AAB runs across a ravine and this location represented the nearest ingress point.

Figure 2-6: Location #6

	Looking west. View across ravine which runs north-south along road to smelter employee parking lot. AAB not visible in this view, as boundary is located further north (right side of image).

Figure 2-7: Location #7

	Looking south. Fencing along south side of smelter parking lot. In background, fencing can be seen that runs around water retention basin. AAB runs along fence line.

Figure 2-8: Location #8

	Looking south. Looking through barbed wire topped fence. In background fence which runs around water retention basin. AAB runs along fence line.
	Looking east. Barbed wire topped fence continues to location #9. AAB runs along fence line.

Figure 2-9: Location #9



Looking east. This location is near terminus of barbed wire topped fencing shown at location #8. Steep slope and berm provides significant impedance to access.

Yellow dotted line added to indicate approximate location of AAB boundary.

Figure 2-10: Location #10



Looking southwest. View of contractor access road with slag dump to the right.

Yellow dotted line added to indicate approximate location of AAB boundary.

	Looking northeast. Contractor parking area with bolder used to restrict vehicle access. Slag dump and water retention basin in background. Yellow dotted line added to indicate approximate location of AAB boundary.
	Looking west. Image taken from water retention basin with view of slag dump. Asarco employee in background for perspective. Yellow dotted line added to indicate approximate location of AAB boundary.

Figure 2-11: Location #11

	Looking east. This view captures the general area that was added to AAB due to Asarco's land purchase. AAB boundary lies beyond the hills in this image.
	Looking north. This view captures the general area that was added to AAB due to Asarco's land purchase. AAB boundary lies beyond the hills in this image.

Figure 2-12: Location #12

	Looking south. View from concentrate storage area towards location #1 where fencing ends. Ravine with train tracks visible. Yellow dotted line added to indicate approximate location of AAB. Line starts where fencing ends.
	Looking north. View of concentrate and lime (white substance) storage area. Yellow dotted line added to indicate approximate location of AAB. AAB runs north from location #1 to approximate location of lime storage then follows roadway (not visible).

Figure 2-13: Location #13

	Looking northeast. View of mountain ridge which runs along the northeast and eastern side of AAB. Yellow dotted line added to indicate approximate location of AAB.
	Looking southwest. View of roadway that is used to demarcate the northwestern edge of AAB. Yellow dotted line added to indicate approximate location of AAB.

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ADEQ
Arizona Department
of Environmental Quality

Appendix C
Copies of SIP Regulations

Draft Notice of Final Rulemaking

Published Notice of Proposed Rulemaking

Air Quality Division
March 2, 2017

NOTICE OF FINAL RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL

PREAMBLE

1. Article, Part, or Section Affected (as applicable)	**Rulemaking Action**
R18-2-715	Amend
R18-2-715.01	Amend
R18-2-715.02	Amend
Article 13	New Article
R18-2-B1301	New Section
R18-2-B1301.01	New Section
R18-2-B1302	New Section
R18-2-C1301	New Section (Reserved)
R18-2-C1302	New Section
Appendix 14	New Appendix
Appendix 15	New Appendix

2. Citations to the agency's statutory rulemaking authority to include both the authorizing statute (general) and the implementing statute (specific):

Authorizing statute: A.R.S. §§ 49-104(A)(10), 49-404(A)

Implementing statute: A.R.S. § 49-425(A)

3. The effective date of the rule:

a. If the agency selected a date earlier than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the earlier date and state the reason or reasons the agency selected the earlier effective date as provided in A.R.S. § 41-1032(A)(1) through (5):

Not applicable

b. If the agency selected a date later than the 60 day effective date as specified in A.R.S. § 41-1032(A), include the later date and state the reason or reasons the agency selected the later effective date as provided in A.R.S. § 41-1032(B):

The effective date of R18-2-B1301 and –B1302 is on the earlier of July 1, 2018 or 180 calendar days after completion of all Converter Retrofit Project improvements authorized by Significant Permit Revision No. 60647.

The effective date of R18-2-B1301.01 is December 1, 2018.

The effective date of R18-2-C1302 is on the later of the effective date of the Administrator's action approving it as part of the state implementation plan or January 1, 2018.

The Arizona Department of Environmental Quality is requesting effective dates that are later than the 60 day effective date as specified in A.R.S. § 41-1032(A). An effective date later than the 60 day effective date is necessary to allow the owners/operators of the facilities subject to the rules to complete construction to comply with the new rules

4. Citations to all related notices published in the *Register* as specified in R1-1-409(A) that pertain to the record of the final rulemaking package:

Notice of Rulemaking Docket Opening: 22 A.A.R. 3336

Notice of Proposed Rulemaking: 22 A.A.R. 3279

5. The agency's contact person who can answer questions about the rulemaking:

For the rules applicable to the Hayden Lead Nonattainment Area:

Name: Natalie Muilenberg
Address: Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington St.
Phoenix, AZ 85007

Telephone: (602) 771-1089

Fax: (602) 771-2299

E-mail: nm3@azdeq.gov

Web site: www.azdeq.gov

For the Article 7 amendments and rules applicable to the Hayden and Miami Sulfur Dioxide Nonattainment Areas:

Name: Lisa Tomczak
Address: Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington St.
Phoenix, AZ 85007

Telephone: (602) 771-4450

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6. An agency's justification and reason why a rule should be made, amended, repealed or renumbered, to

include an explanation about the rulemaking:

Summary.

The Arizona Department of Environmental Quality (ADEQ) is amending R18-2-715, -715.01, and -715.02. ADEQ is also adding a new Article with new rules applicable to two copper smelters: one located in Hayden, Gila County, and one located in Miami, Gila County.

The purpose of this final rulemaking is to control lead and sulfur dioxide air pollution in Hayden and sulfur dioxide pollution in Miami as part of the State Implementation Plan (SIP) program under the federal Clean Air Act (CAA).

The rules will be submitted to the U.S. Environmental Protection Agency (EPA) with a revision to Arizona's SIP for the Hayden lead nonattainment area, the Hayden sulfur dioxide nonattainment area, and the Miami sulfur dioxide nonattainment area. A.R.S. § 41-1038 is not applicable to this rulemaking because the failure to take such rulemaking action would result in sanctions under CAA Section 179.

Background.

Hayden lead nonattainment area

In 2008, EPA revised the nearly 40-year-old air quality standards for lead, strengthening them by almost 90 percent. 73 *Fed. Reg.* 66964 (2008). The maximum allowable level of lead in ambient air is a rolling three-month average of 0.15 micrograms per cubic meter ($\mu g/m^3$) evaluated over a three-year period. EPA reviewed and synthesized over 6,000 international studies that covered a broad range of human health and environmental impacts of lead air pollution. EPA tightened the standards to "provide increased protection for children and other at-risk populations against an array of adverse health effects, most notably including neurological effects in children." 73 *Fed. Reg.* 66964, 66965 (2008).

The promulgation of the 2008 lead National Ambient Air Quality Standards (NAAQS) requires states to subsequently submit boundary designations to EPA of areas that meet the standards ("attainment"), do not meet the standards ("nonattainment"), and cannot be classified. These designation recommendations must be submitted to EPA no later than one year after the promulgation of a new NAAQS, and EPA is required to complete designations within two years of promulgation.

In December of 2009, ADEQ recommended to EPA that most of Arizona be designated unclassified/attainment for the 2008 lead NAAQS. At the time, a violation of the NAAQS was recorded at one of EPA's CERCLA/Superfund ambient air monitors near a copper smelter in Hayden currently owned and operated by ASARCO LLC (Asarco). ADEQ requested that EPA delay its designation of the Hayden area because Asarco committed to improve its control of lead emissions in the future. ADEQ recommended that if the Hayden area continued to violate the NAAQS in 2010, it should be designated nonattainment.

After receiving ADEQ's recommendation, EPA conducted a technical analysis on the Hayden area, investigating the sources of lead emissions, topography, meteorology, and data from the violating air quality monitor. In 2010, EPA proposed to designate the Hayden area as nonattainment using air quality data from the violating CERCLA/Superfund monitor. However, commenters challenged the designation because EPA used data from a monitor that was not part of the State and Local Air Monitoring Stations (SLAMS) network and not collected in accordance with quality control and quality assurance requirements. 79 *Fed. Reg.* 25077, 25079 (2014). In response, EPA designated the Hayden area as unclassifiable in 2011 until sufficient data could be collected by a SLAMS monitor in accordance with federal requirements. Later in 2012, Asarco installed a baghouse on the anode furnace to curb particulate and lead emissions from the smelter.

Finally, in 2014, EPA redesignated the Hayden area from unclassifiable to nonattainment after several violations were recorded at ADEQ's Globe Highway SLAMS monitor. 79 *Fed. Reg*. 52205 (2014). The boundaries of the nonattainment area matched those of the Hayden sulfur dioxide nonattainment area, located in both Gila and Pinal Counties. The area's nonattainment designation triggers planning and control requirements under the CAA to bring the area to attainment as expeditiously as practicable.

In 2015, Asarco entered into a consent decree with EPA (see Consent Decree No. CV-15-02206-PHX-DLR) to settle a civil enforcement action. The action alleged that that ASARCO had violated, and continued to violate, the National Emission Standards for Hazardous Air Pollutants ("NESHAP") for Primary Copper Smelting, 40 C.F.R. Part 63, Subpart QQQ. To comply with the consent decree, Asarco will spend over $150 million to reduce emissions at its smelter and lead concentrations in the ambient air of the surrounding Town of Hayden. Control equipment installation and retrofit requirements in the consent decree are also part of the control strategy for the Hayden area's SIP revision and this rulemaking.

Asarco's copper smelter is one of three in the United States and has been operating since the early 1900s, around the same time the Town of Hayden was established. In general, Asarco's smelter produces copper anodes using an INCO flash furnace smelter, Peirce-Smith batch converters, and anode refining technologies. First, copper concentrate is produced from several of Asarco's mining and milling facilities and transported to the Asarco Hayden Smelter for further refining. Some concentrate may also be custom smelted on behalf of other companies. The concentrate is mixed with flux in the bedding plant and then routed to fluidized bed dryers for drying.

Once dried, the copper concentrate is next introduced into the INCO flash furnace with oxygen enriched air, where it is flash smelted and separates into a heavier copper-bearing matte layer and a lighter slag layer. The lighter slag layer is skimmed into a pot which is transported to the slag dump for deposition. The molten matte is tapped from the flash furnace and is poured into a ladle that transfers it to the converter furnace for further refining.

At the converter furnaces, each batch of matte goes through a series of blowing cycles that drive off the remaining sulfur and other impurities and produce blister copper. From the converters, the molten blister copper is transferred to the anode furnace where it is reduced with natural gas and poured into anode molds for shipment to Asarco's refinery in Amarillo, Texas.

Lead is an impurity that is naturally occurring in the copper ore that is mined and in the copper concentrate that is produced. Lead has the potential to be emitted from the smelting processes in gaseous and particulate form. Smelting process emissions can occur from the INCO flash furnace, the converters, and the anode furnaces. All process emissions are already controlled by either process gas cleaning systems, electrostatic precipitators, or baghouses. However, not all emissions are captured; some are emitted into the atmosphere as process fugitive emissions. Process fugitive emissions occur from matte tapping and slag skimming at the flash furnace, the converters, and anode furnace and anode casting operations. In addition to process fugitive emissions, lead, in the form of particulate matter, is emitted by dust-causing sources. At Asarco's Hayden operations, fugitive leaded dust is generated from sources like open-air concentrate storage and handling, slag pouring, reverts storage and handling, and roadways.

ADEQ's analysis concluded that Asarco's Hayden Operations is the primary source of lead emissions within the Hayden lead nonattainment area, thus, planning and rulemaking efforts are focused on the facility.

Ultimately, ADEQ's planning and rulemaking efforts aim to improve air quality in the Hayden lead nonattainment area to protect human health and the environment. ADEQ also recognizes Asarco's role and contributions to Hayden's local economy, which is historically built on copper mining and smelting, and intends to provide enough flexibility for the facility's successful operation.

Hayden and Miami sulfur dioxide nonattainment areas

The Hayden and Miami areas were designated as nonattainment for sulfur dioxide in 1979 due to violations of the 1971 sulfur dioxide NAAQS. In 1979, Arizona adopted rules to lower sulfur dioxide emissions from the smelters. The State of Arizona submitted revisions to its SIP to EPA on September 20, 1979; January 10, 1980; and September 10, 1980. The revisions consisted of a demonstration of good engineering practice (GEP) stack height for the copper smelter in Hayden, Arizona, and the application of multi-point rollback (MPR) in establishing sulfur dioxide emissions limits. EPA published a notice of proposed rulemaking on November 30, 1981, conditionally approving Arizona's submittals. 46 *Fed. Reg.* 58098 (1981). On June 3, 1982, Arizona submitted a SIP revision to satisfy the conditional approval and Arizona's demonstration of MPR. The MPR rules, which established stack emission limits for the smelters, were approved by EPA on January 14, 1983. 48 *Fed. Feg.* 1717 (1983).

Following EPA's approval of the rule, the smelters began to implement improved process and control technology. In August 1991, the owner and operator of the Miami smelter submitted a study to ADEQ to partially fulfill outstanding SIP commitments for analysis of fugitive emissions. The study was implemented to describe sulfur dioxide fugitive emission units and provide an estimate of fugitive emissions during typical smelter operation. On April 11, 1996, Asarco submitted the results of a fugitive sulfur dioxide emissions study to ADEQ to fulfill outstanding SIP commitments for analysis of fugitive emissions.

To meet CAA requirements for redesignation and demonstrate continued attainment of air quality standards, air quality analyses were performed for the smelters during the time period 2001 – 2002. These analyses used maximum actual emissions (both stack and fugitive) in relation to resulting ambient concentrations and showed that the smelters were not expected to cause or contribute to a violation of the 1971 sulfur dioxide standards. In 2002, ADEQ conducted two rulemakings adopting new limits for the smelters. These rulemakings were finalized in R18-2-715(F), (G), and (H) along with corresponding changes to compliance and monitoring procedures in R18-2-715.01.

In 2004, ADEQ made several technical and administrative changes to A.A.C. Title 18, Chapter 2, Appendix 8 to clarify procedures for calculating material balance for sulfur applicable to three copper smelters: one located in Hayden, Gila County (currently owned by Asarco); one located in Miami, Gila County (currently owned by Freeport McMoRan-Miami Inc.); and one located in San Manuel, Pinal County. In 2006, ADEQ revised R18-2-715 to account for the shutdown of the smelter located in San Manuel and the March 2005 termination of its permit by deleting all references to the smelter from the rule.

On June 22, 2010, EPA replaced the existing annual and 24-hour primary sulfur dioxide NAAQS with a new 1-hour sulfur dioxide standard set at a level of 75 parts per billion (ppb) to better protect public health by reducing public exposure to elevated short-term concentrations of sulfur dioxide. 75 *Fed. Reg.* 35520 (2010). The EPA revoked both the annual and 24-hour primary sulfur dioxide NAAQS. On August 5, 2013, EPA published the final designation of both the Hayden and Miami planning area as nonattainment for the 2010 sulfur dioxide NAAQS. 78 *Fed. Reg.* 47191 (2013).

Regulatory requirements

To satisfy CAA requirements under Section 110 and Part D, ADEQ must develop and submit to EPA revisions to Arizona's SIP for the Hayden lead nonattainment area, Hayden sulfur dioxide nonattainment area, and Miami sulfur dioxide nonattainment area within 18 months of designation. The SIP revision must provide for the attainment of the 2008 lead NAAQS and 2010 sulfur dioxide NAAQS by containing, among other requirements:

1. Provisions to assure that reasonably available control measures are implemented;

2. A demonstration through air quality modeling that the plan will provide for attainment of the NAAQS as expeditiously as practicable, but no later than five years after the area's designation as nonattainment;

3. Provisions that result in reasonable further progress toward timely attainment through adherence to an ambitious compliance schedule;

4. Contingency measures that are to be implemented if the area fails to meet attainment or its reasonable further progress milestones; and

5. A permit program meeting the requirements of CAA Section 173 governing the construction and operation of new lead sources in the area.

As part of the SIP revision and in order to provide a successful strategy that will bring the Hayden and Miami areas into attainment, ADEQ will be submitting these rules to EPA, making them federally enforceable under Arizona's SIP. The rules set emission limits, control requirements, and compliance methods for the Asarco copper smelter in the Hayden lead and Hayden sulfur dioxide nonattainment areas and the Freeport-McMoRan Miami Inc. copper smelter in the Miami sulfur dioxide nonattainment area.

Section by Section Explanation of Proposed Rules:

Arizona is revising its rules for sulfur dioxide (R18-2-715 and -715.01) and adding a new Article to incorporate specific rules for the Hayden and Miami nonattainment areas. The current rules for sulfur dioxide (R18-2-715, -715.01, and -715.02) are being amended to clarify the applicability of the rules to the appropriate planning area and to revise incorrect references. The new rules will be included in Article 13, which contained the rules for the state's terminated diesel conversion grant program, expired under A.R.S. § 41-1056(J) on April 30, 2013.

Hayden lead nonattainment area

Rule R18-2-B1301 primarily sets an emission limit and control requirements for Asarco's copper smelter. The new emission limit will ensure that the smelter's lead emissions will not cause or contribute to violations of the 2008 lead NAAQS. Within the rule, operational standards, monitoring requirements, compliance demonstration procedures, and recordkeeping/reporting requirements are tailored specifically for the smelter with the aim to reduce lead emissions. ADEQ conducted modeling to demonstrate future attainment of the 2008 lead NAAQS using the emission limits required by this rule.

Rule R18-2-B1301.01 sets control requirements for lead-bearing fugitive dust sources within Asarco's Hayden operations. To comply with the rule, Asarco must develop a fugitive dust plan that addresses controls and compliance requirements for sources like paved and unpaved roads, concentrate storage, and reverts crushing. The rule also sets specific housekeeping requirements for such sources to control lead-

bearing fugitive dust. The rule includes other requirements like recordkeeping, reporting, and a contingency measure should the area fail to attain.

Hayden and Miami sulfur dioxide nonattainment areas

Rule R18-2-B1302 sets control requirements and emission limits for sulfur dioxide for Asarco's Hayden operations. Rule R18-2-C1302 sets control requirements and emission limits for sulfur dioxide for Freeport-McMoRan Miami Inc. Miami operations.

The sulfur dioxide NAAQS promulgated by EPA in 2010 adopted a new level, averaging time, and form of the primary standard. To comply with the new standard, control measures must be implemented that will lower emissions of sulfur dioxide sufficient for an area to attain the NAAQS. On April 23, 2014 EPA issued final guidance to assist agencies with the development of SIPs to comply with the new standard and CAA requirements. The guidance provided an approach whereby emission limits based on averaging times longer than one hour could be imposed as long as the limits reflect comparable stringency to a 1-hour critical emissions value (CEV). The CEV is the hourly emission rate that the model predicts would result in the five-year average of the annual 99th percentile of the daily maximum hourly sulfur dioxide concentrations at the level of the NAAQS. The approach requires that the source's hourly emissions are effectively measured and that adequate assurance of attainment is evaluated through performance of a dispersion modeling analysis. The attainment modeling performed for the Hayden and Miami smelters evaluates emission limits with averaging times that are longer than one hour and demonstrates comparable stringency to a 1-hour CEV.

Due to differences in operations, Asarco and Freeport-McMoRan Miami Inc. are implementing control measures unique to each facility. The varied nature of the operations at the Hayden and Miami smelters require rules tailored to their specific operations in order for each area to meet the 2010 sulfur dioxide NAAQS. The new limits for both smelters also require minor changes to the compliance and monitoring provisions.

7. A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

Hayden lead nonattainment area

Arizona Department of Environmental Quality. (2016). "Modeling Technical Support Document for the Hayden lead (lead) Nonattainment Area."

Hayden sulfur dioxide nonattainment area

Arizona Department of Environmental Quality and Asarco LLC. (2016). "Modeling Technical Support Document for the Hayden Sulfur Dioxide (SO_2) Nonattainment Area."

Miami sulfur dioxide nonattainment area

Arizona Department of Environmental Quality and Freeport-McMoRan Copper and Gold Inc. (2016). "Miami Sulfur Dioxide Nonattainment Area SIP Revision Attainment Demonstration Technical Support Document."

All documents are available for the public to review, Monday through Friday, 8:30 a.m. – 4:30 p.m., at the ADEQ Records Center located at:
1110 W Washington St
Phoenix, AZ 85007

For more information, contact the Records Center at (602) 771-4380 or recordscenter@azdeq.gov.

8. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:

This rulemaking does not diminish a previous grant of authority of a political subdivision of this state.

9. A summary of the economic, small business, and consumer impact:

The following discussion addresses each of the elements required for an economic, small business, and consumer impact statement (EIS) under A.R.S. § 41-1055.

An identification of the rule making.

The rulemaking addressed by this EIS consists of new rules added to the new Article 13 (R18-2-B1301; R18-2-B1301.01; R18-2-B1302; R18-2-C1301 (Reserved), and R18-2-C1302). The purpose of the amendments and new rulemaking is to bring nonattainment areas in the State of Arizona into compliance with new air quality standards for lead and sulfur dioxide pollution.

This EIS addresses the impact of the 2008 lead NAAQS and the 2010 sulfur dioxide NAAQS that requires the owner and operators of copper smelters, Asarco and Freeport-McMoRan Miami Inc., to install new and improved air pollution control equipment, apply for a new permit, and comply with new emission limits. The new NAAQS may result in increased compliance costs for Asarco and Freeport-McMoRan Miami Inc. and minor increased administrative costs for ADEQ.

An identification of the persons who will be directly affected by, bear the costs of or directly benefit from the rule making.

The persons who will be directly affected by and bear the costs of this rulemaking are the owners and operators of the Miami and Hayden Smelters, which are Freeport-McMoRan Miami Inc. and Asarco, respectively. There are no other smelting facilities in the state of Arizona affected by this rulemaking.

The persons who will benefit from this rulemaking are the residents of Hayden and Miami, as well as the employees of Asarco and Freeport-McMoRan Miami Inc., due to the improved air quality that will result from this rulemaking and the corresponding control technology Asarco and Freeport-McMoRan Miami Inc.

will be implementing to control lead and sulfur dioxide pollution.

A cost benefit analysis of the following:

(a) The probable costs and benefits to the implementing agency and other agencies directly affected by the implementation and enforcement of the rule making.

ADEQ estimates that the current number of full-time employees assigned in the Permits and Compliance Sections of the Air Quality Division at ADEQ are adequate to implement and enforce the 2008 lead NAAQS in the Hayden nonattainment area and the 2010 sulfur dioxide NAAQS in the Hayden and Miami nonattainment areas. The costs of the rules to the implementing agency will therefore be minimal. Furthermore, permits for sources in the nonattainment areas are revised every five years, with minor revisions occurring periodically. Under A.A.C. R18-2-301(2) and R18-2-326(B)(1)(a), the permit applicant—in this case, Asarco and Freeport-McMoRan Miami Inc.—will ultimately be required to reimburse ADEQ for the cost of revisions as part of permit fees.

ADEQ has permitting, enforcement, and compliance jurisdiction in the Hayden and Miami nonattainment areas, and therefore, no other state agencies will be affected by this rulemaking.

(b) The probable costs and benefits to a political subdivision of this state directly affected by the implementation and enforcement of the rule making.

No political subdivision of the state operates a smelter of metal ore like copper. Under A.R.S. § 49-402(A)(2), ADEQ has original jurisdiction over all "sources, permits, and violations which pertain to…smelting of metal ore." The costs of enforcing these new rules applicable to the Asarco and Freeport-McMoRan Miami Inc. copper smelters are likely to be minimal and will be recoverable through permit fees acquired from Asarco and Freeport-McMoRan Miami Inc.

(c) The probable costs and benefits to businesses directly affected by the rule making, including any anticipated effect on the revenues or payroll expenditures of employers who are subject to the rule making.

The rules that are the subject of this preamble and EIS are necessary to comply with federal requirements for the SIP program under the CAA. If ADEQ fails to adopt these rules, the federal requirements will apply to the copper smelters through the adoption of a Federal Implementation Plan (FIP) issued by EPA under Section 110(c) of the CAA. However, the issuance of a FIP would likely require more strict emission limits and controls for the copper smelters, and further delay the areas' attainment of the lead and sulfur dioxide NAAQS as expeditiously as practicable, as required by the CAA.

If ADEQ fails to submit approvable SIPs, the nonattainment areas would be subject to sanctions under CAA Section 179(b), which can include a prohibition of highway funds and emission offsets requirements for other facilities. Therefore this rulemaking is an effort to not only curb air pollution in

Arizona, but to also avoid federal consequences.

Lead and sulfur dioxide pollution cause extreme health risks and burdensome healthcare costs. Such related costs and benefits obtained from controlling lead and sulfur dioxide pollution are discussed further below.

The effects of lead air pollution

According to EPA, lead is emitted into the air from a wide variety of source types. 73 *Fed. Reg.* 29184, 29190 (2008). Source types include aviation fuel, industrial boilers, iron and steel foundries, and metal ore smelters. Once deposited out of the air, lead can be disturbed and re-suspended into the air. For example, if dust containing particles of lead settles on a road, the lead can become airborne when a truck drives on the road. Lead pollution in the air can be exceptionally troublesome due to its ease of transport in smaller particle sizes. Lead also subsists in the environment for a very long time, making full remediation difficult.

Lead can enter the human body through many routes, but it is primarily inhaled when it is a component of air pollution. In its review of scientific literature for the 2008 lead NAAQS, EPA examined air-related lead exposure through:

1. Inhalation of airborne lead, including re-suspended lead particles

2. Ingestion of lead deposited as indoor or outdoor dust or soil, dietary items (like crops and livestock), and drinking water

EPA recognizes that "lead has been demonstrated to exert 'a broad array of deleterious effects on multiple organ systems via widely diverse mechanisms of action.'" 73 *Fed. Reg.* 29184, 29197 (2008). Furthermore, a "safe" level of lead in the human body that causes little to no harm has yet to be determined. In promulgating the 2008 lead NAAQS, EPA focused primarily on neurological effects in children and cardiovascular effects in adults that "are currently clearly of greatest public health concern."

Health experts agree that the developing nervous system of a child is the most sensitive to lead exposure. EPA states, "Functional manifestations of lead neurotoxicity during childhood include sensory, motor, cognitive, and behavioral impacts." 73 *Fed. Reg.* 29184, 29198 (2008). Studies have observed lower IQ, reduced academic achievement, and decreased graduation rates in adolescents exposed to lead. Lead exposure is associated with more negative ratings by teachers and/or parents for children exhibiting inattentiveness, impulsivity, distractibility, and lack of concentration. Higher concentrations of lead in the blood are also linked to impaired memory and visual-spatial skills.

Additional studies show early exposure to lead in adolescents may result in an increased likelihood of antisocial and criminal behavior later in life. Since children are exposed to lead early, it has more time to accumulate in the blood supply and bones, hindering overall development and growth.

Lead exposure in adults can cause coronary heart disease, strokes, premature death, and hypertension. Furthermore, lead bioaccumulates in the body, causing persistent, long-term health problems. Lead exposure can also cause kidney disease, anemia, decreased sperm count, increased blood pressure, and interference with vitamin D metabolism. In the body of a pregnant woman, lead can easily cross the placenta, resulting in continued fetal exposure during pregnancy with lasting neurological impacts after birth. Pregnant women who are exposed to even low levels of lead are at high risk for premature birth.

Other symptoms caused by lead exposure include: irritability; shortened attention span; fatigue; impaired growth; loss of appetite; learning disabilities; headaches; seizures; nausea and vomiting; and severe abdominal pain.

A discussion of the monetary costs and health-based benefits of the proposed rulemaking for lead follows.

Lead emissions controls and costs

The CAA prohibits the EPA from considering costs in setting or revising the NAAQS for any pollutant. However, in promulgating the 2008 lead NAAQS, EPA analyzed the associated costs for pollution control equipment and benefits associated with improved public health. EPA estimates that full implementation of the lead NAAQS by sources across the U.S. in 2016 alone would cost approximately $150 million to $2.8 billion. The health benefits far outweigh these costs, estimated between $3.8 billion to $6.9 billion. 73 ***Fed. Reg.*** 66964 (2008).

As part of the consent decree, Asarco will implement the Converter Retrofit Project at its Hayden copper smelter to reduce lead and sulfur dioxide emissions. The project will replace the existing five 13-foot diameter copper converters with three 15-foot diameter converters that operate more efficiently. Improved primary and secondary hooded ventilation systems will also be installed above the smelting equipment to capture process off-gases. A new tertiary hooding system will further prevent emissions from escaping the smelting building. An upgraded vent gas baghouse will collect particulate and gaseous emissions coming from the converter dryers and flash furnace.

In addition to the Converter Retrofit Project, Asarco will also be implementing additional control technology for leaded fugitive dust sources. For example, solids from the acid plant scrubbers that process emissions from the flash furnace and copper converters will be dried in a fully enclosed system that is maintained under negative pressure instead of being dried in open piles outside. Materials like

concentrate and reverts will no longer be stored in open piles outside, but rather on concrete pads with fences to block the wind and water sprays to minimize fugitive emissions. Unpaved roads will also be sprayed with chemical dust suppressants and paved roads will be sprayed with water to control leaded dust emissions. In addition to complying with the consent decree, these modifications will also contribute to the control strategy for the Hayden lead nonattainment area SIP.

In 2015, Asarco's Hayden operations emitted over three tons of lead emissions. In 2019, that amount is projected to decrease by half to roughly 1.5 tons. The cost of the retrofit project is estimated to be $110 million.

Benefits of lead emissions controls

The primary benefit of installing the emissions control technologies is an overall reduction in lead in ambient air, which in turn, decreases health and welfare risks from exposure.

Health issues cause more hospital stays and sick time taken from work, putting more burden on health care systems and the economy. EPA estimated between $3.8 billion to $6.9 billion of benefits can be contributed to the new lead NAAQS, reflecting public health improvements and an expected increase in lifetime earnings as a result of avoiding IQ loss.

This rulemaking will also help the State of Arizona avoid federal sanctions implemented under the CAA. If the State fails in submitting the rules and SIP revision for the Hayden lead nonattainment area, EPA has the authority to prohibit highway funding and increase costly emission offset requirements for new or modified facilities.

This rulemaking is necessary because of the health benefits derived from the improved controls implemented at the copper smelter and to avoid federal consequences.

The effects of sulfur dioxide pollution

According to the Agency for Toxic Substances and Disease Registry (ATSDR), sulfur dioxide is a colorless gas with a pungent odor. Sulfur dioxide is a liquid when under pressure; it easily dissolves in water and cannot catch fire. Sulfur dioxide in the air results primarily from activities associated with the burning of fossil fuels (coal, oil) such as at power plants or from copper smelting. Once released into the environment, sulfur dioxide moves to the air where it can convert to sulfuric acid, sulfur trioxide, and sulfates.

Short-term exposures to high levels of sulfur dioxide can be life-threatening. Exposure to 100 parts per million parts of air (ppm) is considered immediately dangerous to life and health. Previously healthy nonsmoking miners who breathed sulfur dioxide released as a result of an explosion in an underground

copper mine developed burning of the nose and throat, breathing difficulties, and severe airway obstructions. Long-term exposure to persistent levels can also affect health. Lung function changes have been observed in some workers exposed to 0.4 - 3.0 ppm of sulfur dioxide for 20 years or more. However, these workers were also exposed to other chemicals, making it difficult to attribute their health effects to sulfur dioxide exposure alone. Additionally, exercising asthmatics are sensitive to the respiratory effects of low concentrations (0.25 ppm) of sulfur dioxide.

Typical outdoor concentrations of sulfur dioxide may range from 0 to 1 ppm. Occupational exposures to sulfur dioxide may lawfully range from 0 to 5 ppm under state OSHA (Occupational Safety and Health Administration) regulations. During any 8-hour work shift of a 40-hour work week, the average concentration of sulfur dioxide in the workplace may not exceed 5 ppm.

Most of the effects of sulfur dioxide exposure that occur in adults (i.e., difficulty breathing, changes in the ability to breathe as deeply or take in as much air per breath, and burning of the nose and throat) are also of potential concern in children, but it is unknown whether children are more vulnerable to exposure. Children may be exposed to more sulfur dioxide than adults because they breathe more air for their body weight than adults do. Children also exercise more frequently than adults. Exercise increases breathing rate. This increase results in both a greater amount of sulfur dioxide in the lungs and enhanced effects on the lungs. One study suggested that a person's respiratory health, and not his or her age, determines vulnerability to the effects of breathing sulfur dioxide.

Sulfur dioxide emissions controls and costs

Freeport-McMoRan Miami Inc.

The construction work being performed at the Freeport-McMoRan Miami Inc. Miami smelter includes process changes along with environmental upgrades to achieve sulfur dioxide emission reductions so that the Miami area will meet the new ambient air quality standards. The Miami Smelter emission control upgrades include new converter mouth covers, a new Aisle Scrubber, additional capture systems, and upgrades to the Acid Plant Tail Gas and Vent Fume Scrubbers to use caustic for sulfur dioxide removal to ensure attainment of EPA’s more stringent sulfur dioxide NAAQS. At this time, the cost of the project is estimated to be $250 million.

Asarco-Hayden

The Converter Retrofit Project and associated controls discussed above for lead pollution will also greatly mitigate sulfur dioxide emissions. As mentioned earlier, the project involves replacement of the existing five 13-foot diameter converters with three 15-foot diameter converters. Corresponding modifications will be made to the converter aisle in order to accommodate the larger converters. The retrofit includes installation of a new converter primary gas system. New secondary hoods will also be

installed and designed to fit the new, larger converters and new primary hoods. The new secondary hoods will direct sulfur dioxide ventilation gases during blowing operations to the acid plant instead of a baghouse, improving control. Other upgrades include installation of a new converter aisle tertiary gas collection system, enhanced lime injection at the secondary and new vent gas baghouse to further control sulfur dioxide emissions, and improvements to the acid plant. Overall, the retrofit is projected to reduce current sulfur dioxide emissions by 90 percent, with a total sulfur dioxide capture rate of 99.5 percent of the sulfur dioxide produced during the copper smelting process. The cost of the converter retrofit project is estimated to be $110 million.

Benefits of sulfur dioxide emissions controls

One of the primary benefits of installing the emissions control technologies is an overall reduction in sulfur dioxide emissions. EPA first set health based standards for sulfur dioxide in 1971 at a 24-hour primary standard at 140 parts per billion (ppb) and an annual average standard at 30 ppb. In 1996, EPA reviewed the sulfur dioxide NAAQS and chose not to revise the standards. The 2010 revision to the sulfur dioxide NAAQS established a new one-hour standard at a level of 75 ppb. 75 *Fed. Reg.* 35520 (2010).

Lowering the standard will result in health benefits by lowering exposure to sulfur dioxide, specifically short-term exposure. Initial respiratory reactions to sulfur dioxide include narrowing of the airways in the lungs and difficulty breathing. Individuals with sensitive or comprised respiratory systems, such as children, the elderly, and individuals with respiratory related illnesses are more susceptible to these reactions. These negative reactions commonly result in increased emergency room and hospital visits. The revised NAAQS is designed to lower emissions and reduce exposure to high levels of sulfur dioxide by lowering the level of the standard and establishing new averaging time frame. EPA estimates that a level of 75 ppb for sulfur dioxide will result in cost benefits between $13 billion and $33 billion from reduced emergency room visits, hospitalizations, lost work days, and cases of aggravated asthma and bronchitis.

In addition to direct impacts, sulfur dioxide is also a precursor to particulate matter that is 2.5 micrometers in diameter, which can penetrate deep into the lungs and cause serious health effects including increases in cardiovascular illness and mortality.

Additional benefits of this rulemaking include continued oversight and control of air emissions by ADEQ. As stated earlier for lead pollution, without approval of this rulemaking and SIPs, the CAA specifies that EPA must develop a federal implementation plan (FIP) to regulate sources within the planning area. In addition to a FIP, the Hayden and Miami nonattainment areas would also be subject to highway sanctions and offsets. Highway sanctions are prohibitions on certain transportation projects or grants within the planning area. Offset sanctions are requirements for new or modified sources to

have a ratio of emissions reductions to increased emissions at a level of at least two to one. Both ADEQ and the business community will benefit from continued regulation at the state level as a result of avoiding federal sanctions.

A general description of the probable impact on private and public employment in businesses, agencies and political subdivisions of this state directly affected by the rule making.

ADEQ anticipates that employment impacts will be minor. ADEQ does not expect short- or long-term employment, production, or industrial growth in Arizona to be negatively impacted by this rulemaking. Furthermore, no sources are expected to close from the implementation of this rulemaking.

Asarco-Hayden Operations

Asarco estimates that 10 contractors and 100 full-time employees will be needed in order to complete the retrofit project. Some of the contractors will be hired for planned maintenance outages during the construction period. Roughly 50 percent of the contractors will be hired from Arizona and the other 50 percent from the Southwest in general. Procurement of equipment for the retrofit project is scheduled to begin in 2015, with full completion of the project scheduled by the fourth quarter of 2018. Asarco is not planning to create any new full or part-time positions at the company as a result of this project.

Freeport-McMoRan Miami Inc. – Miami Operations

Through the various phases of the construction project described above, Freeport-McMoRan Miami Inc. expects to have over 500 contractors/individuals working on the construction; although this number will vary over the construction period. This estimate does not include contractors required for planned maintenance outages during the same time frame. While the number of contractors required for planned maintenance outages is contingent upon the work to be completed during the outage, it usually requires between 500 and 1,000 contractors.

Because of the increased demand for contractors, Freeport-McMoRan Miami Inc. anticipates a short-term increase in employment by the contractors throughout the project. Contractors will be selected on an as needed basis; some local and specialty contractors from outside the State may be necessary. No new positions will be created within the Freeport-McMoRan Miami Inc. Miami smelter for this project.

Construction will occur in two major phases. Phase 1 started with ADEQ's approval of the smelter's significant permit revision authorizing the proposed construction. Phase 2 will begin shortly after internal approval to move forward is received and Freeport-McMoRan Miami Inc. anticipates the project will be completed eight quarters after that approval is received.

A statement of the probable impact of the rule making on small businesses.

(a) An identification of the small businesses subject to the rule making.

Under A.R.S. § 41-1001(21):

"Small business" means a concern, including its affiliates, which is [1] *independently owned and operated*, which is [2] *not dominant in its field* and which [3] *employs fewer than one hundred full-time employees or which had gross annual receipts of less than four million dollars in its last fiscal year.* (Emphasis added.)

The lead and sulfur dioxide-related rules will apply only to the companies that own and operate copper smelters in Hayden and Miami, which is currently Asarco and Freeport-McMoRan Miami Inc., respectively. These companies do not qualify as small businesses.

As of 2014, Asarco's Hayden operations employed over 600 people. Asarco is a subsidiary of Grupo Mexico, a public company, and one of the major copper producers in the world. According to its 2014 annual report, Grupo Mexico's net profit was $1.7 billion. Grupo Mexico nor Asarco's Hayden operations meet the definition of a "small business" under A.R.S. § 41-1001(21).

As of this rulemaking, Asarco currently contracts with Smithco Enterprises, LLC, an operation that processes smelter byproducts like reverts for Asarco. Smithco's business relies heavily on Asarco's copper smelter. Several control measures required by this rulemaking (and the consent decree) will apply to some of Smithco's operations. However, Asarco is paying for the control measures as part of the consent decree with EPA. Therefore, this rulemaking will not have a direct impact on Smithco.

In 2015, Freeport-McMoRan Miami Inc., also a public company and top producer of copper in the world, reported a $15.8 billion revenue. Also in 2015, its Miami mine and smelter produced 43 million pounds of copper. As of 2016, roughly 760 people are employed at Freeport's Miami operations. Freeport-McMoRan Miami Inc. Miami operations do not meet the definition of a "small business" under A.R.S. § 41-1001(21).

(b) The administrative and other costs required for compliance with the rule making.

Not applicable.

(c) A description of the methods that the agency may use to reduce the impact on small businesses.

Not applicable.

(d) The probable cost and benefit to private persons and consumers who are directly affected by the rule making.

Not applicable.

A statement of the probable effect on state revenues.

Since any costs associated with the rulemaking will be recoverable through air quality permit fees, there will be no net effect on state revenues.

A description of any less intrusive or less costly alternative methods of achieving the purpose of the rule making.

ADEQ was not able to identify any less intrusive or costly alternative methods for achieving the purpose of the rulemaking—attainment of the 2008 lead NAAQS and 2010 sulfur dioxide NAAQS. The smelters owned by Asarco and Freeport-McMoRan Miami Inc. are the primary source of emissions and are responsible for installing adequate control technologies that will bring the areas into compliance.

A description of any data on which a rule is based with a detailed explanation of how the data was obtained and why the data is acceptable data. An agency advocating that any data is acceptable data has the burden of proving that the data is acceptable. For the purposes of this paragraph, "acceptable data" means empirical, replicable and testable data as evidenced in supporting documentation, statistics, reports, studies or research.

To support the emission limits and control requirements in both rules, ADEQ conducted air quality modeling using data obtained from Asarco, Freeport-McMoRan Miami Inc., and air quality monitors. ADEQ followed EPA Guidance in conducting the modeling.

Before conducting the air quality modeling, ADEQ identified lead and sulfur dioxide pollution sources in the Hayden nonattainment area and sulfur dioxide pollution sources in the Miami nonattainment area. To do this, ADEQ obtained emissions data from EPA's National Emission Inventory (NEI). After analyzing the emissions data, ADEQ determined that no other sources or combination of sources contributed as much as the Asarco smelter in the Hayden nonattainment area and the Freeport-McMoRan Miami Inc. smelter in the Miami nonattainment area.

ADEQ used the emissions data, in addition to meteorological and topographical data, to develop emissions limits that demonstrate attainment. Since the copper smelters in both areas were identified as the primary sources of emissions, the modeling efforts concentrated on the facilities' operations. The emission limits derived from the modeling are conservative and factor in the emission control

equipment efficiency as well as peak smelter production levels.

The modeling Technical Support Documents outline ADEQ's methods, approach, and empirical results. The documents for both nonattainment areas are available for review at ADEQ's Records Center. See section 7 of this preamble for more information.

10. A description of any changes between the proposed rulemaking, to include supplemental notices, and the final rulemaking:

No substantive changes have been made to the rules. Non-substantive grammatical, formatting, and consistency changes have been made throughout the rules, including those resulting from the Governor's Regulatory Review Council.

As published in the Notice of Proposed Rulemaking, R18-2-715 and -715.01 are being amended. As a result of additional Agency review and stakeholder comments, R18-2-715.02 is also being amended. This amendment will clarify the applicability of the relevant effective dates of the rules to the appropriate planning area. This change is not substantive and only serves to clarify the applicability of the effective dates to ensure compliance.

11. An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments:

On Monday, January 9, 2017, at 2:00 p.m. at ADEQ's Phoenix Offices, the Arizona Department of Environmental Quality conducted a public hearing on the NPRM. The public comment period for the rules began on Monday, December 5, 2016, and closed on Monday, January 9, 2017, at 5:00 p.m. No oral comments were received during the public hearing. The Arizona Department of Environmental Quality (ADEQ) received written comments from the current owner and operators of the copper smelters, ASARCO LLC and Freeport McMoRan, as well as the Environmental Protection Agency (EPA). These comments are summarized and addressed below.

Comments on only R18-2-B1301, Lead Rule

I. Revise the main stack emission limit to conform to the NAAQS averaging period

1) Comment: Under proposed R18-2-B1301(C), lead (Pb) emissions from the main stack cannot exceed 0.683 pound of lead per hour (pph). Asarco comments that "the limit is designed to ensure attainment of the lead NAAQS, which is set at 0.15 micrograms per cubic meter Pb in total suspended particles as a 3-month average," and asserts that "SIP limits should be tied to the averaging time of the corresponding NAAQS."

Asarco proposes that the emission limit in the rule be revised to 0.683 pound of Pb per hour, 3-month average, rolled each calendar month. Asarco asserts that the revised limit "is protective of the NAAQS and consistent with Asarco's modeling approach in the attainment demonstration." In a supplemental comment, Asarco included proposed language to be added to R18-2-B1301(F)(1). Essentially, the proposed rule

language requires Asarco to calculate compliance with the proposed three-month rolling average limit using data from a three-month averaging period. The language also implies that Asarco can conduct additional main stack tests within a three-month period and then average the results.

(Comment submitted by ASARCO LLC)

Response: In ADEQ's attainment demonstration, lead emissions from the main stack were modeled at a constant rate of 0.683 pph, which is consistent with the current emission limit in the rule. This approach was taken due to a lack of main stack emissions data. Specifically, no data exists showing how main stack emissions vary over time. Currently, the only emissions data available comes from the facility's annual stack test, which is a brief representation of main stack emissions.

Asarco requests an emissions limit structure that would average the main stack emission rate over a three month period if the 0.683 pph limit were to be violated during one or more tests. Thus, Asarco could experience main stack emission rates higher than 0.683 pph during some testing periods, and still comply, as long as over a three month period, the average of all test results were below the limit. This varying emission rate approach is inconsistent with the attainment demonstration, in that, there is no fluctuation of the main stack emission rate in the model. A main stack emission rate greater than 0.683 pph was not modeled, therefore, attainment of the NAAQS at an emission rate greater 0.683 pph has not been demonstrated. Given this lack of support, ADEQ is not comfortable with the proposed compliance demonstration.

Furthermore, the rule and modeled limit represent Asarco's Potential To Emit (PTE) for the main stack. This is consistent with EPA's modeling guidance for the lead NAAQS (see memo from Scott Mathias, *2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers*, July 8, 2011, EPA, Office of Air Quality Planning and Standards). This guidance states, "The emissions rate to input into AERMOD for attainment demonstrations is based on the maximum allowable or permit limit emissions, often 1-hour limits." Asarco's PTE limit is the maximum allowable or permit limit.

The guidance also states, "In general, the maximum hourly emission rate (PTE) should be used as the basis for establishing emission limits and for model input. This approach is appropriately conservative for emissions units that 1) could be operated at a relatively high capacity factor (% of available capacity) over the applicable averaging period, 2) are associated with *non-continuous compliance monitoring methods (e.g. periodic source testing)*, and 3) have emissions that are not well correlated with production or other measurable surrogate monitoring parameters" (emphasis added). Under the rule, Asarco is required to conduct main stack testing once a year and is a source that conducts non-continuous compliance monitoring, as mentioned from the guidance above. PTE therefore should serve as the basis for the emissions limit. If Asarco would prefer to have an emission limit that conforms to the NAAQS, then additional emissions data is needed, which can only be achieved through more frequent stack testing or Continuous Emissions Monitoring Systems (CEMS).

ADEQ also notes Asarco's comments that draw a connection between a NAAQS violation and a violation of an emissions limit. While emission limits are designed to attain the NAAQS—and keep the area in attainment so as to avoid a NAAQS violation—they do not need to conform to the NAAQS averaging period so long as they protect the NAAQS. As mentioned earlier, ADEQ modeled the current 0.683 pph limit and the area demonstrates attainment, ensuring protection of the NAAQS.

Finally, under the regulatory approach proposed by Asarco, the facility could choose to conduct additional tests, beyond the required annual test, only when an annual test result exceeded the standard. If a single test result showed compliance with the 0.683 pph limit, Asarco could rely on that result to show compliance for an entire year. On the other hand, if a test result exceeded 0.683 pph, Asarco could continue to retest until it came back into compliance, and then rely on that result to show compliance for the next year. Such an approach, versus a requirement to test periodically regardless of prior results, would bias results downward and would not provide a reliable demonstration of compliance.

II. Removal of three operational limits in O&M plan that have no bearing on Pb emission control

2) Comment: Under proposed R18-2-B1301(D)(2)(b), Asarco must submit an operations and maintenance plan (O&M plan) that addresses initial operating limits that are representative and reliable indicators of the performance of the capture system and control device operations. Asarco maintains that three of these operating limits, or parameters, do not impact Pb emissions, but rather are used to reduce SO_2 emissions. These parameters are:

> "Identification of those modes of operation when the double dampers between the flash furnace vessel and the vent gas system will be closed and the interstitial space evacuated to the acid plant." R18-2-B1301(D)(2)(b)(i).
>
> "The temperatures of the acid plant catalyst bed, which shall at minimum, meet the manufacturer's recommendations." R18-2-B1301(D)(2)(b)(xi).
>
> "The acid plant catalyst replenishment schedule, which shall at minimum, meet the manufacturer's recommendations." R18-2-B1301(D)(2)(b)(xii).
>
> *(Comment submitted by ASARCO LLC)*

Response: ADEQ agrees with Asarco and removed these parameters from the final version of R18-2-B1301(D)(2)(b), as they are reliable performance indicators for SO_2 emission control systems, not those used to control Pb emissions. As Asarco notes in its comments, the Pb emissions from the flash furnace are already routed to a vent gas baghouse that substantially reduces Pb emissions. The double damper position between the flash furnace vessel and the vent gas system and the evacuation of the interstitial space to the acid plant described in R18-2-B1301(D)(2)(b)(i) is used as a SO_2 control performance indicator.

Additionally, the acid plant catalyst bed temperature and schedule are parameters used to indicate the effectiveness of sulfuric acid production from the smelter's SO_2 emissions.

The parameters removed from the Pb rule are still required under the SO_2 rule, R18-2-B1302, and Asarco is still required to submit these parameters in its operations and maintenance plan to comply with R18-2-B1302.

III. Report harmonizing

3) Comment: Under the proposed R18-2-B1301(H)(5), Asarco must submit a quarterly report detailing any deviations from the smelting process and related control systems that are inconsistent with the operations and maintenance plan. Asarco proposes additional language for the rule so that reports can be submitted earlier than required to coordinate with SIP and permit reporting. The proposed rule states:

> "Within 30 days after the end of each calendar-year quarter, the owner or operator shall submit a quarterly report to the Department for the preceding quarter that shall include dates, times, and descriptions of deviations when the owner or operator operated smelting processes and related control equipment in a manner inconsistent with the operations and maintenance plan required by subsection (D)(2)."

Asarco requests that the following language be added to the rule:

> "The owner or operator may submit a report earlier than required for purposes of harmonizing reporting under this Section with air quality permit required reporting, so long as no report is delayed beyond the period required by this Section."
>
> *(Comment submitted by ASARCO LLC)*

Response: ADEQ understands Asarco's desire to consolidate and thus streamline reporting requirements, but does not believe the requested change is necessary to achieve that goal. The phrase "[w]ithin 30 days after the end of each calendar-year quarter" means the report can be submitted *at any time* within that period. Thus, Asarco already has the ability to submit reports earlier than required.

IV. Clarification of calculation method for the converter's primary hood exhaust rate and infiltration ratio

4) Comment: Under the proposed R18-2-B1301(D)(2)(b)(iv), Asarco must include in its operations and maintenance plan a parameter that determines the air infiltration ratio from the converter primary hooding systems. The proposed rule states: "A minimum air infiltration ratio for the converter primary hoods of 1:1 averaged over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing." Asarco understands this language requires it to track Blowing hours to determine the infiltration ratio on a 24-

Blowing hour basis, rolled each Blowing hour. Asarco notes that Blowing hours will rarely, if ever, correspond to calendar hours.

(Comment submitted by ASARCO LLC)

Response: ADEQ notes that the rule is consistent with Asarco's understanding, and states "24 converter *Blowing hours*, rolled hourly…" (emphasis added). The rule already implies that the Blowing hours be rolled each Blowing hour, as Asarco explains in its comment above.

5) Comment: Asarco asserts that the exhaust rate in the primary hood cannot be directly measured due to space and process constraints. Asarco says the primary hood gas flow rate will be calculated as follows: "by a differential pressure-based flow meter located in the common duct downstream of the converter spray chambers. Spray system air and water flow rates will be measured for the blowing converter. The exhaust flow rate of gas exiting the blowing converter's primary hood will be calculated based on the primary gas flow rate measured downstream of the spray chamber and subtracting the spray air flow rate and spray water flow rate. It will be assumed that all of the spray water flow will be evaporated to water vapor into the gas stream."

(Comment submitted by ASARCO LLC)

Response: ADEQ, EPA, and Asarco collaborated on this rule's development, most notably the list of operational parameters in R18-2-B1301(D)(2)(b). As the operator of the copper smelter, Asarco provided extensive knowledge and expertise on the technology and feasibility of such operational parameters. ADEQ appreciates Asarco's input on the rule, while in development and as proposed, and its insight in the space and process constraints for the primary hood exhaust rate measurement. ADEQ commits to work with Asarco to ensure compliance with the rule.

6) Comment: Asarco maintains there will be technical issues in tracking the start and finish of Blowing and tying together all the necessary measurements, such as differential pressure-based flow meter, spray flow rate, spray water flow rate, delta T, to determine the air infiltration ratio. Asarco requests that EPA and ADEQ recognize these issues and allow "some latitude in the development and implementation of the necessary measurement systems."

(Comment submitted by ASARCO LLC)

Response: ADEQ commits to work with Asarco and EPA on ensuring the development and implementation of the necessary measurement systems to meet requirements of the rule. Asarco is also required to maintain the minimum air infiltration ratio of 1:1 under the Consent Decree.

Comments on only R18-2-B1301.01, Fugitive Lead Dust Rule

V. Confirmation that concrete pad designs are approved for SIP/rule purposes

7) Comment: Under R18-2-B1301.01(C)(2)(e), Asarco must develop and comply with a fugitive dust plan that includes, among other things, design plans for concrete pads for leaded materials piles specified in subsections (D)(11) and (D)(13). Under the rule, the concrete pads must be designed to "capture, store, and control stormwater or sprayed water to minimize emissions to the greatest extent practicable, including curbing around the outer edges of the concrete pad where feasible." Like other requirements in R18-2-B1301.01, the concrete pad design requirements are the same as those in the Consent Decree. Asarco has already constructed the concrete pads used to store the revert crushing system. EPA has already approved the design for these pads for Consent Decree purposes and that the approved designs do not include a water pump system. Asarco requests that ADEQ confirms that the concrete pads for the revert crushing system will be approved under the rule since they are approved by EPA.

(Comment submitted by ASARCO LLC)

Response: ADEQ notes that the rule does not explicitly require that the concrete pad designs include a water pump system, but rather must be designed to "capture, store, and control stormwater or sprayed water," which can be done in other ways such as curbing. While ADEQ has yet to review the concrete pad design plans and fugitive dust plan, ADEQ commits to work with Asarco on the implementation of the concrete pads, so long as the designs fulfill the requirements of the rule.

VI. Removal of chemical dust suppressant requirements for certain unpaved roads

8) Comment: Under R18-2-B1301.01(D)(10), Asarco is required to apply chemical dust suppressants on three identified unpaved roads according to the application intensity and schedule in the rule. Asarco refers to ADEQ's "Unpaved Roads De Minimis Analysis" that compares the levels of Pb on unpaved roads using samples taken during EPA's Remediation Investigation and Feasibility Study (RI/FS). These roads are the slag hauler road, smelter support area road, and concentrator access road (See SIP, Modeling TSD, Appendix G). ADEQ compared the road samples to the Arizona residential soil remediation level (SRL) of 400 parts per million (ppm) to evaluate whether the roads were significant for modeling purposes. ADEQ subsequently included the slag hauler road in the modeling demonstration and determined the smelter support area and concentrator access roads were de minimis and did not require modeling.

Asarco thus asserts that the inclusion of the chemical dust suppressant requirement for the smelter support and concentrator access unpaved roads is therefore not justified and requests that the requirements be removed from the rule.

Asarco believes that striking the requirements from the rule for the smelter support area and concentrator access roads would not be a significant change because Asarco is otherwise required to control dust from its operations, including unpaved roads, under the particulate matter requirements of its permit.

Asarco believes that including the requirements in the rule and SIP would render changes to the control regime difficult should different or more effective measures be identified.

(Comment submitted by ASARCO LLC)

Response: ADEQ considered Asarco's comment and concludes that the chemical dust suppressant application should continue to be required for all of the unpaved roads identified in the rule. The rule's requirements match those developed by Asarco in its Fugitive Dust Plan submitted to EPA pursuant to the Consent Decree. Thus, Asarco will be applying the rule-related dust suppressants also to meet Consent Decree requirements. While the concentrator access and smelter support area roads were found to contain de minimis Pb levels for the SIPs' modeling purposes, ADEQ does not believe it appropriate to remove them from the rule for the following reasons:

ADEQ's modeling demonstration did not include the concentrator access and smelter support area roads because of finding that the samples taken near the roads contained a de minimis amount of Pb. However, should operations and processes change in the future, the chemical dust suppressant requirements supply assurance that emissions will still be adequately mitigated. For example, the reverts crushing operation will be re-located near the smelter support area road as part of the Consent Decree. Since this operation is a source of Pb emissions, chemical dust suppressants on the smelter support area road will provide adequate control.

Additionally, striking the requirements from the rule would be a significant change. Asarco's permit and current particulate matter regulations do not contain the level of specificity in R18-2-B1301.01(D)(10)(a)(i)-(iii) that assists in enforcement and compliance determinations (see Asarco's Operating Permit No. 1000042, issued Oct. 9, 2001, at section X, "Non-Point Sources"). In order to bridge the gap between the current PM regulations that are not specific, R18-2-B1301.01 provides a suppressant application schedule, of which compliance is determined through the silt loading test and opacity observations required under Appendix 15.

Asarco asserts that the specific schedule and intensity in the rule and SIP makes future adjustments to the control regime difficult. The rule, however, already allows considerable flexibility in the control regime. The rule includes a provision that allows Asarco to increase the application of the suppressants if needed to control emissions, as well as maintaining backup watering trucks should emissions be observed. In the

future, Asarco could potentially pave these roads, in which case, the roads would then be regulated under R18-2-B1301(D)(9). ADEQ encourages Asarco to find more effective measures should the current control measures be found insufficient. If, in fact, Asarco's control measures for the roads need to be altered, ADEQ commits to work with Asarco to maintain effective control of emissions and reflect changes of the controls in the rule and SIP where appropriate.

9) Comment: Asarco disagrees with ADEQ's use of RI/FS samples taken from the slag dump to characterize the Pb levels of the entire slag hauler road. Asarco asserts that most of the samples are slag and not road-based material and are therefore, not characteristic of the slag hauler road. Additionally, Asarco maintains that the slag dump material represents less than half of the length of the slag hauler road (see SIP, Modeling TSD, Appendix G, Figure 15). Asarco maintains that the slag hauler road is not comprised of significant levels of slag until the unpaved road enters the actual slag dump, where the slag dump becomes part of the road substrate.

Asarco asserts that for the portion of the road that extends farther from the slag dump, the RI/FS samples from the smelter support area would be more representative. Asarco notes that ADEQ's analysis found that this smelter support area road contained de minimis Pb levels. Thus, Asarco believes there is no basis for believing that the portion of the slag hauler road outside of the actual slag dump is a significant source of Pb emissions.

(Comment submitted by ASARCO LLC)

Response: ADEQ considered Asarco's comment and concludes that the chemical dust suppressant application should continue to be required for all of the unpaved roads identified in the rule, including the slag hauler road and any roads to be used by slag hauler, for the following reasons:

First, Asarco asserts that ADEQ used samples of slag instead of road-based material to characterize the Pb content of the slag hauler road. This suggests that there's no mixing of the road-based material and the slag. However, the occurrence of surface creep, saltation, and resuspension of slag from the dump onto the road is likely occurring.

With regards to Asarco's assertion that the smelter support area samples may be more representative for the slag hauler road, ADEQ notes that the samples used in the De Minimis Analysis to characterize the smelter support unpaved roads were taken at a minimum of 600 feet (sample SMS 11 in Sub-Area B) and at a maximum well over 800 feet (samples SMS 23 and 24, sample SMS 39 in Sub-Area H) from the slag hauler road (See SIP, Modeling TSD, Appendix G, Figure 18 "Smelter Support Area"). These samples ranged from a minimum of 25 ppm to a maximum of 350 ppm of Pb.

However, there are samples closer to the slag hauler road that are much higher in Pb than the de minimis samples adjacent to the smelter support area road, particularly in the Sub-Area C identified in Figure 18 of Appendix G. Sub-Area C, while located in the smelter support area, is adjacent to the portion of the slag hauler road that is not near the actual slag dump. In Sub-Area C, samples SMS 08, 09, and 10 had Pb levels of 1,500, 500, and 2,100 ppm, respectively. These levels are significantly higher than levels found in the smelter support area samples considered in the De Minimis Analysis. Therefore, comparing the Pb levels on the smelter support area road to the slag hauler road is inaccurate.

Furthermore, there is evidence showing that Pb levels on the slag hauler road outside of the slag dump are significant, contrary to what Asarco's comment suggests. Another RI/FS sample, SP09.2, was taken from a road roughly 50 yards southwest of the slag hauler road. The Pb results from this sample, in the PM_{10} fraction, are equivalent to a sample taken of crushed slag from the slag dump (sample SP05). Specifically, the crushed slag sample (SP05) resulted in a percent PM_{10} mass of 1.456 percent, while the road sample (SP09.2) resulted in a percent PM_{10} mass of 1.5247 percent. This is not to suggest there is crushed slag on the slag hauler road outside of the slag dump, but that in the PM_{10} particle size fraction, Pb concentrations are similar between the two materials. Given this, ADEQ does not agree with Asarco's assertion that Pb levels on the slag hauler road outside of the slag dump are negligible.

VII. Typographical correction for cross references in R18-2-B1301.01.

10) Comment: Asarco notes that the proposed version of R18-2-B1301.01(D)(10) refers to subsections (D)(10)(a)(i) through (D)(10)(a)(v). However, there are no subsections (D)(10)(a)(iv) through (v) in the proposed rule. Asarco also notes that it has presented substantial reasons as to why chemical dust suppressant requirements in (D)(10)(a)(ii)-(iii) should not apply and be eliminated (see Section VI above).

(Comment submitted by ASARCO LLC)

11) EPA also suggests correcting the typographical error.

Response: Because ADEQ is keeping the unpaved road requirements in the final version, the cross references in (D)(10) have been corrected to "(D)(10)(a)(i) through (iii)." ADEQ thanks Asarco and EPA for bringing this typographical correction to its attention.

VIII. Clarifying silt content language in R18-2-B1301.01.

12) Comment: Asarco proposes clarifying what is meant by 6 percent in R18-2-B1301.01(D)(10)(c) for silt content on unpaved roads, and requests that language from Appendix 15 be incorporated into R18-2-B1301.01(D)(10)(c) as follows:

"However, if silt loading is equal to or greater than 0.33 oz/ft2, then the owner or operator shall not allow the average percent silt content to exceed 6 percent of the total sample taken pursuant to Appendix 15 procedures."

(Comment submitted by ASARCO LLC)

Response: ADEQ concludes that the rule is already clear, and further clarification is provided in Appendix 15 language (starting at subsection A15.3). In Appendix 15, section A15.3.10, the language "average percent silt content" is used to determine the silt content. To provide some additional clarity and consistency among the subsection and Appendix 15, ADEQ added Asarco's suggestion of "average percent" to R18-2-B1301.01(D)(10)(c) as it does not change the requirement.

ADEQ did not, however, add Asarco's additional suggested language because the meaning of "total sample" is unclear. This language is not used in Appendix 15, which requires that three samples be collected and averaged together. Asarco's proposed language of "total sample taken pursuant to Appendix 15 procedures" does not clarify what is meant by 6 percent, as requested, but rather introduces new terminology that is not consistent with the rule or Appendix 15.

IX. Requiring additional contingency measure(s)

13) Comment: EPA requests additional measures be added considering that the Ninth Circuit court (*Bahr vs. EPA*, 836 F.3d 1218, 9th Cir. 2016, "*Bahr*") rejected EPA's approval of contingency measures implemented "early" as inconsistent with the plain language of CAA section 172(c)(9). Subsection (E) of R18-2-B1301.01 establishes a single contingency measure (doubling the paved roads cleaning frequency from once to twice per day) that could be triggered by certain specified events, whichever happens first. One of the triggering events is a notification from EPA that the area failed to attain by its statutory attainment date which is October 3, 2019. EPA asserts that a number of other specific triggering events pre-date the area's attainment date, and as a result, the SIP's one contingency measure could be implemented "early," i.e. prior to EPA's determination of failure to attain, potentially leaving no measure to be undertaken if the area, in fact, fails to attain the standard. In light of the *Bahr* decision, and to meet requirements under CAA § 179(c)(9), EPA requests a measure or measures be set aside specifically for when the area fails to attain by October 3, 2019.

(Comment submitted by U.S. EPA, Region IX)

Response: Subsection (E) of the rule contains a compliance schedule that details the dates of when Asarco must have attainment-related control measures implemented. This compliance schedule is the area's Reasonable Further Progress (RFP) schedule. The compliance schedule, or "certain specified events" as EPA's comment suggests, is one of the trigger mechanisms that will be used to implement the contingency measure. Thus, the compliance schedule in R18-2-B1301.01(E) will be implemented only when a statutory

trigger for a contingency measure under CAA section 172(c)(9) occurs, i.e. failure to meet RFP. The other statutorily required trigger mechanism is a finding of failure to attain issued by EPA.

ADEQ disagrees with EPA's use of *Bahr*, in that the case was regarding already-implemented control measures being credited as a SIP's contingency measure, whereas the use of the compliance schedule in R18-2-B1301.01(E) is to meet the statutory trigger requirement in § 172(c)(9). While the control measures in the compliance schedule will be implemented prior to the attainment date, they are the control measures that will bring the area into attainment. Therefore, these control measures are not being used for contingency purposes and cannot be applied to the *Bahr* case. As mentioned earlier, the compliance schedule in R18-2-B1301.01(E) is the area's RFP schedule.

Furthermore, ADEQ believes that the rule and SIP meet the requirements of § 172(c)(9), which states:

> "Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, *or* to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator." (emphasis added)

As the Act states, contingency measures must be undertaken if the area fails to make reasonable further progress **or** fails to attain by the attainment date. The Act does not imply that separate measures be set aside for each trigger, as EPA interpreted in its comments. A contingency measure, or group of measures, can be used to comply with an RFP schedule or bring an area into attainment, so long as the measure(s) provide the correct amount of emissions reductions. ADEQ's analysis of reductions contributable to the paved road cleaning contingency measure is in the SIP submittal, Section 4.0 "Control Measures." The contingency measure in R18-2-B1301.01(E) will either bring the area back into compliance with its RFP schedule or back into attainment, whichever occurs first. Therefore, ADEQ did not revise R18-2-B1301.01(E) to include additional contingency measures.

X. Clarifying report submittal timeframes.

14) Comment: EPA suggests editing the following language to R18-2-B1301.01(I) "Reporting" to be consistent with the reporting timeframe in R18-2-B1301(H)(5):

> "~~On a quarterly basis,~~ *Within 30 days after the end of each calendar-year quarter*, the owner or operator shall submit a report to the Department covering the prior quarter that includes the following..."

(Comment submitted by EPA, Region IX)

Response: ADEQ has added this language to the rule in order to stay consistent with reporting requirements in R18-2-B1301.

Comments on both R18-2-B1301 and R18-2-C1301

The following comments and responses pertain to Section (D), "Operational Standards" within the Hayden SO_2 and Pb rules, R18-2-B1301 and R18-2-B1302.

XI. Operating in accordance with O&M plan's operational limits

15) Comment: Under both rules, subsection (D)(2)(b), Asarco must establish several operational limits for control devices in the operations and maintenance plan (O&M plan). EPA notes that "subparagraph (D)(2)[(b)] merely states that these limits must be established, and does not include more explicit language indicating that the owner/operator must operate in accordance with those operating limits." EPA suggests the following edits to subsection (D)(2)(b):

> "Operational limits. The owner or operator shall establish *and operate in accordance with* operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indictors of the performance of the capture system and control device operations..."

(Comment submitted by EPA, Region IX)

Response: While subsection (D)(2)(b) does not explicitly state such requirement, subsection (D)(2) does, per the following:

> "Capture system and control device operations and maintenance plan. The owner or operator shall develop *and implement* an operations and maintenance plan for each capture system and/or control device...The operations and maintenance plan must address the following requirements as applicable to each capture system and/or control device." (emphasis added)

Subsection (D)(2) already requires such implementation of the entire operations and maintenance plan, covering those operational limits in subsection (D)(2)(b), in addition to monitoring requirements in (D)(2)(a), preventative maintenance procedures in (D)(2)(c), and inspection requirements in (D)(2)(d). The operations and maintenance plan must include the operational limits required under (D)(2)(b), and the owner/operator must operate (or implement) according to such limits in the plan, per the language in (D)(2).

XII. Qualifying conditions for acid plant catalyst bed temperature for O&M plan.

16) Comment: Subsection (D)(2)(b)(xi) is helpful in addressing preheater operation by establishing a temperature at the catalyst bed consistent with manufacturer's recommendation. However, EPA feels that this language needs additional clarification and specificity to ensure that future acid plant emissions are of a

magnitude consistent with the assumptions in the projected emissions profile, i.e. acid plant SO_2 emissions will not exceed 1,000 pph as assumed in Asarco's projected emissions profile. EPA suggests the following revision to (D)(2)(b)(xi):

> *"The operating temperatures of the acid plant catalyst bed, which shall at minimum, meet ~~manufacturer's~~ catalyst vendor's recommendations for minimum reaction temperature ranges. This operating temperature range shall be achieved in each of the acid plant catalyst beds prior to introduction of gases from hot metal process sources listed in subsection (B)(9)."*

(Comment submitted by U.S. EPA, Region IX)

Response: ADEQ first notes that subsection (D)(2)(b)(xi) has been removed from the R18-2-B1301, per discussions with Asarco (see Section II).

ADEQ concludes that the current rule language provides operational flexibility and also helps in addressing the acid plant's catalyst bed operations by establishing a temperature that is consistent with manufacturer recommendations. The additional clarification language proposed by EPA would again limit operations for equipment that has yet to be installed. After the equipment is in operation, Asarco may submit such temperatures of the acid plant catalyst bed to ADEQ pursuant to subsection (D)(2)(e)(iv). Changes to the operational limits in subsection (D)(2)(b), including the acid plant catalyst bed temperature, must be approved by ADEQ prior to implementation. Furthermore, Asarco will be monitoring SO_2 emissions using CEMS, which can provide accurate emissions data to assess the acid plant's operation.

XIII. Providing additional criteria for acid plant catalyst replenishment in O&M plan.

17) Comment: The language in subsection (D)(2)(b)(xii) is helpful to address acid plant catalyst effectiveness; however, it may be overly restrictive. EPA asserts that the projected acid plant emissions profile is based on historical acid plant emission rates, which are in turn affected by the effectiveness and quality of acid plant catalyst over that historical period. As a result, acid plant catalyst management and replenishment is an important underlying assumption in the projected emissions profile. It is similarly important in ensuring that future acid plant emissions are of a magnitude consistent with the assumptions in the projected emissions profile. While EPA feels the current language in subsection (D)(2)(b)(xii) is helpful in this regard, it focuses only the schedule of acid plant catalyst replenishment. While the frequency/schedule of replenishment is important, there are other aspects governing catalyst replenishment, such as catalyst activity, catalyst structural integrity, and possibly catalyst type, which may be relevant and warrant inclusion in the O&M plan. EPA recommends the use of the broader term "criteria" which would provide for the inclusion of other factor besides schedule in the O&M plan. Such revision is:

> *"The acid plant catalyst replenishment ~~schedule~~ criteria, which shall at a minimum, meet the ~~manufacturer's~~ recommendations of the catalyst vendor(s)."*

(Comment submitted by U.S. EPA, Region IX)

Response: ADEQ first notes that subsection (D)(2)(b)(xii) has been removed from R18-2-B1301, per discussions with Asarco (see Section II).

ADEQ agrees with EPA, and replaced "schedule" with "criteria" in the final rule. However, ADEQ concludes that the use of "vendor" may be inaccurate, as sometimes the vendor is a third party and can be different from the manufacturer, who builds the equipment and would have appropriate recommendations for operations. Therefore, ADEQ kept the use of "manufacturer's recommendations."

XIV. Additional recordkeeping requirements to demonstrate compliance with operational limits in O&M plan.

18) Comment: EPA recommends that both rules be revised in subsection (G) to include more recordkeeping requirements that are sufficient to demonstrate that the facility is operating within the O&M plan established under (D)(2), including the operational limits in (D)(2)(b).

(Comment submitted by U.S. EPA, Region IX)

Response: ADEQ concludes that the rules already supply sufficient recordkeeping requirements, including those O&M plans and plan revisions, as well as related manufacturer/engineer/operator recommendations or instructions that are used (see subsections (G) and (D)(2)(e)(i)). Additionally, subsection (G) requires recordkeeping for maintenance activities and inspections, which can be used to confirm compliance with the operational limits. Furthermore, reporting requirements in subsection (H) require the owner/operator to submit such notifications and reports of excess SO_2 emissions and exceedances of Pb emissions limits. This supplies a mechanism to either identify the cause of excess emissions or to confirm, via the absence of excess emissions, that the O&M plan is being implemented accordingly.

Comments on only R18-2-B1302, Hayden SO2 Rule

XV. Proposed Dual SO_2 Emissions Limit

19) Comment: The rule states "Emissions from the Main Stack shall not exceed 1069.1 pounds per hour on a 14-operating day average unless 1,518 pounds or less is emitted during each hour of the 14-operating day period." Asarco asserts this dual limit satisfies all Clean Air Act requirements and agency guidance as well as providing necessary flexibility. The Supreme Court has explained "so long as the ultimate effect of a State's choice of emission limitations is compliance with the national standard for ambient air, the State is at liberty to adopt whatever mix of emission limitation it deems best suited to its particular situation." Train v. Nat. Res. Def. Council, Inc., 421 U.S. 60, 79 (1975). Moreover, in Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions (April 2014), the U.S. Environmental Protection Agency (EPA) approved the use of the critical emission value (CEV) as well as averaging periods to meet the NAAQS. States may "develop control strategies that account for variability in 1-hour emissions rates through

emission limits with averaging times that are longer than 1 hour, using averaging times as long as 30-days, but still provide for attainment of the 2010 SO_2 NAAQS." EPA Guidance at 24.

Asarco's proposed limit requires it to meet the 14-operating day limit (which assures attainment of the NAAQS). If that is not feasible (i.e. due to malfunction), it still is not a violation if emission in every hour of that same period never exceed the CEV, which EPA agrees is protective of the NAAQS. EPA Guidance at 23. Thus during all periods Asarco is complying with a limit that is protective of the NAAQS. If Asarco has an exceedance of the 14-operating day limit and any hour in that period exceeds 1,518 pound per hour, then Asarco is in violation.

Comment submitted by ASARCO LLC

20) Comment: The proposed emissions limit in R18-2-B1302(C)(1) is inconsistent with the criteria for setting long-term emissions limit outlined in EPA's Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 23, 2014 (2014 Guidance), section V.D.2.b. (p. 27). In order to assure that the SIP includes a limit that provides for attainment of the 1-hour SO_2 NAAQS, revise this language to require continuous compliance with the 1-hour emission limit set at the CEV, or else continuous compliance with the 14-day limit set consistent with the 2014 Guidance, rather than allowing an exceedance of either of these limits at different times. After this revision is made, revise recordkeeping and monitoring requirement to be consistent with the final rule limit.

Comment submitted by U.S. EPA, Region IX

Response: ADEQ's technical support documents demonstrate that the proposed rules and controls for the Hayden smelter will provide for attainment of the NAAQS with a high degree of certainty. While the dual limit is not specifically prescribed in EPA guidance, ADEQ has found no reason to believe this dual limit will not provide for attainment of the NAAQS. The 14-day limit was derived following EPA guidance methodology and the rule requires Asarco to meet this 14-day limit. The dual limit is triggered if Asarco exceeds the 14-day limit and ensures that no single hour during that 14-day period exceeds the critical emissions value, which is the one-hour modeled emission rate that ensures NAAQS compliance. This approach gives Asarco operational flexibility while providing for attainment of the SO_2 NAAQS.

XVI. Stack Testing Alternative Provision

21) Comment: Under R18-2-1302(E)(6), Asarco may petition the department to substitute annual stack testing in lieu of operating the CEMS for the tertiary ventilation or the anode furnace baghouse stack under certain conditions. Based on the current language of this provision, it is unclear if the five-percent SO_2 contribution must be met individually or collectively by the tertiary ventilation system emissions and anode furnace

baghouse stack emissions before substitution is permitted. We propose that the rule language be modified to clarify that contribution is evaluated individually.

Comment submitted by ASARCO LLC

Response: It is ADEQ's interpretation of the rule language as written that the tertiary ventilation or anode furnace baghouse stack CEMS can be substituted by annual stack testing provided that either source individually contributes less than 5% of total facility-wide SO_2. ADEQ has revised the rule language to further clarify this interpretation.

22) Comment: Asarco believes that the criteria governing approval of the request identified in R18-2-B1302(E)(6) regarding the substitution of annual stack testing in lieu of operating the CEMS for the tertiary ventilation or the anode furnace baghouse stack if either is found to contribute less than five percent of the total sulfur dioxide emissions. Asarco suggests adding language to clarify that if the owner or operator makes the demonstration required by the provisions, the department shall approved the request to substitute annual stack testing for the respective CEMS.

Comment submitted by ASARCO LLC

Response: As noted in the response to comment 24, ADEQ interprets the rule language as such that the contribution from the tertiary ventilation and anode furnace baghouse stack would be evaluated individually, not collectively. If the Agency determines that the evaluation submitted by the owner or operator is adequate, it will approve the request to substitute annual stack testing for the respective CEMS. ADEQ has revised the rule language to clarify that it will approve the request if the demonstration is adequate.

23) Comment: In subsection (E)(6), the underlined text in the following paragraph should be added.

> …Annual stack testing shall use EPA Methods 1, 4, 6C in 40 C.F.R. 60 Appendix A or an approved alternative method by the Department and EPA Region IX. Annual stack testing shall commence no later than ~~the~~ one year after the date the continuous emission monitoring system was removed.

Comment submitted by U.S. EPA, Region IX

Response: ADEQ agrees with the inclusion of "EPA" and "40 C.F.R. 60 Appendix A" to clarify the references to the appropriate test methods. To be consistent with R18-2-B1301, Section E, Performance

Test Requirements, ADEQ will add the Department and EPA Region IX as approving alternative test methods.

XVII. Clarification of Primary Hood Measurement/Infiltration Ratio Monitoring

24) Comment: Under R18-2-B1302(D)(2)(b)(iv), Asarco must maintain a "minimum air infiltration ratio for the converter primary hoods of 1:1 average over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing." Asarco understands this language to require it to track Blowing hours and determine the infiltration ration on a 24-Blowing hour basis, rolled each Blowing hour. Blowing hours will rarely, if ever, correspond to calendar hours.

Comment submitted by ASARCO LLC; same comment was submitted for R18-2B1301

Response: ADEQ notes that the rule is consistent with Asarco's understanding, and states "24 converter *Blowing hours*, rolled hourly…" (emphasis added). The rule already implies that the Blowing hours be rolled each Blowing hour, as Asarco explains in its comment above.

25) Comment: Asarco asserts that the exhaust rate in the primary hood cannot be directly measured due to space and process constraints. Asarco says the primary hood gas flow rate will be calculated as follows: "by a differential pressure-based flow meter located in the common duct downstream of the converter spray chambers. Spray system air and water flow rates will be measured for the blowing converter. The exhaust flow rate of gas exiting the blowing converter's primary hood will be calculated based on the primary gas flow rate measured downstream of the spray chamber and subtracting the spray air flow rate and spray water flow rate. It will be assumed that all of the spray water flow will be evaporated to water vapor into the gas stream."

(Comment submitted by ASARCO LLC)

Response: ADEQ, EPA, and Asarco collaborated on this rule's development, most notably the list of operational parameters in R18-2-B1302(D)(2)(b). As the operator of the copper smelter, Asarco provided extensive knowledge and expertise on the technology and feasibility of such operational parameters. ADEQ appreciates Asarco's input on the rule, while in development and as proposed, and its insight in the space and process constraints for the primary hood exhaust rate measurement. ADEQ commits to work with Asarco to ensure compliance with the rule.

26) Comment: Asarco maintains there will be technical issues in tracking the start and finish of Blowing and tying together all the necessary measurements, such as differential pressure-based flow meter, spray flow rate, spray water flow rate, delta T, to determine the air infiltration ratio. Asarco requests that EPA and

ADEQ recognize these issues and allow "some latitude in the development and implementation of the necessary measurement systems."

(Comment submitted by ASARCO LLC)

Response: ADEQ commits to work with Asarco and EPA on ensuring the development and implementation of the necessary measurement systems to meet requirements of the rule. Asarco is also required to maintain the minimum air infiltration ratio of 1:1 under the Consent Decree.

XVIII. Ambient Air Boundary for the Hayden SO_2 Nonattainment Area

27) Comment: Asarco has made an agreement to purchase 40 acres at the SE ¼, SW ¼, S12, T5S R15E G&SR meridian, which is land immediately north of the slag dump at the Hayden Smelter. As with other areas on the each side of the Smelter, Asarco has the practical ability to exclude intruders from the 40 acres due to a combination of fencing, patrols, and physical barriers as set forth in its prior submittal. Asarco requests that the SIP change the ambient air boundary/process area boundary to reflect this property purchase. While there is no impact on the proposed regulatory language, the anode furnace fugitive emission rate in the SIP modeling demonstration can increase to 40.1 pounds per hour (from 32.2 pounds per hour in the current demonstration) without causing an exceedance of the NAAQS using the ADEQ modeling protocol.

Comment submitted by ASARCO LLC

Response: As noted by Asarco, the extension of the ambient air boundary does not affect the SO_2 rule language. Once the land purchase has been finalized, ADEQ is willing to submit a supplemental demonstration to the EPA showing that the anode furnace fugitive SO_2 emission rate in the SIP modeling demonstration can increase to 40.1 pounds per hour without causing a NAAQS exceedance.

XIX. General Comments

28) Comment: The CFR reference in Subsection (C)(2) is incorrect. The correct reference is to 40 C.F.R. 60 Subpart P.

Comment submitted by U.S. EPA, Region IX

Response: ADEQ agrees with the comment and has made the correction in the final rulemaking.

XX. Justification for no CEMS on shutdown ventilation flue

29) Comment: Based on the rule language in subsection (E)(1) a CEMS does not exist on the shutdown ventilation flue. Per subsection (G)(2)(e), emission from shutdown ventilation flue utilization events will be calculated rather than directly monitored. Our understanding of the shutdown ventilation flue is that it is

activated during periods of smelting and converting cessation, and serves isolate certain segments of process equipment from strong residual process gas, protecting personnel to exposure as they perform maintenance activities and other duties on process equipment. It instead directs these strong residual process gasses from source such as the INCO flash furnace into the atmosphere. While we would not necessarily consider this a bypass duct. It has the end effect of allowing strong SO_2 process gas to migrate into the atmosphere without control.

We note that the rule language for the Freeport McMoRan Miami Smelter requires a SO_2 CEMS on a process stream that serves a similar, although not identical function (i.e., the Miami Smelter's bypass duct.) please discuss why it is appropriate for the rule text to not require a SO_2 CEMS on the shutdown ventilation flue for the Hayden Smelter, noting any particular technical or economic challenges associated with monitoring emission from the flue, as well as process differences between the two smelters.

(Comment submitted by U.S. EPA, Region IX)

Response: ADEQ notes that EPA's comment was submitted in reference to the SO_2 and Pb rules. ADEQ notes that there are no CEMS for monitoring Pb emissions and this comment pertains to R18-2-B1302 only.

The primary process difference is that Asarco's shutdown ventilation flue does not see process gas as the damper only opens upon process shutdown. Unlike the Miami bypass stack, the shutdown ventilation flue at the Hayden facility is used to allow ventilation of the furnace during off-line maintenance work. During planned outages, the duct work system is ventilated to the gas plant until cleared of significant sulfur dioxide before the shutdown ventilation flue is opened. In an unplanned shutdown, the most sulfur dioxide it would see is the volume of gas that may have been in the ductwork after the interlock activates, which is one volume and was previously submitted to EPA and ADEQ. In this situation, applying a CEMS to monitor the shutdown ventilation flue is a meaningless exercise. The shutdown ventilation duct does not see any sulfur dioxide during normal operation. It does not see any process sulfur dioxide during ventilation when the unit is off-line. The only sulfur dioxide it would see is the small residual amount of sulfur dioxide in ductwork in the event of an unplanned shutdown. This can be estimated by engineering principles with as much or more precision than a CEMS. Further, there is no effective way to RATA the CEMS when there is no anticipated sulfur dioxide during normal operations. Asarco is strongly opposed to intentionally adding any sulfur dioxide to this system for the sole purpose of monitoring. *(Justification provided by Asarco LLC.)*

XXI. The SIP is protective of the NAAQS and should be approved

30) Comment: The purpose of a state implementation plan is to "provide for implementation, maintenance, and enforcement" of the NAAQS. 42 U.S.C. § 7410(a)(1). So long as the plan achieves this result, the state has

wide latitude to select the measures and form of limits that go into it. In this case, Asarco believes that the measures that the State has proposed amply achieve the goal of the Clean Air Act, which is to assure that the NAAQS is attained.

(Comment submitted by ASARCO LLC)

Response: ADEQ's technical support documents demonstrate that the proposed rules and controls for the Hayden smelter will provide for attainment of the NAAQS with a high degree of certainty. ADEQ's technical support documents demonstrate that with rules and controls fully implemented there is a 0.40 percent probability of a SO_2 NAAQS violation in the Hayden area.

Comments on only R18-2-C1302, Miami SO2 Rule

XXII. Revision of FMMI references

31) Comment: References to "Freeport McRoRan" and "Freeport McMoRan-Miami" throughout the Notice of Proposed Rulemaking should be revised to "Freeport-McMoRan Miami Inc."

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees with the comment and has made the appropriate edits throughout the rulemaking.

XXIII. Edit description of control measures in preamble

32) Comment: On page 3287 of the Notice of Proposed Rulemaking, the description of sulfur dioxide emission control measures in the second sentence of the third paragraph would be more accurately described as "The Miami Smelter emission control upgrades include new converter mouth cover, a new Aisle Scrubber, additional capture systems, and upgrades to the Acid Plant Tail Gas and Vent Fume Scrubbers to use caustic for SO_2 removal to ensure attainment of EPA's more stringent SO_2 NAAQS."

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees with the comment and has revised the description in the rulemaking to accurately reflect the emission control measures.

XXIV. Addition of "or"

33) Comment: In subsection R18-2-C1302(B)(6)(f), the word "or" should be added after the text and semicolon.

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees with the comment and had revised the rule language.

XXV. Edit cross references

34) Comment: In subsection R18-2-C1302(F)(2)(a) and (d), the reference to "subsection (F)(3)(c)" should be "subsection (F)(2)(c).

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees with the comment and has revised the rule language.

Comments on R18-2-715, R18-2-715.01, and R18-2-715.02

XXVI. Language to Differentiate the Copper Smelters

35) Comment: In subsection R18-2-715(I), the language should be revised to differentiate between the Hayden and Miami areas and to clarify applicability based on the relevant effect date of R18-2-B1302 and R18-2-C1302 and the respect SIP revision for the Hayden and Miami SO_2 nonattainment areas. For example, the R18-2-715 provisions related to SO_2 emissions (i.e., those that are part of the current Miami area maintenance SIP addressing the 1971 SO_2 standard) should no longer apply once R18-2-C1302 and the SIP revision for the Miami SO_2 Nonattainment Area (addressing the 2010 SO_2 standard) become effective. The status of R18-2-B1302 and the Hayden SO_2 Nonattainment Area is not relevant to the applicability of the R18-2-715 SO_2 provisions to the owner or operator of the primary copper smelter once R18-2-C1302 and SIP revision for the Miami SO_2 Nonattainment Area become effective.

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees that it is appropriate to revise the rule language to clarify the applicability according to the relevant effective date. ADEQ has made the appropriate revisions in the rule language.

36) Comment: In subsection R18-2-715.01(V), the rule language should be revised as explained in Comment 38.

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees that it is appropriate to revise the rule language to clarify the applicability according to the relevant effective date. ADEQ has made the appropriate revisions in the rule language.

37) Comment: In subsection R18-2-715.02, the rule language should be revised as explained in Comment #13.

(Comment submitted by Freeport-McMoRan Miami Inc.)

Response: ADEQ agrees that it is appropriate to revise the rule language to clarify the applicability according to the relevant effective date. ADEQ has made the appropriate revisions in the rule language.

38) Comment: The version of R18-2-715 being revised by ADEQ is not the same as the version EPA has approved into the Arizona SIP. The SIP-approved version was last amended with an effective date of July 18, 2002. Please ensure the analysis includes any changes in the intervening time, and please provide a

version of this draft rule with markup indicating differences between the SIP-approved version and this draft version.

(Comment submitted by U.S. EPA, Region IX)

Response: U.S. EPA Region IX stated that this comment was included in an internal agency draft and was inadvertently left in the final comments. Region IX indicated that ADEQ may disregard the comment. ADEQ agrees with Region IX and will disregard the comment.

Comments on Appendix 15, Soil Stabilization Methods for Unpaved Roads

XXVII. Changing opacity observation interval for unpaved roads from five seconds to 15 seconds

39) Comment: Appendix 15 details specific opacity observation methods to be used to determine compliance with the unpaved road requirements in R18-2-B1301.01(D)(10). The opacity method requires a certified individual to observe emissions from an unpaved road in five-second intervals. Two observations per vehicle must be made, beginning with the first reading at zero seconds and the second reading at five seconds. The observer must not look continuously at the dust plume, but rather observe the plume briefly at zero seconds and then again at five seconds.

Rather than doing five seconds, Asarco requests that the requirements be changed to 15 seconds to be consistent with EPA Methods 9 and 203A. (Method 203A is virtually identical to Method 9, except for data reduction procedures, which provide for averaging times other than six minutes.) Asarco personnel are already trained for Methods 9 and 203A, and these are the methods that have traditionally been used to observe processes throughout the plant. Asarco asserts, "Requiring a different interval for the observations required by this rule will cause confusion and is not otherwise necessary."

(Comment submitted by ASARCO LLC)

Response: ADEQ maintains that the five-second observation is, on the contrary, necessary, as it is the only method to determine compliance with the opacity limit for unpaved roads in R18-2-B1301.01(D)(10)(c). As noted earlier, ADEQ is keeping the chemical dust suppressant requirements for unpaved roads. In order to ensure the dust suppressants are being applied according to schedule and intensity, opacity readings must be conducted accordingly.

The opacity observation requirements in Appendix 15 are virtually identical to EPA Methods 9 and 203A, however the five-second internal is unique for *unpaved roads*, whereas the 15-second interval is used for stacks or open baghouses. Furthermore, the requirements in Appendix 15 and R18-2-B1301.01(D)(10)(c) are consistent with EPA-approved methods in other jurisdictions, including Maricopa County, AZ (*Phoenix PM_{10} Nonattainment Area FIP*, codified at 40 CFR Part 52, particularly § 52.128, Appendix A, Subsection I.A.); Imperial County, CA (See *Rule 800*, Appendix A, Section A, "Test Method for Unpaved Roads and Unpaved Traffic Areas." Approved at 40 CFR § 52.220); San Joaquin Valley, CA (See *Rule 8011*,

Appendix A, "Visual Determination of Opacity, Section 1, "Test Method for Unpaved Roads and Unpaved Traffic Areas." Approved at 40 CFR § 52.220); and Clark County, NV (See *Section 91*, "Fugitive Dust from Unpaved Roads, Unpaved Alleys, and Unpaved Easement Roads," at section 91.4.1, "Stabilization Test Methods for Unpaved Roads and Unpaved Alleys." Approved at 40 CFR § 52.1470).

XXVIII. Changing opacity observation certification requirements to match Method 9

40) Comment: Asarco asserts that the certification process and procedures at A15.4 are equivalent to Method 9 training requirements and that "Asarco is not in the business of conducting Method 9 or smoke school training." Asarco already sends personnel to a certified third party to receive such training. Therefore, Asarco deems these requirements unnecessary. Asarco proposes that the language at A15.4 is amended to say "Individuals who perform opacity observations must be certified according to EPA Reference Method 9."

(Comment submitted by ASARCO LLC)

Response: ADEQ notes that because Asarco already sends personnel to receive Method 9 training, and because those training requirements are the same as those in A15.4 (as noted in Section XXVII above), then personnel who is trained in Method 9 can conduct the opacity observations in A15.2. ADEQ notes however, that the opacity observations must be conducted in five-second intervals as opposed to the 15-second intervals in Method 9, due to the fact that the source is unpaved roads. Appendix 15 of the rule requires that "this method can only be conducted by an individual who has received certification as a qualified observer. Qualifications and testing requirements can be found in Section A15.4 of this appendix" (see section A15.2). Appendix 15 does not required Asarco to conduct the actual training, so therefore, a certified third party can remain the continued approach. The certification process and procedures in A15.4 are included in Appendix 15 for ease of use.

ADEQ thanks Asarco, Freeport McMoRan, and EPA for participating in the public comment process, and additionally for their contributions to the development of the rules.

12. All agencies shall list other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:

There are no other matters prescribed by statute applicable specifically to ADEQ or this specific rulemaking.

a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:

The rules subject of this rulemaking do not inherently require a permit. As Class I Major Sources pursuant to A.A.C. R18-2-101.61, Asarco and Freeport-McMoRan Miami Inc. are permitted in accordance with Title V of the CAA and Title 49, Chapter 3 of the Arizona Revised Statutes. Therefore, the rules will be incorporated into a revision of Asarco and Freeport-McMoRan Miami Inc. Title V permit.

b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:

The federal Clean Air Act and implementing regulations adopted by EPA apply to the subject of this rulemaking. The rules are designed to bring the nonattainment areas (as designated by EPA) into attainment of the federal National Ambient Air Quality Standards (NAAQS) for lead and sulfur dioxide. This rulemaking is no more stringent than required by federal law.

c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:

No such analysis was submitted.

13. A list of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rule:

There are no incorporations by reference added to the rules in this action.

14. Whether the rule was previously made, amended or repealed as an emergency rule. If so, cite the notice published in the *Register* as specified in R1-1-409(A). Also, the agency shall state where the text was changed between the emergency and the final rulemaking packages:

Not applicable.

15. The full text of the rules follows:

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

R18-2-715.	Standards of Performance for Existing Primary Copper Smelters; Site-specific Requirements
R18-2-715.01.	Standards of Performance for Existing Primary Copper Smelters; Compliance and Monitoring
R18-2-715.02.	Standards of Performance for Existing Primary Copper Smelters; Fugitive Emissions

ARTICLE 13. STATE IMPLEMENTATION PLAN RULES FOR SPECIFIC LOCATIONS

PART A. RESERVED

PART B. HAYDEN, ARIZONA, PLANNING AREA

R18-2-B1301. Limits on Lead Emissions from the Hayden Smelter

R18-2-B1301.01. Limits on Lead-Bearing Fugitive Dust from the Hayden Smelter

R18-2-B1302. Limits on SO_2 Emissions from the Hayden Smelter

PART C. MIAMI, ARIZONA, PLANNING AREA

R18-2-C1301. Reserved

R18-2-C1302. Limits on SO_2 Emissions from the Miami Smelter

A14. Appendix 14. Procedures for Sulfur Dioxide and Lead Fugitive Emissions Studies for the Hayden Smelter

A15. Appendix 15. Test Methods for Determining Opacity and Stabilization of Unpaved Roads

ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

R18-2-715. Standards of Performance for Existing Primary Copper Smelters; Site-specific Requirements

A. No change

1. No change
2. No change

B. No change

C. No change

D. No change

E. No change

1. No change
2. No change
3. No change
4. No change

F. No change

1. No change
   a. No change
   b. No change
2. No change
   a. No change
   b. No change

G. No change

H. No change

I. The owner and operator of the copper smelter located near Hayden, Arizona at the latitude and longitude provided in R18-2-715(F)(1) shall comply with Section R18-2-715(F)(1) and R18-2-715(G) until the effective date of R18-2-B1302 as determined by R18-2-B1302(A)(2). The owner and operator of the copper smelter located near Miami, Arizona at the latitude and longitude provided in R18-2-715(F)(2) shall comply with Section R18-2-715(F)(2) and R18-2-715(H) until the effective date of R18-2-C1302 as determined by R18-2-C1302(A)(2).

R18-2-715.01. Standards of Performance for Existing Primary Copper Smelters; Compliance and Monitoring

A. No change

B. No change

C. No change

1. No change
    a. No change
    b. No change
2. No change

D. No change

1. The compliance date for the cumulative occurrence and emissions limits in R18-2-715(F)(1) and R18-2-715(G)~~(1)~~ is January 15, 2002, and
2. The compliance date for the cumulative occurrence and emissions limits in R18-2-715(F)(2), (F)(3), (G)~~(2)~~, and (H) is the effective date of this rule.

E. No change

1. No change
2. No change

F. No change

G. No change

H. No change

I. No change

J. No change

K. No change

1. No change
2. No change
3. No change
4. No change
5. No change
    a. No change
    b. No change

c. No change

d. No change

e. No change

L. No change

M. No change

N. No change

O. No change

P. No change

1. No change
2. No change
3. The number of three-hour emissions averages that exceeded each of the applicable emissions levels listed in R18-2-715(F) and (G)~~(1)(b)~~ for the compliance periods ending on each day of the month being reported;
4. The date on which a cumulative occurrence limit listed in R18-2-715(F) or (G)~~(1)(b)~~ was exceeded if the exceedance occurred during the month being reported; and
5. No change

Q. No change

R. The owner or operator shall determine compliance with the cumulative occurrence and fugitive emission limits contained in R18-2-715(G)~~(1)~~ as follows:

1. The owner or operator shall calculate annual average emissions at the end of each day by averaging the emissions for all hours measured during the compliance period, as defined in subsection (R)(8), ending on that day. An annual emissions average in excess of the allowable annual average emission limit is a violation of R18-2-715(G)~~(1)(a)~~ if either:
   a. No change
   b. No change
2. No change
3. For purposes of subsection (R)(2), a three-hour emissions average in excess of an emission level E_f violates the associated cumulative occurrence limit n listed in R18-2-715(G)~~(1)(b)~~ if:
   a. No change
   b. No change
4. No change
5. Multiple violations of the same cumulative occurrence limit on the same day and violations of different cumulative occurrence limits on the same day constitute a single violation of R18-2-715(G)~~(1)(b)~~.
6. The violation of any cumulative occurrence limit and an annual average emission limit on the same day constitutes only a single violation of the requirements of R18-2-715(G)~~(1)~~.

7. Multiple violations of a cumulative occurrence limit by different three-hour emissions averages containing any common hour constitutes a single violation of R18-2-715(G)~~(1)(b)~~.

8. No change

S. To determine compliance with R18-2-715(G)~~(1)~~, the owner or operator of the smelter subject to R18-2-715(G)~~(1)~~ shall install, calibrate, maintain, and operate a measurement system for continuously monitoring sulfur dioxide concentrations of the converter roof fugitive emissions.

1. No change

2. No change

T. The emission limit in R18-2-715(G)~~(2)~~ applies to the total of uncaptured fugitive sulfur dioxide emissions from the smelter processing units and sulfur dioxide control and removal equipment, but not emissions due solely to the use of fuel for space heating or steam generation. The owner or operator shall determine compliance with the emission limit contained in R18-2-715(G)~~(2)~~ as follows:

1. No change

2. An annual emissions average in excess of the allowable annual average emission limit violates R18-2-715(G)~~(2)~~ if the fugitive annual average computed at the end of each month exceeds the allowable annual average emission limit.

U. No change

1. No change

2. No change

3. No change

V. The owner and operator of the copper smelter located near Hayden, Arizona at the latitude and longitude provided in R18-2-715(F)(1) shall comply with Section R18-2-715.01 until the effective date of R18-2-B1302 as determined by R18-2-B1302(A)(2). The owner and operator of the copper smelter located near Miami, Arizona at the latitude and longitude provided in R18-2-715(F)(2) shall comply with Section R18-2-715.01 until the effective date of R18-2-C1302 as determined by R18-2-C1302(A)(2).

R18-2-715.02. Standards of Performance for Existing Primary Copper Smelters; Fugitive Emissions

A. No change

B. No change

1. No change

2. No change

3. No change

4. No change

C. No change

D. No change

1. No change

2. No change

E. No change

1. No change

2. No change

F. The owner and operator of the copper smelter located near Hayden, Arizona at the latitude and longitude provided in R18-2-715(F)(1) shall comply with Section R18-2-715.02 until the effective date of R18-2-B1302 as determined by R18-2-B1302(A)(2). The owner and operator of the copper smelter located near Miami, Arizona at the latitude and longitude provided in R18-2-715(F)(2) shall comply with Section R18-2-715.02 until the effective date of R18-2-C1302 as determined by R18-2-C1302(A)(2).

ARTICLE 13. STATE IMPLEMENTATION PLAN RULES FOR SPECIFIC LOCATIONS

PART A. RESERVED

PART B. HAYDEN, ARIZONA, PLANNING AREA

R18-2-B1301. Limits on Lead Emissions from the Hayden Smelter

A. Applicability.

1. This Section applies to the owner or operator of the Hayden Smelter.

2. Effective date. Except as otherwise provided, the requirements of this Section shall become applicable on the earlier of July 1, 2018 or 180 days after completion of all project improvements authorized by Significant Permit Revision No. 60647.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this Section:

1. "ACFM" means actual cubic feet per minute.

2. "Anode furnace baghouse stack" means the dedicated stack that vents controlled off-gases from the anode furnaces to the Main Stack.

3. "Blowing" shall mean the introduction of air or oxygen-enriched air into the converter furnace molten bath through tuyeres that are submerged below the level of the molten bath. The flow of air through the tuyeres above the level of the molten bath or into an empty converter shall not constitute blowing.

4. "Capture system" means the collection of components used to capture gases and fumes released from one or more emission units, and to convey the captured gases and fumes to one or more control devices or a stack. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.

5. "Control device" means a piece of equipment used to clean and remove pollutants from gases and fumes released from one or more emission units that would otherwise be released to the

atmosphere. Control devices may include, but are not limited to, baghouses, Electrostatic Precipitators (ESPs), and sulfuric acid plants.

6. "Hayden Smelter" means the primary copper smelter located in Hayden, Gila County, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.

7. "Main Stack" means the center and annular portions of the 1,000-foot stack, which vents controlled off-gases from the INCO flash furnace, the converters, and anode furnaces and also vents exhaust from the tertiary hoods.

8. "SCFM" means standard cubic feet per minute.

9. "SLAMS monitor" means an ambient air monitor part of the State and Local Air Monitoring Stations network operated by State or local agencies for the purpose of demonstrating compliance with the National Ambient Air Quality Standards.

10. "Smelting process-related fugitive lead emissions" means uncaptured and/or uncontrolled lead emissions that are released into the atmosphere from smelting copper in the INCO flash furnace, converters, and anode furnaces.

C. Emission limit. Main Stack lead emissions shall not exceed 0.683 pound of lead per hour.

D. Operational Standards.

1. Process equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate smelter processes and associated emission capture and/or control equipment in a manner consistent with good air pollution control practices for minimizing lead emissions to the level required by subsection (C). Determination of whether acceptable operating and maintenance procedures are being used shall be based on all information available to the Department and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.

2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and/or control device used to ventilate or control process gas or emissions from the flash furnace, including matte tapping, slag skimming and slag return operations; converter primary hoods, converter secondary hoods, tertiary ventilation system; and anode refining operations. The operations and maintenance plan must address the following requirements as applicable to each capture system and/or control device.

   a. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit values or settings at all times the required capture and control system is operating, except during periods of monitor calibration, repair, and malfunction. The initial plan shall provide for volumetric flow monitoring on the vent gas baghouse (inlet or outlet), each converter primary hood, each converter secondary hood, the tertiary ventilation system,

and the anode furnace baghouse (inlet or outlet). All monitoring devices shall be accurate within +/- 10 percent and calibrated according to manufacturer's instructions. If direct measurement of the exhaust flow is infeasible due to physical limitations or exhaust characteristics, the owner or operator may propose a reliable equivalent method for approval. Initial monitoring may be adjusted as provided in subsection (D)(2)(e). Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements. Capture system damper position setting(s) shall be specified in the plan.

b. Operational limits. The owner or operator shall establish operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indicators of the performance of the capture system and control device operations. Initial operating limits may be adjusted as provided in subsection (D)(2)(e). Initial operating limits shall include the following:

i. A minimum air flow for the furnace ventilation system and associated damper positions for each matte tapping hood or slag skimming hood when operating to ensure that the operation(s) are within the confines or influence of the capture system.

ii. A minimum air flow for the secondary hood baghouse and associated damper positions for each slag return hood to ensure that the operation is within the confines or influence of the capture system's ventilation draft during times when the associated process is operating.

iii. A minimum air infiltration ratio for the converter primary hoods of 1:1 averaged over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing.

iv. A minimum secondary hood exhaust rate of 35,000 SCFM during converter Blowing, averaged over 24 converter Blowing hours, rolled hourly.

v. A minimum secondary hood exhaust rate of 133,000 SCFM during all non-Blowing operating hours, averaged over 24 non-Blowing hours, rolled hourly.

vi. A minimum negative pressure drop across the secondary hood when the doors are closed equivalent to 0.007 inches of water.

vii. A minimum exhaust rate on the tertiary hooding of 400,000 ACFM during all times material is processed in the converter aisle, averaged over 24 hours and rolled hourly.

viii. Fan amperes or minimum air flow for the anode furnace baghouse and associated damper positions for each anode furnace hood to ensure that the

anode furnace off-gas port is within the confines or influence of the capture system's ventilation draft during times when the associated furnace is operating.

ix. The anode furnace charge mouth shall be kept covered when the tuyeres are submerged in the metal bath except when copper is being charged to or transferred from the furnace.

c. Preventative maintenance. The owner or operator shall perform preventative maintenance on each capture system and control device according to written procedures specified in the operations and maintenance plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions, or operator's experience working with the equipment, and frequency for routine and long-term maintenance. This provision does not prohibit additional maintenance beyond that required by the plan.

d. Inspections. The owner or operator shall perform inspections in accordance with written procedures in the operations and maintenance plan for each capture system and control device that are consistent with the manufacturer's, engineer's, or operator's instructions for each system and device.

e. Plan development and revisions.

i. The owner or operator shall develop and keep current the plan required by this Section. Any plan or plan revision shall be consistent with this Section, shall be designed to ensure that the capture and control system performance conforms to the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area State Implementation Plan (SIP), and shall be submitted to the Department for review. Any plan or plan revision submitted shall include the associated manufacturer's, engineer's or operator's recommendations and/or instructions used for capture system and control device operations and maintenance.

ii. The owner or operator shall submit the initial plan to the Department no later than May 1, 2018 and shall include the initial volumetric flow monitoring provisions in subsection (D)(2)(a), the initial operational limits in subsection (D)(2)(b), the preventative maintenance procedures in subsection (D)(2)(c), and the inspection procedures in subsection (D)(2)(d).

iii. The owner or operator shall submit to the Department for approval a plan revision with changes, if any, to the initial volumetric flow monitoring provisions in subsection (D)(2)(a) and initial operational limits in subsection (D)(2)(b) not later than six months after completing a fugitive emissions study conducted in accordance with Appendix 14. The Department shall submit the approved changes to the volumetric flow monitoring provisions and operational

limits pursuant to this subsection to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

iv. Other plan revisions may be submitted at any time when necessary. All plans and plan revisions shall be designed to achieve operation of the capture system and/or control device consistent with the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area SIP. Except for changes to the volumetric flow monitoring provisions in subsection (D)(2)(a) and operational limits in subsection (D)(2)(b), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

3. Emissions from the anode furnace baghouse stack shall be routed to the Main Stack.

E. Performance Test Requirements.

1. Main stack performance tests. No later than 180 calendar days after completion of all Converter Retrofit Project improvements authorized by Significant Permit Revision No. 60647, the owner or operator shall conduct initial performance tests on the following:
   a. the gas stream exiting the anode furnaces baghouse prior to mixing with other gas streams routed to the Main Stack.
   b. the gas stream exiting the acid plant at a location prior to mixing with other gas streams routed to the Main Stack.
   c. the gas stream exiting the secondary baghouse at a location prior to mixing with other gas streams routed to the Main Stack.
   d. the gas stream collected by the tertiary hooding at a location prior to mixing with other gas streams routed to the Main Stack.
   e. the gas stream exiting the vent gas baghouse at a location prior to mixing with other gas streams routed to the Main Stack.
2. Subsequent performance tests on the gas streams specified in subsection (E)(1) shall be conducted at least annually.
3. Performance tests shall be conducted under such conditions as the Department specifies to the owner or operator based on representative performance of the affected sources and in accordance with 40 CFR 60, Appendix A, Reference Method 29.
4. At least 30 calendar days prior to conducting a performance test pursuant to subsection (E)(1), the owner or operator shall submit a test plan, in accordance with R18-2-312(B) and the Arizona Testing Manual, to the Department for approval. The test plan must include the following:
   a. Test duration;
   b. Test location(s);

c. Test method(s), including those for test method performance audits conducted in accordance with subsection (E)(6); and

d. Source operation and other parameters that may affect the test result.

5. The owner or operator may use alternative or equivalent performance test methods as defined in 40 CFR § 60.2 when approved by the Department and EPA Region IX, as applicable, prior to the test.

6. The owner or operator shall include a test method performance audit during every performance test in accordance with 40 CFR § 60.8(g).

F. Compliance Demonstration Requirements.

1. For purposes of determining compliance with the Main Stack emission limit in subsection (C), the owner or operator shall calculate the combined lead emissions in pounds per hour from the gas streams identified in subsection (E)(1) based on the most recent performance tests conducted in accordance with subsection (E).

2. The owner or operator shall determine compliance with the requirements in subsection (D)(2) as follows:

a. Maintaining and operating the emissions capture and control equipment in accordance with the capture system and control device operations and maintenance plan required in subsection (D)(2) and recording operating parameters for capture and control equipment as required in subsection (D)(2)(b); and

b. Conducting a fugitive emissions study in accordance with Appendix 14 starting not later than 6 months after completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The fugitive emissions study shall demonstrate, as set forth in Appendix 14, that fugitive emissions from the smelter are consistent with estimates used in the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area SIP.

3. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limit in subsection (C).

G. Recordkeeping. The owner or operator shall maintain the following records for at least five years and keep on-site for at least two years:

1. All records as specified in the operations and maintenance plan required under subsection (D)(2).

2. All records of major maintenance activities and inspections conducted on emission units, capture systems, monitoring devices, and air pollution control equipment, including those set forth in the operations and maintenance plan required by subsection (D)(2).

3. All records of performance tests, test plans, and audits required by subsection (E).

4. All records of compliance calculations required by subsection (F).

5. All records of fugitive emission studies and study protocols conducted in accordance with Appendix 14.

6. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of concentrate drying, smelting, converting, anode refining, and casting emission units; and any malfunction of the associated air pollution control equipment that is inoperative or not operating correctly.

7. All records of reports and notifications required by subsection (H).

H. Reporting. The owner or operator shall provide the following to the Department:

1. Notification of commencement of construction of any equipment necessary to comply with the operational or emission limits.

2. Semiannual progress reports on construction of any such equipment postmarked by July 30 for the preceding January-June period and January 30 for the preceding July-December period.

3. Notification of initial startup of any such equipment within 15 business days of such startup.

4. Whenever the owner or operator becomes aware of any exceedance of the emission limit set forth in subsection (C), the owner or operator shall notify the Department orally or by electronic or facsimile transmission as soon as practicable, but no later than two business days after the owner or operator first knew of the exceedance.

5. Within 30 days after the end of each calendar-year quarter, the owner or operator shall submit a quarterly report to the Department for the preceding quarter that shall include dates, times, and descriptions of deviations when the owner or operator operated smelting processes and related control equipment in a manner inconsistent with the operations and maintenance plan required by subsection (D)(2).

6. Reports from performance testing conducted pursuant to subsection (E) shall be submitted to the Department within 60 calendar days of completion of the performance test. The reports shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312(A).

R18-2-B1301.01. Limits on Lead-Bearing Fugitive Dust from the Hayden Smelter

A. Applicability.

1. This Section applies to the owner or operator of the Hayden Smelter.

2. Effective Date. Except as otherwise provided, the requirements of this Section shall become applicable on December 1, 2018.

B. Definitions. In addition to definitions contained in R18-2-101 and R18-2-B1301, the following definitions apply to this Section:

1. "Acid plant scrubber blowdown drying system" means the process in which Venturi scrubber blowdown solids are dried and packaged via a thickener, filter press, electric dryer, and supersack filling stations.

2. "Control measure" means a piece of equipment used, or actions taken, to minimize lead-bearing fugitive dust emissions that would otherwise be released to the atmosphere. Control equipment may include, but are not limited to, wind fences, chemical dust suppressants, and water sprayers.

Actions may include, but are not limited to, relocating sources, curtailing operations, or ceasing operations.

3. "Hayden Lead Nonattainment Area" means the townships in Gila and Pinal Counties, as identified and codified in 40 CFR § 81.303, that are designated nonattainment for the 2008 Lead National Ambient Air Quality Standards.

4. "High wind event" means any period of time beginning when the average wind speed, as measured at a meteorological station maintained by the owner or operator that is approved by the Department, is greater than or equal to 15 miles per hour over a 15 minute period, and ending when the average wind speed, as measured at the approved meteorological station maintained by the owner or operator, falls below 15 miles per hour over a 15 minute period.

5. "Lead-bearing fugitive dust" means uncaptured and/or uncontrolled particulate matter containing lead that is entrained in the ambient air and is caused by activities, including, but not limited to, the movement of soil, vehicles, equipment, and wind.

6. "Material pile" means material, including concentrate, uncrushed reverts, crushed reverts, and bedding material, that is stored in a pile outside a building or warehouse and is capable of producing lead-bearing fugitive dust.

7. "Non-smelting process sources" means sources of lead-bearing fugitive dust that are not part of the hot metal process, which includes smelting in the INCO flash furnace, converting, and anode refining and casting. Non-smelting process sources include storage, handling, and unloading of concentrate, uncrushed reverts, crushed reverts, and bedding material; acid plant scrubber blowdown solids; and paved and unpaved roads.

8. "Ongoing visible emissions" means observed emissions to the outside air that are not brief in duration.

9. "Road" means any surface on which vehicles pass for the purpose of carrying people or materials from one place to another in the normal course of business at the Hayden Smelter.

10. "Slag" means the inorganic molten material that is formed during the smelting process and has a lower specific gravity than copper-bearing matte.

11. "Slag hauler" means any vehicle used to transport molten slag.

12. "Storage and handling" means all activities associated with the handling and storage of materials that take place at the Hayden Smelter, including, but not limited to, stockpiling, transport on conveyor belts, transport or storage in rail cars, crushing and milling, arrival and handling of offsite concentrate, bedding, and handling of reverts.

13. "Trackout/carry-out" means any materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that may then fall onto the road.

C. Operational Standards.

1. Equipment operations. At all times, the owner or operator shall operate and maintain all non-smelting process sources, including all associated air pollution control equipment, control

measures, and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing lead-bearing fugitive dust, and in accordance with the fugitive dust plan required by subsection (C)(2) and performance and housekeeping requirements in subsection (D). A determination of whether acceptable operating and maintenance procedures are being used shall be based on all available information to the Department and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, review of fugitive dust plans, and inspection of the relevant equipment.

2. Fugitive dust plan. The owner or operator shall develop, implement, and follow a fugitive dust plan that is designed to minimize lead-bearing fugitive dust from non-smelting process sources. At minimum, the fugitive dust plan shall contain the following:

a. Performance and housekeeping requirements in subsection (D).

b. Design plans and specifications for each wind fence to be installed to control lead-bearing fugitive dust from non-smelting process sources identified in subsections (D)(11) through (D)(14). The dust plan shall contain height limits for the materials being stored in each wind fence, consistent with the design plans and specifications for that particular wind fence. Wind fence design and specifications shall:

i. Require full encircling of the source to be controlled, with reasonable and sufficient openings for ingress and egress;

ii. Consider the orientation of the wind fence to the prevailing winds;

iii. Consider the strength of the winds in the area where the fence will be located;

iv. Consider the porosity of the material to be used, which shall not exceed 50 percent; and

v. Consider the height of the fence relative to the height of the material being stored. At minimum, wind fence height shall be greater than or equal to the material pile height.

c. Design plans and specifications for each new or modified water sprayer system used to control lead-bearing fugitive dust from non-smelting process sources specified in subsections (D)(11) through (D)(14). The number, type, location, watering intensity, flow rates, and other operational parameters of the water sprayers must meet moisture content objectives for sources specified in subsections (D)(11) through (D)(14). The owner or operator may include in the dust plan an exemption to the water requirements at times when the materials are sufficiently moist or it is raining and thus there is no need for additional wetting until the next scheduled watering to meet moisture content objectives. The dust plan shall include the following for each water sprayer:

i. watering schedule;

ii. watering intensity;

iii. minimum flow rate or pressure drop;

iv. appropriate and/or continuous monitoring;

v. schedule for calibration based on the manufacturer's recommended calibration schedule;

vi. preventative maintenance schedule; and

vii. other applicable operational parameters.

d. Necessary improvements and/or modifications to material conveyor systems, along with a schedule for implementing improvements or modifications, targeted to minimize lead-bearing fugitive dust from non-smelting process sources specified in subsections (D)(11) through (D)(14), as applicable, to the greatest extent practicable. The improvements or modifications may include, but is not limited to, hooding of transfer points, utilizing water sprayers, and employing scrapers, brushes, or cleaning systems at all points where belts loop around themselves to catch and contain material before it falls to the ground.

e. Design plans for the concrete pads for the non-smelting process sources specified in subsections (D)(11) and (D)(13). The concrete pads shall be designed to capture, store, and control stormwater or sprayed water to minimize emissions to the greatest extent practicable, including curbing around the outer edges of the concrete pad where feasible.

f. Additional controls and measures for sources specified in subsections (D)(11) through (D)(14) to be implemented during high wind events. These additional controls or measures, which must include curtailment or other alteration of activity when appropriate, must be implemented at these sources during all periods of high wind.

g. Sample inspection sheets, checklists, or logsheets for each of the inspections identified in subsection (D)(6), and in accordance with the following:

i. The inspection sheets or checklists shall include:

(1) Specific descriptions of the equipment being inspected and the specific functions being evaluated;

(2) The findings of the inspection;

(3) The date, time, and location of inspections; and

(4) An identification of who performed the inspection or logged the results.

ii. The logsheets for high wind events shall include:

(1) High wind event start time;

(2) High wind event end time;

(3) Description of area or activity inspected; and

(4) Description of corrective action taken if necessary.

h. Design plans of the new acid plant scrubber blowdown drying system specified in subsection (D)(15).

i. The name and location of the meteorological station, which must be approved by the Department, that is to be used by the owner or operator for determining high wind events

pursuant to subsection (B)(4) and for implementing control requirements pursuant to subsection (D)(5).

3. Plan development and revisions. The owner or operator shall develop and keep current the fugitive dust plan required by subsection (C)(2). Any plan or plan revision shall be consistent with this Section and shall be submitted to the Department for review. The initial plan shall be submitted to the Department for review no later than May 1, 2017. Plans and plan revisions shall be consistent with good air pollution control practice for fugitive dust. Except for the meteorological station to be used for high wind events pursuant to subsection (D)(5), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

D. Performance and Housekeeping Requirements. The owner or operator shall comply with these requirements at all times regardless of a fugitive dust plan.

1. Water sprayers. The owner or operator shall implement a recordkeeping system to capture sprayer operations, including identification of the particular operation, lead-bearing fugitive dust source, timing and intensity of watering, and data regarding the quantity of water used at each water sprayer.
2. Wind fences. The owner or operator shall ensure that wind fences used to control lead-bearing fugitive dust from the non-smelting process sources specified in subsections (D)(11) through (D)(14) meet the following requirements:
    a. Wind fence height shall be greater than or equal to the material pile height. The allowed material pile height shall be posted in a readily visible location at each wind fence.
    b. Wind fence porosity shall not exceed 50 percent.
3. Material conveyor systems. For sources specified in subsections (D)(11) through (D)(14), as applicable, the owner or operator shall:
    a. Minimize conveyor drop heights to the greatest extent practicable.
    b. Clean any spills from conveyors within 30 minutes of discovery. The material collected must be handled in such a way so as to minimize lead-bearing fugitive dust to the maximum extent practicable.
4. Vehicle transport of materials. The owner or operator shall maintain vehicle cargo compartments used to transport materials capable of producing lead-bearing fugitive dust so that the cargo compartment is free of holes or other openings and is covered by a tarp.
5. High wind event requirements.
    a. During high wind events, the owner or operator shall evaluate the non-smelting process sources specified in subsections (D)(11) through (D)(14) for ongoing visible emissions using the appropriate logsheet for each source.

b. If ongoing visible emissions are observed, the owner or operator shall promptly wet the source of emissions with the objective of mitigating further emissions.

c. If wetting does not appear to mitigate the ongoing visible emissions to 20 percent opacity or less, the owner or operator shall postpone associated handling of the source until the high wind event has ceased.

6. Physical inspections. The owner or operator shall conduct physical inspections as follows:

a. Daily inspections of all water sprayers to make sure they are functioning and are in accordance with the dust plan;

b. Daily visual inspections of all material piles to make sure they are maintained within areas protected by a wind fence, that they are not higher than allowed for the wind fence, and to verify that moisture content requirements are met;

c. Daily inspections of all material handling areas to identify and clean up track out or spills of materials;

d. Daily inspections of conveyor systems to identify and clean up material spills;

e. Daily inspections of rumble grates sump levels;

f. Daily spot inspections of vehicles carrying lead-bearing fugitive dust-producing materials when vehicles are in use to ensure that material is not overloaded, is properly covered, and cargo compartments are intact;

g. Weekly inspections of wind fences for material integrity and structural stability;

h. Daily inspections of all paved roads to identify and clean up track out or spills of materials;

i. Daily inspections of unpaved roads in subsection (D)(10)(a) to identify areas where chemical dust suppressant coverage has broken down; and

j. Bi-weekly inspections of the acid plant scrubber blowdown drying system enclosure.

7. Opacity limit and Method 9 readings.

a. Opacity from lead-bearing fugitive dust emissions shall not exceed 20 percent from any part of the facility at any time. Opacity shall be determined by using 40 CFR 60, Appendix A, Reference Method 9, except for unpaved roads, in which opacity shall be determined pursuant to subsection (D)(10)(c).

b. In the event that an employee observes ongoing visible emissions at a non-smelting process source covered by this Section, that employee shall promptly contact a Reference Method 9-certified observer, who shall promptly evaluate the emissions and conduct a Reference Method 9 reading, if possible.

c. A Reference Method 9-certified observer shall conduct a weekly visible emissions survey of all non-smelting process sources covered by this Section and perform a Reference Method 9 reading for any plumes that on an instantaneous basis appear to exceed 15 percent opacity.

8. Corrective actions.

a. At any time that visible emissions from the non-smelting process sources covered by this Section appear to exceed 15 percent opacity, the owner or operator shall take prompt corrective action to identify the source of the emissions and abate such emissions, with the corrective action starting within 30 minutes after discovery.

i. For any non-smelting process source that produces visible emissions that appear to exceed 15 percent opacity, the owner or operator shall perform an analysis of the root cause, and implement a strategy designed to prevent, to the extent feasible, the ongoing recurrence of the source of visible emissions. Within 14 days of completion of its analysis, if appropriate, the owner or operator shall modify the fugitive dust plan in subsection (C)(2) for any changes identified from the analysis differing from the current provisions of the fugitive dust plan.

b. At any time that the owner or operator becomes aware that provisions of the fugitive dust plan and/or performance and housekeeping provisions required by this Section are not being met, the owner or operator shall take prompt action to return to compliance, which may include modifications to monitoring, recordkeeping, and reporting requirements in the fugitive dust plan. This includes, but is not limited to, the following actions:

i. Return water sprayers to full operational status;

ii. Repair damaged conveyor hoodings or other enclosures;

iii. Apply additional water to ensure that sources are meeting moisture content requirements;

iv. Clean any trackout or spillage of dust-producing material, including dropoff of dust producing material from conveyors, using a street sweeper, vacuum, or wet broom with sufficient water and at the speed recommended by the manufacturer;

v. Reapplication of chemical dust suppressants in areas where the coating has broken down on unpaved roads; and

vi. Revisions to the fugitive dust plan to undertake improved monitoring, recordkeeping, and reporting requirements necessary to ensure that the controls contained in the fugitive dust plan are being implemented as contemplated by the fugitive dust plan.

9. Paved Roads. These requirements apply to all roads at the facility currently paved and roads to be paved in the future. The owner or operator shall:

a. Clean roads at least once daily with a sweeper, vacuum, or wet broom in accordance with applicable manufacturer recommendations.

b. Maintain the integrity of the road surface.

c. Clean up trackout and carry-out of material on the following schedule:

i. As expeditiously as practicable, when trackout and carry-out extends a cumulative distance of 50 linear feet or more; and

ii. At the end of the workday, for all other trackout and carry-out.

d. Comply with a speed limit not to exceed 15 miles per hour for all vehicular traffic. At minimum, speed limit signs shall be posted at all entrances and truck loading and unloading areas and/or at conspicuous areas along the roadway.

10. Unpaved Roads. These requirements apply to the unpaved roads identified in subsections (D)(10)(a)(i) through (D)(10)(a)(iii) below, including any access points where the unpaved roads adjoin paved roads and any areas of vehicular handling of material. The owner or operator shall:

a. Implement a chemical dust suppressant application intensity and schedule, which at minimum shall be:

i. For the slag hauler road and all other unpaved roads used or to be used by the slag hauler, chemical dust suppressant shall be applied at least once per week during the summer, and once per every two weeks during the winter.

ii. For the main road to the secondary crusher, chemical dust suppressant shall be applied at least once every six weeks, year-round.

iii. For unpaved roads near reverts and silica flux crushing operations, chemical dust suppressant shall be applied at least once per two weeks during the summer, and once per month in the winter.

b. Increase the frequency of chemical dust suppressant application if necessary to reduce fugitive dust emissions from unpaved roads.

c. Not allow visible emissions to exceed 20 percent opacity and shall not allow silt loading equal to or greater than 0.33 oz/ft^2. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner or operator shall not allow the average percent silt content to exceed 6 percent. Compliance with these requirements shall be determined by the test methods described in Appendix 15.

d. Maintain sufficient watering trucks and personnel to operate such trucks to be employed as an interim measure whenever visible emissions or a breakdown in dust suppressant covering are observed at any point along the treated unpaved road system.

e. Immediately, but no later than 30 minutes after initial observation of any visible emissions, apply water or chemical dust suppressant to the portion of the unpaved road where the visible emissions were observed.

f. Reapply chemical dust suppressant within 24 hours of discovery of any area where the surface chemical dust suppressant coverage has broken down.

g. Collect and prevent from becoming airborne any runoff or material from rinsing or sweeping as soon as practicable.

h. Comply with a speed limit not to exceed 15 miles per hour for all vehicular traffic. At minimum, speed limit signs shall be posted at all entrances and truck loading and unloading areas and/or at conspicuous areas along the roadway.

11. Concentrate Storage, Handling, and Unloading. The owner or operator shall:

a. Consolidate and manage all concentrate storage piles in one or more concrete storage pads.

b. Store concentrate in an area with a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

c. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of concentrate piles are wetted to maintain a nominal 10 percent surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

d. Minimize the footprint of the concentrate storage piles by pushing into the stockpile with a front end loader and sweeping open areas of the pads with a self-powered vacuum sweeper at least daily during use.

12. Uncrushed Reverts Handling and Storage. The owner or operator shall:

a. Manage uncrushed revert material only in areas protected by a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

b. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surface of uncrushed revert material is wetted with the objective to minimize lead-bearing fugitive dust emissions to the greatest extent practicable.

13. Reverts Crushing Operations and Crushed Reverts Storage. The owner or operator shall:

a. Crush revert and store crushed revert only on one or more concrete pads.

b. Crush revert and store crushed revert only within an area protected by a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

c. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of all crushed revert material, including revert managed after it is crushed, is wetted to maintain a nominal 10 percent surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

d. By October 2017, relocate all revert crushing operations to 33º 00’ 25.84” N, 110º 46’ 26.55” W and shall crush revert only at this new location.

14. Bedding Operations, Including Handling, Storage, and Unloading. The owner or operator shall:

a. Perform all bedding activities, including loading and unloading of materials to be blended, only within an area protected by a wind fence in accordance with requirements

set forth in the fugitive dust plan and pursuant to subsection (D)(2). These activities include the storage and handling areas for potentially lead-bearing fugitive dust-producing material within the bedding plant area.

b. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of material in the bedding area is wetted to maintain a nominal 10 percent surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

c. Maintain rumble grates at all of the bedding plant's entrances and exits to shake off material on the loader tires as they enter and exit the area. Material that is tracked out of the bedding area must be cleaned up at the end of the workday.

d. Operate its bedding activities in a manner designed to avoid any trackout outside an area protected by a wind fence. Areas of material spillage or trackout, whether inside or outside of an area protected by a wind fence, shall be rinsed or cleaned daily.

15. Acid Plant Scrubber Blowdown Drying System.

a. The owner or operator shall dry acid plant scrubber blowdown solids only in an enclosed system that uses a venturi scrubber, thickener, filter press, and electric dryer that is maintained under negative pressure at all times that materials are being dried.

b. The owner or operator shall maintain the negative pressure of the electric dryer using a 2,500 ACFM dryer ventilation fan that must run at all times the electric dryer is operational. Monitoring of the negative pressure shall be demonstrated through the run and stop states of the ventilation fan and electric dryer.

c. The acid plant scrubber blowdown drying system shall include the following elements:

i. Venturi scrubber slurry that reports to a new thickener.

ii. Underflow from the thickener that goes to a filter press for further liquid removal, with the resulting filter cake sent to two electric dryers operating in parallel to provide final drying of the dust cake.

iii. Exhaust from the dryers sent to the packed gas cooling tower inlet duct.

iv. Dried cake discharged directly into bags.

d. The owner or operator shall clean all areas previously used for scrubber blowdown drying and no longer use previous areas for scrubber blowdown drying.

E. Contingency Requirements.

1. If the owner or operator does not meet the compliance schedule below in subsection (E)(3), or if the Hayden Lead Nonattainment Area does not attain the 2008 Lead National Ambient Air Quality Standards by the attainment date established in the Act, whichever occurs first, then the owner or operator shall increase the paved road cleaning frequency specified in subsection (D)(9) to twice per day.

2. The owner or operator shall implement the contingency measure in subsection (E)(1) within 60 days of notification by EPA Region IX of either a failure to meet the compliance schedule in subsection (E)(3) or a failure to attain by the attainment date established in the Act, whichever occurs first.

3. The compliance schedule is as follows. The Fugitive Dust Plan referred to in the compliance schedule shall mean the Fugitive Dust Plan submitted to the Administrator by the owner or operator to comply with requirements set forth in Consent Decree No. CV-15-02206-PHX-DLR, which became effective on December 30, 2015 in the United States District Court for the District of Arizona, as that plan may be later revised pursuant to subsection (C)(3):

Control Measure	**Date of Implementation**
Implementation of chemical dust suppression for unpaved roads.	Within 30 days of Administrator approval of application intensity and schedules in Fugitive Dust Plan.
Implementation of wind fences for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate).	Within 120 days of Administrator approval of the Fugitive Dust Plan or the date of completion in the approved Fugitive Dust Plan, whichever is later.
Implementation of water sprays for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate).	Within 120 days of Administrator approval of the Fugitive Dust Plan or the date of completion in the approved Fugitive Dust Plan, whichever is later.
Implementation of new acid plant scrubber blowdown drying system.	November 30, 2016
Implementation of new primary, secondary, and tertiary hooding systems for converter aisle for purposes of complying with requirements in R18-2-B1301.	July 1, 2018
Implementation of new ventilation system for matte tapping and slag skimming for flash furnace for purposes of complying with requirements in R18-2-B1301.	July 1, 2018

F. Ambient Air and Meteorological Monitoring Requirements.

1. The owner or operator shall conduct ambient air monitoring and sampling for lead as follows:
   a. At minimum, the owner or operator shall continue to maintain and operate the ambient lead monitors located at ST-14 (the smelter parking lot), ST-23 (Hillcrest area), ST-26 (post office), and ST-18 (next to the concentrate handling area).
   b. Samples must be collected continuously at all monitor sites specified in subsection (F)(1)(a). For the purposes of this requirement, "continuously" means that 24-hour filters are placed and collected at minimum, every six calendar days at all sites consistent with 40 CFR § 58.12.
   c. The owner or operator shall follow the Hayden Smelter's Quality Assurance Project Plan (QAPP) applicable to these monitors.
   d. The monitors must be operated and maintained in accordance with 40 CFR 58, Appendix A.
   e. The owner or operator shall submit each filter removed from each monitor to a certified laboratory for analysis no later than 18 calendar days after the filter's removal. The owner or operator shall ensure that the laboratory performs its analysis and submits the results to the owner or operator no later than 21 calendar days from the lab's receipt of the filter.
   f. The owner or operator shall calculate, update, and maintain as a record the following data within 14 calendar days of receipt of any results pertaining to the monitor filters received from a certified lab:
      i. The total pollutants on the filters collected and analyzed; and
      ii. Calculations of 30-day rolling average ambient air levels of lead for the ST-23, ST-26, and ST-18 monitors, and 60-day rolling average ambient air levels of lead for the ST-14 monitor, expressed as $\mu g/m^3$.
   g. The owner or operator shall retain lead samples collected pursuant to this Section for at least three years. The samples shall be stored in individually sealed containers and labeled with the applicable monitor and date. Upon request, the samples shall be provided to the Department within five business days.
2. The owner or operator shall conduct meteorological monitoring as follows:
   a. Continuously monitor and record wind speed and direction data using equipment and a meteorological station approved by the Department.
   b. The owner or operator shall calculate and record average wind speed in miles per hour over 15 minutes, rolled each minute.
   c. Conduct wind speed and direction measurements using methods in accordance with EPA's Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV, Meteorological Measurements, Version 2.0.

3. The ambient air and meteorological monitoring stations required by this Section may be discontinued at the end of three full calendar years after the Hayden Lead Nonattainment Area is redesignated attainment for the 2008 Lead National Ambient Air Quality Standards.

G. Compliance Demonstration Requirements. The owner or operator shall demonstrate compliance with this Section by complying with all requirements in the fugitive dust plan pursuant to subsection (C)(2) and implementing all housekeeping and performance requirements pursuant to subsection (D).

H. Recordkeeping.

1. The owner or operator shall maintain the following records for at least five years and keep on-site for at least two years:
   a. Current and past fugitive dust plans required by subsection (C)(2).
   b. Physical inspection sheets, checklists, and logsheets for inspections conducted in accordance with subsection (D)(6).
   c. All records of opacity and stabilization tests, if any, conducted in accordance with subsection (D)(10)(c).
   d. All records of surface moisture content tests, if any, conducted in accordance with subsection (D)(11), subsection (D)(13), and subsection (D)(14).
   e. All records of major maintenance activities and inspections conducted on monitors required by subsection (F).
   f. All records of quality assurance and quality control activities for the monitors required by subsection (F).
   g. All air quality monitoring samples, rolling averages of ambient lead concentrations and necessary calculations, and data required by subsection (F).
   h. All records of wind data from the meteorological station required by subsection (F).
   i. All records of any periods during which a monitoring device required by subsection (F) is inoperative or not operating correctly.
   j. All records of reports and notifications required by subsection (I).
2. All of the following records maintained for the purposes of the fugitive dust plan required by subsection (C)(2) must be maintained in a recordkeeping log or recordkeeping system. As part of the records, the owner or operator shall include the dates and times for each of the following observations or activities, the name of the employee documenting each activity or observation, and the nature and location of each observation activity:
   a. Each instance of observed visible emissions of 15 percent opacity or greater, along with a description of any corrective action undertaken and its success.
   b. Water sprayer operations, including timing and intensity of watering to be captured in the water sprayer recordkeeping system.

c. Timing, location, type, and amount of chemical suppressant and water applied to unpaved roads, and a description of the nature and timing of any additional corrective action taken, as necessary, to minimize emissions to the greatest extent practicable.

d. Timing and location of all sweeping and cleaning of trackout or spillage material.

e. Timing and location of all washdown of concrete areas.

f. Timing and location of sump cleanouts.

g. Results of all visible emissions surveys and Reference Method 9 readings.

h. Appropriate records for operating conditions, including electric dryer ventilation fan start and stop times for the newly designed acid plant scrubber blowdown drying system.

i. Calibration records for all measurement devices, including maintenance of manufacturer's manuals or other documentation for suggested calibration schedules and accuracy levels for each measurement device.

j. Dates, times, and descriptions of deviations when the owner or operator's operations was carried out in a manner inconsistent with the fugitive dust plan required by subsection (C)(2).

I. Reporting. Within 30 days after the end of each calendar-year quarter, the owner or operator shall submit a report to the Department covering the prior quarter that includes the following:

1. All instances where observed fugitive emissions coming from sources covered in this Section were 15 percent or greater.

2. The date of all high wind events, with an identification of the location of the reading, wind speed, and duration of the event, and a description of actions taken as a result of the event on a source-by-source basis.

3. All instances where corrective action was required with identification of the emission source involved, what triggered the corrective action, what action the owner or operator undertook to abate or mitigate the problem, and whether the corrective action achieved the intended results.

4. A summary of all times when the electronic recordkeeping system was not recording data, and a summary and indication of the period when recorded data was outside of established operating parameters.

5. A summary of progress of all new construction, installation, upgrades, or modifications to equipment or structures at the facility required by the fugitive dust plan and subsection (D), including dates of commencement and completion of construction, dates of operations of new or modified equipment or structures, and dates old or outdated equipment or structures were permanently retired.

6. Raw monitoring data and calculated ambient lead concentrations from the ambient air monitoring stations required by subsection (F).

R18-2-B1302. Limits on SO_2 Emissions from the Hayden Smelter

A. Applicability.

1. This Section applies to the owner or operator of the Hayden Smelter. It establishes limits on sulfur dioxide emissions from the Hayden Smelter and monitoring, recordkeeping and reporting requirements for those limits.
2. Effective date. Except as otherwise provided, the requirements of this Section shall become applicable on the earlier of July 1, 2018 or 180 days after completion of all project improvements authorized by Significant Permit Revision No. 60647.

B. Definitions. In addition to definitions contained in R18-2-101 and R18-2-B1301, the following definitions apply to this rule.

1. "Continuous emissions monitoring system" or "CEMS" means the total equipment, required under the emission monitoring provisions in this Chapter, used to sample, condition (if applicable), analyze, and to provide, on a continuous basis, a permanent record of emissions.
2. "Operating day" means any calendar day in which any of the following occurs:
    a. Concentrate is smelted in the smelting furnace;
    b. Copper or sulfur bearing materials are processed in the converters;
    c. Blister or scrap copper is processed in the anode furnaces;
    d. Molten metal, including slag, matte or blister copper, is transferred between vessels; or
    e. Molten metal is cast into anodes or other intermediate or final products.
3. "Out of control period" means the time that begins with the completion of the fifth, consecutive, daily calibration drift check with a calibration drift in excess of two times the allowable limit, or the time corresponding to the completion of the daily calibration drift check preceding the daily calibration drift check that results in a calibration drift in excess of four times the allowable limit, and the time that ends with the completion of the calibration check following corrective action that results in the calibration drifts at both the zero (or low-level) and high-level measurement points being within the corresponding allowable calibration drift limit.

C. Sulfur Dioxide Emissions Limitations.

1. Emissions from the Main Stack shall not exceed 1069.1 pounds per hour on a 14-operating day average unless 1,518 pounds or less is emitted during each hour of the 14-operating day period.
2. The owner and operator shall not cause to be discharged into the atmosphere from any affected unit subject to 40 CFR 60 subpart P any gases which contain sulfur dioxide in excess of the limit set forth in 40 CFR § 60.163(a) (as in effect on July 1, 2016 and no later editions).

D. Operational Standards.

1. Process equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate smelter processes and associated emission control and/or control equipment in a manner consistent with good air pollution control practices for minimizing SO_2 emissions to the levels required by subsection (C). Determination of whether acceptable operating and maintenance

procedures are being used will be based on all information available to the Director and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.

2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and/or control device used to ventilate or control process gas or emissions from the flash furnace including matte tapping, slag skimming, and slag return operations; converter primary hoods, converter secondary hoods, tertiary ventilation system, and anode refining operations. The operations and maintenance plan must address the following requirements as applicable to each capture system and/or control device.

   a. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit values or settings at all times the required capture and control system is operating, except during periods of monitor calibration, repair and malfunction. The initial plan shall provide for volumetric flow monitoring on the vent gas baghouse (inlet or outlet), each converter primary hood, each converter secondary hood, the tertiary ventilation system and the anode furnace baghouse (inlet or outlet). All monitoring devices shall be accurate within +/-10 percent and calibrated according to manufacturer's instructions. If direct measurement of the exhaust flow is infeasible due to physical limitations or exhaust characteristics, the owner or operator may propose a reliable equivalent method for approval. Initial monitoring may be adjusted as provided in subsection (D)(2)(e). Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements. Capture system damper position setting(s) shall be specified in the plan.

   b. Operational limits. The owner or operator shall establish operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indicators of the performance of the capture system and control device operations. The initial operating limits may be adjusted as provided in subsection (D)(2)(e). Initial operating limits shall include the following:

      i. Identification of those modes of operation when the double dampers between the flash furnace vessel and the vent gas system will be closed and the interstitial space evacuated to the acid plant.

      ii. A minimum air flow for the furnace ventilation system and associated damper positions for each matte tapping hood or slag skimming hood when operating to ensure that the operation(s) are within the confines or influence of the capture system.

iii. A minimum air flow for the secondary hood baghouse and associated damper positions for each slag return hood to ensure that the operation is within the confines or influence of the capture system's ventilation draft during times when the associated process is operating.

iv. A minimum air infiltration ratio for the converter primary hoods of 1:1 averaged over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing.

v. A minimum secondary hood exhaust rate of 35,000 SCFM during converter Blowing, averaged over 24 converter Blowing hours, rolled hourly.

vi. A minimum secondary hood exhaust rate of 133,000 SCFM during all non-Blowing operating hours, averaged over 24 non-Blowing hours, rolled hourly.

vii. A minimum negative pressure drop across the secondary hood when the doors are closed equivalent to 0.007 inches of water.

viii. A minimum exhaust rate on the tertiary hooding of 400,000 ACFM during all times material is processed in the converter aisle, averaged over 24 hours and rolled hourly.

ix. Fan amperes or minimum air flow for the anode furnace baghouse and associated damper positions for each anode furnace hood to ensure that the anode furnace off-gas port is within the confines or influence of the capture system's ventilation draft during times when the associated furnace is operating.

x. The anode furnace charge mouth shall be kept covered when the tuyeres are submerged in the metal bath except when copper is being charged to or transferred from the furnace.

xi. The temperatures of the acid plant catalyst bed, which shall at minimum, meet the manufacturer's recommendations.

xii. The acid plant catalyst replenishment criteria, which shall at minimum, meet the manufacturer's recommendations.

c. Preventative maintenance. The owner or operator must perform preventative maintenance on each capture system and control device according to written procedures specified in the operation and maintenance plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions, or operator's experience working with equipment, and frequency for routine and long-term maintenance. This provision does not prohibit additional maintenance beyond that required by the plan.

d. Inspections. The owner or operator must perform inspections in accordance with written procedures in the operations and maintenance plan for each capture system and control

device that are consistent with the manufacturer's, engineer's or operator's instructions for each system and device.

e. Plan development and revisions.

i. The owner or operator shall develop and keep current the plan required by this Section. Any plan or plan revision shall be consistent with this Section, shall be designed to ensure that the capture and control system performance conforms to the attainment demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area State Implementation Plan (SIP), and shall be submitted to the Department for review. Any plan or plan revision submitted shall include the associated manufacturer's recommendations and/or instructions used for capture system and control device operations and maintenance.

ii. The owner or operator shall submit the initial plan to the Department no later than May 1, 2018 and shall include the initial volumetric flow monitoring provisions in subsection (D)(2)(a), the initial operational limits in subsection (D)(2)(b), the preventative maintenance procedures in subsection (D)(2)(c), and the inspection procedures in subsection (D)(2)(d).

iii. The owner or operator shall submit to the Department for approval a plan revision with changes, if any, to the initial volumetric flow monitoring provisions in subsection (D)(2)(a) and initial operational limits in subsection (D)(2)(b) not later than six months after completing a fugitive emissions study conducted in accordance with Appendix 14. The Department shall submit the approved changes to the volumetric flow monitoring provisions and operational limits pursuant to this subsection to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

iv. Other plan revisions may be submitted at any time when necessary. All plans and plan revisions shall be designed to achieve operation of the capture system and/or control device consistent with the attainment demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area SIP. Except for changes to the volumetric flow monitoring provisions in subsection (D)(2)(a) and operational limits in subsection (D)(2)(b), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

3. Emissions from the anode furnace baghouse stack shall be routed to the Main Stack.

E. Monitoring.

1. To determine compliance with subsection (C)(1) the owner or operator of the Hayden Smelter shall install, calibrate, maintain, and operate a CEMS for continuously monitoring and recording SO_2 concentrations and stack gas volumetric flow rates at the following locations.
    a. The exit of the acid plant;
    b. The exit of the secondary hood particulate control device after the High Surface Area (HSA) lime injection system;
    c. The exit of the flash furnace particulate control device after the HSA lime injection system;
    d. The tertiary ventilation system prior to mixing with any other exhaust streams; and
    e. The anode furnace baghouse stack prior to mixing with any other exhaust streams.
2. Except during periods of systems breakdown, repairs, maintenance, out-of-control periods, calibration checks, and zero and span adjustments, the owner or operator shall continuously monitor SO_2 concentrations and stack gas volumetric flow rates at each location in subsection (E)(1).
3. For purposes of this section, continuous monitoring means the taking and recording of at least one measurement of SO_2 concentration and stack gas flow rate reading from the effluent of each affected stack, outlet, or other approved measurement location in each 15-minute period when the associated process units are operating. Fifteen-minute periods start at the beginning of each clock hour, and run consecutively. All CEMS required by subsection (E)(1) shall complete at least one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.
4. If the owner or operator can demonstrate to the Director that measurement of stack gas volumetric flow rate in the outlet of any particular piece of SO_2 control equipment would yield inaccurate results or would be technologically infeasible, then the Director may allow measurement of the flow rate at an alternative sampling point.
5. The owner or operator shall demonstrate that the CEMS required by subsection (E)(1) meet all of the following requirements:
    a. The SO_2 CEMS installed and operated under this Section meets the requirements of 40 CFR 60, Appendix B, Performance Specification 2 and Performance Specification 6. The CEMS on the anode furnace baghouse stack and tertiary ventilation system shall complete an initial Relative Accuracy Test Audit (RATA) in accordance with Performance Specification 2. The RATA runs shall be tied to when the anode furnace is in use and, for the tertiary system, when the converters are in operation and/or material is being transferred in the converter aisle. Asarco may petition the Department and EPA Region IX on the criteria for subsequent RATAs for the anode furnace baghouse stack or tertiary ventilation system CEMS. The petition shall include submittal of CEMS data during the year.

b. The SO_2 CEMS installed and operated under this Section meets the quality assurance requirements of 40 CFR 60, Appendix F.

c. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of the relative accuracy test audit (RATA) performed on the CEMS.

d. The Director shall approve the location of all sampling points for monitoring SO_2 concentration and stack gas volumetric flow rates and the appropriate span values for the monitoring systems. This approval shall be in writing before installation and operation of the measurement instruments.

e. The measurement system installed and used under this subsection is subject to the manufacturer's recommended zero adjustment and calibration procedures at least once per operating day unless the manufacturer specifies or recommends calibration at shorter intervals, in which case the owner or operator shall follow those specifications or recommendations. The owner or operator shall make available a record of these procedures that clearly shows instrument readings before and after zero adjustment and calibration.

f. The owner or operator shall maintain on hand and ready for immediate installation sufficient spare parts or duplicate systems for the CEMS required by this Section to allow for the replacement within six hours of any monitoring equipment part that fails or malfunctions during operation.

6. The owner or operator of the Hayden Smelter may petition the Department to substitute annual stack testing for the tertiary ventilation or the anode furnace baghouse stack CEMS if the owner or operator demonstrates, for a period of two years, that either CEMS contribute(s) less than five percent individually of the total sulfur dioxide emissions. The Department must determine the demonstration adequate to approve the petition. Annual stack testing shall use EPA Methods 1, 4, and 6C in 40 CFR 60 Appendix A or an alternate method approved by the Department and EPA Region IX. Annual stack testing shall commence no later than the one year after the date the continuous emission monitoring system was removed. The owner or operator shall submit a test protocol to the Department at least 30 days in advance of testing. The protocol shall provide for three or more 24-hour runs unless the owner or operator justifies a different period and the Department approves such different period. Reports of testing shall be submitted to the Department no later than 60 days after testing or 30 days after receipt, whichever is later. The report shall provide an emissions rate, in the form of a pound per hour or pound per unit of production factor, that shall be used in the compliance demonstration in subsection (F)(1). Except as provided herein, the owner or operator shall otherwise comply with section R18-2-312 in conducting such testing.

F. Compliance Demonstration Requirements.

1. For purposes of determining compliance with the emission limit in subsection (C)(1) the owner or operator shall calculate emissions for each operating day as follows:
    a. Sum the hourly pounds of SO_2 vented to each uncontrolled shutdown ventilation flue and through each monitoring point listed in subsection (E)(1) for the current operating day and the preceding 13-operating days to calculate the total pounds of SO_2 emissions over the 14-operating day averaging period, as applicable.
    b. Divide the total amount of SO_2 emissions calculated from subsection (F)(1)(a) by 336 to calculate the 14-operating day average SO_2 emissions.
    c. If the calculation in subsection (F)(1)(b) exceeds 1069.1 pounds per hour, then the owner or operator shall sum the hourly pounds of SO_2 vented to each uncontrolled shutdown ventilation flue and through each monitoring point listed in subsection (E)(1) for each hour of the current operating day and each hour of the preceding 13-operating days to ascertain if any hour exceeded 1,518 pounds per hour.
2. When no valid hour or hours of data have been recorded by a continuous monitoring system required by subsections (E)(1) and (E)(2) and the associated process unit is operating, the owner or operator shall calculate substitute data for each such period according to the following procedures:
    a. For a missing data period less than or equal to 24 hours, substitute the average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.
    b. For a missing data period greater than 24 hours, substitute the greater of:
        i. The 90th percentile hourly SO_2 concentrations recorded by the system during the previous 720 quality-assured monitor operating hours.
        ii. The average of the hourly SO_2 concentrations recorded by the system for the hour before and the four hours after the missing data period.
    c. Notwithstanding subsections (F)(3)(a) and (F)(3)(b), the owner or operator may present any credible evidence as to the quantity or concentration of emissions during any period of missing data.
3. The owner or operator shall determine compliance with the requirements in subsection (D)(2) as follows:
    a. Maintaining and operating the emissions capture and control equipment in accordance with the capture system and control device operations and maintenance plan required in subsection (D)(2) and recording operating parameters for capture and control equipment as required in subsection (D)(2)(b); and
    b. Conducting a fugitive study in accordance with Appendix 14 starting not later than 6 months after completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The fugitive study shall demonstrate, as set forth in Appendix 14, that fugitive emissions from the smelter are consistent with estimates used

in the attainment demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area SIP.

4. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limits in subsection (C).

5. The owner and operator shall demonstrate compliance with the limit in subsection (C)(2) in accordance with 40 CFR §§ 60.165 and 60.166 (as in effect on July 1, 2016 and not later editions).

G. Recordkeeping.

1. The owner or operator shall maintain a record of each operation and maintenance plan required under subsection (D)(2).

2. The owner or operator shall maintain the following records for at least five years:

a. All measurements from the continuous monitoring system required by subsection (E)(1), including the date, place, and time of sampling or measurement; parameters sampled or measured; and results. All measurements will be calculated daily.

b. All records of quality assurance and quality control activities for emissions measuring systems required by subsection (E)(1).

c. All records of calibration checks, adjustments, maintenance, and repairs conducted on the continuous monitoring systems required by subsection (E); including records of all compliance calculations required by subsection (F).

d. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of concentrate drying, smelting, converting, anode refining and casting emission units; any malfunction of the associated air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device required by subsection (E)(1) is inoperative or not operating correctly.

e. All records of planned and unplanned shutdown ventilation flue utilization events and calculations used to determine emissions from shutdown ventilation flue utilization events if the owner or operator chooses to use the alternative compliance determination method.

f. All records of major maintenance activities and inspections conducted on emission units, capture system, air pollution control equipment, and CEMS, including those set forth in the operations and maintenance plan required by subsection (D)(2).

g. All records of operating days and production records required for calculations in subsection (F).

h. All records of fugitive emissions studies and study protocols conducted in accordance with Appendix 14.

i. All records of reports and notifications required by subsection (H).

H. Reporting.

1. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of relative accuracy test audit (RATA) procedures performed on the continuous monitoring systems required by subsection (E)(1).

2. Within 30 days after the end of each calendar quarter, the owner or operator shall submit a data assessment report to the Director in accordance with 40 CFR Part 60, Appendix F for the continuous monitoring systems required by subsection (E).

3. The owner or operator shall submit an excess emissions and monitoring systems performance report or summary report form in accordance with 40 CFR § 60.7(c) to the Director quarterly for the continuous monitoring systems required by subsection (E)(1). Excess emissions means any 14-operating day average as calculated in subsection (F) in excess of the emission limit in subsection (C)(1), any period in which the capture and control system was operating outside of its parameters specified in the capture system and control device operation and maintenance plan in subsection (D)(2). For any 14-operating day period exceeding 1069.1 pounds per hour that the owner or operator claims does not exceed the limit in subsection (C)(1) because all hours in the operating period are below 1,518 pounds per hour, the owner or operator shall submit the CEMS data for each hour during that period. All reports shall be postmarked by the 30th day following the end of each calendar quarter time period.

4. The owner or operator shall provide the following to the Director:

   a. The owner or operator shall notify the Director of commencement of construction of any equipment necessary to comply with the operational or emission limits.

   b. The owner or operator shall submit semiannual progress reports on construction of any such equipment postmarked by July 30 for the preceding January-June period and January 30 for the preceding July-December period.

   c. The owner or operator shall submit notification of initial startup of any such equipment within 15 business days of such startup.

I. Preconstruction review. This Section is determined to be Reasonably Available Control Technology (RACT) for SO_2 emissions from the operations subject to subsection (C) for purposes of minor source NSR requirement addressed in R18-2-334.

PART C. MIAMI, ARIZONA, PLANNING AREA

R18-2-C1301. Reserved

R18-2-C1302. Limits on SO_2 Emissions from the Miami Smelter

A. Applicability.

1. This Section applies to the owner or operator of the Miami Smelter. It establishes limits on SO_2 emissions from the Miami Smelter and monitoring, recordkeeping and reporting requirements for those limits.

2. Effective date. Except as otherwise provided, the provisions of this Section shall take effect on the later of the effective date of the Administrator's action approving it as part of the state implementation plan or January 1, 2018.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this rule.

1. "Capture system" means the collection of components used to capture gases and fumes released from one or more emission points, and to convey the captured gases and fumes to one or more control devices. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.
2. "Electric furnace" means a furnace in which copper matte and slag are heated by electrical resistance without the mechanical introduction of air or oxygen.
3. "IsaSmelt® furnace" means a furnace in which air, oxygen, and fuel are injected through a top-submerged lance into a molten slag bath to produce slag and copper matte.
4. "Miami Smelter" means the primary copper smelter located near Miami, Gila County, Arizona at latitude 33º24'50"N and longitude 110°51'25"W.
5. "Out of control period" means the time that begins with the completion of the fifth, consecutive, daily calibration drift check with a calibration drift in excess of two times the allowable limit, or the time corresponding to the completion of the daily calibration drift check preceding the daily calibration drift check that results in a calibration drift in excess of four times the allowable limit, and the time that ends with the completion of the calibration check following corrective action that results in the calibration drifts at both the zero (or low-level) and high-level measurement points being within the corresponding allowable calibration drift limit.
6. "Operating day" means any calendar day in which any of the following occurs:
    a. Concentrate is smelted in the Electric furnace or IsaSmelt® furnace;
    b. Copper or sulfur bearing materials are processed in the converters;
    c. Blister or scrap copper is processed in the anode furnaces or mold vessel;
    d. Molten metal, including slag, matte or blister copper, is transferred between vessels;
    e. Molten metal is cast into molds, anodes, or other intermediate or final products;
    f. Power is provided to the electric furnace to make or maintain a molten bath; or
    g. The anode furnace is heated to make or maintain a molten bath.

C. Sulfur Dioxide Emission Limitations. Combined SO_2 emissions from the tail gas stack, vent fume stack, aisle scrubber stack, bypass stack, and smelter roofline fugitives shall not exceed 142.45 pounds per hour on a 30-day rolling average basis.

D. Operational Standards.

1. Process Equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and

operate smelter processes and associated emission control devices in a manner consistent with good air pollution control practices for minimizing SO_2 emissions from the process gases associated with the IsaSmelt® furnace, electric furnace, and converters at least to the levels required by subsection (C). Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.

2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and control device used to ventilate or control process gas or emissions associated with the IsaSmelt® furnace, electric furnace, and converters. The owner or operator shall submit the initial plan to the Department and EPA Region IX for review and approval by July 1, 2017.

   a. The operations and maintenance plan must address the following requirements as applicable to each capture system and control device:

      i. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit or range values at all times the required system is operating. Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements.

      ii. Operational limits and ranges. The owner or operator shall establish operating limits and ranges in the plan for each capture system and control device that are representative and reliable indicators of capture system performance and control device operation. If selected as an operational limit or range, capture system damper position settings shall be specified in the plan.

      iii. Preventative maintenance. The owner or operator must perform preventative maintenance for each capture system and control device according to written procedures in the plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions and specified frequency for routine and long-term maintenance.

      iv. Inspections. The owner or operator must perform inspections in accordance with written procedures in the plan for each capture system and control device, including position verification of any manual damper settings specified in the plan, that are consistent with the manufacturer's or engineer's instructions for each system and device.

   b. The owner or operator shall operate and maintain each capture system and each control device in accordance with the plan required by subsection (D)(2) and as approved by the Department and EPA Region IX, except as provided herein. Until receiving initial

approval of the plan, the owner or operator shall operate and maintain each capture system and each control device in accordance with the plan as initially submitted pursuant to subsection (D)(2). The owner or operator shall submit plan revisions for review by the Department and EPA Region IX. At any time, the Department and/or EPA Region IX may require the owner or operator to revise the plan if determined to be inconsistent with subsection (D)(2)(a). Within 60 days of receiving written notification from the Department or EPA Region IX specifying such inconsistency, the owner or operator shall submit a proposal to the Department and EPA Region IX that addresses the inconsistency. The owner or operator shall maintain a current copy of the plan onsite and available for review and inspection upon request.

E. Monitoring.

1. To determine compliance with subsection (C), the owner or operator shall install, calibrate, maintain, and operate continuous monitoring systems to monitor and record SO_2 concentrations and stack gas volumetric flow rates at the following locations.
   a. The acid plant tail gas stack;
   b. The vent fume stack;
   c. The aisle scrubber stack; and
   d. The bypass stack.
2. To determine compliance with the emission limit in subsection (C), the owner or operator shall install, calibrate, maintain, and operate a continuous monitoring system to monitor and record fugitive SO_2 concentrations at the Miami Smelter roofline.
3. Except during periods of continuous monitoring system breakdown, repairs, maintenance, out-of-control periods, calibration checks, and zero and span adjustments, the owner or operator shall continuously monitor SO_2 concentrations and stack gas volumetric flow rates at each location specified in subsection (E)(1) and use the monitored concentrations and volumetric flow rates when demonstrating compliance with the SO_2 emission limit in subsection (C) in accordance with subsection (F).
4. Except during periods of continuous monitoring system breakdown, repairs, maintenance, out-of-control periods, calibration checks and zero and span adjustments, the owner or operator shall continuously monitor fugitive SO_2 emissions at the Miami Smelter roofline and use the monitored concentrations and volumetric flow rates when demonstrating compliance with the SO_2 emission limit in subsection (C) in accordance with subsection (F).
5. For purposes of subsections (E)(3) and (E)(4), continuous monitoring means the taking and recording of at least one measurement of SO_2 concentration and stack gas flow rate reading from the effluent of each affected stack, outlet, or other approved measurement location in each 15-minute period when the associated process units are operating. Fifteen-minute periods start at the beginning of each clock hour, and run consecutively. All continuous monitoring systems required

by subsection (E)(1) shall complete at least one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

6. If the owner or operator can demonstrate to the Director and EPA Region IX that measurement of stack gas volumetric flow rate in the outlet of any particular piece of SO_2 control equipment would yield inaccurate results or would be technologically infeasible, then the Director and EPA Region IX may allow measurement of the flow rate at an alternative sampling point.

7. The owner or operator shall demonstrate that the continuous monitoring systems required by subsection (E)(1) meet all of the following requirements:

   a. Each SO_2 continuous monitoring system shall meet the specifications under 40 CFR 60, Appendix B, Performance Specification 6.

   b. Each SO_2 continuous monitoring system installed and operated under this Section shall also meet the quality assurance requirements of 40 CFR 60, Appendix F, Procedure 1.

   c. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of the relative accuracy test audit (RATA) procedures performed on each continuous monitoring system.

   d. The Director shall approve the location of all sampling points for monitoring SO_2 concentrations and stack gas volumetric flow rates in writing before installation and operation of measurement instruments.

   e. The span of each continuous monitoring system for the acid plant tail stack, vent fume stack, and aisle scrubber stack shall be set at a SO_2 concentration of zero to 0.20 percent by volume.

   f. The span of the continuous monitoring system for the bypass stack shall be set at a SO_2 concentration of zero to 20 percent by volume.

   g. The zero (or low-level value between 0 and 20 percent of the span value) and span (50 to 100 percent of span value) calibration drifts shall be checked at least once each operating day in accordance with a written procedure. The zero and span must, at a minimum, be adjusted whenever either the 24-hour zero drift or the 24-hour span drift exceeds two times the limit in 40 CFR Part 60, Appendix B, Performance Specification 2. The system must allow the amount of the excess zero and span drift to be recorded and quantified.

   h. The owner or operator shall maintain on hand and ready for immediate installation sufficient spare parts or duplicate systems for the continuous monitoring system equipment required by this Section to allow for the replacement within six hours of any monitoring system equipment part that fails or malfunctions during operation.

8. The owner or operator shall develop and implement a roofline fugitive emissions monitoring plan for the continuous monitoring system required by subsection (E)(2). The owner or operator shall submit the initial plan to the Department and EPA Region IX for review and approval by July 1, 2017.

a. The roofline fugitive emissions monitoring plan must address the following requirements:

i. The continuous monitoring system required by subsection (E)(2) must include measurement of fugitive emissions from, at a minimum, the Converter, Electric Furnace, Anode Furnace, and IsaSmelt® systems that is representative of total fugitive emissions.

ii. Each measurement system shall include at least one SO_2 analyzer and sufficient sampling locations that ensure collection of a representative sample along the roof monitor for each monitor system. The number of sample probes and their locations for each monitoring system shall account for the physical configuration of the vent, the locations of emitting activities relative to the vent, and heat generated by the equipment served by the vent.

iii. Each measurement system shall include validation of adequate velocity for flow measurements and sufficient flow and temperature sensors to ensure calculation of representative exhaust flows through each vent. The number of such sensors and their locations for each monitoring system shall account for the physical configuration of the vent, the locations of emitting activities relative to the vent, and heat generated by the equipment served by the vent.

iv. Each measurement system shall include an on-site data collection system that continuously logs and stores the measured SO_2 concentration, the measured flow velocity, and the measured temperature.

v. An appropriate range for zero-span drift shall be established for all SO_2 analyzers to ensure proper calibration and operation. Unless otherwise provided in the roofline fugitive emissions monitoring plan required by subsection (E)(8), the zero (or low-level) value determination shall be made using a gas containing between zero to 20 percent of the span value for SO_2 and the span (or high-level) value determination shall be made using a certified gas with a value between 50 and 100 percent of the span value for SO_2. For each SO_2 analyzer, a daily zero-span check shall be performed by introducing zero gas and a known concentration of span gas to the analyzer. If the zero or span drift for an analyzer is greater than five percent of the span gas concentration for five consecutive days or greater than 10 percent of the span gas concentration for one day, the analyzer shall be found to be operating improperly and appropriate measures shall be taken to return the analyzer to proper operation. The zero-span check shall be repeated after any such corrective action is taken.

vi. All SO_2 analyzers shall be inspected quarterly by the owner or operator and inspected annually by an independent auditor. The inspections shall be conducted in accordance with the data accuracy assessment requirements of 40

CFR 60, Appendix F, Procedure 1,Section 5 or as otherwise provided in the roofline fugitive emissions monitoring plan required by subsection (E)(8). The quarterly inspections consist of two certified concentrations of SO_2 to each sample probe system and comparing the known concentrations to the concentrations logged by the corresponding on-site data collection system to generate a relative error for each system.

vii. The flow and temperature data shall be checked daily for proper operation of flow and temperature sensors in accordance with the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a flow or temperature sensor is found to be operating improperly, appropriate measures shall be taken to return the sensor to proper operation.

viii. All temperature sensors shall be inspected annually. The inspection shall be conducted according to the manufacturer's specification. A temperature sensor tolerance range representative of proper sensor operation shall be established in the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a temperature sensor is found to measure outside of an established tolerance range, the sensor shall be found to be operating improperly and appropriate measures shall be taken to return the sensor to proper operation.

ix. All flow sensors shall be calibrated semi-annually with calibration tools according to the manufacturer's specifications. A calibration tool range representative of proper sensor operation shall be established in the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a flow sensor is found to measure outside of an established range, the sensor shall be found to be operating improperly and appropriate measures shall be taken to return the sensor to proper operation.

b. The owner or operator shall operate and maintain the continuous monitoring system required by subsection (E)(2) in accordance with the roofline fugitive emissions monitoring plan required by subsection (E)(2) and as approved by the Department and EPA Region IX, except as provided herein. Until receiving initial approval of the plan, the owner or operator shall operate and maintain the continuous monitoring system required by subsection (E)(2) in accordance with the plan as initially submitted pursuant to subsection (E)(2). The owner or operator shall keep the plan current and consistent with subsection (E)(8)(a). The owner or operator shall maintain a current copy of the plan onsite and available for review and inspection upon request. The Department and/or EPA Region IX may require the owner or operator to revise the plan if determined to be inconsistent with subsection (E)(8)(a). Within 60 days of receiving written notification from the Department or EPA Region IX specifying such inconsistency, the owner or

operator shall submit a proposal to the Department and EPA Region IX that addresses the inconsistency.

F. Compliance Demonstration Requirements.

1. Within 180 days of the effective date set forth in subsection (A)(2), the owner or operator shall demonstrate compliance with the emission limit in subsection (C) by calculating SO_2 emissions for each operating day as follows:
   a. Sum the hourly pounds of SO_2 measured by the continuous monitoring systems required by subsection (E)(1) and (E)(2) for the current operating day and the preceding 29 operating days to calculate the total pounds of SO_2 emissions over the 30-operating day averaging period.
   b. Multiply the operating days occurring during a 30-day averaging period by 24 to calculate the total operating hours over the most recent 30-operating day period.
   c. Divide the total amount of SO_2 emissions calculated from subsection (F)(1)(a) by the total operating hours calculated from subsection (F)(1)(b) to calculate the 30-day rolling hourly average SO_2 emissions.
2. For the continuous monitoring systems required by subsections (E)(1) and (E)(2), hourly emissions shall be computed as follows:
   a. Except as provided under subsection (F)(2)(c), for a full operating hour (any clock hour with 60 minutes of unit operation), at least four valid data points are required to calculate the hourly average, i.e., one data point in each of the 15-minute quadrants of the hour.
   b. Except as provided under subsection (F)(2)(c), for a partial operating hour (any clock hour with less than 60 minutes of unit operation), at least one valid data point in each 15-minute quadrant of the hour in which the unit operates is required to calculate the hourly average.
   c. For any operating hour in which required maintenance or quality-assurance activities are performed:
      i. If the unit operates in two or more quadrants of the hour, a minimum of two valid data points, separated by at least 15 minutes, is required to calculate the hourly average; or
      ii. If the unit operates in only one quadrant of the hour, at least one valid data point is required to calculate the hourly average.
   d. If a daily calibration error check is failed during any operating hour, all data for that hour shall be invalidated, unless a subsequent calibration error test is passed in the same hour and the requirements of subsection (F)(2)(c) are met, based solely on valid data recorded after the successful calibration.
   e. For each full or partial operating hour, all valid data points shall be used to calculate the hourly average.

f. Data recorded during periods of continuous monitoring system breakdown, repair, maintenance, out of control periods, calibration checks, and zero and span adjustments shall not be included in the data averages computed under subsection (F)(3).

g. Either arithmetic or integrated averaging of all data may be used to calculate the hourly average. The data may be recorded in reduced or non-reduced form.

3. When no valid hour or hours of data have been recorded by a continuous monitoring system required by subsections (E)(1) and (E)(2) and the associated process unit is operating, the owner or operator shall calculate substitute data for each such period according to the following procedures:

a. For a missing data period less than or equal to 24 hours, substitute the average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.

b. For a missing data period greater than 24 hours, substitute the greater of:

i. The 90th percentile hourly SO_2 concentrations recorded by the system during the previous 720 quality-assured monitor operating hours; or

ii. The average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.

4. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limit in subsection (C).

G. Recordkeeping.

1. The owner or operator shall maintain records as specified in the capture system and control device operations and maintenance plan required under subsection (D)(2) and the roofline fugitive emissions monitoring plan required under subsection (E)(8).

2. The owner or operator shall maintain the following records for at least five years:

a. All measurements from the continuous monitoring systems required by subsection (E)(1) and (E)(2); including the date, place, and time of sampling or measurement, parameters sampled or measured, and results.

b. All records of all compliance calculations required by subsection (F).

c. All records of quality assurance and quality control activities conducted on the continuous monitoring systems required by subsection (E)(1) and (E)(2).

d. All records of continuous monitoring system breakdowns, repairs, maintenance, out of control periods, calibration checks, and zero and span adjustments for the continuous monitoring systems required by subsection (E)(1) and (E)(2).

e. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of Smelter processes; any malfunction of the associated air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device required by subsection (E)(1) and (E)(2) is inoperative.

f. All records of all major maintenance activities conducted on emission units, capture system, air pollution control equipment, and continuous monitoring systems; including those set forth in the operations and maintenance plan required by subsection (D)(2).

g. All records of reports and notifications required by subsection (H).

H. Reporting

1. Within 30 days after the end of each calendar quarter, the owner or operator shall submit a data assessment report to the Director in accordance with 40 CFR Part 60, Appendix F, Procedure 1 for the continuous monitoring systems required by subsection (E).

2. The owner or operator shall submit an excess emissions and monitoring systems performance report and-or summary report form in accordance with 40 CFR § 60.7(c) to the Director semiannually for the continuous monitoring systems required by subsection (E)(1) and (E)(2). All reports shall be postmarked by the 30th day following the end of each six-month period.

3. The owner or operator shall provide the following to the Director:

a. Notification of commencement of construction of the project improvements and equipment authorized by Significant Permit Revision No. 53592 to comply with the operational or emission limits in this Section no later than 30 days after such date.

b. Semiannual progress reports on construction of any such improvements and equipment on January 1 and July 1 of each calendar year until construction is complete.

c. Notification of initial startup of any such improvements and equipment within 15 days after such date.

I. Preconstruction review. This Section is determined to be Reasonably Available Control Technology (RACT) for SO_2 emissions from the operations subject to subsection (C) for purposes of minor source NSR requirements addressed in R18-2-334.

A14. APPENDIX 14.
PROCEDURES FOR SULFUR DIOXIDE AND LEAD FUGITIVE EMISSIONS STUDIES FOR THE HAYDEN SMELTER

A14.1. Applicability

This appendix applies to the owner or operator of the primary copper smelter located in Hayden, Arizona at latitude 33º0’15”N and longitude 110º46’31”W.

A14.2. Study Objectives

The owner or operator shall conduct fugitive emissions studies to derive a measurement or accurate estimate of total fugitive sulfur dioxide and lead emissions from the Hayden smelter during operations, including planned and unplanned start-up and shutdown periods and malfunctions, for the processes identified in A14.3 below. The studies shall include uncaptured fugitive sulfur dioxide emissions from the smelter processing units, but not emissions due

solely to the use of fuel for space heating or steam generation, burners at anode casting, or slag pouring at the slag dump. The studies shall evaluate the extent to which correlations may exist between fugitive sulfur dioxide, lead, and particulate matter ($PM/PM_{10}/PM_{2.5}$) emissions, and shall develop such correlations as feasible.

The studies shall also be used to help validate that the operating conditions or ranges specified in the capture and control device maintenance and operations plans required in R18-2-B1301(D)(2) and R18-2-B1302(D)(2) are consistent with operating conditions demonstrating attainment of the 2008 Lead National Ambient Air Quality Standards (NAAQS) in the Hayden 2008 Lead NAAQS Nonattainment Area State Implementation Plan (SIP) and the 2010 Sulfur Dioxide NAAQS in the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP.

A14.3. Processes Evaluated

From the fugitive emissions studies, the owner or operator shall develop an emission factor or accurate estimate of fugitive emissions for sulfur dioxide and lead during operations, including planned and unplanned start-up and shutdown periods and malfunctions, produced by each of the following smelting processes:

i. Flash furnace building, including flash furnace and dryer operations

ii. Converter aisle, including converter and related operations

iii. Anode furnace aisle, including oxidizing, poling and related operations

A14.4. Averaging Periods

The emission estimate shall include the average pounds per hour emission factor for the fugitive lead and sulfur dioxide emissions from each step in the smelting process identified in A14.3. The estimate shall include all time periods, including planned and unplanned start-up and shutdown periods and malfunctions.

A14.5. Methods and Study Protocols

The owner or operator shall submit to the Department and EPA Region IX for review and approval study protocols at least six months prior to conducting fugitive emission studies. Study protocols must be approved by the Department and EPA Region IX prior to commencement of fugitive emissions studies. Study protocols shall specify the method(s) used to meet the study objectives as described in A14.2, including during all recurring operating scenarios from all processes identified in A14.3.

Each fugitive emissions measurement system shall include validation of adequate velocity for flow measurements (i.e., the expected exhaust velocity is within the measurement range of the instrument), and have a sufficient number of flow and temperature sensors to ensure calculation of representative exhaust flows through each roof monitor vent. The number of such sensors and their locations for each monitoring system shall account for the physical configuration of the roof monitor vent, the locations of emitting activities relative to the roof monitor vent, and heat generated by the equipment served by the roof monitor vent.

The fugitive emissions studies shall include operation and process information to help understand the emission impacts of startup, shutdown, malfunctions, and significant changes in process operations. This shall include, for example, dates, times and duration of these events, cause of malfunctions, and descriptions of process changes.

After the completion of each fugitive emissions study, the owner or operator shall modify study methods based on data and lessons learned from previous studies, and submit such modified methods in the proceeding study protocols prior to conducting future emissions studies.

A14.6. Study Duration, Frequency, and Submission Schedule

The first fugitive emissions study must commence not later than six months after the completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The second study commencement date shall occur within the same calendar quarter, but five years later from the date of commencement of the first study. The owner or operator shall submit the results of each fugitive emissions study in a report to the Department and EPA Region IX for review and approval not later than six months after completing a study. The data collection portion of the first and second fugitive emissions studies shall be conducted for a period of 12 months to assess the content and quantity of fugitive sulfur dioxide and lead emissions.

A14.7. Study Reports and Subsequent Studies

At minimum, fugitive emission study reports submitted pursuant to A14.6 must include:

i. Resultant emission factors used to determine fugitive emissions of sulfur dioxide and lead.

ii. Resultant average fugitive lead emissions for each process identified in A14.3.

iii. Resultant peak one-hour fugitive sulfur dioxide emissions for each process identified in A14.3.

iv. Seasonal differences, if any.

v. Comparisons of results from past studies, if any.

vi. Descriptions and identification of volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) that are associated with fugitive emissions.

vii. An analysis of whether the results from a study demonstrate that the volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and the operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) continuously ensure that actual fugitive sulfur dioxide and lead emissions are consistent with the modeled emission rates used in the attainment demonstrations in the Hayden 2008 Lead NAAQS Nonattainment Area SIP and the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP. The analysis must also identify subsequent fugitive emissions studies, if any, needed to remedy inaccurate operational limits and volumetric flow monitoring provisions and to ensure attainment of the 2008 Lead NAAQS and 2010 Sulfur Dioxide NAAQS. The scope, duration, and frequency of any subsequent fugitive emissions studies

must also be identified. This provision and the report's conclusion neither require nor prohibit future fugitive emission studies.

viii. An analysis of whether supplemental modeling is needed to demonstrate that resultant fugitive emissions from a study provide attainment of the 2008 Lead NAAQS and 2010 Sulfur Dioxide NAAQS.

ix. A summary of methods as followed per approved study protocols.

A14.8. Revisions to Operations and Maintenance Plan

If an analysis conducted in accordance with A14.7(vi) demonstrates that fugitive emissions associated with volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) may exceed the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, and result in an increased likelihood of a NAAQS exceedance based on modeling required under A14.9, then the owner or operator shall submit to the Department for approval, not later than six months after completing a study, recommended changes to operational limits and volumetric flow monitoring provisions as an operations and maintenance plan revision pursuant to R18-2-B1301(D)(2)(e) and R18-2-B1302(D)(2)(e) that would achieve necessary fugitive emissions levels to demonstrate attainment of the NAAQS at the same level of assurance as in the attainment demonstrations. Until receiving approval of the plan revision, the owner or operator shall operate and maintain the volumetric flow monitoring provisions and the operational limits in accordance with the plan as initially submitted pursuant to R18-2-B1301(D)(2)(e) and R18-2-B1302(D)(2)(e). Additionally, the owner and operator shall submit new attainment demonstrations pursuant to A14.9, making appropriate demonstrations of attainment at adjusted fugitive emissions levels.

Similarly, if an analysis conducted in accordance with A14.7(vi) demonstrates that fugitive emissions associated with the volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) may exceed the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, and result in an increased likelihood of a NAAQS exceedance based on modeling required under A14.9, then the Department shall submit appropriate changes to the operational limits and volumetric flow monitoring provisions, and any revised attainment demonstration pursuant to A14.9, if applicable, to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

A14.9. Supplemental Modeling

If an analysis conducted in accordance with A14.7(vii) demonstrates that fugitive emissions associated with volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits

in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) are greater than the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, the owner or operator shall remodel to demonstrate whether the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS will be attained as such higher rates. The owner or operator shall submit such modeling to the Department and EPA Region IX for review and approval not later than six months after completing a fugitive emissions study.

If the revised modeling demonstrates that the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS will be attained, the Department shall submit such modeling demonstration and revised fugitive emissions assumptions as a SIP revision to EPA Region IX not later than 12 months after completion of a fugitive emissions study. Alternatively, the owner or operator shall propose additional emission control requirements to revise the SIP, or any combination of revised control measures and modeled attainment, to demonstrate attainment of the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS.

A15. APPENDIX 15.
TEST METHODS FOR DETERMINING OPACITY AND STABILIZATION OF UNPAVED ROADS

A15.1. Applicability

This appendix applies to unpaved roads at the primary copper smelter located in Hayden, Arizona at latitude 33º0’15”N and longitude 110º46’31”W.

A15.2. Opacity Test Method

The purpose of this test method is to estimate the percent opacity of fugitive dust plumes caused by vehicle movement on unpaved roads. This method can only be conducted by an individual who has received certification as a qualified observer. Qualification and testing requirements can be found in Section A15.4 of this appendix.

A15.2.1. Step 1

Stand at least 16.5 feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140º sector to the back. Following the above requirements, make opacity observations so that the line of vision is approximately perpendicular to the dust plume and wind direction. If multiple plumes are involved, do not include more than one plume in the line of sight at one time.

A15.2.2. Step 2

Record the fugitive dust source location, source type, method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position to the fugitive dust source, and

color of the plume and type of background on the visible emission observation from both when opacity readings are initiated and completed.

A15.2.3. Step 3

Make opacity observations, to the extent possible, using a contrasting background that is perpendicular to the line of vision. Make opacity observations approximately 1 meter above the surface from which the plume is generated. Note that the observation is to be made at only one visual point upon generation of a plume, as opposed to visually tracking the entire length of a dust plume as it is created along a surface. Make two observations per vehicle, beginning with the first reading at zero seconds and the second reading at five seconds. The zero-second observation should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume but, instead, observe the plume briefly at zero seconds and then again at five seconds.

A15.2.4. Step 4

Record the opacity observations to the nearest 5 percent on an observational record sheet. Each momentary observation recorded represents the average opacity of emissions for a 5-second period. While it is not required by the test method, EPA recommends that the observer estimate the size of vehicles which generate dust plumes for which readings are taken (e.g. midsize passenger car or heavy-duty truck) and the approximate speeds the vehicles are traveling when readings are taken.

A15.2.5. Step 5

Repeat Step 3 (Section A15.2.3 of this appendix) and Step 4 (Section A15.2.4 of this appendix) until you have recorded a total of 12 consecutive opacity readings. This will occur once six vehicles have driven on the source in your line of observation for which you are able to take proper readings. The 12 consecutive readings must be taken within the same period of observation but must not exceed 1 hour. Observations immediately preceding and following interrupted observations can be considered consecutive.

A15.2.6. Step 6

Average the 12 opacity readings together. If the average opacity reading equals 20 percent or lower, the source is in compliance.

A15.3. Silt Content Test Method

The purpose of this test method is to estimate the silt content of the trafficked parts of unpaved roads. The higher the silt content, the more fine dust particles that are released when cars and trucks drive on unpaved roads.

A15.3.1. Equipment

A15.3.1.1. A set of sieves with the following openings: 4 millimeters (mm), 2 mm, 1 mm, 0.5 mm and 0.25 mm (or a set of standard/commonly available sieves), a lid, and collector pan.

A15.3.1.2. A small whisk broom or paintbrush with stiff bristles and dustpan 1 ft. in width. (The broom/brush should preferably have one, thin row of bristles no longer than 1.5 inches in length).

A15.3.1.3. A spatula without holes.

A15.3.1.4. A small scale with half-ounce increments (e.g., postal/package scale).

A15.3.1.5. A shallow, lightweight container (e.g., plastic storage container).

A15.3.1.6. A sturdy cardboard box or other rigid object with a level surface.

A15.3.1.7. A basic calculator.

A15.3.1.8. Cloth gloves (optional for handling metal sieves on hot, sunny days).

A15.3.1.9. Sealable plastic bags (if sending samples to a laboratory).

A15.3.1.10. A pencil/pen and paper.

A15.3.2. Step 1

Look for a routinely traveled surface, as evidenced by tire tracks. (Only collect samples from surfaces that are not damp due to precipitation or dew. This statement is not meant to be a standard in itself for dampness where watering is being used as a control measure. It is only intended to ensure that surface testing is done in a representative manner.) Use caution when taking samples to ensure personal safety with respect to passing vehicles. Gently press the edge of a dustpan (1 foot in width) into the surface four times to mark an area that is 1 square foot. Collect a sample of loose surface material using a whiskbroom or brush and slowly sweep the material into the dustpan, minimizing escape of dust particles. Use a spatula to lift heavier elements such as gravel. Only collect dirt/gravel to an approximate depth of 3/8 inch or 1 cm in the 1 square foot area. If you reach a hard, underlying subsurface that is < 3/8 inch in depth, do not continue collecting the sample by digging into the hard surface. In other words, you are only collecting a surface sample of loose material down to 1 cm. In order to confirm that samples are collected to 1 cm in depth, a wooden dowel or other similar narrow object at least one foot in length can be laid horizontally across the survey area while a metric ruler is held perpendicular to the dowel.

At this point, you can choose to place the sample collected into a plastic bag or container and take it to an independent laboratory for silt content analysis. A reference to the procedure the laboratory is required to follow is at the end of this section.

A15.3.3. Step 2

Place a scale on a level surface. Place a lightweight container on the scale. Zero the scale with the weight of the empty container on it. Transfer the entire sample collected in the dustpan to the container, minimizing escape of dust particles. Weigh the sample and record its weight.

A15.3.4. Step 3

Stack a set of sieves in order according to the size openings specified above, beginning with the largest size opening (4 mm) at the top. Place a collector pan underneath the bottom (0.25 mm) sieve.

A15.3.5. Step 4

Carefully pour the sample into the sieve stack, minimizing escape of dust particles by slowly brushing material into the stack with a whiskbroom or brush. (On windy days, use the trunk or door of a car as a wind barricade.) Cover the stack with a lid. Lift up the sieve stack and shake it vigorously up, down and sideways for at least 1 minute.

A15.3.6. Step 5

Remove the lid from the stack and disassemble each sieve separately, beginning with the top sieve. As you remove each sieve, examine it to make sure that all of the material has been sifted to the finest sieve through which it can pass (e.g., material in each sieve [besides the top sieve that captures a range of larger elements] should look the same size). If this is not the case, re-stack the sieves and collector pan, cover the stack with the lid, and shake it again for at least 1 minute. (You only need to reassemble the sieve(s) that contain material, which requires further sifting.)

A15.3.7. Step 6

After disassembling the sieves and collector pan, slowly sweep the material from the collector pan into the empty container originally used to collect and weigh the entire sample. Take care to minimize escape of dust particles. You do not need to do anything with material captured in the sieves; only the collector pan. Weigh the container with the material from the collector pan and record its weight.

A15.3.8. Step 7

If the source is an unpaved road, multiply the resulting weight by 0.38. The resulting number is the estimated silt loading. Then, divide by the total weight of the sample you recorded earlier in Step 2 (Section A15.3.3 of this appendix) and multiply by 100 to estimate the percent silt content.

A15.3.9. Step 8

Select another two routinely traveled portions of the unpaved road and repeat this test method. Once you have calculated the silt loading and percent silt content of the 3 samples collected, average your results together.

A15.3.10. Step 9

Examine results. If the average silt loading is less than 0.33 oz/ft^2, the surface is STABLE. If the average silt loading is greater than or equal to 0.33 oz/ft^2, then proceed to examine the average percent silt content. If the source is an unpaved road and the average percent silt content is 6 percent or less, the surface is STABLE. If your field test results are within 2 percent of the standard (for example, 4–8 percent silt content on an unpaved road), it is recommended that you collect 3 additional samples from the source according to Step 1 (Section A15.3.2 of this appendix) and take them to an independent laboratory for silt content analysis.

A15.3.11. Independent Laboratory Analysis

You may choose to collect 3 samples from the source, according to Step 1 (Section A15.3.2 of this appendix), and send them to an independent laboratory for silt content analysis rather than conduct the sieve field procedure. If so, the test method the laboratory is required to use is: U.S. Environmental Protection Agency (1995), "Procedures for Laboratory Analysis of Surface/Bulk Dust Loading Samples", (AP-42 Fifth Edition, Volume I, Appendix C.2.3 "Silt Analysis"), Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

A15.4. Qualification and Testing

A15.4.1. Certification Requirements

To receive certification as a qualified observer, a candidate must be tested and demonstrate the ability to assign opacity readings in 5 percent increments to 25 different black plumes and 25 different white plumes, with an error not to exceed 15 percent opacity on any one reading and an average error not to exceed 7.5 percent opacity in each category. Candidates shall be tested according to the procedures described in Section A15.4.2 of this appendix. Any smoke generator used pursuant to Section A15.4.2 of this appendix shall be equipped with a smoke meter which meets the requirements of Section A15.4.3 of this appendix. Certification tests that do not meet the requirements of Sections A15.4.2 and A15.4.3 of this appendix are not valid. The certification shall be valid for a period of 6 months, and after each 6-month period the qualification procedures must be repeated by an observer in order to retain certification.

A15.4.2. Certification Procedure

The certification test consists of showing the candidate a complete run of 50 plumes, 25 black plumes and 25 white plumes, generated by a smoke generator. Plumes shall be presented in random order within each set of 25 black and 25 white plumes. The candidate assigns an opacity value to each plume and records the observation on a suitable form. At the completion of each run of 50 readings, the score of the candidate is determined. If a candidate fails to qualify, the complete run of 50 readings must be repeated in any retest. The smoke test may be administered as part of a smoke school or training program, and may be preceded by training or familiarization runs of the smoke generator, during which candidates are shown black and white plumes of known opacity.

A15.4.3. Smoke Generator Specifications

Any smoke generator used for the purpose of Section A15.4.2 of this appendix shall be equipped with a smoke meter installed to measure opacity across the diameter of the smoke generator stack. The smoke meter output shall display in-stack opacity, based upon a path length equal to the stack exit diameter on a full 0 percent to 100 percent chart recorder scale. The smoke meter optical design and performance shall meet the specifications shown in Table 1 of this appendix. The smoke meter shall be calibrated as prescribed in Section A15.4.3.1 of this appendix prior to conducting each smoke reading test. At the completion of each test, the zero and span drift shall be checked, and if the drift exceeds plus or minus 1 percent opacity, the condition shall be corrected prior to conducting any subsequent test runs. The smoke meter shall be demonstrated, at the time of installation, to meet the specifications listed in Table 1 of this appendix. This demonstration shall be repeated following any subsequent repair or replacement of the photocell or associated electronic circuitry, including the chart recorder or output meter, or every 6 months, whichever occurs first.

A15.4.3.1. Calibration

The smoke meter is calibrated after allowing a minimum of 30 minutes warm-up by alternately producing simulated opacity of 0 percent and 100 percent. When stable response at 0 percent or 100 percent is noted, the smoke meter is adjusted to produce an output of 0 percent or 100 percent, as appropriate. This calibration shall be repeated until stable 0 percent and 100 percent readings are produced without adjustment. Simulated 0 percent and 100 percent opacity values may be produced by alternately switching the power to the light source on and off while the smoke generator is not producing smoke.

A15.4.3.2. Smoke Meter Evaluation

The smoke meter design and performance are to be evaluated as follows:

A15.4.3.2.1. Light Source

Verify, from manufacturer's data and from voltage measurements made at the lamp, as installed, that the lamp is operated within plus or minus 5 percent of the nominal rated voltage.

A15.4.3.2.2. Spectral Response of Photocell

Verify from manufacturer's data that the photocell has a photopic response (i.e., the spectral sensitivity of the cell shall closely approximate the standard spectral-luminosity curve for photopic vision which is referenced in (b) of Table 1 of this appendix).

A15.4.3.2.3. Angle of View

Check construction geometry to ensure that the total angle of view of the smoke plume, as seen by the photocell, does not exceed 15º. Calculate the total angle of view (φ_v) as follows:

Total Angle of View = $2 \tan^{-1} (d/2L)$

where:

d = The photocell diameter + the diameter of the limiting aperture; and

L = The distance from the photocell to the limiting aperture. The limiting aperture is the point in the path between the photocell and the smoke plume where the angle of view is most restricted. In smoke generator smoke meters, this is normally an orifice plate.

A15.4.3.2.4. Angle of Projection

Check construction geometry to ensure that the total angle of projection of the lamp on the smoke plume does not exceed 15º. Calculate the total angle of projection (φ_p) as follows:

Total Angle of Projection = $2 \tan^{-1} (d/2L)$

where:

d = The sum of the length of the lamp filament + the diameter of the limiting aperture; and

L = The distance from the lamp to the limiting aperture.

A15.4.3.2.5. Calibration Error

Using neutral-density filters of known opacity, check the error between the actual response and the theoretical linear response of the smoke meter. This check is accomplished by first calibrating the smoke meter, according to Section A15.4.3.1 of this appendix, and then inserting a series of three neutral-density filters of nominal opacity of 20 percent, 50 percent, and 75 percent in the smoke meter path length. Use filters calibrated within plus or minus 2 percent. Care should be taken when inserting the filters to prevent stray light from affecting the meter. Make a total of five nonconsecutive readings for each filter. The maximum opacity error on any one reading shall be plus or minus 3 percent.

A15.4.3.2.6. Zero and Span Drift

Determine the zero and span drift by calibrating and operating the smoke generator in a normal manner over a 1-hour period. The drift is measured by checking the zero and span at the end of this period.

A15.4.3.2.7. Response Time

Determine the response time by producing the series of five simulated 0 percent and 100 percent opacity values and observing the time required to reach stable response. Opacity values of 0 percent and 100 percent may be simulated by alternately switching the power to the light source off and on while the smoke generator is not operating.

Table 1: Smoke Meter Design and Performance Specifications

Parameter	**Specification**
a. Light source	Incandescent lamp operated at nominal rated voltage
b. Spectral response of photocell	Photopic (daylight spectral response of the human eye)
c. Angle of view	15º maximum total angle
d. Angle of projection	15º maximum total angle
e. Calibration error	Plus or minus 3 percent opacity; maximum
f. Zero and span drift	Plus or minus 1 percent opacity, 30 minutes
g. Response time	Less than or equal to 5 seconds

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NOTICES OF PROPOSED RULEMAKING

This section of the *Arizona Administrative Register* contains Notices of Proposed Rulemakings.

A proposed rulemaking is filed by an agency upon completion and submittal of a Notice of Rulemaking Docket Opening. Often these two documents are filed at the same time and published in the same *Register* issue.

When an agency files a Notice of Proposed Rulemaking under the Administrative Procedure Act (APA), the notice is published in the *Register* within three weeks of filing. See the publication schedule in the back of each issue of the *Register* for more information.

Under the APA, an agency must allow at least 30 days to elapse after the publication of the Notice of Proposed Rulemaking in the *Register* before beginning any proceedings for making, amending, or repealing any rule. (A.R.S. §§ 41-1013 and 41-1022)

The Office of the Secretary of State is the filing office and publisher of these rules. Questions about the interpretation of the proposed rules should be addressed to the agency the promulgated the rules. Refer to item #4 below to contact the person charged with the rulemaking and item #10 for the close of record and information related to public hearings and oral comments.

NOTICE OF PROPOSED RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

[R16-241]

PREAMBLE

1. Article, Part, or Section Affected (as applicable) — **Rulemaking Action**

Article 13	New Article
R18-2-B1301	New Section
R18-2-B1301.01	New Section
R18-2-B1302	New Section
R18-2-C1301	New Section (Reserved)
R18-2-C1302	New Section
R18-2-715	Amend
R18-2-715.01	Amend
Appendix 14	New Appendix
Appendix 15	New Appendix

2. Citations to the agency's statutory rulemaking authority to include the authorizing statute (general) and the implementing statute (specific):

Authorizing statute: A.R.S. §§ 49-104(A)(10), 49-404(A)
Implementing statute: A.R.S. §§ 49-425(A)

3. Citations to all related notices published in the Register as specified in R1-1-409(A) that pertain to the record of the proposed rule:

Notice of Rulemaking Docket Opening: 22 A.A.R. 3336, November 25, 2016 (*in this issue*).

4. The agency's contact person who can answer questions about the rulemaking:

For the rules applicable to the Hayden Lead Nonattainment Area:

Name: Natalie Muilenberg
Address: Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington St.
Phoenix, AZ 85007
Telephone: (602) 771-1089
Fax: (602) 771-2299
Email: nm3@azdeq.gov

For the Article 7 amendments and rules applicable to the Hayden and Miami Sulfur Dioxide Nonattainment Areas:

Name: Lisa Tomczak
Address: Department of Environmental Quality
Air Quality Division, AQIP Section

1110 W. Washington St.
Phoenix, AZ 85007
Telephone: (602) 771-4450
Fax: (602) 771-2299
Email: lt5@azdeq.gov

5. An agency's justification and reason why a rule should be made, amended, repealed or renumbered, to include an explanation about the rulemaking:

Summary.

The Arizona Department of Environmental Quality (ADEQ) is proposing to amend R18-2-715 and -715.01. ADEQ is also proposing to add a new Article with new rules applicable to two copper smelters: one located in Hayden, Gila County, and one located in Miami, Gila County.

The purpose of this rulemaking is to control lead and sulfur dioxide air pollution in Hayden and sulfur dioxide pollution in Miami as part of the State Implementation Plan (SIP) program under the federal Clean Air Act (CAA).

The rules will be submitted to the U.S. Environmental Protection Agency (EPA) with a revision to Arizona's SIP for the Hayden lead nonattainment area, the Hayden sulfur dioxide nonattainment area, and the Miami sulfur dioxide nonattainment area. A.R.S. § 41-1038 is not applicable to this rulemaking because the failure to take such rulemaking action would result in sanctions under CAA Section 179.

Background.

Hayden lead nonattainment area

In 2008, EPA revised the nearly 40-year-old air quality standards for lead, strengthening them by almost 90 percent. 73 *Fed. Reg.* 66964 (2008). The maximum allowable level of lead in ambient air is a rolling three-month average of 0.15 micrograms per cubic meter ($\mu g/m^3$) evaluated over a three-year period. EPA reviewed and synthesized over 6,000 international studies that covered a broad range of human health and environmental impacts of lead air pollution. EPA tightened the standards to "provide increased protection for children and other at-risk populations against an array of adverse health effects, most notably including neurological effects in children." 73 *Fed. Reg.* 66964, 66965 (2008).

The promulgation of the 2008 lead National Ambient Air Quality Standards (NAAQS) requires states to subsequently submit boundary designations to EPA of areas that meet the standards ("attainment"), do not meet the standards ("nonattainment"), and cannot be classified. These designation recommendations must be submitted to EPA no later than one year after the promulgation of a new NAAQS, and EPA is required to complete designations within two years of promulgation.

In December of 2009, ADEQ recommended to EPA that most of Arizona be designated unclassified/attainment for the 2008 lead NAAQS. At the time, a violation of the NAAQS was recorded at one of EPA's CERCLA/Superfund ambient air monitors near a copper smelter in Hayden currently owned and operated by ASARCO LLC (Asarco). ADEQ requested that EPA delay its designation of the Hayden area because Asarco committed to improve its control of lead emissions in the future. ADEQ recommended that if the Hayden area continued to violate the NAAQS in 2010, it should be designated nonattainment.

After receiving ADEQ's recommendation, EPA conducted a technical analysis on the Hayden area, investigating the sources of lead emissions, topography, meteorology, and data from the violating air quality monitor. In 2010, EPA proposed to designate the Hayden area as nonattainment using air quality data from the violating CERCLA/Superfund monitor. However, commenters challenged the designation because EPA used data from a monitor that was not part of the State and Local Air Monitoring Stations (SLAMS) network and not collected in accordance with quality control and quality assurance requirements. 79 *Fed. Reg.* 25077, 25079 (2014). In response, EPA designated the Hayden area as unclassifiable in 2011 until sufficient data could be collected by a SLAMS monitor in accordance with federal requirements. Later in 2012, Asarco installed a baghouse on the anode furnace to curb particulate and lead emissions from the smelter.

Finally, in 2014, EPA redesignated the Hayden area from unclassifiable to nonattainment after several violations were recorded at ADEQ's Globe Highway SLAMS monitor. 79 *Fed. Reg*. 52205 (2014). The boundaries of the nonattainment area matched those of the Hayden sulfur dioxide nonattainment area, located in both Gila and Pinal Counties. The area's nonattainment designation triggers planning and control requirements under the CAA to bring the area to attainment as expeditiously as practicable.

In 2015, Asarco entered into a consent decree with EPA (see Consent Decree No. CV-15-02206-PHX-DLR) to settle a civil enforcement action. The action alleged that that ASARCO had violated, and continued to violate, the National Emission Standards for Hazardous Air Pollutants ("NESHAP") for Primary Copper Smelting, 40 C.F.R. Part 63, Subpart QQQ. To comply with the consent decree, Asarco will spend over $150 million to reduce emissions at its smelter and lead concentrations in the ambient air of the surrounding Town of Hayden. Control equipment installation and retrofit requirements in the consent decree are also part of the control strategy for the Hayden area's SIP revision and this rulemaking.

Asarco's copper smelter is one of three in the United States and has been operating since the early 1900s, around the same time the Town of Hayden was established. In general, Asarco's smelter produces copper anodes using an INCO flash furnace smelter, Peirce-Smith batch converters, and anode refining technologies. First, copper concentrate is produced from several of Asarco's mining and milling facilities and transported to the Asarco Hayden Smelter for further refining. Some concentrate may also be custom smelted on behalf of other companies. The concentrate is mixed with flux in the bedding plant and then routed to fluidized bed dryers for drying.

Once dried, the copper concentrate is next introduced into the INCO flash furnace with oxygen enriched air, where it is flash smelted and separates into a heavier copper-bearing matte layer and a lighter slag layer. The lighter slag layer is skimmed into a pot which is transported to the slag dump for deposition. The molten matte is tapped from the flash furnace and is poured into a ladle that transfers it to the converter furnace for further refining.

At the converter furnaces, each batch of matte goes through a series of blowing cycles that drive off the remaining sulfur and other impurities and produce blister copper. From the converters, the molten blister copper is transferred to the anode furnace where it is reduced with natural gas and poured into anode molds for shipment to Asarco's refinery in Amarillo, Texas.

Lead is an impurity that is naturally occurring in the copper ore that is mined and in the copper concentrate that is produced. Lead has the potential to be emitted from the smelting processes in gaseous and particulate form. Smelting process emissions can occur from the INCO flash furnace, the converters, and the anode furnaces. All process emissions are already controlled by either process gas cleaning systems, electrostatic precipitators, or baghouses. However, not all emissions are captured; some are emitted into the atmosphere as process fugitive emissions. Process fugitive emissions occur from matte tapping and slag skimming at the flash furnace, the converters, and anode furnace and anode casting operations. In addition to process fugitive emissions, lead, in the form of particulate matter, is emitted by dust-causing sources. At Asarco's Hayden operations, fugitive leaded dust is generated from sources like open-air concentrate storage and handling, slag pouring, reverts storage and handling, and roadways.

ADEQ's analysis concluded that Asarco's Hayden Operations is the primary source of lead emissions within the Hayden lead nonattainment area, thus, planning and rulemaking efforts are focused on the facility.

Ultimately, ADEQ's planning and rulemaking efforts aim to improve air quality in the Hayden lead nonattainment area to protect human health and the environment. ADEQ also recognizes Asarco's role and contributions to Hayden's local economy, which is historically built on copper mining and smelting, and intends to provide enough flexibility for the facility's successful operation.

Hayden and Miami sulfur dioxide nonattainment areas

The Hayden and Miami areas were designated as nonattainment for sulfur dioxide in 1979 due to violations of the 1971 sulfur dioxide NAAQS. In 1979, Arizona adopted rules to lower sulfur dioxide emissions from the smelters. The State of Arizona submitted revisions to its SIP to EPA on September 20, 1979; January 10, 1980; and September 10, 1980. The revisions consisted of a demonstration of good engineering practice (GEP) stack height for the copper smelter in Hayden, Arizona, and the application of multi-point rollback (MPR) in establishing sulfur dioxide emissions limits. EPA published a notice of proposed rulemaking on November 30, 1981, conditionally approving Arizona's submittals. 46 *Fed. Reg.* 58098 (1981). On June 3, 1982, Arizona submitted a SIP revision to satisfy the conditional approval and Arizona's demonstration of MPR. The MPR rules, which established stack emission limits for the smelters, were approved by EPA on January 14, 1983. 48 *Fed. Feg.* 1717 (1983).

Following EPA's approval of the rule, the smelters began to implement improved process and control technology. In August 1991, the owner and operator of the Miami smelter submitted a study to ADEQ to partially fulfill

outstanding SIP commitments for analysis of fugitive emissions. The study was implemented to describe sulfur dioxide fugitive emission units and provide an estimate of fugitive emissions during typical smelter operation. On April 11, 1996, Asarco submitted the results of a fugitive sulfur dioxide emissions study to ADEQ to fulfill outstanding SIP commitments for analysis of fugitive emissions.

To meet CAA requirements for redesignation and demonstrate continued attainment of air quality standards, air quality analyses were performed for the smelters during the time period 2001 – 2002. These analyses used maximum actual emissions (both stack and fugitive) in relation to resulting ambient concentrations and showed that the smelters were not expected to cause or contribute to a violation of the 1971 sulfur dioxide standards. In 2002, ADEQ conducted two rulemakings adopting new limits for the smelters. These rulemakings were finalized in R18-2-715(F), (G), and (H) along with corresponding changes to compliance and monitoring procedures in R18-2-715.01.

In 2004, ADEQ made several technical and administrative changes to A.A.C. Title 18, Chapter 2, Appendix 8 to clarify procedures for calculating material balance for sulfur applicable to three copper smelters: one located in Hayden, Gila County (currently owned by Asarco); one located in Miami, Gila County (currently owned by Freeport McMoRan); and one located in San Manuel, Pinal County. In 2006, ADEQ revised R18-2-715 to account for the shutdown of the smelter located in San Manuel and the March 2005 termination of its permit by deleting all references to the smelter from the rule.

On June 22, 2010, EPA replaced the existing annual and 24-hour primary sulfur dioxide NAAQS with a new 1-hour sulfur dioxide standard set at a level of 75 parts per billion (ppb) to better protect public health by reducing public exposure to elevated short-term concentrations of sulfur dioxide. 75 *Fed. Reg.* 35520 (2010). The EPA revoked both the annual and 24-hour primary sulfur dioxide NAAQS. On August 5, 2013, EPA published the final designation of both the Hayden and Miami planning area as nonattainment for the 2010 sulfur dioxide NAAQS. 78 *Fed. Reg.* 47191 (2013).

Regulatory requirements

To satisfy CAA requirements under Section 110 and Part D, ADEQ must develop and submit to EPA revisions to Arizona's SIP for the Hayden lead nonattainment area, Hayden sulfur dioxide nonattainment area, and Miami sulfur dioxide nonattainment area within 18 months of designation. The SIP revision must provide for the attainment of the 2008 lead NAAQS and 2010 sulfur dioxide NAAQS by containing, among other requirements:

1. Provisions to assure that reasonably available control measures are implemented;

2. A demonstration through air quality modeling that the plan will provide for attainment of the NAAQS as expeditiously as practicable, but no later than five years after the area's designation as nonattainment;

3. Provisions that result in reasonable further progress toward timely attainment through adherence to an ambitious compliance schedule;

4. Contingency measures that are to be implemented if the area fails to meet attainment or its reasonable further progress milestones; and

5. A permit program meeting the requirements of CAA Section 173 governing the construction and operation of new lead sources in the area.

As part of the SIP revision and in order to provide a successful strategy that will bring the Hayden and Miami areas into attainment, ADEQ will be submitting these rules to EPA, making them federally enforceable under Arizona's SIP. The rules set emission limits, control requirements, and compliance methods for the Asarco copper smelter in the Hayden lead and Hayden sulfur dioxide nonattainment areas and the Freeport McMoRan copper smelter in the Miami sulfur dioxide nonattainment area.

Section by Section Explanation of Proposed Rules:

Arizona is revising its rules for sulfur dioxide (R18-2-715 and -715.01) and adding a new Article to incorporate specific rules for the Hayden and Miami nonattainment areas. These new rules will be included in Article 13, which contained the rules for the state's terminated diesel conversion grant program, expired under A.R.S. § 41-1056(J) on April 30, 2013.

Hayden lead nonattainment area

Rule R18-2-B1301 primarily sets an emission limit and control requirements for Asarco's copper smelter. The new emission limit will ensure that the smelter's lead emissions will not cause or contribute to violations of the 2008 lead NAAQS. Within the rule, operational standards, monitoring requirements, compliance demonstration procedures, and recordkeeping/reporting requirements are tailored specifically for the smelter with the aim to reduce lead emissions. ADEQ conducted modeling to demonstrate future attainment of the 2008 lead NAAQS using the emission limits required by this rule.

Rule R18-2-B1301.01 sets control requirements for lead-bearing fugitive dust sources within Asarco's Hayden operations. To comply with the rule, Asarco must develop a fugitive dust plan that addresses controls and compliance requirements for sources like paved and unpaved roads, concentrate storage, and reverts crushing. The rule also sets specific housekeeping requirements for such sources to control lead-bearing fugitive dust. The rule includes other requirements like recordkeeping, reporting, and a contingency measure should the area fail to attain.

Hayden and Miami sulfur dioxide nonattainment areas

Rule R18-2-B1302 sets control requirements and emission limits for sulfur dioxide for Asarco's Hayden operations. Rule R18-2-C1302 sets control requirements and emission limits for sulfur dioxide for Freeport McMoRan's Miami operations.

The sulfur dioxide NAAQS promulgated by EPA in 2010 adopted a new level, averaging time, and form of the primary standard. To comply with the new standard, control measures must be implemented that will lower emissions of sulfur dioxide sufficient for an area to attain the NAAQS. On April 23, 2014 EPA issued final guidance to assist agencies with the development of SIPs to comply with the new standard and CAA requirements. The guidance provided an approach whereby emission limits based on averaging times longer than one hour could be imposed as long as the limits reflect comparable stringency to a 1-hour critical emissions value (CEV). The CEV is the hourly emission rate that the model predicts would result in the five-year average of the annual 99th percentile of the daily maximum hourly sulfur dioxide concentrations at the level of the NAAQS. The approach requires that the source's hourly emissions are effectively measured and that adequate assurance of attainment is evaluated through performance of a dispersion modeling analysis. The attainment modeling performed for the Hayden and Miami smelters evaluates emission limits with averaging times that are longer than one hour and demonstrates comparable stringency to a 1-hour CEV.

Due to differences in operations, Asarco and Freeport McMoRan are implementing control measures unique to each facility. The varied nature of the operations at the Hayden and Miami smelters require rules tailored to their specific operations in order for each area to meet the 2010 sulfur dioxide NAAQS. The new limits for both smelters also require minor changes to the compliance and monitoring provisions.

6. A reference to any study relevant to the rule that the agency reviewed and proposes either to rely on or not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

Hayden lead nonattainment area
Arizona Department of Environmental Quality. (2016). "Modeling Technical Support Document for the Hayden lead (lead) Nonattainment Area."

Hayden sulfur dioxide nonattainment area
Arizona Department of Environmental Quality and Asarco LLC. (2016). "Modeling Technical Support Document for the Hayden Sulfur Dioxide (SO2) Nonattainment Area."

Miami sulfur dioxide nonattainment area
Arizona Department of Environmental Quality and Freeport-McMoRan Copper and Gold Inc. (2016). "Miami Sulfur Dioxide Nonattainment Area SIP Revision Attainment Demonstration Technical Support Document."

All documents are available for the public to review, Monday through Friday, 8:30 a.m. – 4:30 p.m., at the ADEQ Records Center located at:
1110 W Washington St
Phoenix, AZ 85007

For more information, contact the Records Center at (602) 771-4380 or recordscenter@azdeq.gov.

7. A showing of good cause why the rulemaking is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:

This proposed rulemaking does not diminish a previous grant of authority of a political subdivision of this state.

8. The preliminary summary of the economic, small business, and consumer impact:

The following discussion addresses each of the elements required for an economic, small business, and consumer impact statement (EIS) under A.R.S. § 41-1055.

An identification of the rule making.

The rulemaking addressed by this EIS consists of new rules added to the new Article 13 (R18-2-B1301; R18-2-B1301.01; R18-2-B1302; R18-2-C1301 (Reserved), and R18-2-C1302). The purpose of the amendments and new rulemaking is to bring nonattainment areas in the State of Arizona into compliance with new air quality standards for lead and sulfur dioxide pollution.

This EIS addresses the impact of the 2008 lead NAAQS and the 2010 sulfur dioxide NAAQS that requires the owner and operators of copper smelters, Asarco and Freeport McMoRan, to install new and improved air pollution control equipment, apply for a new permit, and comply with new emission limits. The new NAAQS may result in increased compliance costs for Asarco and Freeport McMoran and minor increased administrative costs for ADEQ.

An identification of the persons who will be directly affected by, bear the costs of or directly benefit from the rule making.

The persons who will be directly affected by and bear the costs of this rulemaking are the owners and operators of the Miami and Hayden Smelters, which are Freeport McMoRan and Asarco, respectively. There are no other smelting facilities in the state of Arizona affected by this rulemaking.

The persons who will benefit from this rulemaking are the residents of Hayden and Miami, as well as the employees of Asarco and Freeport McMoRan, due to the improved air quality that will result from this rulemaking and the corresponding control technology Asarco and Freeport McMoRan will be implementing to control lead and sulfur dioxide pollution.

A cost benefit analysis of the following:

(a) The probable costs and benefits to the implementing agency and other agencies directly affected by the implementation and enforcement of the rule making.

ADEQ estimates that the current number of full-time employees assigned in the Permits and Compliance Sections of the Air Quality Division at ADEQ are adequate to implement and enforce the 2008 lead NAAQS in the Hayden nonattainment area and the 2010 sulfur dioxide NAAQS in the Hayden and Miami nonattainment areas. The costs of the rules to the implementing agency will therefore be minimal. Furthermore, permits for sources in the nonattainment areas are revised every five years, with minor revisions occurring periodically. Under A.A.C. R18-2-301(2) and R18-2-326(B)(1)(a), the permit applicant—in this case, Asarco and Freeport McMoRan—will ultimately be required to reimburse ADEQ for the cost of revisions as part of permit fees.

ADEQ has permitting, enforcement, and compliance jurisdiction in the Hayden and Miami nonattainment areas, and therefore, no other state agencies will be affected by this rulemaking.

(b) The probable costs and benefits to a political subdivision of this state directly affected by the implementation and enforcement of the rule making.

No political subdivision of the state operates a smelter of metal ore like copper. Under A.R.S. § 49-402(A)(2), ADEQ has original jurisdiction over all "sources, permits, and violations which pertain to…smelting of metal ore." The costs of enforcing these new rules applicable to the Asarco and Freeport McMoRan copper smelters are likely to be minimal and will be recoverable through permit fees acquired from Asarco and Freeport McMoRan.

(c) The probable costs and benefits to businesses directly affected by the rule making, including any anticipated effect on the revenues or payroll expenditures of employers who are subject to the rule making.

The rules that are the subject of this preamble and EIS are necessary to comply with federal requirements for the SIP program under the CAA. If ADEQ fails to adopt these rules, the federal requirements will apply to the copper

smelters through the adoption of a Federal Implementation Plan (FIP) issued by EPA under Section 110(c) of the CAA. However, the issuance of a FIP would likely require more strict emission limits and controls for the copper smelters, and further delay the areas' attainment of the lead and sulfur dioxide NAAQS as expeditiously as practicable, as required by the CAA.

If ADEQ fails to submit approvable SIPs, the nonattainment areas would be subject to sanctions under CAA Section 179(b), which can include a prohibition of highway funds and emission offsets requirements for other facilities. Therefore this rulemaking is an effort to not only curb air pollution in Arizona, but to also avoid federal consequences.

Lead and sulfur dioxide pollution cause extreme health risks and burdensome healthcare costs. Such related costs and benefits obtained from controlling lead and sulfur dioxide pollution are discussed further below.

The effects of lead air pollution

According to EPA, lead is emitted into the air from a wide variety of source types. 73 *Fed. Reg.* 29184, 29190 (2008). Source types include aviation fuel, industrial boilers, iron and steel foundries, and metal ore smelters. Once deposited out of the air, lead can be disturbed and re-suspended into the air. For example, if dust containing particles of lead settles on a road, the lead can become airborne when a truck drives on the road. Lead pollution in the air can be exceptionally troublesome due to its ease of transport in smaller particle sizes. Lead also subsists in the environment for a very long time, making full remediation difficult.

Lead can enter the human body through many routes, but it is primarily inhaled when it is a component of air pollution. In its review of scientific literature for the 2008 lead NAAQS, EPA examined air-related lead exposure through:

1. Inhalation of airborne lead, including re-suspended lead particles

2. Ingestion of lead deposited as indoor or outdoor dust or soil, dietary items (like crops and livestock), and drinking water

EPA recognizes that "lead has been demonstrated to exert 'a broad array of deleterious effects on multiple organ systems via widely diverse mechanisms of action.'" 73 *Fed. Reg*. 29184, 29197 (2008). Furthermore, a "safe" level of lead in the human body that causes little to no harm has yet to be determined. In promulgating the 2008 lead NAAQS, EPA focused primarily on neurological effects in children and cardiovascular effects in adults that "are currently clearly of greatest public health concern."

Health experts agree that the developing nervous system of a child is the most sensitive to lead exposure. EPA states, "Functional manifestations of lead neurotoxicity during childhood include sensory, motor, cognitive, and behavioral impacts." 73 *Fed. Reg.* 29184, 29198 (2008). Studies have observed lower IQ, reduced academic achievement, and decreased graduation rates in adolescents exposed to lead. Lead exposure is associated with more negative ratings by teachers and/or parents for children exhibiting inattentiveness, impulsivity, distractibility, and lack of concentration. Higher concentrations of lead in the blood are also linked to impaired memory and visual-spatial skills. Additional studies show early exposure to lead in adolescents may result in an increased likelihood of antisocial and criminal behavior later in life. Since children are exposed to lead early, it has more time to accumulate in the blood supply and bones, hindering overall development and growth.

Lead exposure in adults can cause coronary heart disease, strokes, premature death, and hypertension. Furthermore, lead bioaccumulates in the body, causing persistent, long-term health problems. Lead exposure can also cause kidney disease, anemia, decreased sperm count, increased blood pressure, and interference with vitamin D metabolism. In the body of a pregnant woman, lead can easily cross the placenta, resulting in continued fetal exposure during pregnancy with lasting neurological impacts after birth. Pregnant women who are exposed to even low levels of lead are at high risk for premature birth.

Other symptoms caused by lead exposure include: irritability; shortened attention span; fatigue; impaired growth; loss of appetite; learning disabilities; headaches; seizures; nausea and vomiting; and severe abdominal pain.

A discussion of the monetary costs and health-based benefits of the proposed rulemaking for lead follows.

Lead emissions controls and costs

The CAA prohibits the EPA from considering costs in setting or revising the NAAQS for any pollutant. However, in promulgating the 2008 lead NAAQS, EPA analyzed the associated costs for pollution control equipment and benefits associated with improved public health. EPA estimates that full implementation of the lead NAAQS by sources across the U.S. in 2016 alone would cost approximately $150 million to $2.8 billion. The health benefits far outweigh these costs, estimated between $3.8 billion to $6.9 billion. 73 *Fed. Reg.* 66964 (2008).

As part of the consent decree, Asarco will implement the Converter Retrofit Project at its Hayden copper smelter to reduce lead and sulfur dioxide emissions. The project will replace the existing five 13-foot diameter copper converters with three 15-foot diameter converters that operate more efficiently. Improved primary and secondary hooded ventilation systems will also be installed above the smelting equipment to capture process off-gases. A new tertiary hooding system will further prevent emissions from escaping the smelting building. An upgraded vent gas baghouse will collect particulate and gaseous emissions coming from the converter dryers and flash furnace.

In addition to the Converter Retrofit Project, Asarco will also be implementing additional control technology for leaded fugitive dust sources. For example, solids from the acid plant scrubbers that process emissions from the flash furnace and copper converters will be dried in a fully enclosed system that is maintained under negative pressure instead of being dried in open piles outside. Materials like concentrate and reverts will no longer be stored in open piles outside, but rather on concrete pads with fences to block the wind and water sprays to minimize fugitive emissions. Unpaved roads will also be sprayed with chemical dust suppressants and paved roads will be sprayed with water to control leaded dust emissions. In addition to complying with the consent decree, these modifications will also contribute to the control strategy for the Hayden lead nonattainment area SIP.

In 2015, Asarco's Hayden operations emitted over three tons of lead emissions. In 2019, that amount is projected to decrease by half to roughly 1.5 tons. The cost of the retrofit project is estimated to be $110 million.

Benefits of lead emissions controls

The primary benefit of installing the emissions control technologies is an overall reduction in lead in ambient air, which in turn, decreases health and welfare risks from exposure.

Health issues cause more hospital stays and sick time taken from work, putting more burden on health care systems and the economy. EPA estimated between $3.8 billion to $6.9 billion of benefits can be contributed to the new lead NAAQS, reflecting public health improvements and an expected increase in lifetime earnings as a result of avoiding IQ loss.

This rulemaking will also help the State of Arizona avoid federal sanctions implemented under the CAA. If the State fails in submitting the rules and SIP revision for the Hayden lead nonattainment area, EPA has the authority to prohibit highway funding and increase costly emission offset requirements for new or modified facilities.

This rulemaking is necessary because of the health benefits derived from the improved controls implemented at the copper smelter and to avoid federal consequences.

The effects of sulfur dioxide pollution

According to the Agency for Toxic Substances and Disease Registry (ATSDR), sulfur dioxide is a colorless gas with a pungent odor. Sulfur dioxide is a liquid when under pressure; it easily dissolves in water and cannot catch fire. Sulfur dioxide in the air results primarily from activities associated with the burning of fossil fuels (coal, oil) such as at power plants or from copper smelting. Once released into the environment, sulfur dioxide moves to the air where it can convert to sulfuric acid, sulfur trioxide, and sulfates.

Short-term exposures to high levels of sulfur dioxide can be life-threatening. Exposure to 100 parts per million parts of air (ppm) is considered immediately dangerous to life and health. Previously healthy nonsmoking miners who breathed sulfur dioxide released as a result of an explosion in an underground copper mine developed burning of the nose and throat, breathing difficulties, and severe airway obstructions. Long-term exposure to persistent levels can also affect health. Lung function changes have been observed in some workers exposed to 0.4 - 3.0 ppm of sulfur dioxide for 20 years or more. However, these workers were also exposed to other chemicals, making it difficult to attribute their health effects to sulfur dioxide exposure alone. Additionally, exercising asthmatics are sensitive to the respiratory effects of low concentrations (0.25 ppm) of sulfur dioxide.

Typical outdoor concentrations of sulfur dioxide may range from 0 to 1 ppm. Occupational exposures to sulfur dioxide may lawfully range from 0 to 5 ppm under state OSHA (Occupational Safety and Health Administration) regulations. During any 8-hour work shift of a 40-hour work week, the average concentration of sulfur dioxide in the workplace may not exceed 5 ppm.

Most of the effects of sulfur dioxide exposure that occur in adults (i.e., difficulty breathing, changes in the ability to breathe as deeply or take in as much air per breath, and burning of the nose and throat) are also of potential concern in children, but it is unknown whether children are more vulnerable to exposure. Children may be exposed to more sulfur dioxide than adults because they breathe more air for their body weight than adults do. Children also exercise more frequently than adults. Exercise increases breathing rate. This increase results in both a greater amount of sulfur dioxide in the lungs and enhanced effects on the lungs. One study suggested that a person's respiratory health, and not his or her age, determines vulnerability to the effects of breathing sulfur dioxide.

Sulfur dioxide emissions controls and costs

Freeport McMoRan-Miami

The construction work being performed at Freeport McMoRan's Miami smelter includes process changes along with environmental upgrades to achieve sulfur dioxide emission reductions so that the Miami area will meet the new ambient air quality standards. The Miami smelter will receive new converter mouth covers, partially enclose the converter aisle to create a canopy, install an aisle scrubber, install an anode plant bag house, and upgrade the smelter furnace to ensure attainment of EPA's more stringent sulfur dioxide NAAQS. At this time, the cost of the project is estimated to be $250 million.

Asarco-Hayden

The Converter Retrofit Project and associated controls discussed above for lead pollution will also greatly mitigate sulfur dioxide emissions. As mentioned earlier, the project involves replacement of the existing five 13-foot diameter converters with three 15-foot diameter converters. Corresponding modifications will be made to the converter aisle in order to accommodate the larger converters. The retrofit includes installation of a new converter primary gas system. New secondary hoods will also be installed and designed to fit the new, larger converters and new primary hoods. The new secondary hoods will direct sulfur dioxide ventilation gases during blowing operations to the acid plant instead of a baghouse, improving control. Other upgrades include installation of a new converter aisle tertiary gas collection system, enhanced lime injection at the secondary and new vent gas baghouse to further control sulfur dioxide emissions, and improvements to the acid plant. Overall, the retrofit is projected to reduce current sulfur dioxide emissions by 90 percent, with a total sulfur dioxide capture rate of 99.5 percent of the sulfur dioxide produced during the copper smelting process. The cost of the converter retrofit project is estimated to be $110 million.

Benefits of sulfur dioxide emissions controls

One of the primary benefits of installing the emissions control technologies is an overall reduction in sulfur dioxide emissions. EPA first set health based standards for sulfur dioxide in 1971 at a 24-hour primary standard at 140 parts per billion (ppb) and an annual average standard at 30 ppb. In 1996, EPA reviewed the sulfur dioxide NAAQS and chose not to revise the standards. The 2010 revision to the sulfur dioxide NAAQS established a new one-hour standard at a level of 75 ppb. 75 ***Fed. Reg.*** 35520 (2010).

Lowering the standard will result in health benefits by lowering exposure to sulfur dioxide, specifically short-term exposure. Initial respiratory reactions to sulfur dioxide include narrowing of the airways in the lungs and difficulty breathing. Individuals with sensitive or comprised respiratory systems, such as children, the elderly, and individuals with respiratory related illnesses are more susceptible to these reactions. These negative reactions commonly result in increased emergency room and hospital visits. The revised NAAQS is designed to lower emissions and reduce exposure to high levels of sulfur dioxide by lowering the level of the standard and establishing new averaging time frame. EPA estimates that a level of 75 ppb for sulfur dioxide will result in cost benefits between $13 billion and $33 billion from reduced emergency room visits, hospitalizations, lost work days, and cases of aggravated asthma and bronchitis.

In addition to direct impacts, sulfur dioxide is also a precursor to particulate matter that is 2.5 micrometers in diameter, which can penetrate deep into the lungs and cause serious health effects including increases in cardiovascular illness and mortality.

Additional benefits of this rulemaking include continued oversight and control of air emissions by ADEQ. As stated earlier for lead pollution, without approval of this rulemaking and SIPs, the CAA specifies that EPA must develop a federal implementation plan (FIP) to regulate sources within the planning area. In addition to a FIP, the Hayden and Miami nonattainment areas would also be subject to highway sanctions and offsets. Highway sanctions are prohibitions on certain transportation projects or grants within the planning area. Offset sanctions are requirements for new or modified sources to have a ratio of emissions reductions to increased emissions at a level of at least two to one. Both ADEQ and the business community will benefit from continued regulation at the state level as a result of avoiding federal sanctions.

A general description of the probable impact on private and public employment in businesses, agencies and political subdivisions of this state directly affected by the rule making.

ADEQ anticipates that employment impacts will be minor. ADEQ does not expect short- or long-term employment, production, or industrial growth in Arizona to be negatively impacted by this rulemaking. Furthermore, no sources are expected to close from the implementation of this rulemaking.

Asarco-Hayden Operations

Asarco estimates that 10 contractors and 100 full-time employees will be needed in order to complete the retrofit project. Some of the contractors will be hired for planned maintenance outages during the construction period. Roughly 50 percent of the contractors will be hired from Arizona and the other 50 percent from the Southwest in general. Procurement of equipment for the retrofit project is scheduled to begin in 2015, with full completion of the project scheduled by the fourth quarter of 2018. Asarco is not planning to create any new full or part-time positions at the company as a result of this project.

Freeport McMoRan-Miami Operations

Through the various phases of the construction project described above, Freeport McMoRan expects to have over 500 contractors/individuals working on the construction; although this number will vary over the construction period. This estimate does not include contractors required for planned maintenance outages during the same time frame. While the number of contractors required for planned maintenance outages is contingent upon the work to be completed during the outage, it usually requires between 500 and 1,000 contractors.

Because of the increased demand for contractors, Freeport McMoRan anticipates a short-term increase in employment by the contractors throughout the project. Contractors will be selected on an as needed basis; some local and specialty contractors from outside the State may be necessary. No new positions will be created within Freeport McMoRan's Miami smelter for this project.

Construction will occur in two major phases. Phase 1 started with ADEQ's approval of the smelter's significant permit revision authorizing the proposed construction. Phase 2 will begin shortly after internal approval to move forward is received and Freeport McMoRan anticipates the project will be completed eight quarters after that approval is received.

A statement of the probable impact of the rule making on small businesses.

(a) An identification of the small businesses subject to the rule making.

Under A.R.S. § 41-1001(21):

"Small business" means a concern, including its affiliates, which is [1] *independently owned and operated*, which is [2] *not dominant in its field* and which [3] *employs fewer than one hundred full-time employees or which had gross annual receipts of less than four million dollars in its last fiscal year*. (Emphasis added.)

The lead and sulfur dioxide-related rules will apply only to the companies that own and operate copper smelters in Hayden and Miami, which is currently Asarco and Freeport McMoRan, respectively. These companies do not qualify as small businesses.

As of 2014, Asarco's Hayden operations employed over 600 people. Asarco is a subsidiary of Grupo Mexico, a public company, and one of the major copper producers in the world. According to its 2014 annual report, Grupo

Mexico's net profit was $1.7 billion. Grupo Mexico nor Asarco's Hayden operations meet the definition of a "small business" under A.R.S. § 41-1001(21).

As of this rulemaking, Asarco currently contracts with Smithco Enterprises, LLC, an operation that processes smelter byproducts like reverts for Asarco. Smithco's business relies heavily on Asarco's copper smelter. Several control measures required by this rulemaking (and the consent decree) will apply to some of Smithco's operations. However, Asarco is paying for the control measures as part of the consent decree with EPA. Therefore, this rulemaking will not have a direct impact on Smithco.

In 2015, Freeport McMoRan, also a public company and top producer of copper in the world, reported a $15.8 billion revenue. Also in 2015, its Miami mine and smelter produced 43 million pounds of copper. As of 2016, roughly 760 people are employed at Freeport's Miami operations. Freeport McMoRan's Miami operations do not meet the definition of a "small business" under A.R.S. § 41-1001(21).

(b) The administrative and other costs required for compliance with the rule making.

Not applicable.

(c) A description of the methods that the agency may use to reduce the impact on small businesses.

Not applicable.

(d) The probable cost and benefit to private persons and consumers who are directly affected by the rule making.

Not applicable.

A statement of the probable effect on state revenues.

Since any costs associated with the rulemaking will be recoverable through air quality permit fees, there will be no net effect on state revenues.

A description of any less intrusive or less costly alternative methods of achieving the purpose of the rule making.

ADEQ was not able to identify any less intrusive or costly alternative methods for achieving the purpose of the rulemaking—attainment of the 2008 lead NAAQS and 2010 sulfur dioxide NAAQS. The smelters owned by Asarco and Freeport McMoRan are the primary source of emissions and are responsible for installing adequate control technologies that will bring the areas into compliance.

A description of any data on which a rule is based with a detailed explanation of how the data was obtained and why the data is acceptable data. An agency advocating that any data is acceptable data has the burden of proving that the data is acceptable. For the purposes of this paragraph, "acceptable data" means empirical, replicable and testable data as evidenced in supporting documentation, statistics, reports, studies or research.

To support the emission limits and control requirements in both rules, ADEQ conducted air quality modeling using data obtained from Asarco, Freeport McMoRan, and air quality monitors. ADEQ followed EPA Guidance in conducting the modeling.

Before conducting the air quality modeling, ADEQ identified lead and sulfur dioxide pollution sources in the Hayden nonattainment area and sulfur dioxide pollution sources in the Miami nonattainment area. To do this, ADEQ obtained emissions data from EPA's National Emission Inventory (NEI). After analyzing the emissions data, ADEQ determined that no other sources or combination of sources contributed as much as the Asarco smelter in the Hayden nonattainment area and the Freeport McMoRan smelter in the Miami nonattainment area.

ADEQ used the emissions data, in addition to meteorological and topographical data, to develop emissions limits that demonstrate attainment. Since the copper smelters in both areas were identified as the primary sources of emissions, the modeling efforts concentrated on the facilities' operations. The emission limits derived from the modeling are conservative and factor in the emission control equipment efficiency as well as peak smelter production levels.

The modeling Technical Support Documents outline ADEQ's methods, approach, and empirical results. The documents for both nonattainment areas are available for review at ADEQ's Records Center. See section 6 of this preamble for more information.

9. The agency's contact person who can answer questions about the economic, small business and consumer impact statement:

Name: Natalie Muilenberg
Address: Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington
Phoenix, AZ 85007
Telephone: (602) 771-1089 or (800) 234-5677 ext. 7711089
Fax: (602) 771-2299
E-mail: nm3@azdeq.gov

10. The time, place, and nature of the proceedings to make, amend, repeal, or renumber the rule, or if no proceeding is scheduled, where, when, and how persons may request an oral proceeding on the proposed rule:

ADEQ will be conducting a public hearing to receive feedback, comments, questions, and concerns on the proposed rulemaking. All interested parties may attend. ADEQ will respond to comments in a summary that is submitted with the SIP revisions, which will include the rules subject of this rulemaking.

The public comment period for this rulemaking will take place on: December 5, 2016 – January 9, 2017.

The public hearing for the rules will be conducted on:
January 9, 2017 at 2:00 p.m.
At the Arizona Department of Environmental Quality
Room 3175
1110 W. Washington St.
Phoenix, AZ 85007

Comments for Hayden and Miami Sulfur Dioxide Nonattainment Areas

Written comments for the Article 7 amendments and rules applicable to the Hayden and Miami Sulfur Dioxide Nonattainment Areas may be submitted at any time during the public comment period by mail, fax, or email to:

Lisa Tomczak
Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington St.
Phoenix, AZ 85007
Telephone: (602) 771-4450
Fax: (602) 771-2299
E-mail: lt5@azdeq.gov

Comments for Hayden Lead Nonattainment Area

Written comments for the rules applicable to the Hayden Lead Nonattainment Areas may be submitted at any time during the public comment period by mail, fax, or email to:

Natalie Muilenberg
Department of Environmental Quality
Air Quality Division, AQIP Section
1110 W. Washington St.
Phoenix, AZ 85007
Telephone: (602) 771-1089
Fax: (602) 771-2299
E-mail: nm3@azdeq.gov

Information on the public process can be found online at ADEQ's event calendar here: http://azdeq.gov/events.

11. All agencies shall list other matters prescribed by statute applicable to the specific agency or to any specific rule or class of rules. Additionally, an agency subject to Council review under A.R.S. §§ 41-1052 and 41-1055 shall respond to the following questions:

There are no matters prescribed by statute applicable specifically to ADEQ or this specific rulemaking.

a. Whether the rule requires a permit, whether a general permit is used and if not, the reasons why a general permit is not used:

The rules subject of this rulemaking do not inherently require a permit. As Class I Major Sources pursuant to A.A.C. R18-2-101.61, Asarco and Freeport McMoRan are permitted in accordance with Title V of the CAA and Title 49, Chapter 3 of the Arizona Revised Statutes. Therefore, the rules will be incorporated into a revision of Asarco and Freeport McMoRan's Title V permit.

b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than federal law and if so, citation to the statutory authority to exceed the requirements of federal law:

The rules will help the Hayden and Miami nonattainment areas comply with Title I of the Clean Air Act. The rules are not more stringent than what is federally required.

c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:
No person(s) submitted an analysis to ADEQ.

12. A list of any incorporated by reference material as specified in A.R.S. § 41-1028 and its location in the rules:
Not applicable.

13. The full text of the rules follows:

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL

ARTICLE 13. STATE IMPLEMENTATION PLAN RULES FOR SPECIFIC LOCATIONS

PART A. RESERVED

PART B. HAYDEN, ARIZONA, PLANNING AREA

R18-2-B1301.	Limits on Lead Emissions from the Hayden Primary Copper Smelter
R18-2-B1301.01.	Limits on Lead-Bearing Fugitive Dust from the Hayden Primary Copper Smelter
R18-2-B1302.	Limits on SO_2 Emissions from the Hayden Primary Copper Smelter

PART C. MIAMI, ARIZONA, PLANNING AREA

R18-2-C1301.	Reserved
R18-2-C1302.	Limits on SO_2 Emissions from the Miami Smelter

ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

R18-2-715.	Standards of Performance for Existing Primary Copper Smelters; Site-specific Requirements
R18-2-715.01.	Standards of Performance for Existing Primary Copper Smelters; Compliance and Monitoring
A14. Appendix 14.	Procedures for Sulfur Dioxide and Lead Fugitive Emissions Studies for the Hayden Primary Copper Smelter
A15. Appendix 15.	Test Methods for Determining Opacity and Stabilization of Unpaved Roads

ARTICLE 13. STATE IMPLEMENTATION PLAN RULES FOR SPECIFIC LOCATIONS

PART A. RESERVED

PART B. HAYDEN, ARIZONA, PLANNING AREA

R18-2-B1301. Limits on Lead Emissions from the Hayden Primary Copper Smelter

A. Applicability.

1. This Section applies to the owner or operator of the primary copper smelter located in Hayden, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.
2. Effective date. Except as otherwise provided, the requirements of this Section shall become applicable on the earlier of July 1, 2018 or 180 calendar days after completion of all Converter Retrofit Project improvements authorized by Significant Permit Revision No. 60647.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this Section:

1. "ACFM" means actual cubic feet per minute.
2. "Anode furnace baghouse stack" means the dedicated stack that vents controlled off-gases from the anode furnaces to the main stack.
3. "Blowing" shall mean the introduction of air or oxygen-enriched air into the converter furnace molten bath through tuyeres that are submerged below the level of the molten bath. The flow of air through the tuyeres above the level of the molten bath or into an empty converter shall not constitute blowing.
4. "Capture system" means the collection of components used to capture gases and fumes released from one or more emission units, and to convey the captured gases and fumes to one or more control devices or a stack. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.
5. "CFR" means the Code of Federal Regulations.
6. "Control device" means a piece of equipment used to clean and remove pollutants from gases and fumes released from one or more emission units that would otherwise be released to the atmosphere. Control devices may include, but are not limited to, baghouses, Electrostatic Precipitators (ESPs), and sulfuric acid plants.
7. "Emission unit" means the INCO flash furnace, converter furnaces, anode furnaces, and associated ancillary equipment.
8. "Hayden Smelter" means the primary copper smelter located in Hayden, Gila County, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.
9. "Main stack" means the center and annular portions of the 1,000-foot stack, which vents controlled off-gases from the INCO flash furnace, the converters, and anode furnaces and also vents exhaust from the tertiary hoods.
10. "SCFM" means standard cubic feet per minute.
11. "SLAMS monitor" means an ambient air monitor part of the State and Local Air Monitoring Stations network operated by State or local agencies for the purpose of demonstrating compliance with the National Ambient Air Quality Standards.
12. "Smelting process-related fugitive lead emissions" means uncaptured and/or uncontrolled lead emissions that are released into the atmosphere from smelting copper in the INCO flash furnace, converters, and anode furnaces.

C. Emission limit. Main stack lead emissions shall not exceed 0.683 pound of lead per hour.

D. Operational Standards.

1. Process equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate smelter processes and associated emission capture and/or control equipment in a manner consistent with good air pollution control practices for minimizing lead emissions to the level required by subsection (C). Determination of whether acceptable operating and maintenance procedures are being used shall be based on all information available to the Department and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.
2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and/or control device used to ventilate or control process gas or emissions from the flash furnace, including matte tapping, slag skimming and slag return operations; converter primary hoods, converter secondary hoods, tertiary ventilation system;

and anode refining operations. The operations and maintenance plan must address the following requirements as applicable to each capture system and/or control device.

a. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit values or settings at all times the required capture and control system is operating, except during periods of monitor calibration, repair, and malfunction. The initial plan shall provide for volumetric flow monitoring on the vent gas baghouse (inlet or outlet), each converter primary hood, each converter secondary hood, the tertiary ventilation system, and the anode furnace baghouse (inlet or outlet). All monitoring devices shall be accurate within +/- 10 percent and calibrated according to manufacturer's instructions. If direct measurement of the exhaust flow is infeasible due to physical limitations or exhaust characteristics, the owner or operator may propose a reliable equivalent method for approval. Initial monitoring may be adjusted as provided in subsection (D)(2)(e). Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements. Capture system damper position setting(s) shall be specified in the plan.

b. Operational limits. The owner or operator shall establish operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indicators of the performance of the capture system and control device operations. Initial operating limits may be adjusted as provided in subsection (D)(2)(e). Initial operating limits shall include the following:

i. Identification of those modes of operation when the double dampers between the flash furnace vessel and the vent gas system will be closed and the interstitial space evacuated to the acid plant.

ii. A minimum air flow for the furnace ventilation system and associated damper positions for each matte tapping hood or slag skimming hood when operating to ensure that the operation(s) are within the confines or influence of the capture system.

iii. A minimum air flow for the secondary hood baghouse and associated damper positions for each slag return hood to ensure that the operation is within the confines or influence of the capture system's ventilation draft during times when the associated process is operating.

iv. A minimum air infiltration ratio for the converter primary hoods of 1:1 averaged over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing.

v. A minimum secondary hood exhaust rate of 35,000 SCFM during converter Blowing, averaged over 24 converter Blowing hours, rolled hourly.

vi. A minimum secondary hood exhaust rate of 133,000 SCFM during all non-Blowing operating hours, averaged over 24 non-Blowing hours, rolled hourly.

vii. A minimum negative pressure drop across the secondary hood when the doors are closed equivalent to 0.007 inches of water.

viii. A minimum exhaust rate on the tertiary hooding of 400,000 ACFM during all times material is processed in the converter aisle, averaged over 24 hours and rolled hourly.

ix. Fan amperes or minimum air flow for the anode furnace baghouse and associated damper positions for each anode furnace hood to ensure that the anode furnace off-gas port is within the confines or influence of the capture system's ventilation draft during times when the associated furnace is operating.

x. The anode furnace charge mouth shall be kept covered when the tuyeres are submerged in the metal bath except when copper is being charged to or transferred from the furnace.

xi. The temperatures of the acid plant catalyst bed, which shall at minimum, meet the manufacturer's recommendations.

xii. The acid plant catalyst replenishment schedule, which shall at minimum, meet the manufacturer's recommendations.

c. Preventative maintenance. The owner or operator shall perform preventative maintenance on each capture system and control device according to written procedures specified in the operations and maintenance plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions, or operator's experience working with the equipment, and frequency for routine and long-term maintenance. This provision does not prohibit additional maintenance beyond that required by the plan.

d. Inspections. The owner or operator shall perform inspections in accordance with written procedures in the operations and maintenance plan for each capture system and control device that are consistent with the manufacturer's, engineer's, or operator's instructions for each system and device.

e. Plan development and revisions.

i. The owner or operator shall develop and keep current the plan required by this Section. Any plan or plan revision shall be consistent with this Section, shall be designed to ensure that the capture and control system performance conforms to the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area State Implementation Plan (SIP), and shall be submitted to the Department for review. Any plan or plan revision submitted shall include the associated manufacturer's, engineer's or operator's recommendations and/or instructions used for capture system and control device operations and maintenance.

ii. The owner or operator shall submit the initial plan to the Department no later than May 1, 2018 and shall include the initial volumetric flow monitoring provisions in subsection (D)(2)(a), the initial operational limits in subsection (D)(2)(b), the preventative maintenance procedures in subsection (D)(2)(c), and the inspection procedures in subsection (D)(2)(d).

iii. The owner or operator shall submit to the Department for approval a plan revision with changes, if any, to the initial volumetric flow monitoring provisions in subsection (D)(2)(a) and initial operational limits in subsection (D)(2)(b) not later than six months after completing a fugitive emissions study conducted in accordance with Appendix 14. The Department shall submit the approved changes to the volumetric flow monitoring provisions and operational limits pursuant to this subsection to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

iv. Other plan revisions may be submitted at any time when necessary. All plans and plan revisions shall be designed to achieve operation of the capture system and/or control device consistent with the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area SIP. Except for changes to the volumetric flow monitoring provisions in subsection (D)(2)(a) and operational limits in subsection (D)(2)(b), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

3. Emissions from the anode furnace baghouse stack shall be routed to the Main Stack.

E. Performance Test Requirements.

1. Main stack performance tests. No later than 180 calendar days after completion of all Converter Retrofit Project improvements authorized by Significant Permit Revision No. 60647, the owner or operator shall conduct initial performance tests on the following:

a. the gas stream exiting the anode furnaces baghouse prior to mixing with other gas streams routed to the main stack.

b. the gas stream exiting the acid plant at a location prior to mixing with other gas streams routed to the main stack.

c. the gas stream exiting the secondary baghouse at a location prior to mixing with other gas streams routed to the main stack.

d. the gas stream collected by the tertiary hooding at a location prior to mixing with other gas streams routed to the main stack.

e. the gas stream exiting the vent gas baghouse at a location prior to mixing with other gas streams routed to the main stack.

2. Subsequent performance tests on the gas streams specified in subsection (E)(1) shall be conducted at least annually.

3. Performance tests shall be conducted under such conditions as the Department specifies to the owner or operator based on representative performance of the affected sources and in accordance with 40 CFR 60, Appendix A, Reference Method 29.

4. At least 30 calendar days prior to conducting a performance test pursuant to subsection (E)(1), the owner or operator shall submit a test plan, in accordance with R18-2-312(B) and the Arizona Testing Manual, to the Department for approval. The test plan must include the following:

a. Test duration;

b. Test location(s);

c. Test method(s), including those for test method performance audits conducted in accordance with subsection (E)(6); and
d. Source operation and other parameters that may affect the test result.

5. The owner or operator may use alternative or equivalent performance test methods as defined in 40 CFR § 60.2 when approved by the Department and EPA Region IX, as applicable, prior to the test.
6. The owner or operator shall include a test method performance audit during every performance test in accordance with 40 CFR § 60.8(g).

F. Compliance Demonstration Requirements.

1. For purposes of determining compliance with the main stack emission limit in subsection (C)(1), the owner or operator shall calculate the combined lead emissions in pounds per hour from the gas streams identified in subsection (E)(1) based on the most recent performance tests conducted in accordance with subsection (E).
2. The owner or operator shall determine compliance with the requirements in subsection (D)(2) as follows:
   a. Maintaining and operating the emissions capture and control equipment in accordance with the capture system and control device operations and maintenance plan required in subsection (D)(2) and recording operating parameters for capture and control equipment as required in subsection (D)(2)(b); and
   b. Conducting a fugitive emissions study in accordance with Appendix 14 starting not later than 6 months after completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The fugitive emissions study shall demonstrate, as set forth in Appendix 14, that fugitive emissions from the smelter are consistent with estimates used in the attainment demonstration in the Hayden 2008 Lead National Ambient Air Quality Standards Nonattainment Area SIP.
3. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limit in subsection (C).

G. Recordkeeping. The owner or operator shall maintain the following records for at least five years and keep on-site for at least two years:

1. All records as specified in the operations and maintenance plan required under subsection (D)(2).
2. All records of major maintenance activities and inspections conducted on emission units, capture systems, monitoring devices, and air pollution control equipment, including those set forth in the operations and maintenance plan required by subsection (D)(2).
3. All records of performance tests, test plans, and audits required by subsection (E).
4. All records of compliance calculations required by subsection (F).
5. All records of fugitive emission studies and study protocols conducted in accordance with Appendix 14.
6. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of concentrate drying, smelting, converting, anode refining, and casting emission units; and any malfunction of the associated air pollution control equipment that is inoperative or not operating correctly.
7. All records of reports and notifications required by subsection (H).

H. Reporting. The owner or operator shall provide the following to the Department:

1. Notification of commencement of construction of any equipment necessary to comply with the operational or emission limits.
2. Semiannual progress reports on construction of any such equipment postmarked by July 30 for the preceding January-June period and January 30 for the preceding July-December period.
3. Notification of initial startup of any such equipment within 15 business days of such startup.
4. Whenever the owner or operator becomes aware of any exceedance of the emission limit set forth in subsection (C), the owner or operator shall notify the Department orally or by electronic or facsimile transmission as soon as practicable, but no later than two business days after the owner or operator first knew of the exceedance.
5. Within 30 days after the end of each calendar-year quarter, the owner or operator shall submit a quarterly report to the Department for the preceding quarter that shall include dates, times, and descriptions of deviations when the owner or operator operated smelting processes and related control equipment in a manner inconsistent with the operations and maintenance plan required by subsection (D)(2).
6. Reports from performance testing conducted pursuant to subsection (E) shall be submitted to the Department within 60 calendar days of completion of the performance test. The reports shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312(A).

R18-2-B1301.01. Limits on Lead-Bearing Fugitive Dust from the Hayden Primary Copper Smelter

A. Applicability.

1. This Section applies to the owner or operator of the primary copper smelter located in Hayden, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.

2. Effective Date. Except as otherwise provided, no later than December 1, 2018, the owner or operator shall comply with all requirements of this Section.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this Section:

1. "ACFM" means actual cubic feet per minute.
2. "Acid plant scrubber blowdown drying system" means the process in which Venturi scrubber blowdown solids are dried and packaged via a thickener, filter press, electric dryer, and supersack filling stations.
3. "Control measure" means a piece of equipment used, or actions taken, to minimize lead-bearing fugitive dust emissions that would otherwise be released to the atmosphere. Control equipment may include, but are not limited to, wind fences, chemical dust suppressants, and water sprayers. Actions may include, but are not limited to, relocating sources, curtailing operations, or ceasing operations.
4. "Hayden Lead Nonattainment Area" means the townships in Gila and Pinal Counties, as identified and codified in 40 CFR § 81.303, that are designated nonattainment for the 2008 Lead National Ambient Air Quality Standards.
5. "Hayden Smelter" means the primary copper smelter located in Hayden, Gila County, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.
6. "High wind event" means any period of time beginning when the average wind speed, as measured at a meteorological station maintained by the owner or operator that is approved by the Department, is greater than or equal to 15 miles per hour over a 15 minute period, and ending when the average wind speed, as measured at the approved meteorological station maintained by the owner or operator, falls below 15 miles per hour over a 15 minute period.
7. "Lead-bearing fugitive dust" means uncaptured and/or uncontrolled particulate matter containing lead that is entrained in the ambient air and is caused by activities, including, but not limited to, the movement of soil, vehicles, equipment, and wind.
8. "Material pile" means material, including concentrate, uncrushed reverts, crushed reverts, and bedding material, that is stored in a pile outside a building or warehouse and is capable of producing lead-bearing fugitive dust.
9. "Non-smelting process sources" means sources of lead-bearing fugitive dust that are not part of the hot metal process, which includes smelting in the INCO flash furnace, converting, and anode refining and casting. Non-smelting process sources include storage, handling, and unloading of concentrate, uncrushed reverts, crushed reverts, and bedding material; acid plant scrubber blowdown solids; and paved and unpaved roads.
10. "Ongoing visible emissions" means observed emissions to the outside air that are not brief in duration.
11. "Road" means any surface on which vehicles pass for the purpose of carrying people or materials from one place to another in the normal course of business at the Hayden Smelter.
12. "Slag" means the inorganic molten material that is formed during the smelting process and has a lower specific gravity than copper-bearing matte.
13. "Slag hauler" means any vehicle used to transport molten slag.
14. "Storage and handling" means all activities associated with the handling and storage of materials that take place at the Hayden Smelter, including, but not limited to, stockpiling, transport on conveyor belts, transport or storage in rail cars, crushing and milling, arrival and handling of offsite concentrate, bedding, and handling of reverts.
15. "Trackout/carry-out" means any materials that adhere to and agglomerate on the surfaces of motor vehicles, haul trucks, and/or equipment (including tires) and that may then fall onto the road.

C. Operational Standards.

1. Equipment operations. At all times, the owner or operator shall operate and maintain all non-smelting process sources, including all associated air pollution control equipment, control measures, and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing lead-bearing fugitive dust, and in accordance with the fugitive dust plan required by subsection (C)(2) and performance and housekeeping requirements in subsection (D). A determination of whether acceptable operating and maintenance procedures are being used shall be based on all available information to the Department and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, review of fugitive dust plans, and inspection of the relevant equipment.
2. Fugitive dust plan. The owner or operator shall develop, implement, and follow a fugitive dust plan that is designed to minimize lead-bearing fugitive dust from non-smelting process sources. At minimum, the fugitive dust plan shall contain the following:
   a. Performance and housekeeping requirements in subsection (D).

b. Design plans and specifications for each wind fence to be installed to control lead-bearing fugitive dust from non-smelting process sources identified in subsections (D)(11) through (D)(14). The dust plan shall contain height limits for the materials being stored in each wind fence, consistent with the design plans and specifications for that particular wind fence. Wind fence design and specifications shall:
   i. Require full encircling of the source to be controlled, with reasonable and sufficient openings for ingress and egress;
   ii. Consider the orientation of the wind fence to the prevailing winds;
   iii. Consider the strength of the winds in the area where the fence will be located;
   iv. Consider the porosity of the material to be used, which shall not exceed 50 percent; and
   v. Consider the height of the fence relative to the height of the material being stored. At minimum, wind fence height shall be greater than or equal to the material pile height.

c. Design plans and specifications for each new or modified water sprayer system used to control lead-bearing fugitive dust from non-smelting process sources specified in subsections (D)(11) through (D)(14). The number, type, location, watering intensity, flow rates, and other operational parameters of the water sprayers must meet moisture content objectives for sources specified in subsections (D)(11) through (D)(14). The owner or operator may include in the dust plan an exemption to the water requirements at times when the materials are sufficiently moist or it is raining and thus there is no need for additional wetting until the next scheduled watering to meet moisture content objectives. The dust plan shall include the following for each water sprayer:
   i. watering schedule;
   ii. watering intensity;
   iii. minimum flow rate or pressure drop;
   iv. appropriate and/or continuous monitoring;
   v. schedule for calibration based on the manufacturer's recommended calibration schedule;
   vi. preventative maintenance schedule; and
   vii. other applicable operational parameters.

d. Necessary improvements and/or modifications to material conveyor systems, along with a schedule for implementing improvements or modifications, targeted to minimize lead-bearing fugitive dust from non-smelting process sources specified in subsections (D)(11) through (D)(14), as applicable, to the greatest extent practicable. The improvements or modifications may include, but is not limited to, hooding of transfer points, utilizing water sprayers, and employing scrapers, brushes, or cleaning systems at all points where belts loop around themselves to catch and contain material before it falls to the ground.

e. Design plans for the concrete pads for the non-smelting process sources specified in subsections (D)(11) and (D)(13). The concrete pads shall be designed to capture, store, and control stormwater or sprayed water to minimize emissions to the greatest extent practicable, including curbing around the outer edges of the concrete pad where feasible.

f. Additional controls and measures for sources specified in subsections (D)(11) through (D)(14) to be implemented during high wind events. These additional controls or measures, which must include curtailment or other alteration of activity when appropriate, must be implemented at these sources during all periods of high wind.

g. Sample inspection sheets, checklists, or logsheets for each of the inspections identified in subsection (D)(6), and in accordance with the following:
   i. The inspection sheets or checklists shall include:
      (1) Specific descriptions of the equipment being inspected and the specific functions being evaluated;
      (2) The findings of the inspection;
      (3) The date, time, and location of inspections; and
      (4) An identification of who performed the inspection or logged the results.
   ii. The logsheets for high wind events shall include:
      (1) High wind event start time;
      (2) High wind event end time;
      (3) Description of area or activity inspected; and
      (4) Description of corrective action taken if necessary.

h. Design plans of the new acid plant scrubber blowdown drying system specified in subsection (D)(15).

i. The name and location of the meteorological station, which must be approved by the Department, that is to be used by the owner or operator for determining high wind events pursuant to subsection (B)(6) and for implementing control requirements pursuant to subsection (D)(5).

3. Plan development and revisions. The owner or operator shall develop and keep current the fugitive dust plan required by subsection (C)(2). Any plan or plan revision shall be consistent with this Section and shall be submitted to the Department for review. The initial plan shall be submitted to the Department for review no later than May 1, 2017. Plans and plan revisions shall be consistent with good air pollution control practice for fugitive dust. Except for the meteorological station to be used for high wind events pursuant to subsection (D)(5), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

D. Performance and Housekeeping Requirements. The owner or operator shall comply with these requirements at all times regardless of a fugitive dust plan.

1. Water sprayers. The owner or operator shall implement a recordkeeping system to capture sprayer operations, including identification of the particular operation, lead-bearing fugitive dust source, timing and intensity of watering, and data regarding the quantity of water used at each water sprayer.
2. Wind fences. The owner or operator shall ensure that wind fences used to control lead-bearing fugitive dust from the non-smelting process sources specified in subsections (D)(11) through (D)(14) meet the following requirements:
   a. Wind fence height shall be greater than or equal to the material pile height. The allowed material pile height shall be posted in a readily visible location at each wind fence.
   b. Wind fence porosity shall not exceed 50 percent.
3. Material conveyor systems. For sources specified in subsections (D)(11) through (D)(14), as applicable, the owner or operator shall:
   a. Minimize conveyor drop heights to the greatest extent practicable.
   b. Clean any spills from conveyors within 30 minutes of discovery. The material collected must be handled in such a way so as to minimize lead-bearing fugitive dust to the maximum extent practicable.
4. Vehicle transport of materials. The owner or operator shall maintain vehicle cargo compartments used to transport materials capable of producing lead-bearing fugitive dust so that the cargo compartment is free of holes or other openings and is covered by a tarp.
5. High wind event requirements.
   a. During high wind events, the owner or operator shall evaluate the non-smelting process sources specified in subsections (D)(11) through (D)(14) for ongoing visible emissions using the appropriate logsheet for each source.
   b. If ongoing visible emissions are observed, the owner or operator shall promptly wet the source of emissions with the objective of mitigating further emissions.
   c. If wetting does not appear to mitigate the ongoing visible emissions to 20 percent opacity or less, the owner or operator shall postpone associated handling of the source until the high wind event has ceased.
6. Physical inspections. The owner or operator shall conduct physical inspections as follows:
   a. Daily inspections of all water sprayers to make sure they are functioning and are in accordance with the dust plan;
   b. Daily visual inspections of all material piles to make sure they are maintained within areas protected by a wind fence, that they are not higher than allowed for the wind fence, and to verify that moisture content requirements are met;
   c. Daily inspections of all material handling areas to identify and clean up track out or spills of materials;
   d. Daily inspections of conveyor systems to identify and clean up material spills;
   e. Daily inspections of rumble grates sump levels;
   f. Daily spot inspections of vehicles carrying lead-bearing fugitive dust-producing materials when vehicles are in use to ensure that material is not overloaded, is properly covered, and cargo compartments are intact;
   g. Weekly inspections of wind fences for material integrity and structural stability;
   h. Daily inspections of all paved roads to identify and clean up track out or spills of materials;
   i. Daily inspections of unpaved roads in subsection (D)(10)(a) to identify areas where chemical dust suppressant coverage has broken down; and
   j. Bi-weekly inspections of the acid plant scrubber blowdown drying system enclosure.
7. Opacity limit and Method 9 readings.

a. Opacity from lead-bearing fugitive dust emissions shall not exceed 20 percent from any part of the facility at any time. Opacity shall be determined by using 40 CFR 60, Appendix A, Reference Method 9, except for unpaved roads, in which opacity shall be determined pursuant to subsection (D)(10)(c).
b. In the event that an employee observes ongoing visible emissions at a non-smelting process source covered by this Section, that employee shall promptly contact a Reference Method 9-certified observer, who shall promptly evaluate the emissions and conduct a Reference Method 9 reading, if possible.
c. A Reference Method 9-certified observer shall conduct a weekly visible emissions survey of all non-smelting process sources covered by this Section and perform a Reference Method 9 reading for any plumes that on an instantaneous basis appear to exceed 15 percent opacity.

8. Corrective actions.
a. At any time that visible emissions from the non-smelting process sources covered by this Section appear to exceed 15 percent opacity, the owner or operator shall take prompt corrective action to identify the source of the emissions and abate such emissions, with the corrective action starting within 30 minutes after discovery.
i. For any non-smelting process source that produces visible emissions that appear to exceed 15 percent opacity, the owner or operator shall perform an analysis of the root cause, and implement a strategy designed to prevent, to the extent feasible, the ongoing recurrence of the source of visible emissions. Within 14 days of completion of its analysis, if appropriate, the owner or operator shall modify the fugitive dust plan in subsection (C)(2) for any changes identified from the analysis differing from the current provisions of the fugitive dust plan.
b. At any time that the owner or operator becomes aware that provisions of the fugitive dust plan and/or performance and housekeeping provisions required by this Section are not being met, the owner or operator shall take prompt action to return to compliance, which may include modifications to monitoring, recordkeeping, and reporting requirements in the fugitive dust plan. This includes, but is not limited to, the following actions:
i. Return water sprayers to full operational status;
ii. Repair damaged conveyor hoodings or other enclosures;
iii. Apply additional water to ensure that sources are meeting moisture content requirements;
iv. Clean any trackout or spillage of dust-producing material, including dropoff of dust producing material from conveyors, using a street sweeper, vacuum, or wet broom with sufficient water and at the speed recommended by the manufacturer;
v. Reapplication of chemical dust suppressants in areas where the coating has broken down on unpaved roads; and
vi. Revisions to the fugitive dust plan to undertake improved monitoring, recordkeeping, and reporting requirements necessary to ensure that the controls contained in the fugitive dust plan are being implemented as contemplated by the fugitive dust plan.

9. Paved Roads. These requirements apply to all roads at the facility currently paved and roads to be paved in the future. The owner or operator shall:
a. Clean roads at least once daily with a sweeper, vacuum, or wet broom in accordance with applicable manufacturer recommendations.
b. Maintain the integrity of the road surface.
c. Clean up trackout and carry-out of material on the following schedule:
i. As expeditiously as practicable, when trackout and carry-out extends a cumulative distance of 50 linear feet or more; and
ii. At the end of the workday, for all other trackout and carry-out.
d. Comply with a speed limit not to exceed 15 miles per hour for all vehicular traffic. At minimum, speed limit signs shall be posted at all entrances and truck loading and unloading areas and/or at conspicuous areas along the roadway.

10. Unpaved Roads. These requirements apply to the unpaved roads identified in subsections (D)(10)(a)(i) through (D)(10)(a)(v) below, including any access points where the unpaved roads adjoin paved roads and any areas of vehicular handling of material. The owner or operator shall:
a. Implement a chemical dust suppressant application intensity and schedule, which at minimum shall be:
i. For the slag hauler road and all other unpaved roads used or to be used by the slag hauler, chemical dust suppressant shall be applied at least once per week during the summer, and once per every two weeks during the winter.

ii. For the main road to the secondary crusher, chemical dust suppressant shall be applied at least once every six weeks, year-round.

iii. For unpaved roads near reverts and silica flux crushing operations, chemical dust suppressant shall be applied at least once per two weeks during the summer, and once per month in the winter.

b. Increase the frequency of chemical dust suppressant application if necessary to reduce fugitive dust emissions from unpaved roads.

c. Not allow visible emissions to exceed 20 percent opacity and shall not allow silt loading equal to or greater than 0.33 oz/ft^2. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner or operator shall not allow the silt content to exceed 6 percent. Compliance with these requirements shall be determined by the test methods described in Appendix 15.

d. Maintain sufficient watering trucks and personnel to operate such trucks to be employed as an interim measure whenever visible emissions or a breakdown in dust suppressant covering are observed at any point along the treated unpaved road system.

e. Immediately, but no later than 30 minutes after initial observation of any visible emissions, apply water or chemical dust suppressant to the portion of the unpaved road where the visible emissions were observed.

f. Reapply chemical dust suppressant within 24 hours of discovery of any area where the surface chemical dust suppressant coverage has broken down.

g. Collect and prevent from becoming airborne any runoff or material from rinsing or sweeping as soon as practicable.

h. Comply with a speed limit not to exceed 15 miles per hour for all vehicular traffic. At minimum, speed limit signs shall be posted at all entrances and truck loading and unloading areas and/or at conspicuous areas along the roadway.

11. Concentrate Storage, Handling, and Unloading. The owner or operator shall:

a. Consolidate and manage all concentrate storage piles in one or more concrete storage pads.

b. Store concentrate in an area with a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

c. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of concentrate piles are wetted to maintain a nominal 10 percent surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

d. Minimize the footprint of the concentrate storage piles by pushing into the stockpile with a front end loader and sweeping open areas of the pads with a self-powered vacuum sweeper at least daily during use.

12. Uncrushed Reverts Handling and Storage. The owner or operator shall:

a. Manage uncrushed revert material only in areas protected by a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

b. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surface of uncrushed revert material is wetted with the objective to minimize lead-bearing fugitive dust emissions to the greatest extent practicable.

13. Reverts Crushing Operations and Crushed Reverts Storage. The owner or operator shall:

a. Crush revert and store crushed revert only on one or more concrete pads.

b. Crush revert and store crushed revert only within an area protected by a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2).

c. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of all crushed revert material, including revert managed after it is crushed, is wetted to maintain a nominal 10 percent surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

d. By October 2017, relocate all revert crushing operations to 33º 00’ 25.84” N, 110º 46’ 26.55” W and shall crush revert only at this new location.

14. Bedding Operations, Including Handling, Storage, and Unloading. The owner or operator shall:

a. Perform all bedding activities, including loading and unloading of materials to be blended, only within an area protected by a wind fence in accordance with requirements set forth in the fugitive dust plan and pursuant to subsection (D)(2). These activities include the storage and handling areas for potentially lead-bearing fugitive dust-producing material within the bedding plant area.

b. Maintain water sprayers in accordance with requirements set forth in the fugitive dust plan and to ensure the surfaces of material in the bedding area is wetted to maintain a nominal 10 percent

surface moisture content as determined from representative samples using ASTM Method D2216-10 or other equivalent methods approved by the Department and EPA Region IX.

c. Maintain rumble grates at all of the bedding plant's entrances and exits to shake off material on the loader tires as they enter and exit the area. Material that is tracked out of the bedding area must be cleaned up at the end of the workday.

d. Operate its bedding activities in a manner designed to avoid any trackout outside an area protected by a wind fence. Areas of material spillage or trackout, whether inside or outside of an area protected by a wind fence, shall be rinsed or cleaned daily.

15. Acid Plant Scrubber Blowdown Drying System.

a. The owner or operator shall dry acid plant scrubber blowdown solids only in an enclosed system that uses a venturi scrubber, thickener, filter press, and electric dryer that is maintained under negative pressure at all times that materials are being dried.

b. The owner or operator shall maintain the negative pressure of the electric dryer using a 2,500 ACFM dryer ventilation fan that must run at all times the electric dryer is operational. Monitoring of the negative pressure shall be demonstrated through the run and stop states of the ventilation fan and electric dryer.

c. The acid plant scrubber blowdown drying system shall include the following elements:

i. Venturi scrubber slurry that reports to a new thickener.

ii. Underflow from the thickener that goes to a filter press for further liquid removal, with the resulting filter cake sent to two electric dryers operating in parallel to provide final drying of the dust cake.

iii. Exhaust from the dryers sent to the packed gas cooling tower inlet duct.

iv. Dried cake discharged directly into bags.

d. The owner or operator shall clean all areas previously used for scrubber blowdown drying and no longer use previous areas for scrubber blowdown drying.

E. Contingency Requirements.

1. If the owner or operator does not meet the compliance schedule below in subsection (E)(3), or if the Hayden Lead Nonattainment Area does not attain the 2008 Lead National Ambient Air Quality Standards by the attainment date established in the Act, whichever occurs first, then the owner or operator shall increase the paved road cleaning frequency specified in subsection (D)(9) to twice per day.

2. The owner or operator shall implement the contingency measure in subsection (E)(1) within 60 days of notification by EPA Region IX of either a failure to meet the compliance schedule in subsection (E)(3) or a failure to attain by the attainment date established in the Act, whichever occurs first.

3. The compliance schedule is as follows. The Fugitive Dust Plan referred to in the compliance schedule shall mean the Fugitive Dust Plan submitted to the Administrator by the owner or operator to comply with requirements set forth in Consent Decree No. CV-15-02206-PHX-DLR, which became effective on December 30, 2015 in the United States District Court for the District of Arizona, as that plan may be later revised pursuant to subsection (C)(3):

Control Measure	**Date of Implementation**
Implementation of chemical dust suppression for unpaved roads.	Within 30 days of Administrator approval of application intensity and schedules in Fugitive Dust Plan.
Implementation of wind fences for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate).	Within 120 days of Administrator approval of the Fugitive Dust Plan or the date of completion in the approved Fugitive Dust Plan, whichever is later.
Implementation of water sprays for materials piles (uncrushed reverts, reverts crushing and crushed reverts, bedding materials, and concentrate).	Within 120 days of Administrator approval of the Fugitive Dust Plan or the date of completion in the approved Fugitive Dust Plan, whichever is later.
Implementation of new acid plant scrubber blowdown drying system.	November 30, 2016
Implementation of new primary, secondary, and tertiary hooding systems for converter aisle for	July 1, 2018

purposes of complying with requirements in R18-2-B1301.	
Implementation of new ventilation system for matte tapping and slag skimming for flash furnace for purposes of complying with requirements in R18-2-B1301.	July 1, 2018

F. Ambient Air and Meteorological Monitoring Requirements.

1. The owner or operator shall conduct ambient air monitoring and sampling for lead as follows:
   a. At minimum, the owner or operator shall continue to maintain and operate the ambient lead monitors located at ST-14 (the smelter parking lot), ST-23 (Hillcrest area), ST-26 (post office), and ST-18 (next to the concentrate handling area).
   b. Samples must be collected continuously at all monitor sites specified in subsection (F)(1)(a). For the purposes of this requirement, "continuously" means that 24-hour filters are placed and collected at minimum, every six calendar days at all sites consistent with 40 CFR § 58.12.
   c. The owner or operator shall follow the Hayden Smelter's Quality Assurance Project Plan (QAPP) applicable to these monitors.
   d. The monitors must be operated and maintained in accordance with 40 CFR 58, Appendix A.
   e. The owner or operator shall submit each filter removed from each monitor to a certified laboratory for analysis no later than 18 calendar days after the filter's removal. The owner or operator shall ensure that the laboratory performs its analysis and submits the results to the owner or operator no later than 21 calendar days from the lab's receipt of the filter.
   f. The owner or operator shall calculate, update, and maintain as a record the following data within 14 calendar days of receipt of any results pertaining to the monitor filters received from a certified lab:
      i. The total pollutants on the filters collected and analyzed; and
      ii. Calculations of 30-day rolling average ambient air levels of lead for the ST-23, ST-26, and ST-18 monitors, and 60-day rolling average ambient air levels of lead for the ST-14 monitor, expressed as $\mu g/m^3$.
   g. The owner or operator shall retain lead samples collected pursuant to this Section for at least three years. The samples shall be stored in individually sealed containers and labeled with the applicable monitor and date. Upon request, the samples shall be provided to the Department within five business days.
2. The owner or operator shall conduct meteorological monitoring as follows:
   a. Continuously monitor and record wind speed and direction data using equipment and a meteorological station approved by the Department.
   b. The owner or operator shall calculate and record average wind speed in miles per hour over 15 minutes, rolled each minute.
   c. Conduct wind speed and direction measurements using methods in accordance with EPA's Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV, Meteorological Measurements, Version 2.0.
3. The ambient air and meteorological monitoring stations required by this Section may be discontinued at the end of three full calendar years after the Hayden Lead Nonattainment Area is redesignated attainment for the 2008 Lead National Ambient Air Quality Standards.

G. Compliance Demonstration Requirements. The owner or operator shall demonstrate compliance with this Section by complying with all requirements in the fugitive dust plan pursuant to subsection (C)(2) and implementing all housekeeping and performance requirements pursuant to subsection (D).

H. Recordkeeping.

1. The owner or operator shall maintain the following records for at least five years and keep on-site for at least two years:
   a. Current and past fugitive dust plans required by subsection (C)(2).
   b. Physical inspection sheets, checklists, and logsheets for inspections conducted in accordance with subsection (D)(6).
   c. All records of opacity and stabilization tests, if any, conducted in accordance with subsection (D)(10)(c).
   d. All records of surface moisture content tests, if any, conducted in accordance with subsection (D)(11), subsection (D)(13), and subsection (D)(14).
   e. All records of major maintenance activities and inspections conducted on monitors required by subsection (F).

f. All records of quality assurance and quality control activities for the monitors required by subsection (F).
g. All air quality monitoring samples, rolling averages of ambient lead concentrations and necessary calculations, and data required by subsection (F).
h. All records of wind data from the meteorological station required by subsection (F).
i. All records of any periods during which a monitoring device required by subsection (F) is inoperative or not operating correctly.
j. All records of reports and notifications required by subsection (I).

2. All of the following records maintained for the purposes of the fugitive dust plan required by subsection (C)(2) must be maintained in a recordkeeping log or recordkeeping system. As part of the records, the owner or operator shall include the dates and times for each of the following observations or activities, the name of the employee documenting each activity or observation, and the nature and location of each observation activity:
a. Each instance of observed visible emissions of 15 percent opacity or greater, along with a description of any corrective action undertaken and its success.
b. Water sprayer operations, including timing and intensity of watering to be captured in the water sprayer recordkeeping system.
c. Timing, location, type, and amount of chemical suppressant and water applied to unpaved roads, and a description of the nature and timing of any additional corrective action taken, as necessary, to minimize emissions to the greatest extent practicable.
d. Timing and location of all sweeping and cleaning of trackout or spillage material.
e. Timing and location of all washdown of concrete areas.
f. Timing and location of sump cleanouts.
g. Results of all visible emissions surveys and Reference Method 9 readings.
h. Appropriate records for operating conditions, including electric dryer ventilation fan start and stop times for the newly designed acid plant scrubber blowdown drying system.
i. Calibration records for all measurement devices, including maintenance of manufacturer's manuals or other documentation for suggested calibration schedules and accuracy levels for each measurement device.
j. Dates, times, and descriptions of deviations when the owner or operator's operations was carried out in a manner inconsistent with the fugitive dust plan required by subsection (C)(2).

I. Reporting. On a quarterly basis, the owner or operator shall submit a report to the Department covering the prior quarter that includes the following:
a. All instances where observed fugitive emissions coming from sources covered in this Section were 15 percent or greater.
b. The date of all high wind events, with an identification of the location of the reading, wind speed, and duration of the event, and a description of actions taken as a result of the event on a source-by-source basis.
c. All instances where corrective action was required with identification of the emission source involved, what triggered the corrective action, what action the owner or operator undertook to abate or mitigate the problem, and whether the corrective action achieved the intended results.
d. A summary of all times when the electronic recordkeeping system was not recording data, and a summary and indication of the period when recorded data was outside of established operating parameters.
e. A summary of progress of all new construction, installation, upgrades, or modifications to equipment or structures at the facility required by the fugitive dust plan and subsection (D), including dates of commencement and completion of construction, dates of operations of new or modified equipment or structures, and dates old or outdated equipment or structures were permanently retired.
f. Raw monitoring data and calculated ambient lead concentrations from the ambient air monitoring stations required by subsection (F).

R18-2-B1302. Limits on SO_2 Emissions from the Hayden Primary Copper Smelter

A. Applicability.
1. This Section applies to the owner or operator of the Hayden Smelter. It establishes limits on sulfur dioxide emissions from the Hayden Smelter and monitoring, recordkeeping and reporting requirements for those limits.
2. Effective date. Except as otherwise provided, the requirements of this Section shall become applicable on the earlier of July 1, 2018 or 180 days after completion of all project improvements authorized by Significant Permit Revision No. 60647.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this rule.

1. "ACFM" means actual cubic feet per minute.
2. "Anode furnace baghouse stack" means the dedicated stack that vents controlled off-gases from the anode furnaces to the Main Stack.
3. "Blowing" shall mean the introduction of air or oxygen-enriched air into the converter furnace molten bath through tuyeres that are submerged below the level of the molten bath. The flow of air through the tuyeres above the level of the molten bath or into an empty converter shall not constitute blowing.
4. "Capture system" means the collection of components used to capture gases and fumes released from one or more emission units, and to convey the captured gases and fumes to one or more control devices or a stack. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.
5. "Continuous emissions monitoring system" or "CEMS" means the total equipment, required under the emission monitoring provisions in this Chapter, used to sample, condition (if applicable), analyze, and to provide, on a continuous basis, a permanent record of emissions.
6. "Hayden Smelter" means the primary copper smelter located in Hayden, Gila County, Arizona at latitude 33°0'15"N and longitude 110°46'31"W.
7. "Main Stack" means the center and annular portions of the 1000 foot stack, which vents controlled off-gases from the INCO flash furnace, the converters, anode furnaces and also vents exhaust from the tertiary hoods.
8. "Operating day" means any calendar day in which any of the following occurs:
   a. Concentrate is smelted in the smelting furnace;
   b. Copper or sulfur bearing materials are processed in the converters;
   c. Blister or scrap copper is processed in the anode furnaces;
   d. Molten metal, including slag, matte or blister copper, is transferred between vessels; or
   e. Molten metal is cast into anodes or other intermediate or final products.
9. "Out of control period" means the time that begins with the completion of the fifth, consecutive, daily calibration drift check with a calibration drift in excess of two times the allowable limit, or the time corresponding to the completion of the daily calibration drift check preceding the daily calibration drift check that results in a calibration drift in excess of four times the allowable limit, and the time that ends with the completion of the calibration check following corrective action that results in the calibration drifts at both the zero (or low-level) and high-level measurement points being within the corresponding allowable calibration drift limit.
10. "SCFM" means standard cubic feet per minute.

C. Sulfur Dioxide Emissions Limitations.

1. Emissions from the Main Stack shall not exceed 1069.1 pounds per hour on a 14-operating day average unless 1,518 pounds or less is emitted during each hour of the 14-operating day period.
2. The owner and operator shall not cause to be discharged into the atmosphere from any affected unit subject to 40 C.F.R. Part P any gases which contain sulfur dioxide in excess of the limit set forth in 40 C.F.R. section 60.163(a) (as in effect on July 1, 2016 and no later editions).

D. Operational Standards.

1. Process equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate smelter processes and associated emission control and/or control equipment in a manner consistent with good air pollution control practices for minimizing SO_2 emissions to the levels required by subsection (C). Determination of whether acceptable operating and maintenance procedures are being used will be based on all information available to the Director and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.
2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and/or control device used to ventilate or control process gas or emissions from the flash furnace including matte tapping, slag skimming, and slag return operations; converter primary hoods, converter secondary hoods, tertiary ventilation system, and anode refining operations. The operations and maintenance plan must address the following requirements as applicable to each capture system and/or control device.
   a. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit values or settings at all times the required capture and control system is operating, except during periods of monitor calibration, repair and malfunction. The initial plan shall provide for volumetric flow monitoring on the vent gas baghouse (inlet or outlet), each converter primary hood, each converter

secondary hood, the tertiary ventilation system and the anode furnace baghouse (inlet or outlet). All monitoring devices shall be accurate within +/-10 percent and calibrated according to manufacturer's instructions. If direct measurement of the exhaust flow is infeasible due to physical limitations or exhaust characteristics, the owner or operator may propose a reliable equivalent method for approval. Initial monitoring may be adjusted as provided in subsection (D)(2)(e). Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements. Capture system damper position setting(s) shall be specified in the plan.

b. Operational limits. The owner or operator shall establish operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indicators of the performance of the capture system and control device operations. The initial operating limits may be adjusted as provided in subsection (D)(2)(e). Initial operating limits shall include the following:

i. Identification of those modes of operation when the double dampers between the flash furnace vessel and the vent gas system will be closed and the interstitial space evacuated to the acid plant.

ii. A minimum air flow for the furnace ventilation system and associated damper positions for each matte tapping hood or slag skimming hood when operating to ensure that the operation(s) are within the confines or influence of the capture system.

iii. A minimum air flow for the secondary hood baghouse and associated damper positions for each slag return hood to ensure that the operation is within the confines or influence of the capture system's ventilation draft during times when the associated process is operating.

iv. A minimum air infiltration ratio for the converter primary hoods of 1:1 averaged over 24 converter Blowing hours, rolled hourly measured as volumetric flow in primary hood less the volumetric flow of tuyere Blowing compared to the volumetric flow of tuyere Blowing.

v. A minimum secondary hood exhaust rate of 35,000 SCFM during converter Blowing, averaged over 24 converter Blowing hours, rolled hourly.

vi. A minimum secondary hood exhaust rate of 133,000 SCFM during all non-Blowing operating hours, averaged over 24 non-Blowing hours, rolled hourly.

vii. A minimum negative pressure drop across the secondary hood when the doors are closed equivalent to 0.007 inches of water.

viii. A minimum exhaust rate on the tertiary hooding of 400,000 ACFM during all times material is processed in the converter aisle, averaged over 24 hours and rolled hourly.

ix. Fan amperes or minimum air flow for the anode furnace baghouse and associated damper positions for each anode furnace hood to ensure that the anode furnace off-gas port is within the confines or influence of the capture system's ventilation draft during times when the associated furnace is operating.

x. The anode furnace charge mouth shall be kept covered when the tuyeres are submerged in the metal bath except when copper is being charged to or transferred from the furnace.

xi. The temperatures of the acid plant catalyst bed, which shall at minimum, meet the manufacturer's recommendations.

xii. The acid plant catalyst replenishment schedule, which shall at minimum, meet the manufacturer's recommendations.

c. Preventative maintenance. The owner or operator must perform preventative maintenance on each capture system and control device according to written procedures specified in the operation and maintenance plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions, or operator's experience working with equipment, and frequency for routine and long-term maintenance. This provision does not prohibit additional maintenance beyond that required by the plan.

d. Inspections. The owner or operator must perform inspections in accordance with written procedures in the operations and maintenance plan for each capture system and control device that are consistent with the manufacturer's, engineer's or operator's instructions for each system and device.

e. Plan development and revisions.

i. The owner or operator shall develop and keep current the plan required by this Section. Any plan or plan revision shall be consistent with this Section, shall be designed to ensure that the capture and control system performance conforms to the attainment

demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area State Implementation Plan (SIP), and shall be submitted to the Department for review. Any plan or plan revision submitted shall include the associated manufacturer's recommendations and/or instructions used for capture system and control device operations and maintenance.

ii. The owner or operator shall submit the initial plan to the Department no later than May 1, 2018 and shall include the initial volumetric flow monitoring provisions in subsection (D)(2)(a), the initial operational limits in subsection (D)(2)(b), the preventative maintenance procedures in subsection (D)(2)(c), and the inspection procedures in subsection (D)(2)(d).

iii. The owner or operator shall submit to the Department for approval a plan revision with changes, if any, to the initial volumetric flow monitoring provisions in subsection (D)(2)(a) and initial operational limits in subsection (D)(2)(b) not later than six months after completing a fugitive emissions study conducted in accordance with Appendix 14. The Department shall submit the approved changes to the volumetric flow monitoring provisions and operational limits pursuant to this subsection to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

iv. Other plan revisions may be submitted at any time when necessary. All plans and plan revisions shall be designed to achieve operation of the capture system and/or control device consistent with the attainment demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area SIP. Except for changes to the volumetric flow monitoring provisions in subsection (D)(2)(a) and operational limits in subsection (D)(2)(b), which shall require prior approval, plans and plan revisions may be implemented upon submittal and shall remain in effect until superseded or until disapproved by the Department. Disapprovals are appealable Department actions.

3. Emissions from the anode furnace baghouse stack shall be routed to the Main Stack.

E. Monitoring.

1. To determine compliance with subsection (C)(1) the owner or operator of the Hayden Smelter shall install, calibrate, maintain, and operate a CEMS for continuously monitoring and recording SO_2 concentrations and stack gas volumetric flow rates at the following locations.
   a. The exit of the acid plant;
   b. The exit of the secondary hood particulate control device after the High Surface Area (HSA) lime injection system;
   c. The exit of the flash furnace particulate control device after the HSA lime injection system;
   d. The tertiary ventilation system prior to mixing with any other exhaust streams; and
   e. The anode furnace baghouse stack prior to mixing with any other exhaust streams.
2. Except during periods of systems breakdown, repairs, maintenance, out-of-control periods, calibration checks, and zero and span adjustments, the owner or operator shall continuously monitor SO_2 concentrations and stack gas volumetric flow rates at each location in subsection (E)(1).
3. For purposes of this section, continuous monitoring means the taking and recording of at least one measurement of SO_2 concentration and stack gas flow rate reading from the effluent of each affected stack, outlet, or other approved measurement location in each 15-minute period when the associated process units are operating. Fifteen-minute periods start at the beginning of each clock hour, and run consecutively. All CEMS required by subsection (E)(1) shall complete at least one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.
4. If the owner or operator can demonstrate to the Director that measurement of stack gas volumetric flow rate in the outlet of any particular piece of SO_2 control equipment would yield inaccurate results or would be technologically infeasible, then the Director may allow measurement of the flow rate at an alternative sampling point.
5. The owner or operator shall demonstrate that the CEMS required by subsection (E)(1) meet all of the following requirements:
   a. The SO_2 CEMS installed and operated under this Section meets the requirements of 40 CFR 60, Appendix B, Performance Specification 2 and Performance Specification 6. The CEMS on the anode furnace baghouse stack and tertiary ventilation system shall complete an initial Relative Accuracy Test Audit (RATA) in accordance with Performance Specification 2. The RATA runs shall be tied to when the anode furnace is in use and, for the tertiary system, when the converters are in operation and/or material is being transferred in the converter aisle. Asarco may petition the Department and EPA Region IX on the criteria for subsequent RATAs for the anode furnace

baghouse stack or tertiary ventilation system CEMS. The petition shall include submittal of CEMS data during the year.

b. The SO_2 CEMS installed and operated under this Section meets the quality assurance requirements of 40 CFR 60, Appendix F.

c. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of the relative accuracy test audit (RATA) performed on the CEMS.

d. The Director shall approve the location of all sampling points for monitoring SO_2 concentration and stack gas volumetric flow rates and the appropriate span values for the monitoring systems. This approval shall be in writing before installation and operation of the measurement instruments.

e. The measurement system installed and used under this subsection is subject to the manufacturer's recommended zero adjustment and calibration procedures at least once per operating day unless the manufacturer specifies or recommends calibration at shorter intervals, in which case the owner or operator shall follow those specifications or recommendations. The owner or operator shall make available a record of these procedures that clearly shows instrument readings before and after zero adjustment and calibration.

f. The owner or operator shall maintain on hand and ready for immediate installation sufficient spare parts or duplicate systems for the CEMS required by this Section to allow for the replacement within six hours of any monitoring equipment part that fails or malfunctions during operation.

6. The owner operator of the Hayden Smelter may petition the department to substitute annual stack testing for the tertiary ventilation or the anode furnace baghouse stack CEMS if the owner or operator demonstrates, for a period of two years, that such CEMS contribute(s) less than five percent of the total sulfur dioxide emissions. Annual stack testing shall use Methods 1, 4, and 6C or an approved alternate method. Annual stack testing shall commence no later than the one year after the date the continuous emission monitoring system was removed. The owner or operator shall submit a test protocol to the department at least 30 days in advance of testing. The protocol shall provide for three or more 24-hour runs unless the owner or operator justifies a different period and the department approves such different period. Reports of testing shall be submitted to the department no later than 60 days after testing or 30 days after receipt, whichever is later. The report shall provide an emissions rate, in the form of a pound per hour or pound per unit of production factor, that shall be used in the compliance demonstration in subsection (F)(1). Except as provided herein, the owner or operator shall otherwise comply with section R18-2-312 in conducting such testing.

F. Compliance Demonstration Requirements.

1. For purposes of determining compliance with the emission limit in subsection (C)(1) the owner or operator shall calculate emissions for each operating day as follows:

a. Sum the hourly pounds of SO_2 vented to each uncontrolled shutdown ventilation flue and through each monitoring point listed in subsection (E)(1) for the current operating day and the preceding 13-operating days to calculate the total pounds of SO_2 emissions over the 14-operating day averaging period, as applicable.

b. Divide the total amount of SO_2 emissions calculated from subsection (F)(1)(a) by 336 to calculate the 14-operating day average SO_2 emissions.

c. If the calculation in subsection (F)(1)(b) exceeds 1069.1 pounds per hour, then the owner or operator shall sum the hourly pounds of SO_2 vented to each uncontrolled shutdown ventilation flue and through each monitoring point listed in subsection (E)(1) for each hour of the current operating day and each hour of the preceding 13-operating days to ascertain if any hour exceeded 1,518 pounds per hour.

2. When no valid hour or hours of data have been recorded by a continuous monitoring system required by subsections (E)(1) and (E)(2) and the associated process unit is operating, the owner or operator shall calculate substitute data for each such period according to the following procedures:

a. For a missing data period less than or equal to 24 hours, substitute the average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.

b. For a missing data period greater than 24 hours, substitute the greater of:

i. The 90th percentile hourly SO_2 concentrations recorded by the system during the previous 720 quality-assured monitor operating hours.

ii. The average of the hourly SO_2 concentrations recorded by the system for the hour before and the four hours after the missing data period.

c. Notwithstanding subsections (F)(3)(a) and (F)(3)(b), the owner or operator may present any credible evidence as to the quantity or concentration of emissions during any period of missing data.

3. The owner or operator shall determine compliance with the requirements in subsection (D)(2) as follows:
   a. Maintaining and operating the emissions capture and control equipment in accordance with the capture system and control device operations and maintenance plan required in subsection (D)(2) and recording operating parameters for capture and control equipment as required in subsection (D)(2)(b); and
   b. Conducting a fugitive study in accordance with Appendix 14 starting not later than 6 months after completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The fugitive study shall demonstrate, as set forth in Appendix 14, that fugitive emissions from the smelter are consistent with estimates used in the attainment demonstration in the Hayden 2010 Sulfur Dioxide National Ambient Air Quality Standards Nonattainment Area SIP.
4. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limits in subsection (C).
5. The owner and operator shall demonstrate compliance with the limit in subsection (C)(2) in accordance with 40 C.F.R. §§ 60.165 and 60.166 (as in effect on July 1, 2016 and not later editions).

G. Recordkeeping.

1. The owner or operator shall maintain a record of each operation and maintenance plan required under subsection (D)(2).
2. The owner or operator shall maintain the following records for at least five years:
   a. All measurements from the continuous monitoring system required by subsection (E)(1), including the date, place, and time of sampling or measurement; parameters sampled or measured; and results. All measurements will be calculated daily.
   b. All records of quality assurance and quality control activities for emissions measuring systems required by subsection (E)(1).
   c. All records of calibration checks, adjustments, maintenance, and repairs conducted on the continuous monitoring systems required by subsection (E); including records of all compliance calculations required by subsection (F).
   d. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of concentrate drying, smelting, converting, anode refining and casting emission units; any malfunction of the associated air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device required by subsection (E)(1) is inoperative or not operating correctly.
   e. All records of planned and unplanned shutdown ventilation flue utilization events and calculations used to determine emissions from shutdown ventilation flue utilization events if the owner or operator chooses to use the alternative compliance determination method.
   f. All records of major maintenance activities and inspections conducted on emission units, capture system, air pollution control equipment, and CEMS, including those set forth in the operations and maintenance plan required by subsection (D)(2).
   g. All records of operating days and production records required for calculations in subsection (F).
   h. All records of fugitive emissions studies and study protocols conducted in accordance with Appendix 14.
   i. All records of reports and notifications required by subsection (H).

H. Reporting.

1. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of relative accuracy test audit (RATA) procedures performed on the continuous monitoring systems required by subsection (E)(1).
2. Within 30 days after the end of each calendar quarter, the owner or operator shall submit a data assessment report to the Director in accordance with 40 C.F.R. Part 60, Appendix F for the continuous monitoring systems required by subsection (E).
3. The owner or operator shall submit an excess emissions and monitoring systems performance report or summary report form in accordance with 40 C.F.R. § 60.7(c) to the Director quarterly for the continuous monitoring systems required by subsection (E)(1). Excess emissions means any 14-operating day average as calculated in subsection (F) in excess of the emission limit in subsection (C)(1), any period in which the capture and control system was operating outside of its parameters specified in the capture system and control device operation and maintenance plan in subsection (D)(2). For any 14-operating day period exceeding 1069.1 pounds per hour that the owner or operator claims does not exceed the limit in subsection (C)(1) because all hours in the operating period are below 1,518 pounds per hour, the owner or operator shall submit the CEMS data for each hour during that period. All reports shall be postmarked by the 30th day following the end of each calendar quarter time period.
4. The owner or operator shall provide the following to the Director:

a. The owner or operator shall notify the Director of commencement of construction of any equipment necessary to comply with the operational or emission limits.
b. The owner or operator shall submit semiannual progress reports on construction of any such equipment postmarked by July 30 for the preceding January-June period and January 30 for the preceding July-December period.
c. The owner or operator shall submit notification of initial startup of any such equipment within 15 business days of such startup.

I. Preconstruction review. This Section is determined to be RACT for SO_2 emissions from the operations subject to subsection (C) for purposes of minor source NSR requirement addressed in R18-2-334.

PART C. MIAMI, ARIZONA, PLANNING AREA

R18-2-C1301. Reserved

R18-2-C1302. Limits on SO_2 Emissions from the Miami Smelter

A. Applicability.
1. This Section applies to the owner or operator of the Miami Smelter. It establishes limits on SO_2 emissions from the Miami Smelter and monitoring, recordkeeping and reporting requirements for those limits.
2. Effective date. Except as otherwise provided, the provisions of this Section shall take effect on the later of the effective date of the Administrator's action approving it as part of the state implementation plan or January 1, 2018.

B. Definitions. In addition to general definitions contained in R18-2-101, the following definitions apply to this rule.
1. "Capture system" means the collection of components used to capture gases and fumes released from one or more emission points, and to convey the captured gases and fumes to one or more control devices. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.
2. "Electric furnace" means a furnace in which copper matte and slag are heated by electrical resistance without the mechanical introduction of air or oxygen.
3. "IsaSmelt® furnace" means a furnace in which air, oxygen, and fuel are injected through a top-submerged lance into a molten slag bath to produce slag and copper matte.
4. "Miami Smelter" means the primary copper smelter located near Miami, Gila County, Arizona at latitude 33º24'50"N and longitude 110°51'25"W.
5. "Out of control period" means the time that begins with the completion of the fifth, consecutive, daily calibration drift check with a calibration drift in excess of two times the allowable limit, or the time corresponding to the completion of the daily calibration drift check preceding the daily calibration drift check that results in a calibration drift in excess of four times the allowable limit, and the time that ends with the completion of the calibration check following corrective action that results in the calibration drifts at both the zero (or low-level) and high-level measurement points being within the corresponding allowable calibration drift limit.
6. "Operating day" means any calendar day in which any of the following occurs:
   a. Concentrate is smelted in the Electric furnace or IsaSmelt® furnace;
   b. Copper or sulfur bearing materials are processed in the converters;
   c. Blister or scrap copper is processed in the anode furnaces or mold vessel;
   d. Molten metal, including slag, matte or blister copper, is transferred between vessels;
   e. Molten metal is cast into molds, anodes, or other intermediate or final products;
   f. Power is provided to the electric furnace to make or maintain a molten bath;
   g. The anode furnace is heated to make or maintain a molten bath.

C. Sulfur Dioxide Emission Limitations. Combined SO_2 emissions from the tail gas stack, vent fume stack, aisle scrubber stack, bypass stack, and smelter roofline fugitives shall not exceed 142.45 pounds per hour on a 30-day rolling average basis.

D. Operational Standards.
1. Process Equipment and control device operations. At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate smelter processes and associated emission control devices in a manner consistent with good air pollution control practices for minimizing SO_2 emissions from the process gases associated with the IsaSmelt® furnace, electric furnace, and converters at least to the levels required by subsection (C)(1). Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director and EPA Region IX, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and records, and inspection of the relevant equipment.

2. Capture system and control device operations and maintenance plan. The owner or operator shall develop and implement an operations and maintenance plan for each capture system and control device used to ventilate or control process gas or emissions associated with the IsaSmelt® furnace, electric furnace, and converters. The owner or operator shall submit the initial plan to the Department and EPA Region IX for review and approval by July 1, 2017.
   a. The operations and maintenance plan must address the following requirements as applicable to each capture system and control device:
      i. Monitoring devices. The plan shall provide for installation, operation, calibration, and maintenance of appropriate monitoring devices to measure and record operating limit or range values at all times the required system is operating. Dampers that are manually set and remain in the same position while the capture system is operating are exempt from these monitoring requirements.
      ii. Operational limits and ranges. The owner or operator shall establish operating limits and ranges in the plan for each capture system and control device that are representative and reliable indicators of capture system performance and control device operation. If selected as an operational limit or range, capture system damper position settings shall be specified in the plan.
      iii. Preventative maintenance. The owner or operator must perform preventative maintenance for each capture system and control device according to written procedures in the plan. The procedures must include a preventative maintenance schedule that is consistent with the manufacturer's or engineer's instructions and specified frequency for routine and long-term maintenance.
      iv. Inspections. The owner or operator must perform inspections in accordance with written procedures in the plan for each capture system and control device, including position verification of any manual damper settings specified in the plan, that are consistent with the manufacturer's or engineer's instructions for each system and device.
   b. The owner or operator shall operate and maintain each capture system and each control device in accordance with the plan required by subsection (D)(2) and as approved by the Department and EPA Region IX, except as provided herein. Until receiving initial approval of the plan, the owner or operator shall operate and maintain each capture system and each control device in accordance with the plan as initially submitted pursuant to subsection (D)(2). The owner or operator shall submit plan revisions for review by the Department and EPA Region IX. At any time, the Department and/or EPA Region IX may require the owner or operator to revise the plan if determined to be inconsistent with subsection (D)(2)(a). Within 60 days of receiving written notification from the Department or EPA Region IX specifying such inconsistency, the owner or operator shall submit a proposal to the Department and EPA Region IX that addresses the inconsistency. The owner or operator shall maintain a current copy of the plan onsite and available for review and inspection upon request.

E. Monitoring.

1. To determine compliance with subsection (C)(1), the owner or operator shall install, calibrate, maintain, and operate continuous monitoring systems to monitor and record SO_2 concentrations and stack gas volumetric flow rates at the following locations.
   a. The acid plant tail gas stack;
   b. The vent fume stack;
   c. The aisle scrubber stack; and
   d. The bypass stack.
2. To determine compliance with the emission limit in subsection (C)(1), the owner or operator shall install, calibrate, maintain, and operate a continuous monitoring system to monitor and record fugitive SO_2 concentrations at the Smelter roofline.
3. Except during periods of continuous monitoring system breakdown, repairs, maintenance, out-of-control periods, calibration checks, and zero and span adjustments, the owner or operator shall continuously monitor SO_2 concentrations and stack gas volumetric flow rates at each location specified in subsection (E)(1) and use the monitored concentrations and volumetric flow rates when demonstrating compliance with the SO_2 emission limit in subsection (C)(1) in accordance with subsection (F).
4. Except during periods of continuous monitoring system breakdown, repairs, maintenance, out-of-control periods, calibration checks and zero and span adjustments, the owner or operator shall continuously monitor fugitive SO_2 emissions at the Smelter roofline and use the monitored concentrations and volumetric flow rates when demonstrating compliance with the SO_2 emission limit in subsection (C)(1) in accordance with subsection (F).

5. For purposes of subsections (E)(3) and (E)(4), continuous monitoring means the taking and recording of at least one measurement of SO_2 concentration and stack gas flow rate reading from the effluent of each affected stack, outlet, or other approved measurement location in each 15-minute period when the associated process units are operating. Fifteen-minute periods start at the beginning of each clock hour, and run consecutively. All continuous monitoring systems required by subsection (E)(1) shall complete at least one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.
6. If the owner or operator can demonstrate to the Director and EPA Region IX that measurement of stack gas volumetric flow rate in the outlet of any particular piece of SO_2 control equipment would yield inaccurate results or would be technologically infeasible, then the Director and EPA Region IX may allow measurement of the flow rate at an alternative sampling point.
7. The owner or operator shall demonstrate that the continuous monitoring systems required by subsection (E)(1) meet all of the following requirements:
    a. Each SO_2 continuous monitoring system shall meet the specifications under 40 CFR 60, Appendix B, Performance Specification 6.
    b. Each SO_2 continuous monitoring system installed and operated under this Section shall also meet the quality assurance requirements of 40 CFR 60, Appendix F, Procedure 1.
    c. The owner or operator shall notify the Director in writing at least 30 days in advance of the start of the relative accuracy test audit (RATA) procedures performed on each continuous monitoring system.
    d. The Director shall approve the location of all sampling points for monitoring SO_2 concentrations and stack gas volumetric flow rates in writing before installation and operation of measurement instruments.
    e. The span of each continuous monitoring system for the acid plant tail stack, vent fume stack, and aisle scrubber stack shall be set at a SO_2 concentration of zero to 0.20 percent by volume.
    f. The span of the continuous monitoring system for the bypass stack shall be set at a SO_2 concentration of zero to 20 percent by volume.
    g. The zero (or low-level value between 0 and 20 percent of the span value) and span (50 to 100 percent of span value) calibration drifts shall be checked at least once each operating day in accordance with a written procedure. The zero and span must, at a minimum, be adjusted whenever either the 24-hour zero drift or the 24-hour span drift exceeds two times the limit in 40 CFR Part 60, Appendix B, Performance Specification 2. The system must allow the amount of the excess zero and span drift to be recorded and quantified.
    h. The owner or operator shall maintain on hand and ready for immediate installation sufficient spare parts or duplicate systems for the continuous monitoring system equipment required by this Section to allow for the replacement within six hours of any monitoring system equipment part that fails or malfunctions during operation.
8. The owner or operator shall develop and implement a roofline fugitive emissions monitoring plan for the continuous monitoring system required by subsection (E)(2). The owner or operator shall submit the initial plan to the Department and EPA Region IX for review and approval by July 1, 2017.
    a. The roofline fugitive emissions monitoring plan must address the following requirements:
        i. The continuous monitoring system required by subsection (E)(2) must include measurement of fugitive emissions from, at a minimum, the Converter, Electric Furnace, Anode Furnace, and IsaSmelt® systems that is representative of total fugitive emissions.
        ii. Each measurement system shall include at least one SO_2 analyzer and sufficient sampling locations that ensure collection of a representative sample along the roof monitor for each monitor system. The number of sample probes and their locations for each monitoring system shall account for the physical configuration of the vent, the locations of emitting activities relative to the vent, and heat generated by the equipment served by the vent.
        iii. Each measurement system shall include validation of adequate velocity for flow measurements and sufficient flow and temperature sensors to ensure calculation of representative exhaust flows through each vent. The number of such sensors and their locations for each monitoring system shall account for the physical configuration of the vent, the locations of emitting activities relative to the vent, and heat generated by the equipment served by the vent.
        iv. Each measurement system shall include an on-site data collection system that continuously logs and stores the measured SO_2 concentration, the measured flow velocity, and the measured temperature.
        v. An appropriate range for zero-span drift shall be established for all SO_2 analyzers to ensure proper calibration and operation. Unless otherwise provided in the roofline

fugitive emissions monitoring plan required by subsection (E)(8), the zero (or low-level) value determination shall be made using a gas containing between zero to 20 percent of the span value for SO_2 and the span (or high-level) value determination shall be made using a certified gas with a value between 50 and 100 percent of the span value for SO_2. For each SO_2 analyzer, a daily zero-span check shall be performed by introducing zero gas and a known concentration of span gas to the analyzer. If the zero or span drift for an analyzer is greater than five percent of the span gas concentration for five consecutive days or greater than 10 percent of the span gas concentration for one day, the analyzer shall be found to be operating improperly and appropriate measures shall be taken to return the analyzer to proper operation. The zero-span check shall be repeated after any such corrective action is taken.

vi. All SO_2 analyzers shall be inspected quarterly by the owner or operator and inspected annually by an independent auditor. The inspections shall be conducted in accordance with the data accuracy assessment requirements of 40 CFR 60, Appendix F, Procedure 1,Section 5 or as otherwise provided in the roofline fugitive emissions monitoring plan required by subsection (E)(8). The quarterly inspections consist of two certified concentrations of SO_2 to each sample probe system and comparing the known concentrations to the concentrations logged by the corresponding on-site data collection system to generate a relative error for each system.

vii. The flow and temperature data shall be checked daily for proper operation of flow and temperature sensors in accordance with the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a flow or temperature sensor is found to be operating improperly, appropriate measures shall be taken to return the sensor to proper operation.

viii. All temperature sensors shall be inspected annually. The inspection shall be conducted according to the manufacturer's specification. A temperature sensor tolerance range representative of proper sensor operation shall be established in the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a temperature sensor is found to measure outside of an established tolerance range, the sensor shall be found to be operating improperly and appropriate measures shall be taken to return the sensor to proper operation.

ix. All flow sensors shall be calibrated semi-annually with calibration tools according to the manufacturer's specifications. A calibration tool range representative of proper sensor operation shall be established in the roofline fugitive emissions monitoring plan required by subsection (E)(8). If a flow sensor is found to measure outside of an established range, the sensor shall be found to be operating improperly and appropriate measures shall be taken to return the sensor to proper operation.

b. The owner or operator shall operate and maintain the continuous monitoring system required by subsection (E)(2) in accordance with the roofline fugitive emissions monitoring plan required by subsection (E)(2) and as approved by the Department and EPA Region IX, except as provided herein. Until receiving initial approval of the plan, the owner or operator shall operate and maintain the continuous monitoring system required by subsection (E)(2) in accordance with the plan as initially submitted pursuant to subsection (E)(2). The owner or operator shall keep the plan current and consistent with subsection (E)(8)(a). The owner or operator shall maintain a current copy of the plan onsite and available for review and inspection upon request. The Department and/or EPA Region IX may require the owner or operator to revise the plan if determined to be inconsistent with subsection (E)(8)(a). Within 60 days of receiving written notification from the Department or EPA Region IX specifying such inconsistency, the owner or operator shall submit a proposal to the Department and EPA Region IX that addresses the inconsistency.

F. Compliance Demonstration Requirements.

1. Within 180 days of the effective date set forth in subsection (A)(2), the owner or operator shall demonstrate compliance with the emission limit in subsection (C)(1) by calculating SO_2 emissions for each operating day as follows:

a. Sum the hourly pounds of SO_2 measured by the continuous monitoring systems required by subsection (E)(1) and (E)(2) for the current operating day and the preceding 29 operating days to calculate the total pounds of SO_2 emissions over the 30-operating day averaging period.

b. Multiply the operating days occurring during a 30-day averaging period by 24 to calculate the total operating hours over the most recent 30-operating day period.

c. Divide the total amount of SO_2 emissions calculated from subsection (F)(1)(a) by the total operating hours calculated from subsection (F)(1)(b) to calculate the 30-day rolling hourly average SO_2 emissions.

2. For the continuous monitoring systems required by subsections (E)(1) and (E)(2), hourly emissions shall be computed as follows:
   a. Except as provided under subsection (F)(3)(c), for a full operating hour (any clock hour with 60 minutes of unit operation), at least four valid data points are required to calculate the hourly average, i.e., one data point in each of the 15-minute quadrants of the hour.
   b. Except as provided under subsection (F)(2)(c), for a partial operating hour (any clock hour with less than 60 minutes of unit operation), at least one valid data point in each 15-minute quadrant of the hour in which the unit operates is required to calculate the hourly average.
   c. For any operating hour in which required maintenance or quality-assurance activities are performed:
      i. If the unit operates in two or more quadrants of the hour, a minimum of two valid data points, separated by at least 15 minutes, is required to calculate the hourly average; or
      ii. If the unit operates in only one quadrant of the hour, at least one valid data point is required to calculate the hourly average.
   d. If a daily calibration error check is failed during any operating hour, all data for that hour shall be invalidated, unless a subsequent calibration error test is passed in the same hour and the requirements of subsection (F)(3)(c) are met, based solely on valid data recorded after the successful calibration.
   e. For each full or partial operating hour, all valid data points shall be used to calculate the hourly average.
   f. Data recorded during periods of continuous monitoring system breakdown, repair, maintenance, out of control periods, calibration checks, and zero and span adjustments shall not be included in the data averages computed under subsection (F)(3).
   g. Either arithmetic or integrated averaging of all data may be used to calculate the hourly average. The data may be recorded in reduced or non-reduced form.
3. When no valid hour or hours of data have been recorded by a continuous monitoring system required by subsections (E)(1) and (E)(2) and the associated process unit is operating, the owner or operator shall calculate substitute data for each such period according to the following procedures:
   a. For a missing data period less than or equal to 24 hours, substitute the average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.
   b. For a missing data period greater than 24 hours, substitute the greater of:
      i. The 90th percentile hourly SO_2 concentrations recorded by the system during the previous 720 quality-assured monitor operating hours; or
      ii. The average of the hourly SO_2 concentrations recorded by the system for the hour before and the hour after the missing data period.
4. The owner or operator shall include periods of startup, shutdown, malfunction, or other upset conditions when determining compliance with the emission limit in subsection (C)(1).

G. Recordkeeping.
1. The owner or operator shall maintain records as specified in the capture system and control device operations and maintenance plan required under subsection (D)(2) and the roofline fugitive emissions monitoring plan required under subsection (E)(8).
2. The owner or operator shall maintain the following records for at least five years:
   a. All measurements from the continuous monitoring systems required by subsection (E)(1) and (E)(2); including the date, place, and time of sampling or measurement, parameters sampled or measured, and results.
   b. All records of all compliance calculations required by subsection (F).
   c. All records of quality assurance and quality control activities conducted on the continuous monitoring systems required by subsection (E)(1) and (E)(2).
   d. All records of continuous monitoring system breakdowns, repairs, maintenance, out of control periods, calibration checks, and zero and span adjustments for the continuous monitoring systems required by subsection (E)(1) and (E)(2).
   e. All records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of Smelter processes; any malfunction of the associated air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device required by subsection (E)(1) and (E)(2) is inoperative.

f. All records of all major maintenance activities conducted on emission units, capture system, air pollution control equipment, and continuous monitoring systems; including those set forth in the operations and maintenance plan required by subsection (D)(2).

g. All records of reports and notifications required by subsection (H).

H. Reporting

1. Within 30 days after the end of each calendar quarter, the owner or operator shall submit a data assessment report to the Director in accordance with 40 C.F.R. Part 60, Appendix F, Procedure 1 for the continuous monitoring systems required by subsection (E).
2. The owner or operator shall submit an excess emissions and monitoring systems performance report and-or summary report form in accordance with 40 C.F.R. § 60.7(c) to the Director semiannually for the continuous monitoring systems required by subsection (E)(1) and (E)(2). All reports shall be postmarked by the 30th day following the end of each six-month period.
3. The owner or operator shall provide the following to the Director:
   a. Notification of commencement of construction of the project improvements and equipment authorized by Significant Permit Revision No. 53592 to comply with the operational or emission limits in this Section no later than 30 days after such date.
   b. Semiannual progress reports on construction of any such improvements and equipment on January 1 and July 1 of each calendar year until construction is complete.
   c. Notification of initial startup of any such improvements and equipment within 15 days after such date.

I. Preconstruction review. This Section is determined to be RACT for SO_2 emissions from the operations subject to subsection (C) for purposes of minor source NSR requirements addressed in R18-2-334.

ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

R18-2-715. Standards of Performance for Existing Primary Copper Smelters; Site-specific Requirements

A. No change
1. No change
2. No change

B. No change
C. No change
D. No change
E. No change
1. No change
2. No change
3. No change
4. No change

F. No change
1. No change
   a. No change
   b. No change
2. No change
   a. No change
   b. No change

G. No change
H. No change
I. Owners and operators of primary copper smelters shall comply with this Section until the new compliance dates established in R18-2-B1302 and R18-2-C1302.

R18-2-715.01. Standards of Performance for Existing Primary Copper Smelters; Compliance and Monitoring

A. No change
B. No change
C. No change
1. No change
   a. No change
   b. No change
2. No change

D. No change

1. The compliance date for the cumulative occurrence and emissions limits in R18-2-715(F)(1) and R18-2-715(G)~~(1)~~ is January 15, 2002, and
2 The compliance date for the cumulative occurrence and emissions limits in R18-2-715(F)(2), (F)(3), (G)~~(2)~~, and (H) is the effective date of this rule.

E. No change
1. No change
2. No change

F. No change
G. No change
H. No change
I. No change
J. No change
K. No change
1. No change
2. No change
3. No change
4. No change
5. No change
   a. No change
   b. No change
   c. No change
   d. No change
   e. No change

L. No change
M. No change
N. No change
O. No change
P. No change
1. No change
2. No change
3. The number of three-hour emissions averages that exceeded each of the applicable emissions levels listed in R18-2-715(F) and (G)~~(1)(b)~~ for the compliance periods ending on each day of the month being reported;
4. The date on which a cumulative occurrence limit listed in R18-2-715(F) or (G)~~(1)(b)~~ was exceeded if the exceedance occurred during the month being reported; and
5. No change

Q. No change
R. The owner or operator shall determine compliance with the cumulative occurrence and fugitive emission limits contained in R18-2-715(G)~~(1)~~ as follows:
1. The owner or operator shall calculate annual average emissions at the end of each day by averaging the emissions for all hours measured during the compliance period, as defined in subsection (R)(8), ending on that day. An annual emissions average in excess of the allowable annual average emission limit is a violation of R18-2-715(G)~~(1)(a)~~ if either:
   a. No change
   b. No change
2. No change
3. For purposes of subsection (R)(2), a three-hour emissions average in excess of an emission level E_f violates the associated cumulative occurrence limit n listed in R18-2-715(G)~~(1)(b)~~ if:
   a. No change
   b. No change
4. No change
5. Multiple violations of the same cumulative occurrence limit on the same day and violations of different cumulative occurrence limits on the same day constitute a single violation of R18-2-715(G)~~(1)(b)~~.
6. The violation of any cumulative occurrence limit and an annual average emission limit on the same day constitutes only a single violation of the requirements of R18-2-715(G)~~(1)~~.
7. Multiple violations of a cumulative occurrence limit by different three-hour emissions averages containing any common hour constitutes a single violation of R18-2-715(G)~~(1)(b)~~.
8. No change

S. To determine compliance with R18-2-715(G)~~(1)~~, the owner or operator of the smelter subject to R18-2-715(G)~~(1)~~ shall install, calibrate, maintain, and operate a measurement system for continuously monitoring sulfur dioxide concentrations of the converter roof fugitive emissions.
1. No change
2. No change

T. The emission limit in R18-2-715(G)~~(2)~~ applies to the total of uncaptured fugitive sulfur dioxide emissions from the smelter processing units and sulfur dioxide control and removal equipment, but not emissions due solely to the use of fuel for space heating or steam generation. The owner or operator shall determine compliance with the emission limit contained in R18-2-715(G)~~(2)~~ as follows:
1. No change
2. An annual emissions average in excess of the allowable annual average emission limit violates R18-2-715(G)~~(2)~~ if the fugitive annual average computed at the end of each month exceeds the allowable annual average emission limit.

U. No change
1. No change
2. No change
3. No change

V. Owners and operators of primary copper smelters shall comply with this Section until the new compliance dates established in R18-2-B1302 and R18-2-C1302.

A14. APPENDIX 14.

PROCEDURES FOR SULFUR DIOXIDE AND LEAD FUGITIVE EMISSIONS STUDIES FOR THE HAYDEN PRIMARY COPPER SMELTER

A14.1. Applicability

This appendix applies to the owner or operator of the primary copper smelter located in Hayden, Arizona at latitude 33º0'15"N and longitude 110º46'31"W.

A14.2. Study Objectives

The owner or operator shall conduct fugitive emissions studies to derive a measurement or accurate estimate of total fugitive sulfur dioxide and lead emissions from the Hayden primary copper smelter during operations, including planned and unplanned start-up and shutdown periods and malfunctions, for the processes identified in A14.3 below. The studies shall include uncaptured fugitive sulfur dioxide emissions from the smelter processing units, but not emissions due solely to the use of fuel for space heating or steam generation, burners at anode casting, or slag pouring at the slag dump. The studies shall evaluate the extent to which correlations may exist between fugitive sulfur dioxide, lead, and particulate matter ($PM/PM_{10}/PM_{2.5}$) emissions, and shall develop such correlations as feasible.

The studies shall also be used to help validate that the operating conditions or ranges specified in the capture and control device maintenance and operations plans required in R18-2-B1301(D)(2) and R18-2-B1302(D)(2) are consistent with operating conditions demonstrating attainment of the 2008 Lead National Ambient Air Quality Standards (NAAQS) in the Hayden 2008 Lead NAAQS Nonattainment Area State Implementation Plan (SIP) and the 2010 Sulfur Dioxide NAAQS in the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP.

A14.3. Processes Evaluated

From the fugitive emissions studies, the owner or operator shall develop an emission factor or accurate estimate of fugitive emissions for sulfur dioxide and lead during operations, including planned and unplanned start-up and shutdown periods and malfunctions, produced by each of the following smelting processes:

i. Flash furnace building, including flash furnace and dryer operations
ii. Converter aisle, including converter and related operations
iii. Anode furnace aisle, including oxidizing, poling and related operations

A14.4. Averaging Periods

The emission estimate shall include the average pounds per hour emission factor for the fugitive lead and sulfur dioxide emissions from each step in the smelting process identified in A14.3. The estimate shall include all time periods, including planned and unplanned start-up and shutdown periods and malfunctions.

A14.5. Methods and Study Protocols

The owner or operator shall submit to the Department and EPA Region IX for review and approval study protocols at least six months prior to conducting fugitive emission studies. Study protocols must be approved by the Department and EPA

Region IX prior to commencement of fugitive emissions studies. Study protocols shall specify the method(s) used to meet the study objectives as described in A14.2, including during all recurring operating scenarios from all processes identified in A14.3.

Each fugitive emissions measurement system shall include validation of adequate velocity for flow measurements (i.e., the expected exhaust velocity is within the measurement range of the instrument), and have a sufficient number of flow and temperature sensors to ensure calculation of representative exhaust flows through each roof monitor vent. The number of such sensors and their locations for each monitoring system shall account for the physical configuration of the roof monitor vent, the locations of emitting activities relative to the roof monitor vent, and heat generated by the equipment served by the roof monitor vent.

The fugitive emissions studies shall include operation and process information to help understand the emission impacts of startup, shutdown, malfunctions, and significant changes in process operations. This shall include, for example, dates, times and duration of these events, cause of malfunctions, and descriptions of process changes.

After the completion of each fugitive emissions study, the owner or operator shall modify study methods based on data and lessons learned from previous studies, and submit such modified methods in the proceeding study protocols prior to conducting future emissions studies.

A14.6. Study Duration, Frequency, and Submission Schedule

The first fugitive emissions study must commence not later than six months after the completion of the Converter Retrofit Project authorized by Significant Permit Revision No. 60647. The second study commencement date shall occur within the same calendar quarter, but five years later from the date of commencement of the first study. The owner or operator shall submit the results of each fugitive emissions study in a report to the Department and EPA Region IX for review and approval not later than six months after completing a study. The data collection portion of the first and second fugitive emissions studies shall be conducted for a period of 12 months to assess the content and quantity of fugitive sulfur dioxide and lead emissions.

A14.7. Study Reports and Subsequent Studies

At minimum, fugitive emission study reports submitted pursuant to A14.6 must include:

i. Resultant emission factors used to determine fugitive emissions of sulfur dioxide and lead.
ii. Resultant average fugitive lead emissions for each process identified in A14.3.
iii. Resultant peak one-hour fugitive sulfur dioxide emissions for each process identified in A14.3.
iv. Seasonal differences, if any.
v. Comparisons of results from past studies, if any.
vi. Descriptions and identification of volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) that are associated with fugitive emissions.
vii. An analysis of whether the results from a study demonstrate that the volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and the operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) continuously ensure that actual fugitive sulfur dioxide and lead emissions are consistent with the modeled emission rates used in the attainment demonstrations in the Hayden 2008 Lead NAAQS Nonattainment Area SIP and the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP. The analysis must also identify subsequent fugitive emissions studies, if any, needed to remedy inaccurate operational limits and volumetric flow monitoring provisions and to ensure attainment of the 2008 Lead NAAQS and 2010 Sulfur Dioxide NAAQS. The scope, duration, and frequency of any subsequent fugitive emissions studies must also be identified. This provision and the report's conclusion neither require nor prohibit future fugitive emission studies.
viii. An analysis of whether supplemental modeling is needed to demonstrate that resultant fugitive emissions from a study provide attainment of the 2008 Lead NAAQS and 2010 Sulfur Dioxide NAAQS.
ix. A summary of methods as followed per approved study protocols.

A14.8. Revisions to Operations and Maintenance Plan

If an analysis conducted in accordance with A14.7(vi) demonstrates that fugitive emissions associated with volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) may exceed the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, and result in an increased likelihood of a NAAQS exceedance based on modeling required under A14.9, then the owner or operator shall submit to the Department for approval, not later than six months after completing a study,

recommended changes to operational limits and volumetric flow monitoring provisions as an operations and maintenance plan revision pursuant to R18-2-B1301(D)(2)(e) and R18-2-B1302(D)(2)(e) that would achieve necessary fugitive emissions levels to demonstrate attainment of the NAAQS at the same level of assurance as in the attainment demonstrations. Until receiving approval of the plan revision, the owner or operator shall operate and maintain the volumetric flow monitoring provisions and the operational limits in accordance with the plan as initially submitted pursuant to R18-2-B1301(D)(2)(e) and R18-2-B1302(D)(2)(e). Additionally, the owner and operator shall submit new attainment demonstrations pursuant to A14.9, making appropriate demonstrations of attainment at adjusted fugitive emissions levels.

Similarly, if an analysis conducted in accordance with A14.7(vi) demonstrates that fugitive emissions associated with the volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) may exceed the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, and result in an increased likelihood of a NAAQS exceedance based on modeling required under A14.9, then the Department shall submit appropriate changes to the operational limits and volumetric flow monitoring provisions, and any revised attainment demonstration pursuant to A14.9, if applicable, to EPA Region IX as a SIP revision not later than 12 months after completion of a fugitive emissions study.

A14.9. Supplemental Modeling

If an analysis conducted in accordance with A14.7(vii) demonstrates that fugitive emissions associated with volumetric flow monitoring provisions in R18-2-B1301(D)(2)(a) and R18-2-B1302(D)(2)(a) and operational limits in R18-2-B1301(D)(2)(b) and R18-2-B1302(D)(2)(b) are greater than the modeled emission rates used in the Hayden 2008 Lead NAAQS Nonattainment Area SIP attainment demonstration and/or the Hayden 2010 Sulfur Dioxide NAAQS Nonattainment Area SIP attainment demonstration, the owner or operator shall remodel to demonstrate whether the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS will be attained as such higher rates. The owner or operator shall submit such modeling to the Department and EPA Region IX for review and approval not later than six months after completing a fugitive emissions study.

If the revised modeling demonstrates that the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS will be attained, the Department shall submit such modeling demonstration and revised fugitive emissions assumptions as a SIP revision to EPA Region IX not later than 12 months after completion of a fugitive emissions study. Alternatively, the owner or operator shall propose additional emission control requirements to revise the SIP, or any combination of revised control measures and modeled attainment, to demonstrate attainment of the 2010 Sulfur Dioxide NAAQS and/or 2008 Lead NAAQS.

A15. APPENDIX 15.

TEST METHODS FOR DETERMINING OPACITY AND STABILIZATION OF UNPAVED ROADS

A15.1. Applicability

This appendix applies to unpaved roads at the primary copper smelter located in Hayden, Arizona at latitude 33º0’15”N and longitude 110º46’31”W.

A15.2. Opacity Test Method

The purpose of this test method is to estimate the percent opacity of fugitive dust plumes caused by vehicle movement on unpaved roads. This method can only be conducted by an individual who has received certification as a qualified observer. Qualification and testing requirements can be found in Section A15.4 of this appendix.

A15.2.1. Step 1

Stand at least 16.5 feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140º sector to the back. Following the above requirements, make opacity observations so that the line of vision is approximately perpendicular to the dust plume and wind direction. If multiple plumes are involved, do not include more than one plume in the line of sight at one time.

A15.2.2. Step 2

Record the fugitive dust source location, source type, method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position to the fugitive dust source, and color of the plume and type of background on the visible emission observation from both when opacity readings are initiated and completed.

A15.2.3. Step 3
Make opacity observations, to the extent possible, using a contrasting background that is perpendicular to the line of vision. Make opacity observations approximately 1 meter above the surface from which the plume is generated. Note that the observation is to be made at only one visual point upon generation of a plume, as opposed to visually tracking the entire length of a dust plume as it is created along a surface. Make two observations per vehicle, beginning with the first reading at zero seconds and the second reading at five seconds. The zero-second observation should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume but, instead, observe the plume briefly at zero seconds and then again at five seconds.

A15.2.4. Step 4
Record the opacity observations to the nearest 5 percent on an observational record sheet. Each momentary observation recorded represents the average opacity of emissions for a 5-second period. While it is not required by the test method, EPA recommends that the observer estimate the size of vehicles which generate dust plumes for which readings are taken (e.g. midsize passenger car or heavy-duty truck) and the approximate speeds the vehicles are traveling when readings are taken.

A15.2.5. Step 5
Repeat Step 3 (Section A15.2.3 of this appendix) and Step 4 (Section A15.2.4 of this appendix) until you have recorded a total of 12 consecutive opacity readings. This will occur once six vehicles have driven on the source in your line of observation for which you are able to take proper readings. The 12 consecutive readings must be taken within the same period of observation but must not exceed 1 hour. Observations immediately preceding and following interrupted observations can be considered consecutive.

A15.2.6. Step 6
Average the 12 opacity readings together. If the average opacity reading equals 20 percent or lower, the source is in compliance.

A15.3. Silt Content Test Method
The purpose of this test method is to estimate the silt content of the trafficked parts of unpaved roads. The higher the silt content, the more fine dust particles that are released when cars and trucks drive on unpaved roads.

A15.3.1. Equipment
A15.3.1.1. A set of sieves with the following openings: 4 millimeters (mm), 2 mm, 1 mm, 0.5 mm and 0.25 mm (or a set of standard/commonly available sieves), a lid, and collector pan.

A15.3.1.2. A small whisk broom or paintbrush with stiff bristles and dustpan 1 ft. in width. (The broom/brush should preferably have one, thin row of bristles no longer than 1.5 inches in length).

A15.3.1.3. A spatula without holes.

A15.3.1.4. A small scale with half-ounce increments (e.g., postal/package scale).

A15.3.1.5. A shallow, lightweight container (e.g., plastic storage container).

A15.3.1.6. A sturdy cardboard box or other rigid object with a level surface.

A15.3.1.7. A basic calculator.

A15.3.1.8. Cloth gloves (optional for handling metal sieves on hot, sunny days).

A15.3.1.9. Sealable plastic bags (if sending samples to a laboratory).

A15.3.1.10. A pencil/pen and paper.

A15.3.2. Step 1
Look for a routinely traveled surface, as evidenced by tire tracks. (Only collect samples from surfaces that are not damp due to precipitation or dew. This statement is not meant to be a standard in itself for dampness where watering is being used as a control measure. It is only intended to ensure that surface testing is done in a representative manner.) Use caution when taking samples to ensure personal safety with respect to passing vehicles. Gently press the edge of a dustpan (1 foot in width) into the surface four times to mark an area that is 1 square foot. Collect a sample of loose surface material using a

whiskbroom or brush and slowly sweep the material into the dustpan, minimizing escape of dust particles. Use a spatula to lift heavier elements such as gravel. Only collect dirt/gravel to an approximate depth of 3/8 inch or 1 cm in the 1 square foot area. If you reach a hard, underlying subsurface that is < 3/8 inch in depth, do not continue collecting the sample by digging into the hard surface. In other words, you are only collecting a surface sample of loose material down to 1 cm. In order to confirm that samples are collected to 1 cm in depth, a wooden dowel or other similar narrow object at least one foot in length can be laid horizontally across the survey area while a metric ruler is held perpendicular to the dowel.

At this point, you can choose to place the sample collected into a plastic bag or container and take it to an independent laboratory for silt content analysis. A reference to the procedure the laboratory is required to follow is at the end of this section.

A15.3.3. Step 2
Place a scale on a level surface. Place a lightweight container on the scale. Zero the scale with the weight of the empty container on it. Transfer the entire sample collected in the dustpan to the container, minimizing escape of dust particles. Weigh the sample and record its weight.

A15.3.4. Step 3
Stack a set of sieves in order according to the size openings specified above, beginning with the largest size opening (4 mm) at the top. Place a collector pan underneath the bottom (0.25 mm) sieve.

A15.3.5. Step 4
Carefully pour the sample into the sieve stack, minimizing escape of dust particles by slowly brushing material into the stack with a whiskbroom or brush. (On windy days, use the trunk or door of a car as a wind barricade.) Cover the stack with a lid. Lift up the sieve stack and shake it vigorously up, down and sideways for at least 1 minute.

A15.3.6. Step 5
Remove the lid from the stack and disassemble each sieve separately, beginning with the top sieve. As you remove each sieve, examine it to make sure that all of the material has been sifted to the finest sieve through which it can pass (e.g., material in each sieve [besides the top sieve that captures a range of larger elements] should look the same size). If this is not the case, re-stack the sieves and collector pan, cover the stack with the lid, and shake it again for at least 1 minute. (You only need to reassemble the sieve(s) that contain material, which requires further sifting.)

A15.3.7. Step 6
After disassembling the sieves and collector pan, slowly sweep the material from the collector pan into the empty container originally used to collect and weigh the entire sample. Take care to minimize escape of dust particles. You do not need to do anything with material captured in the sieves; only the collector pan. Weigh the container with the material from the collector pan and record its weight.

A15.3.8. Step 7
If the source is an unpaved road, multiply the resulting weight by 0.38. The resulting number is the estimated silt loading. Then, divide by the total weight of the sample you recorded earlier in Step 2 (Section A15.3.3 of this appendix) and multiply by 100 to estimate the percent silt content.

A15.3.9. Step 8
Select another two routinely traveled portions of the unpaved road and repeat this test method. Once you have calculated the silt loading and percent silt content of the 3 samples collected, average your results together.

A15.3.10. Step 9
Examine results. If the average silt loading is less than 0.33 oz/ft^2, the surface is STABLE. If the average silt loading is greater than or equal to 0.33 oz/ft^2, then proceed to examine the average percent silt content. If the source is an unpaved road and the average percent silt content is 6 percent or less, the surface is STABLE. If your field test results are within 2 percent of the standard (for example, 4–8 percent silt content on an unpaved road), it is recommended that you collect 3 additional samples from the source according to Step 1 (Section A15.3.2 of this appendix) and take them to an independent laboratory for silt content analysis.

A15.3.11. Independent Laboratory Analysis
You may choose to collect 3 samples from the source, according to Step 1 (Section A15.3.2 of this appendix), and send them to an independent laboratory for silt content analysis rather than conduct the sieve field procedure. If so, the test method the laboratory is required to use is: U.S. Environmental Protection Agency (1995), "Procedures for Laboratory Analysis of

Surface/Bulk Dust Loading Samples", (AP-42 Fifth Edition, Volume I, Appendix C.2.3 "Silt Analysis"), Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

A15.4. Qualification and Testing

A15.4.1. Certification Requirements

To receive certification as a qualified observer, a candidate must be tested and demonstrate the ability to assign opacity readings in 5 percent increments to 25 different black plumes and 25 different white plumes, with an error not to exceed 15 percent opacity on any one reading and an average error not to exceed 7.5 percent opacity in each category. Candidates shall be tested according to the procedures described in Section A15.4.2 of this appendix. Any smoke generator used pursuant to Section A15.4.2 of this appendix shall be equipped with a smoke meter which meets the requirements of Section A15.4.3 of this appendix. Certification tests that do not meet the requirements of Sections A15.4.2 and A15.4.3 of this appendix are not valid. The certification shall be valid for a period of 6 months, and after each 6-month period the qualification procedures must be repeated by an observer in order to retain certification.

A15.4.2. Certification Procedure

The certification test consists of showing the candidate a complete run of 50 plumes, 25 black plumes and 25 white plumes, generated by a smoke generator. Plumes shall be presented in random order within each set of 25 black and 25 white plumes. The candidate assigns an opacity value to each plume and records the observation on a suitable form. At the completion of each run of 50 readings, the score of the candidate is determined. If a candidate fails to qualify, the complete run of 50 readings must be repeated in any retest. The smoke test may be administered as part of a smoke school or training program, and may be preceded by training or familiarization runs of the smoke generator, during which candidates are shown black and white plumes of known opacity.

A15.4.3. Smoke Generator Specifications

Any smoke generator used for the purpose of Section A15.4.2 of this appendix shall be equipped with a smoke meter installed to measure opacity across the diameter of the smoke generator stack. The smoke meter output shall display in-stack opacity, based upon a path length equal to the stack exit diameter on a full 0 percent to 100 percent chart recorder scale. The smoke meter optical design and performance shall meet the specifications shown in Table 1 of this appendix. The smoke meter shall be calibrated as prescribed in Section A15.4.3.1 of this appendix prior to conducting each smoke reading test. At the completion of each test, the zero and span drift shall be checked, and if the drift exceeds plus or minus 1 percent opacity, the condition shall be corrected prior to conducting any subsequent test runs. The smoke meter shall be demonstrated, at the time of installation, to meet the specifications listed in Table 1 of this appendix. This demonstration shall be repeated following any subsequent repair or replacement of the photocell or associated electronic circuitry, including the chart recorder or output meter, or every 6 months, whichever occurs first.

A15.4.3.1. Calibration

The smoke meter is calibrated after allowing a minimum of 30 minutes warm-up by alternately producing simulated opacity of 0 percent and 100 percent. When stable response at 0 percent or 100 percent is noted, the smoke meter is adjusted to produce an output of 0 percent or 100 percent, as appropriate. This calibration shall be repeated until stable 0 percent and 100 percent readings are produced without adjustment. Simulated 0 percent and 100 percent opacity values may be produced by alternately switching the power to the light source on and off while the smoke generator is not producing smoke.

A15.4.3.2. Smoke Meter Evaluation

The smoke meter design and performance are to be evaluated as follows:

A15.4.3.2.1. Light Source

Verify, from manufacturer's data and from voltage measurements made at the lamp, as installed, that the lamp is operated within plus or minus 5 percent of the nominal rated voltage.

A15.4.3.2.2. Spectral Response of Photocell

Verify from manufacturer's data that the photocell has a photopic response (i.e., the spectral sensitivity of the cell shall closely approximate the standard spectral-luminosity curve for photopic vision which is referenced in (b) of Table 1 of this appendix).

A15.4.3.2.3. Angle of View

Check construction geometry to ensure that the total angle of view of the smoke plume, as seen by the photocell, does not exceed 15°. Calculate the total angle of view (φ_v) as follows:

Total Angle of View = $2 \tan^{-1} (d/2L)$

where:
d = The photocell diameter + the diameter of the limiting aperture; and
L = The distance from the photocell to the limiting aperture. The limiting aperture is the point in the path between the photocell and the smoke plume where the angle of view is most restricted. In smoke generator smoke meters, this is normally an orifice plate.

A15.4.3.2.4. Angle of Projection
Check construction geometry to ensure that the total angle of projection of the lamp on the smoke plume does not exceed 15º. Calculate the total angle of projection (φ_p) as follows:

Total Angle of Projection = $2 \tan^{-1} (d/2L)$

where:
d = The sum of the length of the lamp filament + the diameter of the limiting aperture; and
L = The distance from the lamp to the limiting aperture.

A15.4.3.2.5. Calibration Error
Using neutral-density filters of known opacity, check the error between the actual response and the theoretical linear response of the smoke meter. This check is accomplished by first calibrating the smoke meter, according to Section A15.4.3.1 of this appendix, and then inserting a series of three neutral-density filters of nominal opacity of 20 percent, 50 percent, and 75 percent in the smoke meter path length. Use filters calibrated within plus or minus 2 percent. Care should be taken when inserting the filters to prevent stray light from affecting the meter. Make a total of five nonconsecutive readings for each filter. The maximum opacity error on any one reading shall be plus or minus 3 percent.

A15.4.3.2.6. Zero and Span Drift
Determine the zero and span drift by calibrating and operating the smoke generator in a normal manner over a 1-hour period. The drift is measured by checking the zero and span at the end of this period.

A15.4.3.2.7. Response Time
Determine the response time by producing the series of five simulated 0 percent and 100 percent opacity values and observing the time required to reach stable response. Opacity values of 0 percent and 100 percent may be simulated by alternately switching the power to the light source off and on while the smoke generator is not operating.

Table 1: Smoke Meter Design and Performance Specifications

Parameter	**Specification**
a. Light source	Incandescent lamp operated at nominal rated voltage
b. Spectral response of photocell	Photopic (daylight spectral response of the human eye)
c. Angle of view	15º maximum total angle
d. Angle of projection	15º maximum total angle
e. Calibration error	Plus or minus 3 percent opacity; maximum
f. Zero and span drift	Plus or minus 1 percent opacity, 30 minutes
g. Response time	Less than or equal to 5 seconds

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ADEQ
Arizona Department
of Environmental Quality

Appendix D: 2008 Pb NAAQS Hayden Nonattainment Area Inventory Preparation Plan

Air Quality Division

March 2, 2017 Final

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Glossary of Terms

ADEQ	Arizona Department of Environmental Quality
ADOA	Arizona Department of Administration
ADOT	Arizona Department of Transportation
AERMOD	AMS/EPA Regulatory Model
AQS	Air Quality System
CEMS	Continuous Emission Monitoring System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DQI	Data Quality Objectives
DQO	Data Quality Objective
EI	Emission Inventory
EPA	US Environmental Protection Agency
IPP	Inventory Preparation Plan
LLC	Limited Liability Corporation
m/s	meters per second
MOVES	Motor Vehicle Emission Simulator
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standard
NEI	National Emission Inventory
NWS	National Weather Service
Pb	Lead
$PM_{2.5}$	Particulate Matter Under 2.5 Microns
Ppb	parts per billion
PTE	Potential to Emit
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
RAM	Responsibility Assignment Matrix
RFP	Reasonable Further Progress
ROP	Rate of Progress
SCC	Source Classification Code
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring System
SOP	Standard Operating Procedure
TAU	Technical Analysis Unit
Tpy	Tons per year
TSD	Technical Support Document

1 Introduction

On August 20, 2014, The United States Environmental Protection Agency (US EPA or EPA) took final action to redesignate the Hayden Planning area from unclassifiable to nonattainment for the 2008 Lead (Pb) National Ambient Air Quality Standard (NAAQS). The final rule was published in the Federal Register on September 3, 2014 and went into effect on October 3, 2014[1].

1.1 Inventory Scope

The Hayden Pb Nonattainment Area (NAA) encompasses the portions of Gila and Pinal county bound by the townships and ranges outlined in Table 1-1. In light of this designation, ADEQ must prepare a SIP revision to show attainment with the standard within five years of the effective date of designation. This requirement necessitates attainment of the standard with enforceable control measures by April 3, 2019[2].

Table 1-1: Portions of Arizona Counties Designated Nonattainment for the 2008 Primary Lead NAAQS

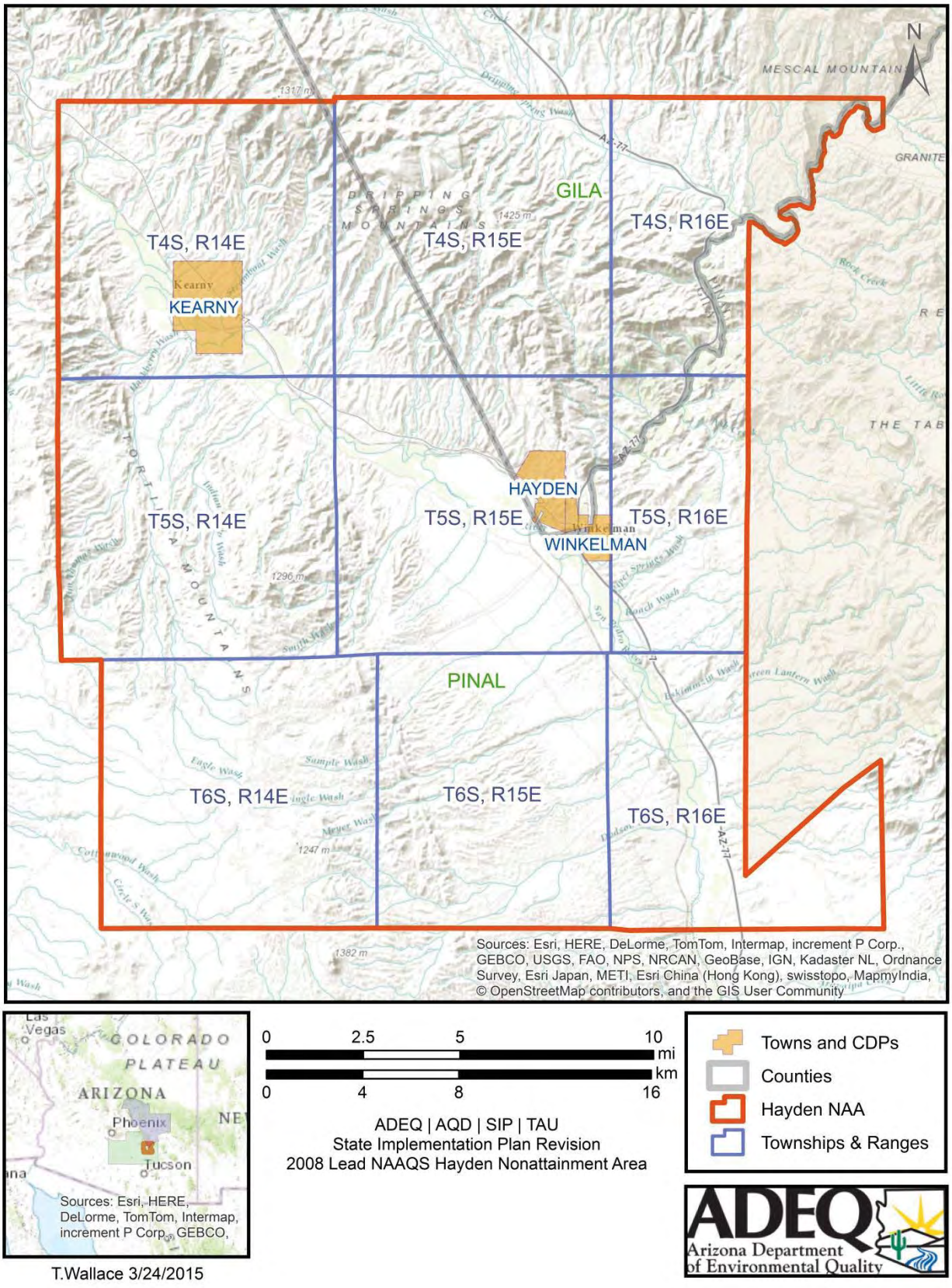
County	Portions of County Designated Nonattainment for the 2008 Primary Lead NAAQS
Gila County	The portions of Gila County that are bounded by T4S, R14E; T4S, R15E; T4S, R16E; T5S, R15E; T5S, R16E
Pinal County	The portions of Pinal County that are bounded by: T4S, R14E; T4S, R15E; T4S, R16E (except those portions in the San Carlos Indian Reservation);T5S, R14E; T5S, R15E; T5S, R16E (except those portions in the San Carlos Indian Reservation); T6S, R14E; T6S, R15E; T6S, R16E (except those portions in the San Carlos Indian Reservation).

Figure 1-1 is a detailed map of the portions of Gila and Pinal Counties that are bounded by the townships and ranges listed in Table 1-1. The Map in figure 1-1 also includes the towns and Census Designated Places (CDP) within the Hayden Pb NAA.

[1] 40 CFR Part 81; FR#: 2014-20920; Docket ID: EPA-R09-OAR-2014-0266

[2] EPA Pb Guidance states that states must model attainment within the outside statutory deadline for the attainment date.

Figure 1-1: Map of the Hayden Lead (Pb) Nonatainment Area Boundaries



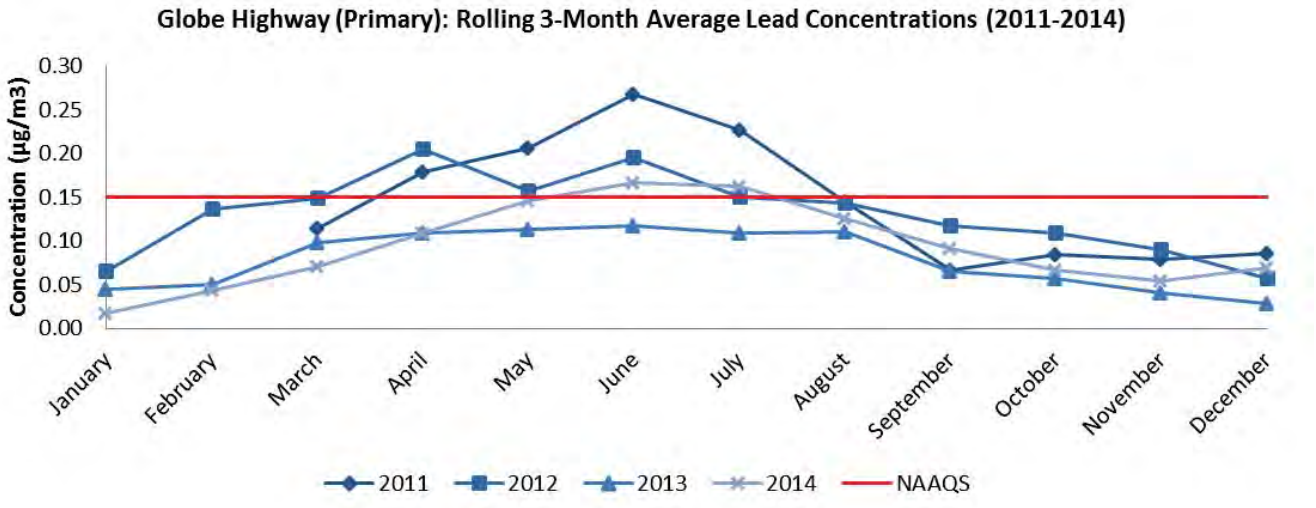
1.1.1 Base Year Determination

ADEQ proposes a base year of 2012 for the preparation of a Pb inventory, contingency measure calculations and as the basis for the attainment demonstration. The year 2012 is the data year the designation is based on, and is consistent with the recommendation by EPA in the *2008 Lead NAAQS Implementation Questions and Answers*. EPA Region 9 recommended ADEQ examine 2012, 2013, and 2014 as possible base years for the following reasons:

- Hayden was designated nonattainment in 2014, and EPA would generally expects us to use 2014 as a base year unless another year is more appropriate
- Asarco ambient monitors, operated under an Administrative Order of Consent between ADEQ, Asarco and EPA, indicated there may have been violations of the 2008 Lead NAAQS in 2013, but AQS certified Globe Highway Monitors did not indicate such a violation
- EPA would like a comparison of the lead emissions of each year at the Asarco LLC Hayden Smelter rather than rely solely on the ambient monitored values[3]

The selection of 2012 as the base year supports the requirement for timeliness of data and is illustrative of a year with exceedances and violations of the primary standard. ADEQ operates two collocated State and Local Air Monitoring Station (SLAMS) for Pb ambient monitoring at the Globe Highway site in Winkelman, Arizona. The Globe Highway Primary Monitor recorded four violations of the 2008 Pb Primary NAAQS in 2011, Three such violations in 2012, no violations in 2013, and two violations in 2014. Figure 1-2 is a chart of 3-month rolling averages monitored at the Primary Globe Highway SLAMS during from 2011, when data collection began, through the end of 2014.

Figure 1-2: Comparison of 3-month Rolling Average Lead Concentrations at GLobe Highway Primary Pb Monitor

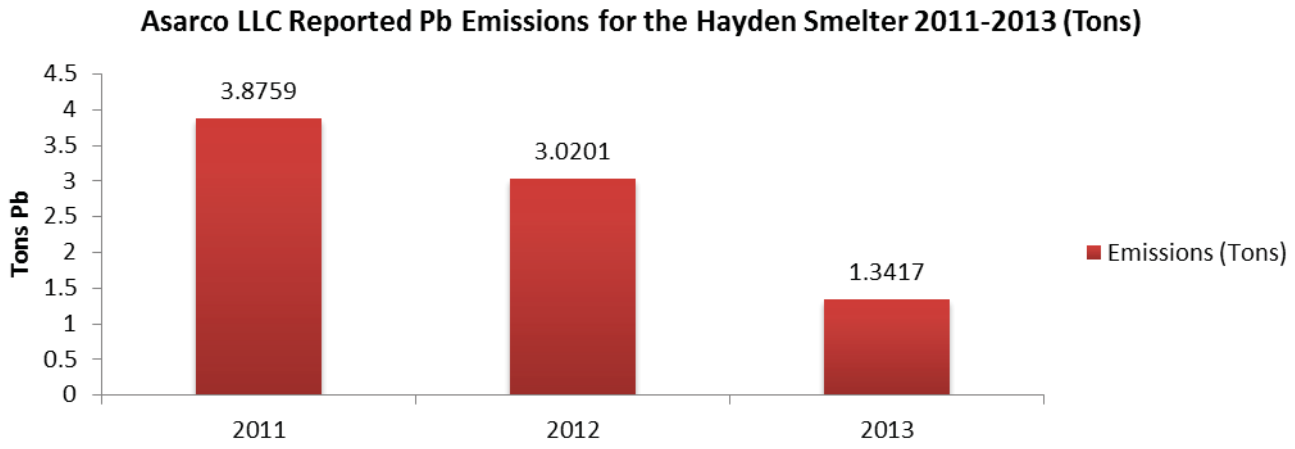


Although 2011 had the highest reported lead emissions and violations of the 2008 Pb NAAQS, Asarco LLC installed a Anode Baghouse Stack specifically to control lead at the facility. 2011 was also prior to the data year used in the designation and the collocated monitors at Globe Highway did not collect enough data to determine

[3] Email correspondence with EPA Air Plannig Office (AIR-2), Region 9 between 3/12/2015 and 3/23/2015

lead concentrations in the form of the NAAQS for the first two months of the year. Figure 1-3 compares the reported emissions for the Asarco Smelter form 2011-2013.

Figure 1-3: Asarco LLC Hayden Smelter Reported Annual Lead Emissions



ADEQ ruled out 2014 as a base year as not enough data will be available for ADEQ to perform an adequate attainment demonstration prior to the submission deadline. Preliminary smelter emission data for 2014 will not be available until July 2015, and will not be finalized and verified until the end of October 2015 at the earliest. Additionally, 2014 had fewer violations of the standard than all years except 2013.

Currently, the Globe Highway collocated monitors are the only NAAQS compliant monitors with approved Quality Assurance (QA) plans, and data submitted and verified in AQS. Asarco has installed a number of monitors at various heights at and around the facility as part of their remediation project under the CERCLA settlement. ADEQ will survey the data from these monitors with the intention of determining specific fugitive and volume sources to model in the attainment demonstration. As lead is environmentally and biologically persistent, these monitors may indicate the need for control to prevent track-out or windblown fugitive emissions as a school, park and public pool are located within a few thousand feet of the smelter, and conveyer lines delivering ore concentrate run along residential properties.

In the base year determination, ADEQ ruled out 2013 as a base year because no violations occurred at a NAAQS compliant monitor. Additionally, the reported plantwide fugitive emissions, and continuously monitored emissions from the acid plant main stack, main stack annulus, and the anode baghouse stack were less than half of what they were in 2012. Asarco provided documentation to support these emissions estimates with their annual emission inventory questionnaire submission for that year. These estimates in-turn support the lack of violations recorded at the Globe Highway monitors in 2013. ADEQ will investigate the reason for high ambient concentrations at the settlement monitors in the attainment demonstration, which may indicate more localized process fugitives or vehicle trackout emissions. This will aid in the control measure determination portion of the SIP revision.

In summary, ADEQ proposes 2012 as the base year for the following reasons:

- 2012 has the highest reported emissions after the installation of the anode baghouse scrubber

- 2012 is the year the designation of nonattainment is based
- 2012 has three recorded violations, second only to a year prior to the installation of controls

1.1.2 Source Category Inclusion and Exclusion

Source categories to be included in the inventory are:

- Point Source Emissions
- Nonpoint Source Emissions
- Onroad Mobile Emissions
- Nonroad Mobile Emissions

ADEQ will compile a 2012 base year inventory containing actual Pb emissions from the previously mentioned source categories. Per the Pb NAAQS implementation rule, all point sources within the nonattainment area or point sources that could contribute to a violation within the nonattainment area that have the potential to emit (PTE) or a federally enforceable permit limitation equivalent or greater than 0.5 tons per year (tpy) of Pb will be accounted for in the inventory.

ADEQ will not include biogenic and crustal sources in the base year or attainment year inventory, but will model any smaller and diffuse impacts as background concentrations in the attainement demonstration. This is consistent with EPA guidance from the *Addemdum to the 2008 Lead NAAQS Implementaion Questions and Answer* (U.S. EPA, 2012) and is consistent with the *Guideline on Air Quality Models* (U.S. EPA 2005).

1.2 Resource Allocation and Staffing

ADEQ will be the lead agency in the development of the ambient monitoring & meteorological data analysis, emission inventory development and modeling analysis. Asarco LLC will provide the modeling inputs and analysis related to the modeling for their permit revision to accommodate necessary controls to meet compliance with the NAAQS. ADEQ will then develop the modeling protocol with cooperation from Asarco LLC at which point the agency will determine the extent of the modeling necessary to demonstrate attainment. In its role as the project lead, ADEQ will manage the project schedule, facilitate communication and consultation between the source and EPA region IX and make final decisions on issues regarding the development of the TSD.

1.2.1 Communication Plan

The communications plan is an important piece in keeping a fluid workflow in a project as complex as this. The permit modeling and permit revisions run concurrent to the development of the SIP. Both processes have multiple objectives, some of which are dependent on the other and other objectives that are independent of each other. In addition, the plan outlines the communication paths that will exist in the development of the technical portions of the SIP to create outlets to mitigate challenges as they may arise. The communication plan simply outlines the communication schedule that will take place in an attempt to keep the process fluid and transparent.

Table 1-2: Emission Inventory Development Communication Plan

Type	Frequency	Subject	Attendees
Int. Meet	Once	TAU EI Kickoff Meeting	TAU
Int. Meet	Once	SIP Kickoff Meeting	SIP | Legal | Permit | Assessment | Mgmt
Ext. Meet	Bi-weekly	ASARCO Modeling for SIP	SIP | Permit | Asarco
Ext. Meet	Once	Site Tour	SIP | Permit | Asarco
Audit/QA	As Needed	EI Data Audit	QA Coordinator
Int. Meet	Weekly	One on One to discuss progress/challenges	TAU UM | TAU Project Lead
Int. Meet	Bi-Weekly	SIP Progress Report Update	SIP
Call	As Needed	SIP/EI Challenges Questions	EPA Region 9 | SIP

1.2.2 Responsibility Assignment Matrix

The responsibility assignment matrix is simply a high-level overview of the various roles involved in developing the EI. Additionally, if challenges arise then the matrix indicates those management has assigned to and will be involved in various levels of the EI development. The responsibility assignment matrix indicates all who will be involved in the development of the inventory and those who the EI development lead will consult on the progress of the inventory development.

Table 1-3: Responsibility Assignment Matrix

Role	Section | Unit	Staff Assignment (Extension)
Project Manager	SIP | Planning	Lesley Forst (602-771-5352)
QA Lead	SIP | TAU	TBD
Lead Technical/EI	SIP | TAU	Kamran Khan (602-771-4519)
SIP Management	SIP	Marina Mejia (602-771-4858)
Air Quality Division Director's Office	AQD	Eric Massey (602-771-2288)
SIP Modeling	SIP | TAU	Farah Mohammadesmaeili (602-771-2350)
Source Modeling	Asarco	TBD
Asarco Project Contacts	Asarco	Amy Veek (520-356-3296)
Lead Rule Writer	SIP | Planning	Lesley Forst (602-771-5352)
In-House Data Provider	Assessment | Data Management	Heather Colson (602-771-4488)

1.2.3 Schedule for Completion

The following schedule for completion is a high-level overview of the inventory development schedule by month agreed upon between the Technical Analysis Unit and Planning Unit within the SIP section. The schedule is based upon major action items relevant to the various stages of technical work closely related to the development of the EI and critical to the development of the SIP.

Table 1-4: Ambient Monitoring, Emission Inventory and Modeling Analysis Schedule for Completion

Action Item	2/15	3/15	4/15	5/15	6/15	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16
Stage I: Planning														
Resource Allocation														
Project Planning														
Stage II: IPP Development														
Stage III: Met/Ambient Analysis														
Data Collection														
Met/Ambient Analysis														
Stage IV: EI Development														
Data Collection														
Point Source Inventory														
Nonpoint Source Inventory														
Mobile Inventory														
Inventory Projections														
Inventory TSD														
Stage V: Attainment Demonstration														
Data Collection														
Modeling Protocol														
Data Processing														
AERMOD/LEADPOST Attainment Process														
Modeling TSD														

2 Meteorological and Ambient Monitoring Data Analyses

ADEQ will perform a meteorological and ambient monitoring analysis for the Hayden Planning Area to determine the local meteorology and its impact on monitored concentrations of Pb. ADEQ will perform these analyses using meteorological data gathered at onsite meteorological stations to build meteorological profiles for potentially inferring causality of exceedances at the ambient monitors. ADEQ will perform an ambient monitoring data analysis to determine violations, exceedances and meteorological impacts on ambient concentrations within the Hayden Planning Area. We will provide design values for the AQS certified monitor data.

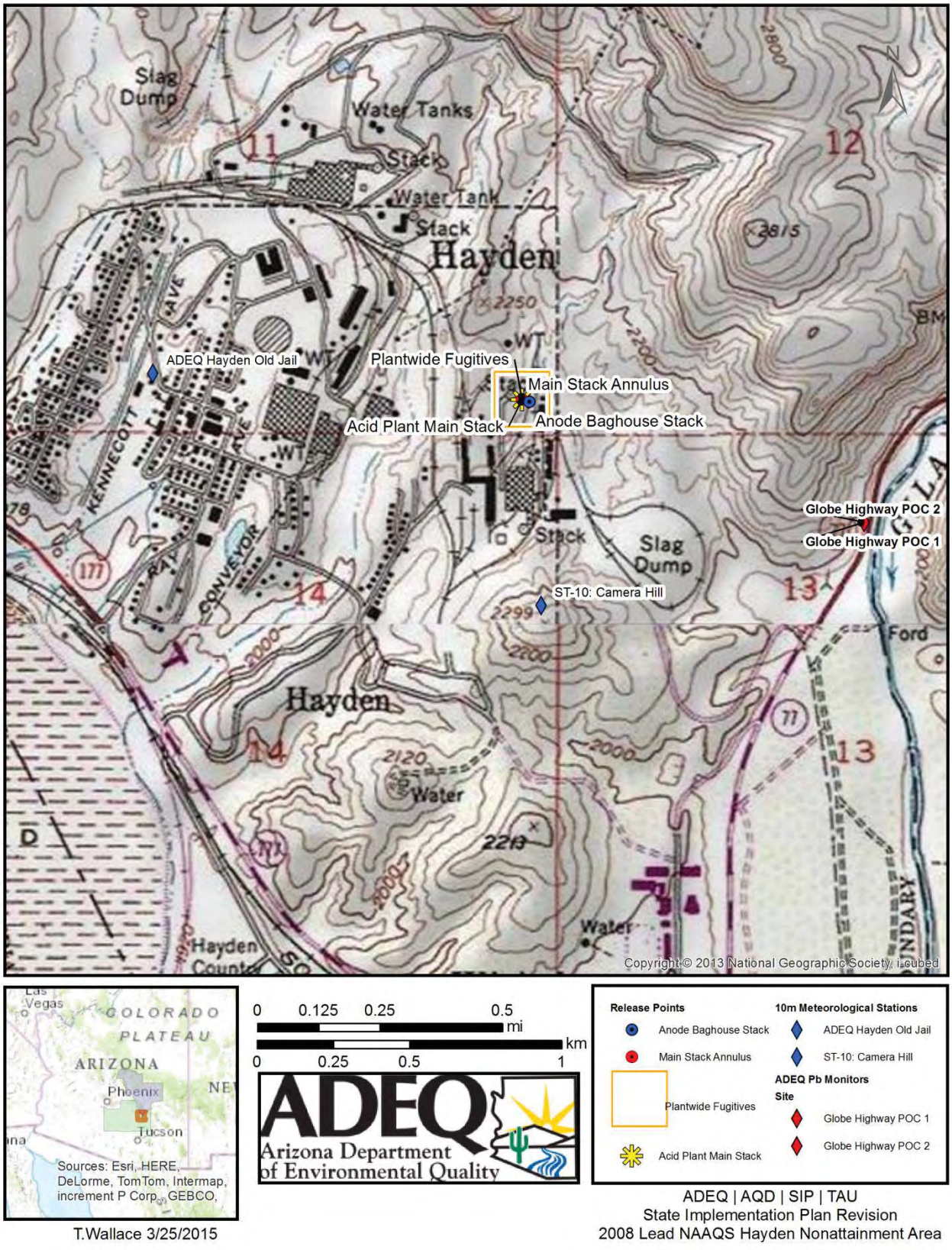
Technical staff will perform these analyses with ambient monitoring data from the colocated Globe Highway SLAMS and meteorological data form the Hayden Old Jail site, the Camera Hill Meteorological Station and possibly meteorological data from a number of locations run by Hailey & Aldrich as part of the Administrative Settlement Agreement between EPA, ADEQ and Asarco.

2.1 Meteorological Data Analysis

ADEQ plans to examine at least 1.5 years of on-site meteorological data for this analysis to illustrate meteorological patterns that exist within the Hayden NAA. The onsite data is collected at the Camera Hill location (ST-10), which has only been operational and collecting quality assured data since August 2013. ADEQ also plans to examine the meteorological data from the Hayden Old Jail location. ADEQ intends to assess meteorological data from any other meteorological stations within the Hayden Nonattainment Area, although only the Camera Hill station and the Hayden Old Jail station meet ADEQ siting criteria. ADEQ plans to perform an analysis of the local meteorology to obtain a thorough understanding of wind patterns in the terrain surrounding the Hayden Smelter. Figure 2-1 lists the sites that ADEQ intends to survey in the meteorlogical data analysis.

ADEQ will plot these data sets in wind roses for easy graphical comparison, and examine the speed and direction of the winds in the study area, examining both the diurnal and seasonal profiles. If precipitation data exists, ADEQ will compare ambient values on precipitation days against non-precipitation days to determine the impact form lead contaminated fugitive dust.

Figure 2-1: Asarco Hayden Smelter Release Points and Local Ambient Monitor and Meteorological Stations



T.Wallace 3/25/2015

ADEQ | AQD | SIP | TAU
State Implementation Plan Revision
2008 Lead NAAQS Hayden Nonattainment Area

2.2 Ambient Monitoring Data Analysis

ADEQ will perform an analysis of the ambient monitored Pb concentrations at the Globe Highway collocated monitors using all available monitor data from 2011 through 2014, or any portion thereof, to better understand the ambient air concentrations and any trends in concetrations over the period monitors have been installed. As the standard is a rolling three month average and sampling is performed on an every-sixth-day schedule, we will look at meteorology on days where lead concentrations were monitored to determine what impact meteorology has on ambient concentrations.

Additionally, ADEQ will examine precipitation data from the Asarco LLC operated Camera Hill Meteorological station to determine to what extent ambient concetrations are attributable to windblown dust or re-entrainment of fugitive dust contaminated with lead. This analysis will be performed by comparing ambient concentrations on precipitation days to nonprecipitation days at ambient lead monitoring stations. Lastly, we will examine lead monitor days against CEMS data to determine if stack emissions and operational characteristics are the primary contributor to emissions above the NAAQS and ultimately violations of the standard. In addition to using the Globe Highway monitors, ADEQ intends to use the special study monitors required under the agreement with EPA, ASARCO and ADEQ to determine likely sources of lead emissions.

3 Emission Inventory Development

ADEQ will take the following approach to developing the emission inventory for the Hayden Pb NAA. ADEQ will employ both a top-down and bottom-up approach to compiling a comprehensive inventory of all point, nonpoint, onroad, and nonroad Pb emissions in the Hayden NAA. As the Hayden Asarco LLC Copper Smelter is known to be the primary source of Pb emissions in the Hayden Planning Area, ADEQ will employ a bottom-up approach to determining emissions from any point sources emitting more than the required threshold for lead withinthe NAA.

3.1 Point Source Inventory

ADEQ will compile actual emissions for all permitted point sources within the Hayden Pb NAA. AEDQ will also determine all facility maximum or PTE Pb emissions for point sources within the Hayden Pb NAA above the reporting threshold of 0.5 tpy. ADEQ will report the actual emissions from these facilities for the base year and use current or anticipated facility PTE emissions for the attainment year as PTE or permitted emissions are permanent and enforceable for the purposes of developing a SIP. ADEQ will provide maps and data files containing the geographic coordinates of the facilities and stacks within the NAA.

3.1.1 Emission Estimation Methodology Discussion

ADEQ will collect and verify point source location and emission data from the following sources:

- EPA EIS Database
- ADEQ Permitted Sources SLEIS Database
- ADEQ Monthly Compliance Reports (As Needed)
- ADEQ Annual Compliance Reports (As Needed)

ADEQ will estimate emissions from the Hayden Asarco LLC Copper Smelter and other sources with the potential to emit above 0.5 tons using the previously mentioned sources for the 2012 base year. ADEQ will present actual emissions totals and potential to emit or federally enforceable limits for the Smelter during the period 2010-2012. ADEQ will also present facility permitted emission limits for the base year and attainment year. ADEQ will take a similar bottom up approach for all emission estimates for any other point sources that meet the 0.5 tpy threshold within the NAA.

3.1.2 Point Source Emissions Projections

Emission projections for the Hayden Asarco LLC Copper Smelter are dependent on changes in activity level, changes in emission factors and applicable control measures applied as the result of the attainment demonstration and will be modeled in conjunction with expected controls to be installed per the Hayden SO_2 NAA SIP. Other sources that are discovered to emit lead in the NAA will be projected based on current facility maximum potential to emit or federally enforceable permit limits. ADEQ will also survey active permit applications and revisions for these sources to determine if any additional changes to PTE or federally enforceable emissions exist.

3.2 Nonpoint Source Inventory

ADEQ will utilize the 2011 NEI v2 to compile a base year inventory of nonpoint sources for Gila and Pinal Counties, and allocate these to the NAA by population or land area depending on the source classification. ADEQ will estimate nonpoint emissions through a top-down approach that allocates Pb emissions estimated in the NEI to the NAA by population, area or another scaling method. ADEQ intends to omit the following miscellaneous and natural crustal source emission categories as they are not significant sources of lead and any contribution will be picked up as background concentration in the attainment modeling:

- Crustal and geogenic emissions
- Wind Erosion

Activity, population and commodity level data used for allocating and estimating nonpoint emissions will come from ADOA and in-house databases.

3.2.1 Nonpoint Source Emission Projections

Growth or decline in emissions from nonpoint sources is typically driven by an increase or decrease in NAA population size, activity levels or economic growth indicators. ADEQ will use an appropriate growth factor to estimate the projected emissions from these sources in the attainment year. ADEQ intends to follow guidelines for projecting emission inventories that EPA has outlined in Volume X of the Emission Inventory Improvement Program (EIIP) Guides (EPA, 1996-1999). ADEQ will project these emissions to the attainment date by a growth factor such as population, housing, land-use, employment, a combination of these growth factors or some other growth factor. ADEQ will present these emissions in tables categorized by the nonpoint source category defined by the Source Classification Code (SCC).

3.3 Onroad & Nonroad Mobile Source Inventory

ADEQ does not intend to inventory or model onroad emissions. Lead was completely phased out of gasoline by 1996 and thus is not calculated as a pollutant in the MOVES model. The only fuels allowed to contain lead are those used in nonroad applications such as outboard marine engines, piston engine aircraft, farm equipment

and race cars. A survey of the 2011 NEI v2 found that only aircraft and locomotives exist in Gila and Pinal counties that use leaded fuel.[4] However, ADEQ will survey data from the EPA-ADEQ-Asarco agreement under CERCLA to determine if there are any significant lead emissions attributable to re-entrained fugitive dust from vehicle and wind blown sources both on and near the facility.

These factors considered, ADEQ will analyze data from road dust sampling as part of a remedial investigation for the Asarco CERCLA settlement to determine the potential impact lead laden road dust has on ambient concentrations in the Hayden Pb NAA. If this analysis determines the amount of lead in re-entrained dust to be negligible, then these emissions will be modeled as background concentration in the attainment demonstration.

ADEQ intends to take a top down approach to estimating nonroad mobile source emissions for the Hayden Pb NAA. ADEQ finds this approach adequate as the NAA is a rural area expected to see little growth in population. Vehicle emissions are likely an insignificant/negligible source of Pb emissions and the 2011 NEI v2 indicates nonroad emissions to be a small contributor to ambient Pb concentrations outside of the smelter area.

3.3.1 Fugitive emissions from onroad and windblown sources

ADEQ intends to use existing data and AP-42 guidance to develop an emissions inventory of fugitive dust emissions at the facility and in the nonattainment area due to traffic and wind erosion. This analysis will use a combination of ambient monitor, meteorological, and Asarco CERCLA settlement data to quantify emissions from windblown sources. Additionally, ADEQ will utilize available data from road and soil sampling in and around the Asarco Hayden Smelter to determine the lead content within re-entrained road dust. The emissions from this analysis will either be modeled as a volume/area source in the attainment demonstration or captured as background emissions based on their contribution to violations of the ambient air quality standard.

3.3.2 Nonroad Emission Inventory Development

The Agency will estimate nonroad emissions from emission estimates reported in the 2011 NEI v1 Nonroad emissions category. ADEQ will apportion nonroad emissions to the NAA through a combination of rail line, Landing, Takeoff & Operation (LTO) data and population adjustment factors. ADEQ will determine the percentage of emissions from aircraft by proportionately allocating emissions based on flight activity per airports within and outside of the Hayden NAA. ADEQ will proportionately allocate locomotive emissions based on rail line length within the NAA compared to that outside of the NAA. There is only one rail line that runs through the NAA and the two counties so rail traffic is not necessary to consider in allocating emissions. Nonroad diesel and gasoline emissions will be allocated to the NAA based on population. The following nonroad emission sources will be included in Hayden Pb NAA inventory:

- Aircraft
- Locomotives
- Nonroad Equipment—Diesel
- Nonroad Equipment—Gasoline

If none of these emission sources exist within the NAA, they will be excluded from the inventory.

[4] *Note: from* http://www2.epa.gov/aboutepa/epa-takes-final-step-phaseout-leaded-gasoline

3.3.3 Mobile Source Emission Projections

Growth or decline in emissions from mobile sources is typically driven by an increase or decrease in NAA population size, activity levels or economic growth indicators. ADEQ will use an appropriate growth factor to estimate the projected emissions from these sources in the attainment year. ADEQ intends to follow guidelines for projecting emission inventories that EPA has outlined in Volume X of the Emission Inventory Improvement Program (EIIP) Guides (EPA, 1996-1999).

As ADEQ does not intend to model onroad sources, growth for the nonroad emission sources will be calculated based on population growth or decline for the area. ADEQ intends to use population estimates and projections from ADOA per executive order 2011-04.

4 Overview of Modeling Approach

ADEQ Staff will work with the Source to develop a modeling protocol for the attainment modeling required for the completion of the SIP. ADEQ plans to use AERMOD and LEADPOST to demonstrate attainment with the Pb NAAQS. ADEQ intends to establish a technical working group to develop the modeling protocol and perform the attainment demonstration. The protocol will be developed jointly and approved by ADEQ prior to submitting the protocol to EPA for review.

The attainment modeling will be performed by both ADEQ and Asarco based on the agreed upon protocol. Asarco will provide the site specific data for the model and both ADEQ and Asarco will quality assure and validate the data to ensure it meets data completeness requirements. ADEQ and Asarco will likely perform the modeling in parallel, working independently to verify each other's results and commenting on inputs and results as needed. ADEQ will invite EPA to join these technical workgroups at the appropriate steps to keep EPA knowledgeable of the process and allow EPA to offer targeted feedback to areas where challenges arise.

Upon completion of the attainment demonstration, ADEQ and Asarco will develop a draft of the results into an attainment demonstration TSD. These results will be submitted to the EPA for preview and comment. The material contained in the attainment demonstration TSD should be a compilation of all the materials discussed with EPA and the source throughout the attainment demonstration process.

The modeling will conform to EPA attainment demonstration guidance on the Lead Implementation Toolkit website as well as outlined in *Appendix W to Part 51—Guideline on Air Quality Models* unless technically infeasible. In these instances, the alternative approach will be vetted by ADEQ technical staff and included in the modeling protocol submitted to the EPA.

4.1 Point Source Modeling Protocol Overview

As mentioned earlier, ADEQ will perform an inventory of the point sources within the Hayden Pb NAA that includes the PTE and actual emissions of all known permitted sources in ADEQ and county jurisdiction. ADEQ's Technical and Modeling staff will perform the necessary screens to determine which sources, other than the Asarco LLC Hayden Smelter, should be included as point sources within the modeling domain. ADEQ will model any sources that are determined to be significant contributors to Pb emissions in the NAA that report or have the capacity to produce emissions greater than the half ton reporting threshold identified in the AERR.

ADEQ will model the facilities based on maximum allowable emissions or federally enforceable permit limits for modeled sources assuming operation at 100% load. ADEQ will perform modeling that includes any federal rules the Asarco LLC Hayden Smelter or other modeled sources are subject to as specific enforceable Pb emissions limits because of such rules. ADEQ will also perform an analysis to determine the necessity of running the model at less than 100% design capacity. According to Appendix W, modeling at operating load of more or less than 100% can result in increased ground level concentrations due to changes in stack parameters.[5] ADEQ will model facilities that operate at higher or lower load than the 100% design capacity accordingly.

ADEQ will also attempt to pinpoint the fugitive sources of lead emissions at the Asarco LLC Hayden Smelter and Concentrator to determine if these sources may contribute to the violations of ambient air quality standards. ADEQ will use data from the settlement monitors to determine the most likely source of fugitive lead emissions from storage piles, vehicle trackout, and concentrate delivery to determine how these sources should be modeled in the attainement demonstration. Table 4-1 includes the locations and heights of the settlement monitors ADEQ will examine to determine likely high impact areas for fugitive lead emissions.

Table 4-1: Locations of Settlement Monitors for Pb-TSP

Monitor Name	Latitude	Longitude	Site Elevation (ft)
ST-02: Winkelman High School	32.99505	-110.77156	2016
ST-05: Globe Highway	33.00254	-110.76542	1968
ST-14: Smelter Parking Lot	33.00254	-110.77911	2096
ST-23: Hillcrest Avenue	33.00363	-110.78232	2112
ST-26 Concentrator Station	33.00622	-110.78369	2096

ADEQ will perform modeling of control measures required to demonstrate attainment with the NAAQS. This attainment modeling will mimic the form of the 2008 Pb NAAQS using AERMOD and LEADPOST, focusing on the 3-month rolling average of lead concentrations. ADEQ will perform modeling for the standard based on maximum allowable emissions under a federally enforceable permit approved prior to the attainment date, with actual or design capacity after the Asarco Smelter installs anticipated federally enforceable controls. ADEQ will model controls until the model results confirm attainment with the standard. ADEQ will attach the modeling results and analyses to the SIP submittal as a separate TSD. This will then become the modeling basis for any necessary subsequent permit revision that ADEQ requires the Asarco LLC Hayden Smelter to undergo to establish federally enforceable SIP emission Limits.

Additionally, ADEQ plans to incorporate actual emissions from all point sources determined to significantly contribute to Pb emissions in the Hayden Pb NAA. ADEQ intends to omit modeling contributions from nonpoint sources unless they contribute significantly to the emissions within the NAA. The significance of the contribution of nonpoint sources within the Hayden Pb NAA will be determined based on the EI. ADEQ will perform attainment modeling using emissions information submitted to ADEQ by Asarco LLC in annual and monthly compliance reports. Asarco will provide any other pertinent information for performing the attainment modeling, including available on-site meteorological data and other data as required. These data will be

[5] Appendix W Section 8.1.2 of 40 CFR 51 gives details on modeling design capacities other than 100% for baseline modeling demonstrations.

combined with meteorological data gathered by ADEQ and will adopt some of the protocol and inputs used in the most recent permit modeling demonstration. ADEQ plans to discuss the modeling results in the EI TSD and use these results as the basis for the projected point source emissions in the EI.

5 Quality Assurance Plan

ADEQ will assign a TAU staff member as the QA lead for tracking the Data Quality Indicators (DQI) and assuring project staff meets the DQO laid out in table 5-1. This person will schedule, perform and report QA audits and results; attend inventory status meetings; make recommendations for corrective action; and maintain a file of all audits and resultant recommendations.

Table 5-1: Data Quality Objective Matrix

DQO	Procedure for Achieving DQO	DQI
Accuracy	- 100% calculations checked by Emission inventory team lead - 10% calculations checked by peer review - If ≥ 10% of calculations reviewed by peer require revisions, peer review will check 100% of calculations	- < 5% of calculations require revisions for point sources - < 5% of calculations require revisions for nonpoint sources - < 5% of calculations require revisions for mobile sources
Completeness	- Perform extensive guidance review of relevant SIP and Modeling guidance - Develop EI preplan to determine schedule, DQOs, identify sources, and organize questions/concerns - Justification for source inclusion/exclusion	- 100% point sources with Pb emissions ≥ 100 tpy - 90% point sources with Pbemissions < 100 tpy
Representativeness	- Emission inventory team lead will compare estimates to previous SIPs and similar inventories to ensure estimates are reasonable	- Representative of Haydeni NA - Base inventory representative of 2012 - Attainment inventory projected to 2019
Comparability	- TAU Staff will follow ADEQ Standardized Operating Procedures (SOP) for developing NA IPPs and EIs to ensure data is comparable	- Ambient values correlate with actuals-based modeled values - All values will be represented in same units as NEI

5.1 Data Documentation

The project team will compile two technical planning documents and two Technical Support Documents (TSD) as supplements to the Hayden Pb NAA SIP Submittal. This document and the attainment demonstration modeling protocol will serve as the technical plan for producing the emissions inventory, attainment demonstration and associated analyses. The team will combine the ambient monitoring and meteorological data analyses with the inventory into an EI TSD as well as develop a modeling summary TSD to summarize and document the attainment demonstration and establishment of controls and limits. ADEQ will adhere to a number of procedures to document data and maintain data quality control. ADEQ will implement the data documentation procedures throughout the EI development process and will perform periodic QC checks to ensure the agency meets the aforementioned DQOs.

The project lead will document all activities related to the development of the inventory. The lead should document these activities in bound notebooks or electronically, to facilitate easy retrieval of information. This activity log will help another inventory team member reproduce the emission results and allow an evaluation of data accuracy and completeness. ADEQ staff will adhere to the following procedures when documenting data for use in any TSD:

- The inventory lead should index data written in notebooks and information should be written legibly in black or blue ink
- Files will be archived in the project file directory at the project file directory at: AQD>SIPS>TECHNICAL_ANALYSIS_UNIT>SIPS-TSDS>Hayden Pb
    - Email communications will be archived and saved in the project file directory upon inventory completion
    - Mail (courier and delivered) correspondence will be scanned and archived in PDF format in the project file directory
    - PDFs, spreadsheets, maps and pictures will be copied to the project file directory with the subject and download date
    - All working drafts will be saved and archived in the project file directory
- Data sources will be documented with full references and foot notes where appropriate in the TSD
- All agency aggregated workbooks will contain a readme sheet containing sources and links for all data contained within the workbook
- Meetings will be documented with agendas and electronic meeting invitations
    - Documentation will include date, attendees, subject, notes and action items as a result of the discussion
- All emission factors will be documented and referenced in the draft and final documents
- All emission estimation methodologies will be documented and referenced in the EI TSD
- Maps will be documented in a GIS folder on the ADEQ servers specific to each NA
    - All GIS data inputs that came from sources outside of ADEQ or other data sources will be compiled into workbooks with a readme sheet, and archived in the project technical folder upon project completion
    - The readme sheet should contain references and citations for all data sources used to create any references and citations for all data sources used to create any GIS shapefiles or layers.

5.2 Quality Assurance Lead Duties

The QA Lead will be responsible for overseeing the QA/QC duties associated with developing the IPP and EI. The QA Lead's responsibilities and activities are as follows:

- Attend inventory status meetings
- Manage the peer review process
- Work with the SIP team lead to resolve any quality concerns that cannot be resolved at the inventory management level

The QA Lead will manage the peer review process and will be the primary technical reviewer of the EI and modeling TSDs.

5.3 Data Source

ADEQ will perform QC spot checks periodically throughout the various stages of performing the technical analyses required for the SIP. ADEQ will perform QC checks and full QA audits according to the processes

outlined in table 5-2. ADEQ staff will perform QC checks by peer and management review with the results reported to the Technical Lead and QA Coordinator.

Table 5-2: Data Source Matrix

Data Gathering	Source Type	Suggested Data Source
	Population	ADOA
	Land Area	Internal GIS Database; ADOA
	Point	Existing Inventories, Permit Files, Compliance Reports, Facility Surveys, Other Government Agencies, NEI
	Nonpoint	Existing Inventories, Other Government Agencies, Trade Groups, Data Source, NEI
	Onroad Mobile	ADOT, NEI
	Nonroad Mobile	ADOT, NEI

In addition to the suggested QC procedures performed for each specific source category, the following checklist contains the procedures the QA Coordinator will perform if resources permit during a QC audit for any technical work done in the development of the EI.

- □ Did the analyst follow data collection and handling procedures?
- □ Was there appropriate management supervision of work?
- □ Are calculations technically sound and accurate?
- □ Did the analyst use the appropriate emission factors?
- □ Did the analyst properly assess the impact of control measures on emission estimates?
- □ Did the analyst assign the correct source classification codes to the emission source categories?
- □ Did the analyst document data in a fashion that would allow another analyst or EPA to reconstruct inventory development activities?
- □ Did the analyst maintain an orderly master file?

The QA Coordinator or peer reviewer should document any areas where the data and documentation procedures did not meet minimum quality standards.

6 References

U.S. EPA, 2005. Guideline on Air Quality Models. 40 CFR Part 51 Appendix W.

U.S. EPA, August 10, 2012. Addendum – 2008 LEAD NAAQS Implementation Questions and Answers. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

U.S. EPA, August 14, 2014. Lead Implementation—Programs and Requirements for Reducing Lead. Office of Air and Radiation (OAR). Research Research Triangle Park, NC 27711. Retrieved from: http://www.epa.gov/airquality/lead/implement.html

U.S. EPA, March 2012. Final Phase II Remedial Investigation/ Feasibility Study (RI/FS) Work Plan—ASARCO Hayden Plant Site . Retreived from: http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/ViewByEPAID/AZD008397127?OpenDocument

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Appendix E

Technical Memorandum: Hayden Pb Contingency Assumptions

Air Quality Division
March 2, 2017

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY TECHNICAL MEMORANDUM
HAYDEN LEAD CONTINGENCY ASSUMPTIONS

The purpose of this document is to memorialize the assumptions made and methodology for determining emission reductions for the Hayden Lead (Pb) contingency measure. Contingency measures are required by the Clean Air Act to be triggered in the event that an area fails to attain the NAAQS by the required date. EPA policy states that contingency measures should provide emission reductions approximately equal to one year's worth of progress towards attainment.

ADEQ has chosen to increase the frequency of road sweeping from once to twice a day as a contingency measure. The decision to further control paved roads is due to results obtained from ADEQ's attainment model. Specifically, the model showed high sensitivity of the ambient air lead concentrations to paved road emissions. The methodology presented below shows that the emission reduction from the increase in frequency of street sweeping on paved roads at the facility meets the required emission reduction for a contingency measure.

In order to estimate the resulting emissions reduction, ADEQ employed technical guidance from the Maricopa Association of Governments (MAG) 5% plan and the assumptions discussed below. The basis of the estimate is silt content on paved roads, and how increasing sweeping could potentially impact the silt content percent (SC%).

Assumption 1.

> The first assumption is that SC% is uniform throughout the facility. In reality, this is likely not the case, and road surfaces adjacent to materials handling operations differ in SC% when compared to roads further from said operations. ADEQ made this assumption due to the lack of existing data regarding the variability of SC% throughout the facility.

Assumption 2.

> According to MAGs 5% plan, on the day of sweeping (with a conventional sweeper) silt loading is reduced to 45% of the initial value, or a reduction 55%. This reduction is assumed for road surfaces that have achieved steady state with regards to silt loading. In other words, silt deposited on the road surface equals what is being emitted/re-entrained.

Assumption 3.

> In Asarco's 2015 annual emissions inventory, the facility reported a site specific SC% of 9.5% for 10 of 11 paved road emissions calculations. Also, in 2015 the facility had been implementing a street sweeping frequency of once per day. Given this, the assumption is made that daily sweeping results in a SC% of 9.5% for facility paved roads.

To verify these assumptions, a SC% was back calculated using MAGs estimated day of sweeping reduction (55%) and Asarco's site specific 9.5% SC%, which results in an SC% of 21%. This implies that if Asarco were to not be sweeping daily, the average SC% at the facility would be roughly 21%. This SC% aligns with AP-42, Table 13.2.1-3 "Typical Silt Content and Loading Values for Paved Roads at Industrial Facilities" in AP-

42 Section 13.2.1 “Paved Roads” (January 2011), which presents typical SC% for paved roads at copper smelters as ranging from 15.4% to 21.7% with a mean of 19%. Given the alignment between the back calculated value and AP-42, and correspondence with the facility verifying the daily sweeping schedule, ADEQ is comfortable with the assumptions 2 and 3.

In Asarco’s 2015 annual emissions inventory the facility reports paved road emissions due to various vehicles/traffic types, these are given below:

- Road emissions from the hauling of concentrate, oxygen, anodes, and blister copper, silica flux
- Road emissions from the flow of general plant traffic
- Road emissions from the maintenance of roads by water truck
- Road emissions from the maintenance of roads by street sweeper
- Road emissions from the hauling of material by plant service haul trucks
- Road emissions from forklift traffic (scrap material handling & miscellaneous use)
- Road emissions from delivering various items to tanks or heavy items to point of use
- Road emissions from the hauling of sulfuric acid
- Road emissions from the traveling of front-end loaders (storage pile front-end loaders & miscellaneous use)

Of particular importance is forklift scrap handling and the use of front-end loaders (both for storage piles and misc. use). Between these three vehicle/traffic types Asarco reports a total of 28 trips/hour in 2015. Given the almost constant operation of this facility, an annual average of 8088 operating hours (2011 to 2015) for the main stack, the potential for spillage and track out of silts onto paved road surfaces is significant. Moreover, Asarco has implemented a daily sweeping schedule absent any permit requirement. These two points suggest a potential for high silt accumulation rates on paved road surfaces at the facility exists, which leads to assumption 4.

Assumption 4.

> Due to the nature of operations at the facility, highly trafficked road segments likely approach a silt loading steady state within a 24 hour window (or before the sweeper makes its daily round). Because of this, an estimated 55% reduction per sweeper pass is a reasonable assumption.

However, in order to account for the variability in silt loading along the road segments (assumption 1), ADEQ included a margin of safety by decreasing the 55% reduction by 10%. In short, ADEQ applied a 45% reduction (55% of the original SC%) to the 9.5% SC% reported in Asarco’s annual emissions inventory. This reduced SC% was then used to calculate new annual emission. The attainment model was then ran with the resulting emission rates.

The final attainment model design value including this contingency measure was .1103 $\mu g/m^3$. The final attainment model design value without this contingency measure was .1226 $\mu g/m^3$. As a note, these design values include the background concentration of .0028 $\mu g/m^3$. The difference in these two concentrations is .0123 $\mu g/m^3$, satisfying the requirement that the contingency measure lead to an ambient air concentration reduction of .0114 $\mu g/m^3$.

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Appendix F
Public Process Documentation

Public Notice
Affidavit of Public Notice Publication
Public Hearing Officer Certification
Public Hearing Agenda
Public Hearing Sign-In Sheet
Public Hearing Transcript
Responsiveness Summary
Copies of Comments Received

Air Quality Division
March 2, 2017

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
PUBLIC COMMENT PERIOD AND HEARING

The Air Quality Division of the Arizona Department of Environmental Quality (ADEQ) welcomes comments on the proposed Hayden Lead Nonattainment Area State Implementation Plan (SIP) revision. The plan demonstrates that the Hayden nonattainment area will attain the 2008 Lead National Ambient Air Quality Standards (NAAQS). The revision will be submitted to the U.S. Environmental Protection Agency for incorporation in Arizona's SIP as required by the Clean Air Act under Section 110.

Comments will be accepted between December 5, 2016 and January 10, 2017. Comments may be mailed, faxed, or emailed to Natalie Muilenberg, Air Quality Division, Air Quality Improvement Planning Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007; fax (602) 771-2299; email nm3@azdeq.gov. ADEQ will address comments applicable to the proposed SIP revision for the Hayden Lead Nonattainment Area.

Comments are also welcome at the public hearing held on January 10, 2017, at 10:00 a.m. at the Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007, Room 3175. Comments must be received no later than January 10, 2017 by 5:00 p.m., or submitted at the public hearing. Mailed comments must be postmarked by January 10, 2017. To request auxiliary aid or service for accessible communication, call (602) 771-2215, email co2@azdeq.gov, or dial 7-1-1 for TTY/TTD Services. Find maps and parking information here: http://www.azdeq.gov/function/about/contact.html.

The proposed revision is available for review:

- Online at: http://www.azdeq.gov.
- At the ADEQ Records Center, 1110 W. Washington St., Phoenix, AZ 85007. For hours or appointment scheduling, call (602) 771-4380 or (800) 234-5677 ext. 6027714380.
- At the Hayden Senior Center, 520 Velasco Ave., Hayden, AZ 85135. For hours, call (520) 356-7035.

For more information, contact Natalie Muilenberg at 602-771-1089 or nm3@azdeq.gov.

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365829

State of Arizona
County of Pinal

AFFIDAVIT OF PUBLICATION

Jennifer R. Carnes being first duly sworn deposes and says that she is a representative of the *Copper Basin News*, a legal newspaper published weekly at Kearny, in the County of Pinal, State of Arizona that the legal entitled, ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY PUBLIC COMMENT PERIOD AND HEARING Hayden Lead Nonattainment Area State Implementation Plan, a printed copy of which is hereto attached, has been or will be published in all the regular weekly editions of said newspaper (and not a supplement thereof) for TWO weeks, the dates of publication being as follows, to-wit:

11/30/16, 12/7/16

Jennifer R Carnes
Representative

Subscribed and sworn to before me this

12 DAY OF December, 2016

SHAWN M. OSTRANDER
Notary Public - Arizona
Pinal County
My Comm. Expires Jan 9, 2019

Shawn M. Ostrander
Notary Public

Public Notice

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY PUBLIC COMMENT PERIOD AND HEARING

The Air Quality Division of the Arizona Department of Environmental Quality (ADEQ) welcomes comments on the proposed Hayden Lead Nonattainment Area State Implementation Plan (SIP) revision The plan demonstrates that the Hayden nonattainment area will attain the 2008 Lead National Ambient Air Quality Standards (NAAQS) The revision will be submitted to the U S Environmental Protection Agency for incorporation in Arizona's SIP as required by the Clean Air Act under Section 110

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Comments are also welcome at the public hearing held on January 10, 2017 at 10:00 a m at the Arizona Department of Environmental Quality, 1110 W Washington St Phoenix, AZ 85007 Room 3175 Comments must be received no later than January 10, 2017 by 5:00 p m or submitted at the public hearing Mailed comments must be postmarked by January 10 2017

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At the Hayden Senior Center, 520 Velasco Ave , Hayden, AZ 85135 For hours, call (520) 356-7035

For more information, contact Natalie Muilenberg at 602-771-1089 or nm3@ azdeq gov

CBN Legal 11/30/16, 12/7/16

ADEQ AIR QUALITY DIVISION
16 DEC 16 PM 12: 15

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Arizona Department
of Environmental Quality

Air Quality Division

Public Hearing Presiding Officer Certification

I, Brian Parkey, the designated Presiding Officer, do hereby certify that the public hearing for the proposed Arizona State Implementation Plan Revision for the Hayden Lead Nonattainment Area for the 2008 Lead National Ambient Air Quality Standards held by the Arizona Department of Environmental Quality was conducted on January 10, 2017, at the Arizona Department of Environmental Quality, Conference Room 3175, 1110 West Washington Street, Phoenix, Arizona, in accordance with public notice requirements by publication in *The Copper Basin News* on November 30, 2016 and December 7, 2016. Furthermore, I do hereby certify that the public hearing was recorded from the opening of the public record through concluding remarks and adjournment, and the transcript provided contains a full, true, and correct record of the above-referenced public hearing.

Dated this 12th day of January 2017.

Signature of Hearing Officer

State of Arizona)
) ss.
County of Maricopa)

Subscribed and sworn to before me on this 12th day of January, 2017.

OPHELIA BEGAY
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
February 11, 2018

Notary Public

My commission expires: 2/11/18

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Public Hearing Agenda

AIR QUALITY DIVISION PUBLIC HEARING

Proposed State Implementation Plan Revision
Hayden Lead Nonattainment Area for the
2008 Lead National Ambient Air Quality Standard

Arizona Department of Environmental Quality (ADEQ)
Room # 3175, 1110 W. Washington St., Phoenix, Arizona
10:00 a.m., Tuesday, January 10, 2017

Pursuant to 40 CFR § 51.102 notice is hereby given that the above referenced meeting is open to the public.

1. Welcome and Introductions
2. Purpose of the Oral Proceedings
3. Procedure for Making Public Comment
4. Brief Overview of the Proposal
5. Oral Comment Period
6. Adjournment of Oral Proceeding

During the comment period, which started on December 5, 2016 and ends today, January 10, 2017 at 5:00 p.m., the proposed State Implementation Plan Revision for the Hayden Lead Nonattainment Area is available online at www.azdeq.gov. Physical copies of the proposal are also available at the ADEQ Records Center, 1110 W. Washington St., Phoenix, AZ 85007, for hours or appointment scheduling call (602) 771-4380 or (800) 234-5677 ext. 6027714380, as well as the Hayden Senior Center, 520 Velasco Ave., Hayden, AZ 85135. Please call (520) 356-7035 for hours.

At this time, written comments may be submitted at the public hearing. Comments can also be faxed or emailed to Natalie Muilenberg, fax: (602) 771-2299; email: nm3@azdeq.gov. Comments can also be mailed to: Natalie Muilenberg, Air Quality Division, Air Quality Improvement Planning Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007. Mailed comments must be postmarked by today, January 10, 2017. ADEQ will address comments applicable to the proposal.

For additional information regarding the hearing, please contact Natalie Muilenberg, Air Quality Improvement Planning Section, at 602-771-1089 or nm3@azdeq.gov.

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ADEQ Arizona Department of Environmental Quality

Air Quality Division Sign-In Sheet

Please Sign In

SUBJECT: Hayden Lead (Pb) SIP Public Hearing **DATE:** 1/10/17

	NAME	ORGANIZATION	PHONE	E-MAIL (primary method of contact)
1.	Todd Weaver	Freeport-McM. Ron	602 366-7858	tweaver1@fmi.com
2.	Eric Hiser	JH+J / Asarco	480 587 3727	ehiser@jhjlawyers.com
3.	MARK SEVERSON	BISON ENGINEERING	520-262-0576	mseverson@bison-eng.com
4.	Mike Sorenberg	ADEQ		MS23@azdeq.gov
5.	Chris West	FMMI	928-701-8734	CWEST@FMI.com
6.	Natalie Muilenberg	ADEQ	602 771 1089	nm3@azdeq.gov
7.				

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ORAL PROCEEDING

Hearing Officer Transcript

PROPOSED

State Implementation Plan Revision

Hayden Lead Nonattainment Area

for the 2008 Lead National Ambient Air Quality Standard

Tuesday, January 10, 2017

Brian Parkey: Thank you for coming. I now open this hearing on the proposed State Implementation Plan Revision for the Hayden Lead Nonattainment Area.

This proceeding is being recorded and will be preserved for the record.

Today is Tuesday, January 10, 2017 and the time is 10:04 a.m. The location is conference room 3175, Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, Arizona, 85007. My name is Brian Parkey and I have been appointed by the Director of the Arizona Department of Environmental Quality to preside at this proceeding.

The purpose of this oral proceeding is to provide the public an opportunity hear a summary of the proposed State Implementation Plan Revision for the Hayden Lead Nonattainment Area.

The Department's representative for today's hearing is Natalie Muilenberg of the Air Quality Division's Air Quality Improvement Planning Section.

Public notice of the comment period and hearing were published in *The Copper Basin News* on November 30, 2016 and December 7, 2016. Copies of the proposal were made available on ADEQ's website, at the ADEQ Phoenix Records Center, and at the Hayden Senior Center starting December 5, 2016. The plan will remain available until the close of comment period, which is 5:00 p.m. today.

If you wish to make a verbal comment, fill out a speaker slip, available at the sign-in table, and give it to the Department representative. You may also submit written comments during today's hearing or refer to the hearing agenda for additional submission details.

Comments made during the formal comment period are required by law to be considered by the Department when preparing the final submission to the U.S. Environmental Protection Agency. The Department will include a responsiveness summary for written and oral comments received during the formal comment period.

The agenda for this hearing is as follows:

First, we will present a brief overview of the proposal.

Then I will conduct the oral comment portion. At that time, I will call speakers in the order that I have received speaker slips.

Please be aware that any comments at today's hearing that you want the Department to formally consider must be given either in writing or on the record during this oral proceeding.

At this time Natalie will give a brief overview of the proposal.

* * * * *

Natalie Muilenberg: Hello and thank you for coming.

In 2008, EPA revised the nearly 40-year-old National Ambient Air Quality Standard for lead, strengthening them by almost 90 percent. The maximum allowable level of lead in ambient air is a rolling three-month average of 0.15 micrograms per cubic meter evaluated over a three-year period. EPA tightened the standards to provide increased protection for children and other at-risk populations against an array of adverse health effects, including neurological effects in children.

In 2014, EPA redesignated the Hayden area from unclassifiable to nonattainment after several violations of the lead air quality standards were recorded at ADEQ's ambient air monitor. The boundaries of the nonattainment area match those of the Hayden sulfur dioxide nonattainment area, located in both Gila and Pinal Counties. The area's nonattainment designation triggers planning and control requirements under the Clean Air Act to bring the area to attainment of the 2008 Lead standards as expeditiously as practicable.

ADEQ's analysis shows that a copper smelter, currently owned and operated by ASARCO, is the primary source of lead emissions within the Hayden nonattainment area, thus, planning and rulemaking efforts are focused on the facility.

In 2015, ASARCO entered into a consent decree with the Environmental Protection Agency to settle a civil enforcement action for National Emissions Standards for Hazardous Air Pollutants or NESHAPs. To comply with the consent decree, ASARCO will spend over $150 million in control equipment and retrofits to reduce emissions at its smelter and ambient lead concentrations in Hayden. The controls required by the consent decree are also part of the control strategy for this SIP revision. The control requirements are integrated into two new rules applicable to ASARCO, R18-2-B1301 and R18-2-B1301.01. This SIP revision demonstrates that the Hayden area will attain the 2008 lead air quality standards by 2019.

* * * * *

Mr. Parkey: This concludes the overview portion of this proceeding.

* * * * *

Does anyone want to make any comments?

Hearing that no one wants to make a comment, this concludes the oral comment portion of this proceeding.

* * * * *

If you have not already submitted written comments, you may submit them at this time. Again, the comment period for this proposal ends today, Tuesday, January 10, 2017 at 5:00 p.m.

Thank you for attending.

The time is now 10:08 a.m. I now close this oral proceeding.

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Responsiveness Summary

Response to Testimony Taken at Oral Proceedings and Written Comments Received on the Hayden Lead (Pb) State Implementation Plan Revision

The oral proceeding on the Hayden Lead (Pb) Nonattainment Area State Implementation Plan (SIP) revision was held on Tuesday, January 10, 2017, at 10:00 a.m. at the Arizona Department of Environmental Quality (ADEQ) in Conference Room 3175, 1110 West Washington Street, Phoenix, Arizona. The public comment period closed on Tuesday, January 10, 2017, at 5:00 p.m. No oral comments were received by ADEQ for the SIP revision. The following written comments were received from the Environmental Protection Agency and ADEQ's responses are below.

Please note that provided in the SIP submittal (Appendix F) are copies of the comments ADEQ received from EPA. EPA's comments on the Hayden Pb SIP were included in comments given on the Hayden Pb SIP, Hayden SO_2 SIP, Miami SO_2 SIP, and the rules pertaining to all three nonattainment areas. Because this submittal is for the Hayden Pb SIP only, ADEQ addressed below only EPA's comments related to the Hayden Pb SIP. The rest of EPA's comments are addressed in the separate submittals for the Hayden SO_2 SIP, Miami SO_2 SIP, and the final rulemaking for all three nonattainment areas.

Chapter 1: Introduction

1) Comment: Check to see if footnotes are accurate and all cited documents are publicly available in the links provided.

   Response: Footnotes and website links have been updated.

2) Comments: On page 6:
   a. Section 1.5.1 – Last sentence in first paragraph needs to be updated.
   b. Emission threshold is 0.5 tpy not 0.05 tpy.

   Response: ADEQ made these changes in the final SIP.

3) Comment: Section 1.6.4 "Economy" could be considerably shortened with citations to already published documents. Except for some summary information, much of this discussion is irrelevant for the SIP.

   Response: ADEQ left the SIP as is. The Section provides important economic and employment data for the town of Hayden, which lends context to the role Asarco's copper smelter plays in the local economy.

Chapter 2: Air Quality Monitoring

4) Comment: In listing monitoring regulations on page 20, please revise the Part 58 bullet to match the Hayden SO2 SIP bullet and state "40 CFR Part 58 and Appendices A, C, D, and E." The subparts currently listed are incomplete, and do not include the appendices.

Response: ADEQ edited the final SIP to say, "40 CFR Part 58 and Appendices A, C, D, and E."

5) Comment: In listing monitoring regulations on page 20, please delete the subparts and simply refer to the 40 CFR 50. If it is necessary to specify the subparts, please include Subparts A, C, and E.

   Response: No subparts were originally listed for 40 CFR Part 50 in the proposed SIP. There are also no subparts in 40 CFR Part 50. Only Appendix G and Appendix Q pertaining to lead were listed in the proposed SIP. Thus, no changes were made.

6) Comment: To clarify/add to what is provided on page 20, to be used for determining NAAQS compliance (i.e. for boundary determinations associated with NAAQS designations), data must be measured using FRM/FEM/ARMs, follow the quality assurance and quality control requirements contained in 40 CFR 58 Appendix A, siting requirements contained in 40 CFR 58 Appendix E, and be analyzed in accordance with the relevant portion of 40 CFR Part 50.

   Response: The proposed SIP already included relevant appendices from 40 CFR Part 50. The final SIP is also edited per comment #4, which already includes 40 CFR Part 58, Appendices A and E.

7) Comment: Footnote 32 appears to contain an inactive link.

   Response: ADEQ updated the website link in footnote 32.

8) Comment: Page 22 contains an Error! Message related to Figure 3.

   Response: ADEQ corrected this cross-reference error message for Figure 3.

9) Comment: Page 22 states that ADEQ runs meteorological and Pb monitoring at Globe Highway. This is confusing given that the discussion on the preceding page only discussed meteorological monitoring at Camera Hill and Hayden Old Jail. Please clarify.

   Response: ADEQ has edited Section 2.1 to clearly define the meteorological and ambient Pb monitoring networks in the Hayden Pb NAA. In sum, meteorological monitoring occurs at ADEQ's Globe Highway and Hayden Old Jail, in addition to Asarco's monitor at the Camera Hill site. Ambient Pb monitoring occurs at ADEQ's Globe Highway and Hillcrest sides, in addition to Asarco's monitoring locations installed as part of EPA's Superfund Remedial Investigation and Feasibility Study (RI/FS).

10) Comment: Pb collocation requirements are contained in 40 CFR 58 Appendix A. The first sentence of Section 2.1.2 should therefore refer to Appendices D and A.

    Response: ADEQ made this correction in the final SIP.

11) Comment: In section 2.2, please include an explanation as to why the data are shown only through 2014, if it is not included elsewhere in the document.

    Response: ADEQ has edited Section 2.2 to add air quality monitoring data through 2016. The proposed SIP was only updated through 2014, but now that the final SIP will be submitted in 2017, ADEQ included complete data through 2016 accordingly.

Chapter 4: Control Measures

12) Comments: For Section 4.6 -
    a. Table 22 – Please use "EPA approval" "EPA Administrator approval" in lieu of "administrator approval".

       Response: "Administrator" was changed to "EPA" in Table 23 on page 123 in the final SIP (formerly Table 22 in the proposed) for the NAA's RFP schedule. ADEQ notes that "Administrator" is retained in the same schedule incorporated in the Pb dust rule, R18-2-B1301.01, to remain consistent with the definition of "Administrator" in R18-2-101.

    b. We are not sure Figure 8 with data from 3 different monitors is helpful or provides useful information. We recommend removing this figure or further explaining why this is necessary.

       Response: Both Figures 8 and 7 depict RFP for the Hayden Pb NAA. Figure 8 depicts RFP using data from the Hillcrest ambient Pb monitor and Figure 7 depicts RFP using data from the Globe Highway ambient Pb monitor. Each figure does not use data from three different monitors as EPA commented. The data represented in each figure is comparing the RFP "slope" in ug/m^3, the actual Pb concentration from the monitor in ug/m^3, and the estimated emissions amount in tons (see each figure's color-coded key). As explained in Section 4.6.2, RFP for the Hayden Pb NAA is being measured in ambient air concentrations. Therefore, each figure depicts RFP using ambient air data from each of ADEQ's monitors (Globe Highway and Hillcrest). ADEQ did not remove these figures as they satisfy RFP requirements under CAA Section 172(c)(2) and related EPA guidance.

    c. Also please note that the red line, for 2016-2019, are modeled estimates. So the red line is observed (past) and estimated (future) concentrations at the monitors.

Response: ADEQ assumes EPA's comment is still in regards to Figures 7 and 8. ADEQ notes EPA's comment, as this was already depicted in the figures and explained in the SIP at page 125 in Section 4.6.2.

13) Comments: Please clarify the following:

a. Section 4.7.3 - It is not clear that the paved roads silt loading reduction of 55% is due to sweeping roads twice a day. MAG's analysis suggests that this reduction in silt loading is achieved by one sweeping of the paved roads with a conventional sweeper on the day of sweeping. It is also not clear that sweeping twice a day linearly decreases silt loading by an additional 55%.

Response: ADEQ has provided a Technical Memo to address this comment as well as comment (b) below. The Memo is included as Appendix E in the final SIP.

b. R18-2-B1301.01 requires cleaning roads at least once daily with a sweeper, vacuum, or wet broom in accordance with manufacturer recommendations. This is assumed to provide for a 55% reduction in silt loading, which is already required as part of the base control strategy for the SIP. Therefore, it is not clear what silt loading reduction was assumed as an input for modeling for twice a day sweeping and how that is considered additional control that can be used as a contingency measure.

Response: ADEQ has provided a Technical Memo to address this comment as well as comment (a) above. The Memo is included as Appendix E in the final SIP.

ADEQ maintains that the contingency measure for the Hayden Pb NAA meets all necessary requirements. In its comments on the Pb dust rule (R18-2-B1301.01), EPA asserted that Subsection (E) of the rule be revised to set aside an additional contingency measure to be undertaken if the Hayden Pb NAA fails to attain the NAAQS by the attainment date, and the one contingency measure in Subsection (E) of the rule be already triggered "early."[1] EPA interpreted the *Bahr* case[2] to justify this additional requirement.

This is an inaccurate interpretation of the *Bahr* case, as the case was silent on requiring separate contingency measures, one to be used when an area fails to reach RFP and one to be used when it fails to reach attainment. CAA Section 172(c)(9) is clear that

[1] See letter from Colleen McKaughan, Associate Director, Air Division, EPA Region 9 to Tim Franquist, Director, Air Quality Division, ADEQ dated January 13, 2017, "RE: Comments on the Draft State Implementation Plan for the Hayden Nonattainment Area for the 2008 Primary Lead (Pb) Standard and the 2010 Primary Sulfur Dioxide (SO2) standard and associated rules; Comments on State Implementation Plan for the Miami Nonattainment area for the 2010 Primary SO2 standard and associated rules." Specific comment mentioned here is on page 12, "Section E 'Contingency Requirements'".

[2] See Bahr v. EPA, 836 F.3d 1218 (9th Circuit, 2016).

contingency measures are triggered should an "area fail to make reasonable further progress, *or* to attain the national primary ambient air quality standard by the attainment date applicable under this part" (emphasis added). As explained in the SIP, Section 4.7.3, the Hayden Pb NAA's contingency measure supplies the required amount of ambient Pb reductions that equate to one year's worth of RFP. R18-2-B1301.01 incorporates the statutorily required trigger mechanisms (failure to meet RFP and attainment) so that the contingency measure can be implemented without further action on ADEQ or EPA's part.

Furthermore, the NAA's contingency measure is, in fact, not being implemented "early." The *Bahr* case opposed EPA's previous interpretation of CAA Section 172(c)(9), which allowed the use control measures not part of a SIP's attainment control strategy for contingency purposes, even if those control measures were already implemented. The *Bahr* decision upheld the definition of "contingency," meaning, contingency measures are those to be undertaken in the future, and thus cannot be implemented "early." The Hayden Pb NAA's contingency measure is required to be implemented when statutorily triggered, i.e. fails to reach RFP or attainment, whichever occurs first. The *Bahr* case therefore has no implications for the Hayden Pb NAA's contingency measure.

Chapter 5: Attainment Demonstration

14) Comment: Section 5.2 – Table 23 outlines reductions assumed in the modeling attainment demonstration. Here or in the Emission Inventory sections please further describe how the 84% emission reduction is achieved for paved roads.

Response: ADEQ has added more language in the Emissions Inventory TSD in Section 6.1.2 to address EPA's comment, which now states:

> No control efficiencies were mandated for paved roads in the fugitive dust plan. The paved roads section states Asarco must clean roads with sweepers or vacuum/wet broom vehicles no less frequently than daily. In addition, the facility will be required to pave certain roads. ADEQ's attainment year paved road emissions are based on 2019 PTE calculations provided by Asarco for PM_{10} emitted from the activities in Table 5-2 [of the EI TSD].
>
> ADEQ then determined a representative lead factor to apply to road emissions in the attainment year. The lead factor ADEQ used was from the CERCLA investigation, which took place between 2013 and 2015. During this time, high lead sources associated with filter plant activities (wet dry bins) were in operation, and the consent decree wind fences, material pile water sprays, and thickener project controls we're not. This is significant because fugitive and track out emissions from the wet dry bins, and other

materials handling operations, have a large impact on the lead content of smelter road dust. By the attainment date, thickener project controls (replacing wet dry bins), wind fences, and waters sprays will be implemented. This application of controls is anticipated to change future state leaded silt loading on smelter paved roads.

The previously mentioned controls are intended to reduce fugitive and track out emissions from the concentrate bedding area and wet dry bins (also called solar drying pads). Both of these sources are located adjacent to a heavily trafficked paved road in the center of the smelter complex. Given this, the mass fraction of lead in road dust is anticipated to decrease, changing the attainment year paved road dust Pb factor.

ADEQ's approach for determining an appropriate future state lead factor involved using a paved road lead sample from the RI/FS that was spatially removed from the materials handling sources previously mentioned. ADEQ's chosen factor was derived from sample SP09.5, more specifically. This sample was taken from a paved road near the concentrator.

ADEQ feels this sample is representative of the smelter's future state due to its distance from sources not present in 2019, or sources to which consent decree controls apply (concentrate bedding area). However, the sample location is still within close proximity to other Pb sources at the facility, such as:

- slag loading (takes place roughly .1 miles east)
- concentrate over flow storage (takes place roughly .25 miles north)
- smelter fugitives (the smelter is roughly .5 miles southeast).

ADEQ's calculation methodology involved applying the SP09.5 percent mass result (for lead) to 2019 PM_{10} paved road dust totals. A comparison of the 2012 and 2019 smelter paved road emissions can be seen in Table 7-3 [of the EI TSD]. For more on this calculation see the reference workbook titled "Facility PTE" [submitted with SIP].

Appendix A (Emission Inventory Technical Support Document)

15) Comment: The Emission Inventory TSD contains table summaries of emission calculations for the 2012 base year and the 2019 projected year. These tables represent the final summaries of an extensive amount of work on the part of ADEQ staff in quantifying and projecting Pb emissions from point and nonpoint sources in the nonattainment area. It does not appear that any of the supporting calculations used to develop these summary tables are present in the proposed SIP. Please describe these supporting calculations and assumptions in greater detail in the Emission Inventory TSD, and include the underlying documentation in the final submittal to EPA. If the entirety of the underlying spreadsheets and documents are too extensive or

voluminous to practicably make available for review, please focus on the most crucial or often-referenced spreadsheets and documents.

Response: ADEQ has edited the EI TSD to describe the supporting calculations and has submitted the supporting Excel Workbooks with the final SIP.

Appendix B (Modeling Technical Support Document)

16) Comment: EPA's memorandum "Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions", dated April 23, 2014, Appendix A, Section 5.3 states "receptors should be placed in areas that are considered ambient air" and "at key locations such as around facility fence lines (which define the ambient air boundary for a particular source)". Ambient air is defined as "that portion of the atmosphere, external to buildings, to which the general public has access."[3] EPA's longstanding view is that the exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers.[4] This represents EPA's national policy with regard to ambient air, and has been reaffirmed on multiple occasions.[5,6,7] As part of demonstrating if an exemption is appropriate, a source must show that the necessary steps have been taken to preclude the general public from accessing the property by some type of physical barrier, such as a fence, wall or a natural obstruction.[8]

In general, the documentation provided was insufficient for EPA to conclude that exemption from ambient air would be appropriate. Additional supporting information is needed, as well as further evaluation of the adequacy of the existing physical barriers. Based on our review of the information currently available, we have the following recommendations:

> *The Modeling Technical Support Documents for the Hayden SO_2 and Pb SIPs provide a description of the ambient air boundary used for attainment modeling for the Asarco smelter. Upon preliminary review of the documentation provided, it is unclear if a sufficient physical barrier that precludes public access exists along the entirety of the indicated boundary. We recommend areas closest to towns and roadways (segments B-*

[3] 40 CFR 50.1(e)
[4] Letter from Administrator Douglas M. Costle, EPA to Senator Jennings Randolph, Chairman, Environment and Public Works Committee (Dec. 19, 1980).
[5] EPA Memo "Determining the Ambient Air Boundary for Potential Permit Application in Support of Alaska Industrial Development and Export Authority's Restart of Healy Clean Coal Project", September 11, 2007.
[6] Letter from Gerald Emison, EPA to William O'Keefe, American Petroleum Institute, January 22, 1986
[7] EPA Memo from Joseph Tikvart, Chief, Source Receptor Analysis Branch to Regional Modeling Contacts, Regions I-X, January 21, 1986
[8] EPA Memo "Interpretation of 'Ambient Air' In Situations Involving Leased Land Under the Regulations for Prevention of Significant Deterioration", June 22, 2007. As indicated in the attachment to this EPA memo, "preclude" does not necessarily imply that public access is absolutely impossible, but rather that the likelihood of such access is small.

H) include additional fencing to form a continuous fence, due to the potential for public access. For Segments A and I, we also recommend a physical barrier consisting of additional fencing except in those areas, such as where the distance increases from the main road (and any other roads), for which the State can document that the terrain is sufficiently rugged to preclude public access. A site survey of the terrain and roads, etc. should be completed by the State to determine where fencing may terminate in those segments and verify that public access is precluded, including at access points to those areas.

Response: ADEQ appreciates EPA's concerns regarding the ambient air boundary for the Hayden Pb and SO2 SIPs. ADEQ personnel inspected both the Asarco and Freeport McMoRan smelters in Hayden and Miami to investigate the physical barriers around the properties. ADEQ visited the Asarco smelter in Hayden on 2/23/17. During the inspection, ADEQ confirmed the appropriate fencing and physical barriers. A description and photographic evidence of the visit is included in the Modeling TSD in Appendix B. ADEQ concurs with the AAB assessment provide by Asarco[9] and agrees that the boundary represents a practical ability to preclude public access.

ADEQ also notes the following change made to the final SIP in the Modeling TSD and Chapter 5: In January 2017, Asarco acquired a piece of land east of the smelter that was previously not part of the ambient air boundary (AAB). ADEQ re-modeled the new AAB that incorporates the land, but modeling results did not change. The resultant ambient Pb concentration remained 0.12 ug/m^3. Chapter 5 in the final SIP and the Modeling TSD in Appendix B includes new figures that depict the updated AAB.

[9] See the Hayden SO_2 Nonattainment SIP, Modeling Technical Support Document, Appendix C. The Hayden SO_2 nonattainment area's boundaries are the same for the Hayden Pb nonattainment area boundaries.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

January 13, 2017

Timothy Franquist
Director, Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

RE: Comments on the Draft State Implementation Plan for the Hayden Nonattainment Area for the 2008 Primary Lead (Pb) standard and the 2010 Primary Sulfur Dioxide (SO_2) standard and associated rules; Comments on State Implementation Plan for the Miami Nonattainment area for the 2010 Primary SO_2 standard and associated rules.

Dear Mr. Franquist:

This letter transmits the U.S. Environmental Protection Agency's (USEPA) comments based on our preliminary review of the above State Implementation Plans (SIPs) developed by the Arizona Department of Environmental Quality (ADEQ). We appreciate the opportunity to review the SIPs and to provide our comments. Our comments are based on an assessment of how the SIPs meet the requirements of the Clean Air Act and the respective regulations and guidance for each pollutant.

Although we expect that you will consider and incorporate all the changes indicated by our comments, we wanted to highlight the following as critical issues to be addressed in the above SIPs:

1. Replacing the Hybrid or Dual Emission limits proposed in the Hayden SO_2 SIP with the approach for setting long term emissions limits as outlined in the EPA's Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 23, 2014;
2. Providing additional detail for the EPA to determine whether the ambient air boundaries used for dispersion modeling are appropriate for all the above SIPs;
3. Making specific rule language changes as indicated in the attached document section titled "EPA Region 9 Comments to Arizona Department of Environmental Quality on Rules for Pb and SO_2 Nonattainment Area SIPs".

We appreciate the collaborative working relationship between ADEQ and USEPA over the past many months, and the effort put forward by you and your staff. This has been an extremely unique and complex effort, and we look forward to moving these SIPs and rules forward for the protection of Arizona residents and the environment. If you have any questions, or wish to discuss our comments further, please contact me at 520-498-0118 or Krishna Viswanathan at 520-999-7880.

Sincerely,

Colleen McKaughan

Colleen McKaughan
Associate Director, Air Division
USEPA, Region 9

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Attachments

ADEQ Hayden Pb SIP Review

1.0 Introduction

- Check to see if footnotes are accurate and all cited documents are publicly available in the links provided.
- Page 6:
  - Section 1.5.1 – Last sentence in first paragraph needs to be updated.
  - Emission threshold is 0.5 tpy not 0.05 tpy.
- Section 1.6.4 This section could be considerably shortened with citations to already published documents. Except for some summary information, much of this discussion is irrelevant for the SIP.

2.0 Air Quality Monitoring

- In listing monitoring regulations on page 20, please revise the Part 58 bullet to match the Hayden SO2 SIP bullet and state "40 CFR Part 58 and Appendices A, C, D, and E." The subparts currently listed are incomplete, and do not include the appendices.
- In listing monitoring regulations on page 20, please delete the subparts and simply refer to the 40 CFR 50. If it is necessary to specify the subparts, please include Subparts A, C, and E.
- To clarify/add to what is provided on page 20, to be used for determining NAAQS compliance (i.e. for boundary determinations associated with NAAQS designations), data must be measured using FRM/FEM/ARMs, follow the quality assurance and quality control requirements contained in 40 CFR 58 Appendix A, siting requirements contained in 40 CFR 58 Appendix E, and be analyzed in accordance with the relevant portion of 40 CFR Part 50.
- Footnote 32 appears to contain an inactive link.
- Page 22 contains an Error! Message related to Figure 3.
- Page 22 states that ADEQ runs meteorological and Pb monitoring at Globe Highway. This is confusing given that the discussion on the preceding page only discussed meteorological monitoring at Camera Hill and Hayden Old Jail. Please clarify.
- Pb collocation requirements are contained in 40 CFR 58 Appendix A. The first sentence of Section 2.1.2 should therefore refer to Appendices D and A.
- In section 2.2, please include an explanation as to why the data are shown only through 2014, if it is not included elsewhere in the document.

4.0 Control Measures

Section 4.6

- Table 22 – Please use "EPA approval" "EPA Administrator approval" in lieu of "administrator approval".
- We are not sure Figure 8 with data from 3 different monitors is helpful or provides useful information. We recommend removing this figure or further explaining why this is necessary.
- Also please note that the red line, for 2016-2019, are modeled estimates. So the red line is observed (past) and estimated (future) concentrations at the monitors.

- Please clarify the following:
    a. Section 4.7.3 - It is not clear that the paved roads silt loading reduction of 55% is due to sweeping roads twice a day. MAG's analysis suggests that this reduction in silt loading is achieved by one sweeping of the paved roads with a conventional sweeper on the day of sweeping. It is also not clear that sweeping twice a day linearly decreases silt loading by an additional 55%.
    b. R18-2-B1301.01 requires cleaning roads at least once daily with a sweeper, vacuum, or wet broom in accordance with manufacturer recommendations. This is assumed to provide for a 55% reduction in silt loading, which is already required as part of the base control strategy for the SIP. Therefore, it is not clear what silt loading reduction was assumed as an input for modeling for twice a day sweeping and how that is considered additional control that can be used as a contingency measure.

5.0 Attainment Demonstration

- Section 5.2 – Table 23 outlines reductions assumed in the modeling attainment demonstration. Here or in the Emission Inventory sections please further describe how the 84% emission reduction is achieved for paved roads.

Appendix A (Emission Inventory Technical Support Document)

- The Emission Inventory TSD contains table summaries of emission calculations for the 2012 base year and the 2019 projected year. These tables represent the final summaries of an extensive amount of work on the part of ADEQ staff in quantifying and projecting Pb emissions from point and nonpoint sources in the nonattainment area. It does not appear that any of the supporting calculations used to develop these summary tables are present in the proposed SIP. Please describe these supporting calculations and assumptions in greater detail in the Emission Inventory TSD, and include the underlying documentation in the final submittal to EPA. If the entirety of the underlying spreadsheets and documents are too extensive or voluminous to practicably make available for review, please focus on the most crucial or often-referenced spreadsheets and documents.

Appendix B (Modeling Technical Support Document)

- EPA's memorandum "Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions", dated April 23, 2014, Appendix A, Section 5.3 states "receptors should be placed in areas that are considered ambient air" and "at key locations such as around facility fence lines (which define the ambient air boundary for a particular source)". Ambient air is defined as "that portion of the atmosphere, external to buildings, to which the general public has access."[1]. EPA's longstanding view is that the exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers.[2] This represents EPA's national policy with regard to ambient air, and has been

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[2] Letter from Administrator Douglas M. Costle, EPA to Senator Jennings Randolph, Chairman, Environment and Public Works Committee (Dec. 19, 1980).

reaffirmed on multiple occasions.[3,4,5] As part of demonstrating if an exemption is appropriate, a source must show that the necessary steps have been taken to preclude the general public from accessing the property by some type of physical barrier, such as a fence, wall or a natural obstruction.[6]

In general, the documentation provided was insufficient for EPA to conclude that exemption from ambient air would be appropriate. Additional supporting information is needed, as well as further evaluation of the adequacy of the existing physical barriers. Based on our review of the information currently available, we have the following recommendations:

The Modeling Technical Support Documents for the Hayden SO_2 and Pb SIPs provide a description of the ambient air boundary used for attainment modeling for the Asarco smelter. Upon preliminary review of the documentation provided, it is unclear if a sufficient physical barrier that precludes public access exists along the entirety of the indicated boundary. We recommend areas closest to towns and roadways (segments B-H) include additional fencing to form a continuous fence, due to the potential for public access. For Segments A and I, we also recommend a physical barrier consisting of additional fencing except in those areas, such as where the distance increases from the main road (and any other roads), for which the State can document that the terrain is sufficiently rugged to preclude public access. A site survey of the terrain and roads, etc. should be completed by the State to determine where fencing may terminate in those segments and verify that public access is precluded, including at access points to those areas.

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ADEQ Hayden SO2 SIP Review

1.0 Introduction

- Page 4, section 1.5 Last paragraph – Revise "The Governor's Office submitted the recommendation to EPA on April 25, 2011. EPA agreed with Arizona's recommendation, and the Miami area was designated as nonattainment for the 2010 SO2 NAAQS on August 5, 2013 (78 FR 47191; effective October 4, 2013)." to include Hayden, as both areas were designated in the same action.
- Section 1.6.1 NAA Legal descriptions are cited correctly but the boundaries seem different from the Pb SIP description (they should be the same) and the legal boundary provided in the table is incorrect. Please rectify.
- Sections 1.6.3 and 1.6.4 need to be closely tied to the air quality problem in the area. These sections can be summarized to one page and readers referred to other publications for more detailed information.
- Table 1.8 110(l) please correct *inferred* to *interfered.*
- Throughout text, please replace Miami with Hayden as appropriate.

2.0 Ambient Air Quality Monitoring

- Please provide a discussion of monitor location versus anticipated high concentrations in this chapter.
- In listing monitoring regulations on page 20, please include 40 CFR 50 Appendix A, and 40 CFR 58 Appendices A, C, D, and E. Also, revise it to simply say 40 CFR 58 and do not list the subparts, or list subparts A-G. Also, 40 CFR 51 should not be referenced here.
- Page 20 says the state established monitoring sites "during 1970." Table 2-1 shows the date the Hayden Old Jail was established as 1/1/1969. Please reconcile.
- Please revise the first sentence of Section 2.2 to read, "The CAA requires EPA to set national ambient air quality standards for SO2 and other criteria air pollutants..."
- The last sentence on page 22 should read that the highest annual 99th percentile 1-hour concentration was 353 ppb in 2012 (not 314 ppb).
- Table 2-3 appears to be incorrectly titled, as it presents data from 2010-2014.
- Please include information as to whether ADEQ considers the ASARCO data to be adequate to be considered as additional information. If not, please explain why. If so, please provide a description of the values seen at those monitors in relation to the concentrations measured at the Hayden Old Jail site.
- In section 2.3, please include an explanation as to why the data are shown only through 2014, if it is not included elsewhere in the document.

4.0 Control Strategy

- 4.2 Retrofit controls and designed control efficiencies are discussed in the narrative. We recommend that these be summarized in a table to clearly call out for the reader each discrete control being compared in the RACT/RACM analysis later.

Emission Points

- 4.3.1: Is the discussion on GEP stack height accurate? (PDF page 56, document page 49)
- 4.3.1: Duplicate "... an effective" in first line of first full paragraph (PDF page 57)
- 4.3.2: Recommend include discussion/explanation on why direct monitoring of roofline fugitives is not being done.

4.4.3 RACT/RACM Analysis

The existing analysis outlines the proposed control measures, then includes a table of similar measures that have been deemed RACM or RACT in other facilities across the country. This analysis is insufficient. We recommend improving the RACT/RACM analysis with the following additions that mirror the analysis conducted for the Miami SO2 SIP.

- Describe each control measure discussed in the narrative in 4.2, and explain why ADEQ believes such a control meets RACT or RACM for SO2 control.
- Include ADEQ's evaluation on the effectiveness for each proposed control measure at the Hayden smelter in a tabular format, similar to the evaluation done for the Miami smelter in this section of the SIP chapter.
- Compare each control measure and its effectiveness to equivalent control measures from across the country directly in the same table.

4.5.3.7 Compliance and Test Methods

- Missing discussion of the dual limit, allowing compliance with the 1518 pounds per hour CEV limit. This approach is not acceptable to EPA. See our detailed comments on this topic in the rules section, R18-2-B1302, paragraph C.1.

5.0 Reasonable Further Progress

- Page 68; Citation to General preamble is incorrect. It should be 57 FR 13498, at 13547.

- The language seems to imply that the implementation of controls by the applicable attainment date is acceptable whereas the Guidance states "..... the air agency needs to ensure that affected sources implement appropriate control measures as expeditiously as practicable in order to ensure attainment of the standard by the applicable attainment date.", which means that controls need to be installed earlier than the attainment date such that the area attains the NAAQS by the attainment date of October 4, 2018.

5.5.1 Compliance Schedule for Implementation of the CRP at the Hayden Smelter

- The SIP states "The EPA SO2 guidance indicates that a nonattainment area must achieve one calendar year of clean data to be considered for redesignation to attainment." This is incorrect and needs to be revised. As stated in the Guidance, EPA's requirements for determination of attainment generally requires 3 calendar years of clean data from a regulatory monitor. The inclusion of one year of post-compliance monitoring data would increase the likelihood of the area showing 3 years of clean data at the regulatory monitor. In the EPA SO2 Guidance (Guidance), EPA stated that it expects states to require sources to begin complying with the

attainment strategy in the SIP no later than January 1, 2017. The plans should be able to provide at least 1 calendar year of air quality monitoring data (and at least 1 calendar year of compliance information which, when modeled, would show attainment) before the applicable attainment deadline, indicating that the plan is in fact providing for attainment.

- EPA's requirements for redesignation of areas are separately outlined in the memorandum from John Calcagni, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, N.C., "Procedures for Processing Requests to Redesignate Areas to Attainment." September 4, 1992.
- Please clarify that "Although the area will not have one year of clean data by the attainment deadline, the modeling projections indicate that emission reductions of SO2 and the resulting ambient monitoring will show attainment of the 2010 SO2 NAAQS, with the implementation schedule outlined in Table 5-8".

5.6 Attainment Demonstration

- Modify last sentence on Page 70 to "This delay may result in the area not attaining the NAAQS by the applicable attainment date of October 2018. However, as stated earlier, ADEQ commits to submitting any necessary SIP revisions per the streamlined approach outlined in page 11 of the SO2 NAA Guidance."

6.0 Contingency Measures

- 6.2 Please remove last statement regarding the clean data policy. The policy as stated in the Guidance is "Nonattainment areas with design values over the level of the NAAQS may be able to achieve emission reductions in the area, or in nearby areas such that, when their effect is considered in combination with reductions achieved under national or regional programs, they may be sufficient to attain the SO2 NAAQS before SIPs are due under section 191(a)."
- The SIP for this area was due in April 2015 and is approximately 24 months late; therefore, the Clean Data Policy does not apply in this area and contingency measures are required.

7.0 Conformity

- 7.1 Change text to indicate Hayden NAA.

8.0 New Source Review

- 8.1 NSR for the Hayden SO2 Nonattainment NAA.
- The text is unclear. EPA promulgated a limited approval/limited disapproval of ADEQ's 2012 submission; please clarify the status of the submittal of the parts of the program that were disapproved by the EPA.

Appendix B (Emission Inventory Technical Support Document)

- The Emission Inventory TSD contains table summaries of emission calculations for the 2012 base year and the 2019 projected year. It also includes table summaries of 2009-14 historical emissions for major point sources in the NAA, specifically the Hayden Smelter and Ray Mine Complex. These tables represent the final summaries of an extensive amount of work on the

part of ADEQ staff in quantifying and projecting SO_2 emissions from the Hayden Smelter, as well as other sources in the NAA. It does not appear that the supporting calculations used to develop these summary tables were part of the proposed SIP. Please describe these supporting calculations and assumptions in greater detail in the Emission Inventory TSD, and include the underlying documentation in the final submittal to EPA. In particular, we consider those spreadsheets that contain Hayden Smelter historical emission data and projected emission profile to be the most crucial.

Appendix C (Attainment Demonstration Technical Support Document)

- Please include wind roses and discuss the meteorological characteristics of Camera Hill in comparison to alternate meteorological stations located near the smelter. Discuss why Camera Hill meteorology adequately represents the behavior of the smelter fugitives and main stack plumes.
- See EPA comment regarding the model receptor/ambient air boundary used in the Hayden Pb SIP above, which also applies to model receptor boundary discussed in Appendix C of Appendix C (Modeling Technical Support Document for the Hayden Sulfur Dioxide (SO_2) Nonattainment Area).

ADEQ Miami SO2 SIP Review

General

Please check all citations in the document. Some citations are referred to incorrectly and some provided links don't seem to work.

1.0 Introduction

- Section 1.6.1 NAA Legal descriptions; please correct 3rd row in Table 1-3 to R 13E.
- Section 1.6.3 and 1.6.4 need to be closely tied to the air quality problem in the area. These sections can be summarized to one page and the reader referred to other publications for more detailed information.
- Table 1.8 110(l) please correct *inferred* to *interfered*.

2.0 Ambient Air Quality Monitoring

- In listing monitoring regulations on page 20, please include 40 CFR 50 Appendix A, and 40 CFR 58 Appendices A, C, D, and E. Also, revise it to simply say 40 CFR 58 and do not list the subparts, or list subparts A-G. Also, 40 CFR 51 should not be referenced here.
- The last sentence in the first paragraph on Section 2.1 appears to be misworded.
- On page 20, please indicate why all three monitors are located south-southwest of the smelter.
- Table 2-1 indicates that the three sites were established in 1993 and 1997. These years do not correspond to any of the discussion contained on page 19, making the explanations and table together confusing. Please clarify.
- Please revise the first sentence of Section 2.2 to read, "The CAA requires EPA to set national ambient air quality standards for SO2 and other criteria air pollutants..."
- In Table 2-2, please duplicate the shading used in the Ridgeline cells to the Jones Ranch and Townsite 2013 and 2014 99th percentile cells.
- In Table 2-2, please include a footnote stating something to the effect of, "This monitor had only three valid quarters of data this year" for the following (we note that the 2010 incomplete data year at Miami Ridgeline does not affect the validity of its design values):
    - Miami Ridgeline, 2010
    - Miami Jones Ranch, 2013
    - Miami Townsite, 2013
- The last sentence on page 22 should state that the highest design value (132 ppb) occurred 2007-2009, not 2012-2014 as currently stated.
- In section 2.3, please include an explanation as to why the data are shown only through 2014, if it is not included elsewhere in the document.

4.4.3 RACT/RACM Analysis

- RACT/RACM analysis includes estimates for control efficiency and emissions reduction for the control measures described in 4.3, and describes the analysis for the acid plant scrubbers and for fugitive emissions in the narrative. ADEQ presents its analysis in narrative format and concludes that the controls being implemented in this SIP would constitute RACT/RACM. A more effective analysis would include an additional table, or an additional column in an existing

table, that clearly compares each proposed control measure, the existing control measure defined as RACT/RACM, and comparative effectiveness. Please revise accordingly.

5.5.1 Compliance Schedule for Implementation of the CRP at the Hayden Smelter

- The SIP states "The EPA SO2 guidance indicates that a nonattainment area must achieve one calendar year of clean data to be considered for redesignation to attainment." This is incorrect and needs to be revised. As stated in the Guidance, EPA's requirements for determination of attainment generally requires 3 calendar years of clean data from a regulatory monitor. The inclusion of one year of post compliance monitoring data would increase the likelihood of the area showing 3 years of clean data at the regulatory monitor. In the EPA SO2 Guidance (Guidance), EPA stated that it expects states to require sources to begin complying with the attainment strategy in the SIP no later than January 1, 2017. The plans should be able to provide at least 1 calendar year of air quality monitoring data (and at least 1 calendar year of compliance information which, when modeled, would show attainment) before the applicable attainment deadline, indicating that the plan is in fact providing for attainment.
- EPA's requirements for redesignation of areas are separately outlined in the memorandum from John Calcagni, Director, Air Quality Management Division, OAQPS, U.S. EPA, Research Triangle Park, N.C., "Procedures for Processing Requests to Redesignate Areas to Attainment." September 4, 1992.
- Please clarify that "Although the area will not have one year of clean data by the attainment deadline, the modeling projections indicate that emission reductions of SO2 and the resulting ambient monitoring will show attainment of the 2010 SO2 NAAQS, with the implementation schedule outlined in Table 5-8".

5.6 Attainment Demonstration

- Modify last sentence on Page 68 to "This delay may result in the area not attaining the NAAQS by the applicable attainment date of October 2018. However, as stated earlier, ADEQ commits to submitting any necessary SIP revisions per the streamlined approach outlined in page 11 of the SO2 NAA Guidance."

8.0 New Source Review

8.1 NSR for the Hayden SO2 Nonattainment NAA.

- The text is unclear. EPA promulgated a limited approval/limited disapproval of ADEQ's 2012 submission; please clarify the status of the submittal of the parts of the program that were disapproved by the EPA.

Appendix B (Emission Inventory Technical Support Document)

The Emission Inventory TSD contains table summaries of emission calculations for the 2011 base year and the 2018 projected year. It also includes table summaries of 2012-14 historical emissions for major point sources in the NAA, specifically the Miami Smelter, as well as certain analyses for hourly emission rate frequency distribution for smelter sources. These tables represent the final summaries of an extensive amount of work on the part of ADEQ staff in quantifying and projecting SO_2 emissions from the Miami Smelter, as well as other sources in the NAA. It does not appear that the supporting calculations used to develop these summary

tables were part of the proposed SIP. Please describe these supporting calculations and assumptions in greater detail in the Emission Inventory TSD, and include the underlying documentation in the final submittal to EPA. In particular, we consider those spreadsheets that contain Miami Smelter historical emission data and projected emission profile to be the most crucial.

Appendix C (Attainment Demonstration Technical Support Document)

- Appendix L is missing from Appendix C.
- Please provide a walkthrough of the most recent Model Change Bulletins associated with the v15181 and v16216 to justify that the bug fixes since v14134 will not adversely affect the modeling results or rerun using the latest AERMOD version.
- See EPA comment regarding model receptor/ambient air boundary in the Hayden Pb SIP above, which provides background information applicable here. Appendix C, Section 3.2, pp. 3-15 to 3-19 provides a description of the ambient air boundary used for attainment modeling for the FMMI smelter. Upon preliminary review of the documentation, we recommend that the State complete a site survey to verify that continuous fencing exists around the boundary and that any unfenced terrain, particularly around the town of Miami, sufficiently and effectively precludes public access. It is not clear from Figure 3-3 and our examination of satellite imagery that public access is adequately precluded by the topography in these areas.

EPA Region 9 Comments to Arizona Department of Environmental Quality on Rules for Pb and SO_2 Nonattainment Area SIPs

Thank you for the opportunity to provide comment on the following draft Arizona Administrative Code rules and appendices:

- R18-2-B1301 "Limits on Lead Emissions from the Hayden Primary Copper Smelter"
- R18-2-B1301.01 "Limits on Lead-Bearing Fugitive Dust from the Hayden Primary Copper Smelter"
- R18-2-B1302 "Limits on SO_2 from the Hayden Primary Copper Smelter"
- R18-2-C1302 "Limits on SO_2 from the Miami Smelter"
- R18-2-715 "Standards for Performance for Existing Primary Copper Smelters; Site-specific Requirements"
- R18-2-715.01 "Standards for Performance for Existing Primary Copper Smelters; Compliance and Monitoring"
- A14 Appendix 14 "Procedures for Sulfur Dioxide and Lead Fugitive Emissions Studies for the Hayden Primary Copper Smelter"
- A15 Appendix 15 "Test Methods for Determining Opacity and Stabilization of Unpaved Roads"

Italicized text indicates rule text. Sections of text in strikeout are recommended for deletion, and sections in underlined text indicate proposed additional language. Bold text is for contextual emphasis.

We look forward to working with the Arizona Department of Environmental Quality to resolve these issues.

R18-2-B1301.01

Section D "Performance and Housekeeping Requirements," paragraph 10 "Unpaved Roads."

10. Unpaved Roads. These requirements apply to the unpaved roads identified in subsections (D)(10)(a)(i) through ***(D)(10)(a)(v)*** ...

There is no section (D)(10(a)(iv) or (v) in the rule. Please correct this error.

Section E "Contingency Requirements."

Clean Air Act (CAA)section 172(c)(9) requires nonattainment area SIPs to provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the standard by the applicable attainment date. In a recent decision, the U.S. Court of Appeals for the Ninth Circuit rejected EPA's approval of contingency measures implemented "early" as inconsistent with the plain language of CAA section 172(c)(9). *See Bahr v. EPA*, 836 F.3d 1218 (9th Cir. 2016) ("*Bahr*"), at 1235-1237.

Section E of R18-2-B1301.01 establishes a single contingency measure (doubling the paved road cleaning frequency from once to twice per day) that could be triggered by certain specified events, whichever happens first. One of the triggering events is notification by EPA Region IX of a failure of the area to attain by the attainment date. Under CAA section 179(c), EPA must determine within six months of the applicable attainment date whether an area attains the standard by that date, which, in the case of

Hayden for the 2008 Pb National Ambient Air Quality Standards (NAAQS) in Hayden, AZ, is as expeditiously as practicable but no later than October 3, 2019. Thus, if the Hayden area fails to attain the 2008 Pb NAAQS by the area's applicable attainment date, EPA's determination to that effect will likely not occur until 2020. A number of the other specific triggering events pre-date 2020, and as a result, the one contingency measure could be implemented "early," i.e. prior to EPA's determination of failure to attain (if the area in fact fails to attain), potentially leaving no measure to be undertaken if the area fails to attain the standard. In light of the *Bahr* decision and to meet the attainment contingency measure requirement under CAA section 172(c)(9), we suggest revising section E. of R18-2-B1301.01 to set aside a measure or measures specifically to be undertaken if and when EPA determines that the Hayden area has failed to attain the 2008 Pb NAAQS by the attainment date.

Section I "Reporting."

1. ~~On a quarterly basis~~ Within 30 days after the end of each calendar-year quarter, the owner or operator shall submit a report to the Department covering the prior quarter that includes the following:

We recommend inserting a time limit to be consistent with other ADEQ rules e.g., R18-2-B1301 section H.5.

R18-2-B1302

Section C "Sulfur Dioxide Emission Limitations," paragraph 1 (main stack emission limit, two-step limit).

R18-2-B1302, paragraph C.1 currently reads:

Emissions from the Main Stack shall not exceed 1069.1 pounds per hour on a 14-operating day average unless 1,518 pounds or less is emitted during each hour of the 14-operating day period.

The proposed emissions limit is inconsistent with the criteria for setting long term emissions limits outlined in EPA's Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 23, 2014 ("2014 Guidance"), Section V.D.2.b. (p.27). In order to assure that the SIP includes a limit that provides for attainment of the 1-hour SO2 NAAQS, revise this language to require continuous compliance with the 1-hr emission limit set at the CEV, or else continuous compliance with the 14-day limit set consistent with the 2014 Guidance, rather than allowing an exceedance of **either** of these limits at different times. After this revision is made, revise recordkeeping and monitoring requirements to be consistent with the final rule limit.

Section C "Sulfur Dioxide Emission Limitations," paragraph 2 (New Source Performance Standards limit).

2 The owner and operator shall not cause to be discharged into the atmosphere from any affected unit subject to 40 C.F.R. 60 Subpart P ….

The correct reference is to 60 subpart P. Please correct this error.

Section E "Monitoring," paragraph 6 (substitutes for annual stack testing).

6. ...Annual stack testing shall use EPA Methods 1, 4, 6C in 40 C.F.R. 60 Appendix A or an approved alternative method by the Department and EPA Region IX. Annual stack testing shall commence no later than ~~the~~ one year after the date the continuous emission monitoring system was removed...

Please correct the above noted errors, and include EPA Region IX in any approval for alternative testing methods.

R18-2-B1301 and R18-2-B1302

The following comments apply to the provisions concerning the Operations and Maintenance Plans (O&M plan) in the Hayden Smelter SO_2 and Lead rules. The paragraph citations are the same for both rules.

Section D "Operational Standards," paragraph 2 "Capture system and control device operations and maintenance plan," subparagraph b "Operational limits."

Subparagraph D.2.b identifies several operating limits that must be established in the O&M plan. While these provisions are described as limits in the rule language, we note that Paragraph D.2 merely states that these limits must be established, and does not include more explicit language indicating that the owner/operator must operate in accordance with those operating limits. We recognize that the O&M plan may contain additional provisions and content beyond these 12 initial operating limits listed in subparagraph D.2.b, and that not all of such additional provisions and content will be or should be compliance obligations. However, given the prominence of these 12 initial operating limits listed in subparagraph D.2.b., we consider more explicit language appropriate, and recommend the following revision:

b. Operational limits. The owner or operator shall establish and operate in accordance with operating limits in the operations and maintenance plan for the capture systems and/or control devices that are representative and reliable indicators of the performance of the capture system and control device operations. The initial operating limits may be adjusted as provided in subsection (D)(2)(e). Initial operating limits shall include the following:...

Section D "Operational Standards," paragraph 2 "Capture system and control device operations and maintenance plan," subparagraph b "Operational limits," item xi (acid plant catalyst bed temperature).

As noted on page 5-18 of the "Modeling Technical Support Document for the Hayden SO2 Nonattainment Area" supporting the SO2 SIP, Asarco has installed a new, full flow preheater at the acid plant. This preheater provides Asarco with the capability to heat all four catalyst beds in the acid plant to a minimum reaction temperature before process gases are introduced to the acid plant. Because the practice with the previous preheater was to only heat the first catalyst bed to the minimum reaction temperature, the acid plant operated at reduced effectiveness during startup periods. Many of the highest historical 1-hr emission rates are primarily attributable to acid plant startup emissions. The new, full flow preheater is expected to reduce peak startup emissions by 50%, and should eliminate many of the highest historical 1-hr emission rates. Its anticipated effectiveness is reflected in the projected emission profile of the smelter by an assumption that acid plant emissions will not exceed 1,000 lb/hr.

The language in subparagraph D.2.b.xi is helpful in addressing preheater operation by establishing a temperature at the catalyst bed consistent with manufacturer's recommendation. However, we feel

that this language needs additional clarification and specificity to ensure that future acid plant emissions are of a magnitude consistent with the assumptions in the projected emission profile.

xi. The operating temperatures of the acid plant catalyst bed, which shall at minimum, meet the ~~manufacturer's~~ catalyst vendor's recommendations for minimum reaction temperature ranges. This operating temperature range shall be achieved in each of the acid plant catalyst beds prior to introduction of gases from hot metal process sources as listed in Paragraph B.9.

Section D "Operational Standards," paragraph 2 "Capture system and control device operations and maintenance plan," subparagraph b "Operational limits," item xii (acid plant catalyst replenishment schedule).

While the language in subparagraph D.2.b.xii is helpful in addressing acid plant catalyst effectiveness, it may be overly restrictive. The projected acid plant emission profile is based on historical acid plant emission rates, which are in turn affected by the effectiveness and quality of acid plant catalyst over that historical period. As a result, acid plant catalyst management and replenishment is an important underlying assumption in the projected emission profile. It is similarly important in ensuring that future acid plant emissions are of a magnitude consistent with the assumptions in the projected emission profile. While we feel that the current language in subparagraph D.2.b.xii is helpful in this regard, it focuses only on the schedule of acid plant catalyst replenishment. While the frequency/schedule of replenishment is important, there are other aspects governing catalyst replenishment, such as catalyst activity, catalyst structural integrity, and possibly catalyst type, which may be relevant and warrant inclusion in the O&M plan. We recommend the use of the broader term "criteria" which would provide for the inclusion of other factors besides schedule in the O&M plan.

xii. The acid plant catalyst replenishment ~~schedule~~ criteria, which shall at a minimum, meet the ~~manufacturer's~~ recommendations of the catalyst vendor(s).

Section G "Recordkeeping."

The current rule language regarding recordkeeping (in section G) or regarding O&M plan contents (section D) do not include any mechanism for verifying that the O&M plan is being implemented. It is unclear how facility personnel or state inspectors will be able to determine if the owner/operator is implementing or operating within the limits established by the O&M plan. Please include rule language that requires the O&M plan to include a requirement for the owner/operator to maintain records that are sufficient to demonstrate that the facility is operating within the limits established pursuant to subparagraph D.2.b.

Section E "Monitoring," paragraph 1 (compliance determination with emission limit, shutdown ventilation flue).

Based upon the rule language in paragraph E.1, a CEMS does not exist on the shutdown ventilation flue. Per Paragraph G.2.e., emissions from shutdown ventilation flue utilization events will be calculated rather than directly monitored. Our understanding of the shutdown ventilation flue is that it is activated during periods of smelting and converting cessation, and serves to isolate certain segments of process equipment from strong residual process gas, protecting personnel to exposure as they perform maintenance activities and other duties on process equipment. It instead directs these strong residual process gases from sources such as the INCO flash furnace into the atmosphere. While we would not necessarily consider this a bypass duct, it has the end effect of allowing strong SO_2 process gas to migrate into the atmosphere without control.

We note that the rule language for the Freeport McMoRan Miami Smelter requires an SO_2 CEMS on a process stream that serves a similar, although not identical, function (i.e., the Miami Smelter's bypass duct). Please discuss why it is appropriate for the rule text to not require an SO2 CEMS on the shutdown ventilation flue for the Hayden Smelter, noting any particular technical or economic challenges associated with monitoring emissions from the flue, as well as process differences between the two smelters.

R18-2-715 Standards of Performance for Existing Copper Smelters

The version of this rule being revised by ADEQ is not the same as the version EPA has approved into the Arizona SIP. For example, the SIP-approved version was last amended with an effective date of July 18, 2002. The most recent version of this rule as approved on the ADEQ website[7] was amended with an effective date of March 7, 2009. Please ensure that your analysis includes any changes in the intervening time, and please provide a version of this draft rule with markup indicating differences between the SIP-approved version and this draft version.

[7] Accessed on 12/16/2016 at http://apps.azsos.gov/public_services/Title_18/18-02.pdf