

Copper World Air Quality Permitting Community Meeting

Balaji Vaidyanathan

Jeff Christensen

August 14, 2024



Clean Air, Safe Water,
Healthy Land for Everyone



Copper World Project Overview

Copper World Project
Air Quality Permitting

Copper World Project
Compliance Requirements

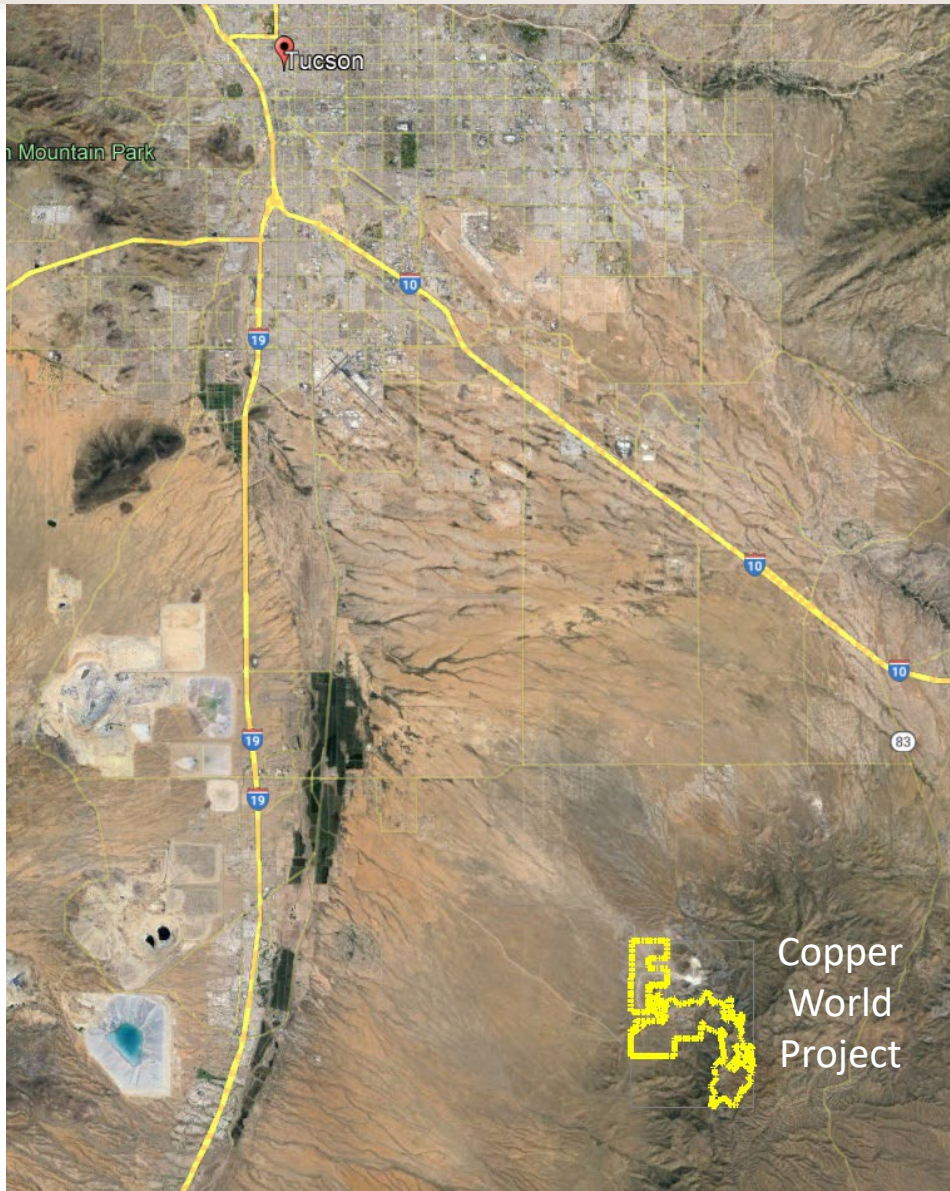
Questions & Answers Session



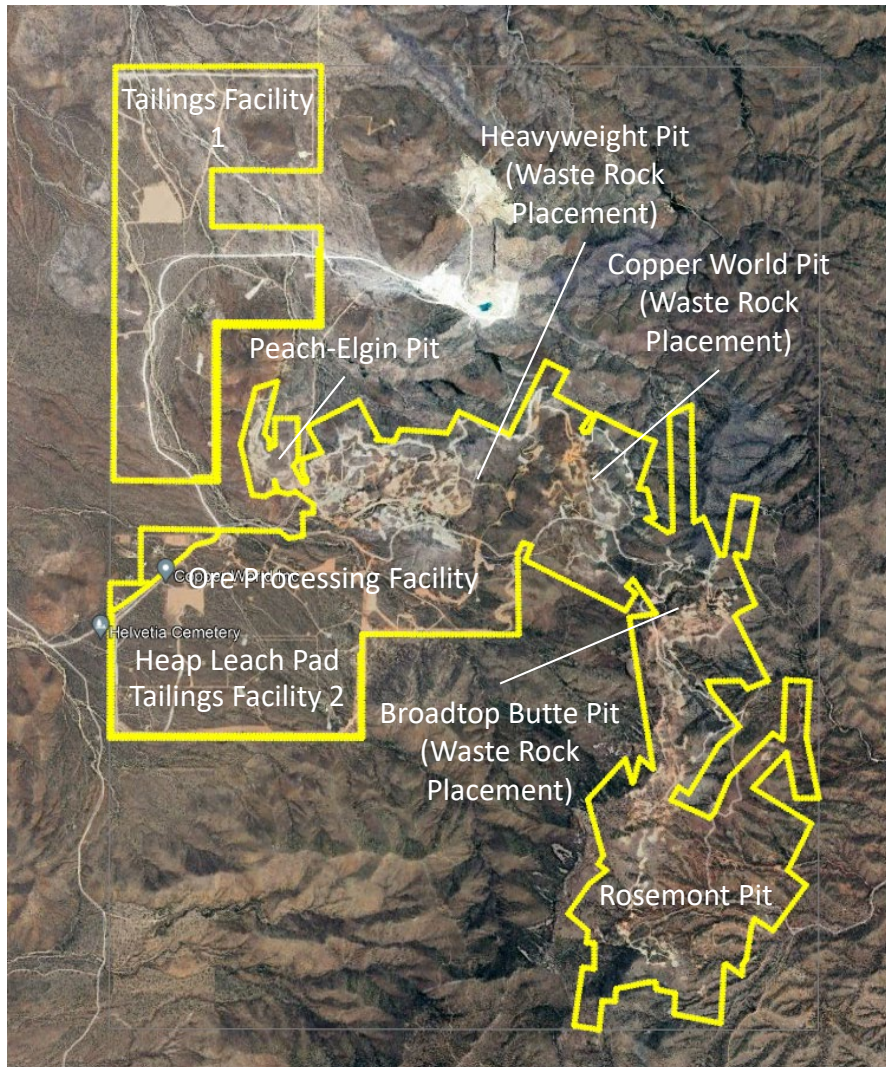
COPPER WORLD PROJECT OVERVIEW

- In August 2012, ADEQ asserted jurisdiction over air quality permitting for the Rosemont Copper Project from the Pima Department of Environmental Quality.
- To remain consistent with this action, ADEQ re-asserted jurisdiction over air quality permitting of the Copper World Project in August 2022.

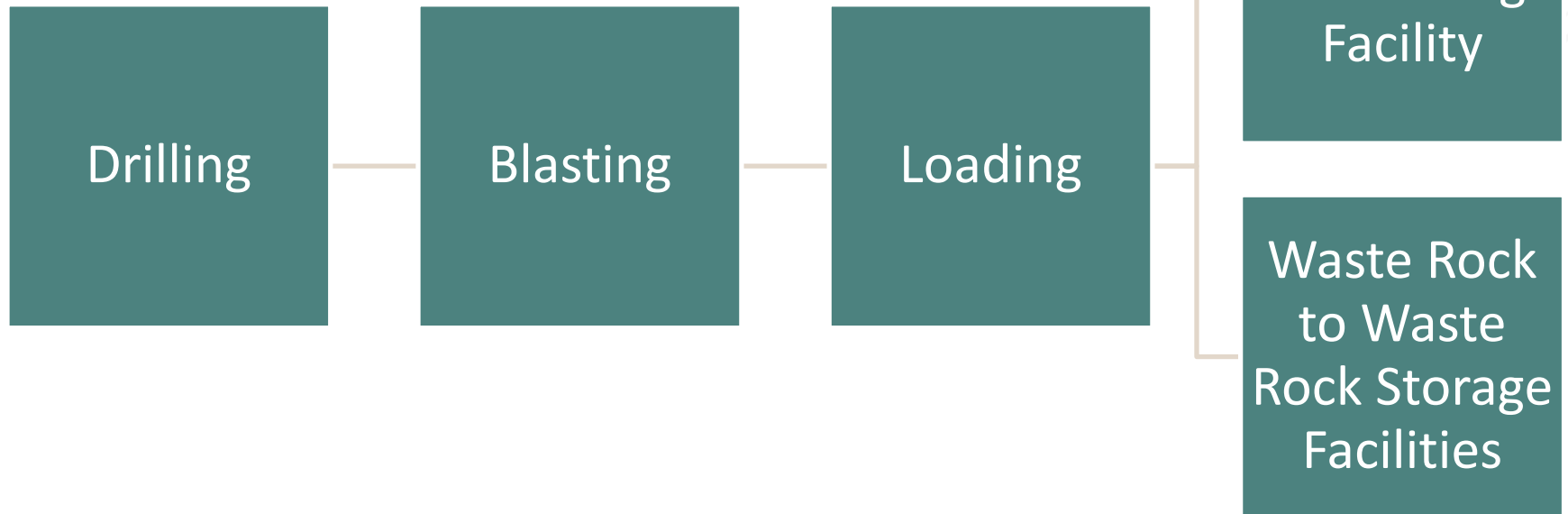
Copper World Project Overview



- The Copper World Project is a proposed open-pit copper mine and ore processing facility located approximately 28 miles Southeast of Tucson in the Santa Rita Mountains.



- Mining takes place in 5 open-pit mines over the life of the project.
 - Mining begins on the west side in the Peach-Elgin Pit, gradually moving east until all mining takes place at the Rosemont pit.
 - Waste rock from mining operations will be placed in the remaining open pits for the Heavyweight, Copper World, and Broadtop Butte pits.





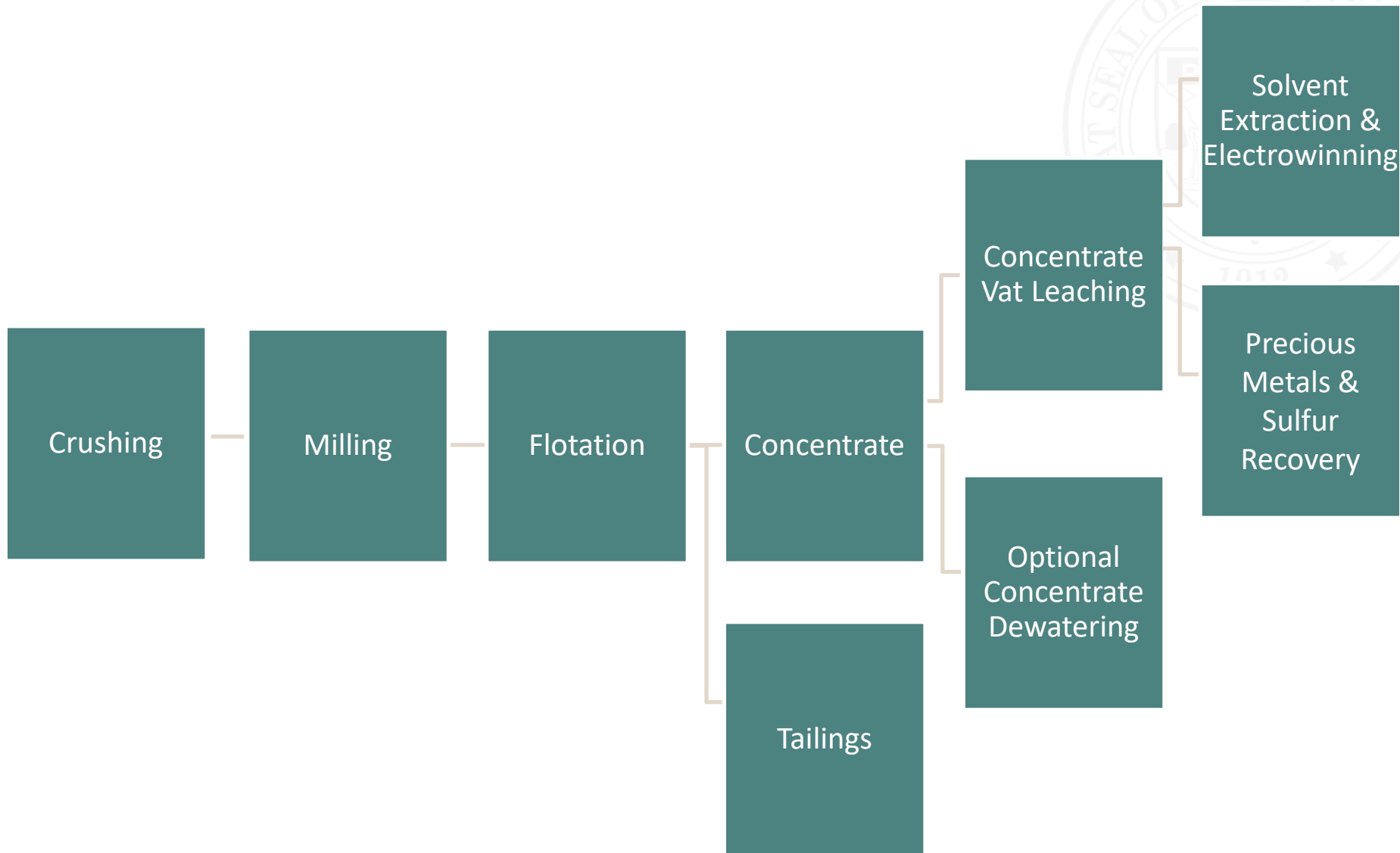
Crushing

Heap Leach
Pad

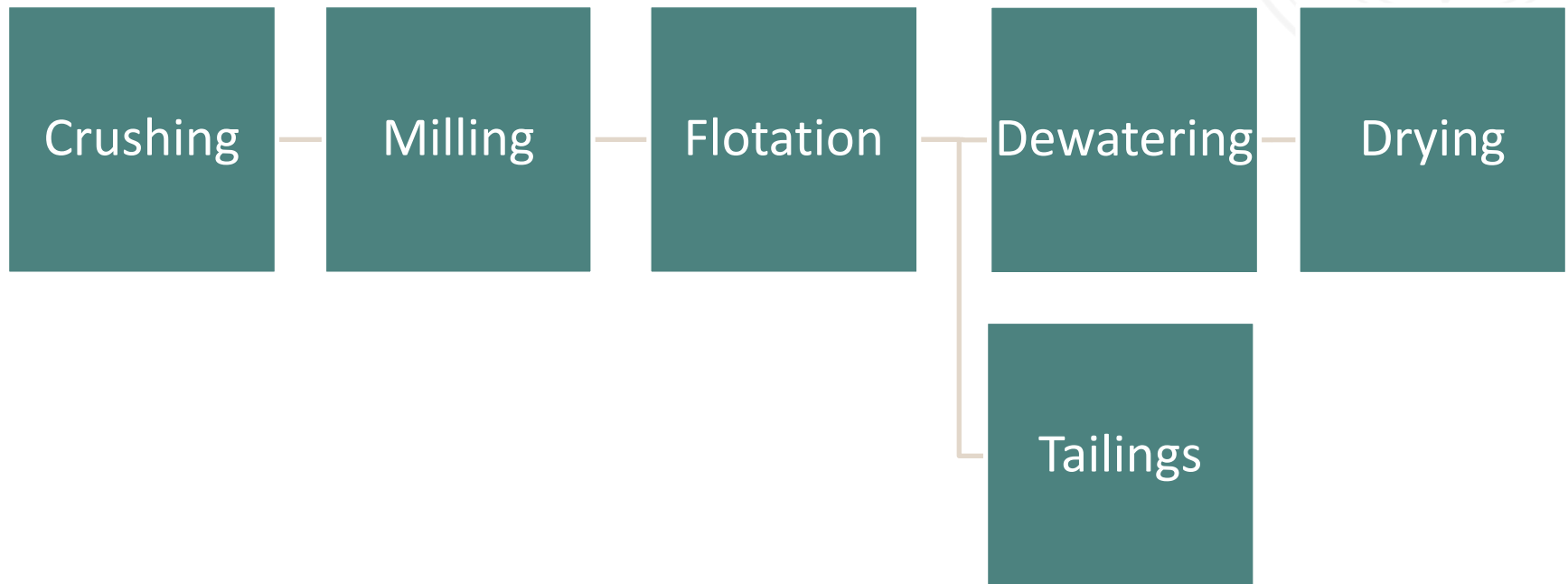
Solvent
Extraction

Electrowinning

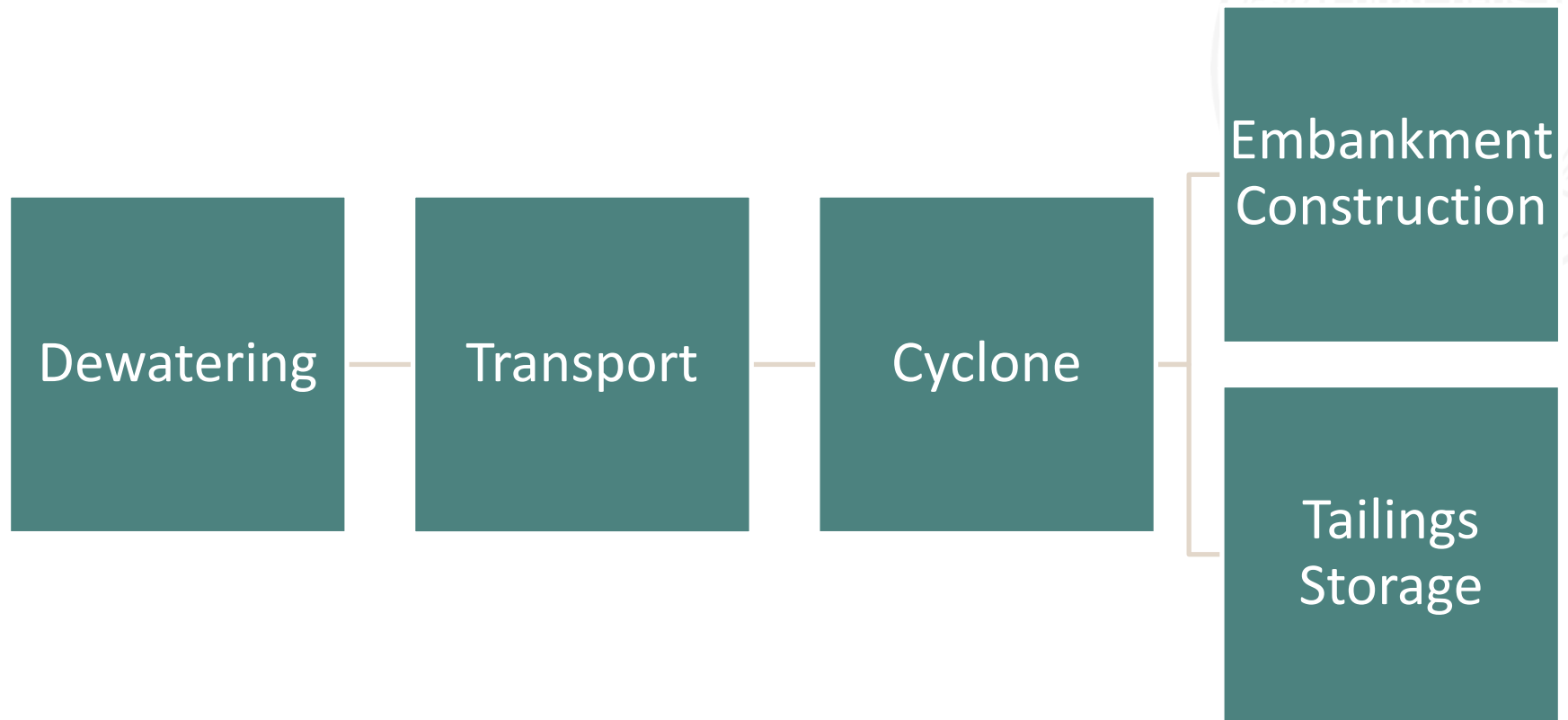
Sulfide Ore Processing



Molybdenum Processing



Tailings Placement and Storage



Sulfuric Acid Plant

Emergency
Internal
Combustion
Engines

Storage Tanks

Mobile Vehicles



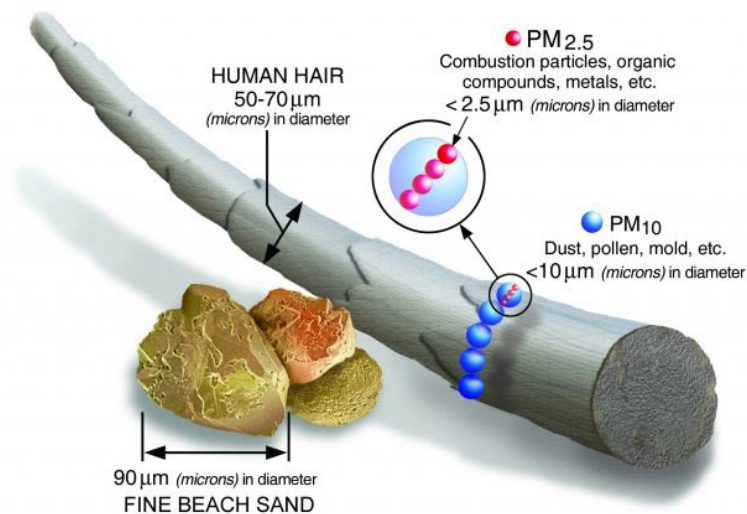
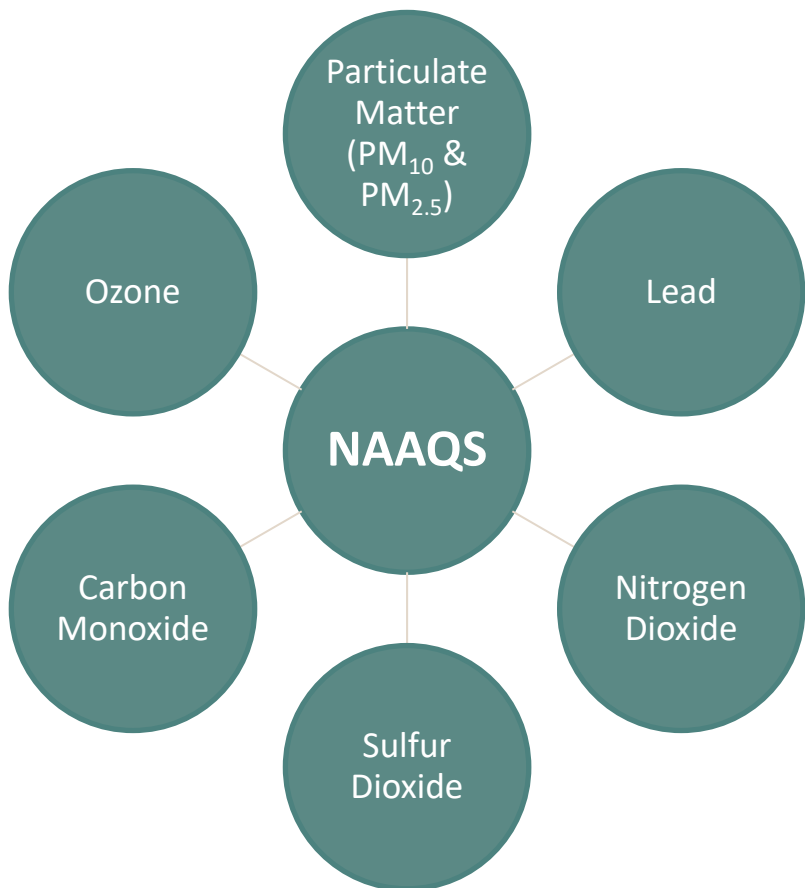
COPPER WORLD PROJECT AIR QUALITY PERMITTING

Copper World Project Air Permitting Process



- ADEQ issues air permits for stationary sources of air pollution to ensure compliance with federal, state, and local regulations.
- New facilities are often required to demonstrate that emissions resulting from operation of the facility will not interfere with attainment of the National Ambient Air Quality Standards in publicly accessible areas through air dispersion modeling.

- Federal health-based ambient air quality standards that are protective of sensitive populations, including children, the elderly, and populations with respirable illnesses.



Primary NAAQS

Pollutant	Averaging Period	Primary NAAQS
PM-10	24-Hour	150 $\mu\text{g}/\text{m}^3$
PM-2.5	Annual	9 $\mu\text{g}/\text{m}^3$
	24-Hour	35 $\mu\text{g}/\text{m}^3$
Nitrogen Dioxide	Annual	100 $\mu\text{g}/\text{m}^3$
	1-Hour	188 $\mu\text{g}/\text{m}^3$
Sulfur Dioxide	3-Hour	1,300 $\mu\text{g}/\text{m}^3$
	1-Hour	196 $\mu\text{g}/\text{m}^3$
Carbon Monoxide	8-Hour	10,000 $\mu\text{g}/\text{m}^3$
	1-Hour	40,000 $\mu\text{g}/\text{m}^3$
Ozone	8-Hour	70 ppb
Lead	3-Month Rolling	0.15 $\mu\text{g}/\text{m}^3$
Hazardous Air Pollutants	Not Applicable	Not Applicable

- Type of permit depends on the source's potential to emit regulated air pollutants.
- Potential to emit is a source's capacity to emit air pollutants assuming continuous operation at maximum capacity based on the source's operational design and legally enforceable operating requirements.
- For copper mines, fugitive emissions are only evaluated for permit applicability for Hazardous Air Pollutants

Fugitive vs. Non-Fugitive Emissions

Non-Fugitive Emissions Sources	Fugitive Emissions Sources
Processes Controlled by Dust Collectors	Haul Roads
Processes Controlled by Scrubbers	Wind Erosion/Wind-Blown Dust
Sulfuric Acid Plant	Drilling and Explosive Blasting
Internal Combustion Engines	Support Vehicle Use
Solvent Extraction Process	Truck Loading and Unloading

- Fugitive emissions are defined as emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

Permitting Thresholds

Pollutant	Copper World Potential to Emit (tons per year)	Minor New Source Review (tons per year)	Class II Permit (tons per year)	Class I Permit (tons per year)
Particulate Matter (PM)	62.10	Not Applicable	25	Not Applicable
PM-10	35.56	7.5	15	100
PM-2.5	23.85	5	10	100
Nitrogen Oxide	33.18	20	40	100
Sulfur Dioxide	13.70	20	40	100
Volatile Organic Compounds	13.46	20	40	100
Carbon Monoxide	10.51	50	100	100
Lead	0.01	0.3	0.6	100
Maximum Individual Hazardous Air Pollutant (HAP)	5.10	Not Applicable	Not Applicable	10
Total HAPs	15.82			25

Copper World Potential to Emit

Pollutant	Potential to Emit (tons per year)	Fugitive Emissions (tons per year)
PM	62.10	3,991.36
PM-10	35.56	1,097.40
PM-2.5	23.85	117.78
NO _x	33.18	16.20
SO ₂	13.70	0.3
VOCs	13.46	0.0
CO	10.51	603.00
Pb	0.01	0.46
Maximum Single HAP (Manganese Compounds)	5.10	5.10
Total HAPs	15.82	9.79

- The Copper World Project's potential to emit triggers requirements for:
 - Class II Permit
 - Minor New Source Review
- Fugitive emissions are evaluated in air dispersion modeling.

Class I vs. Class II Air Quality Permit?

	Class I Permit	Class II Permit
EPA 45-Day Review Period	Yes	No
Notification of Affected States	Yes	No
Emissions Inventory	Annual	Every 3 Years (unless requested)
Annual Emissions-Based Fees	Yes	No
Compliance Certification	Semiannual	Semiannual (for Copper World)

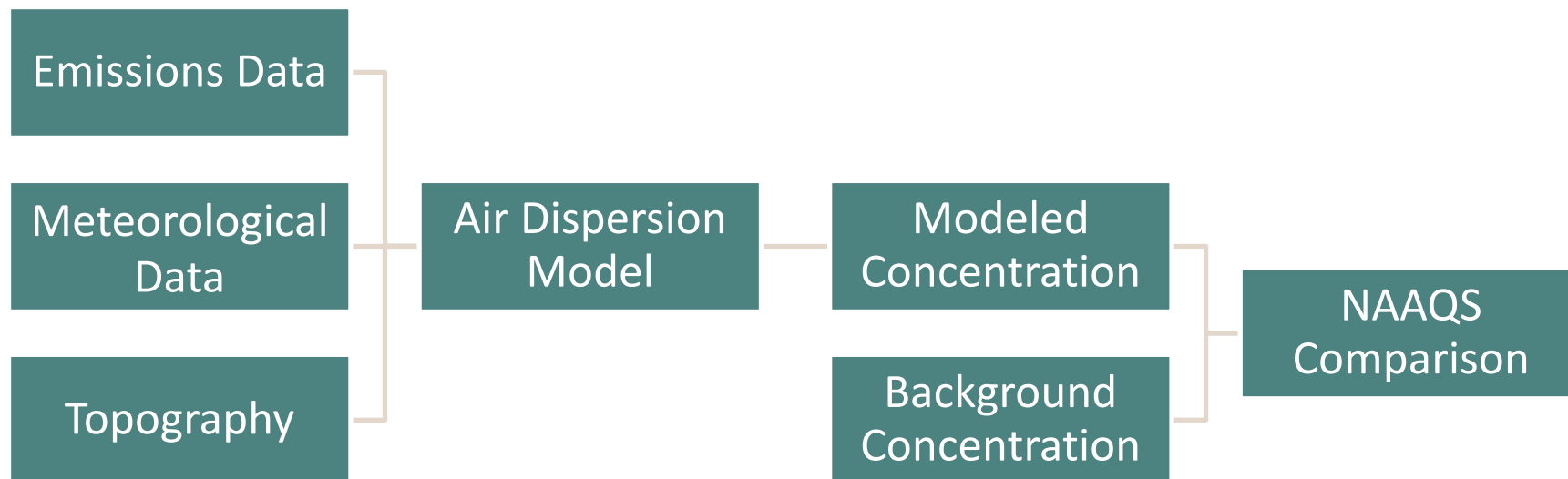
Minor New Source Review

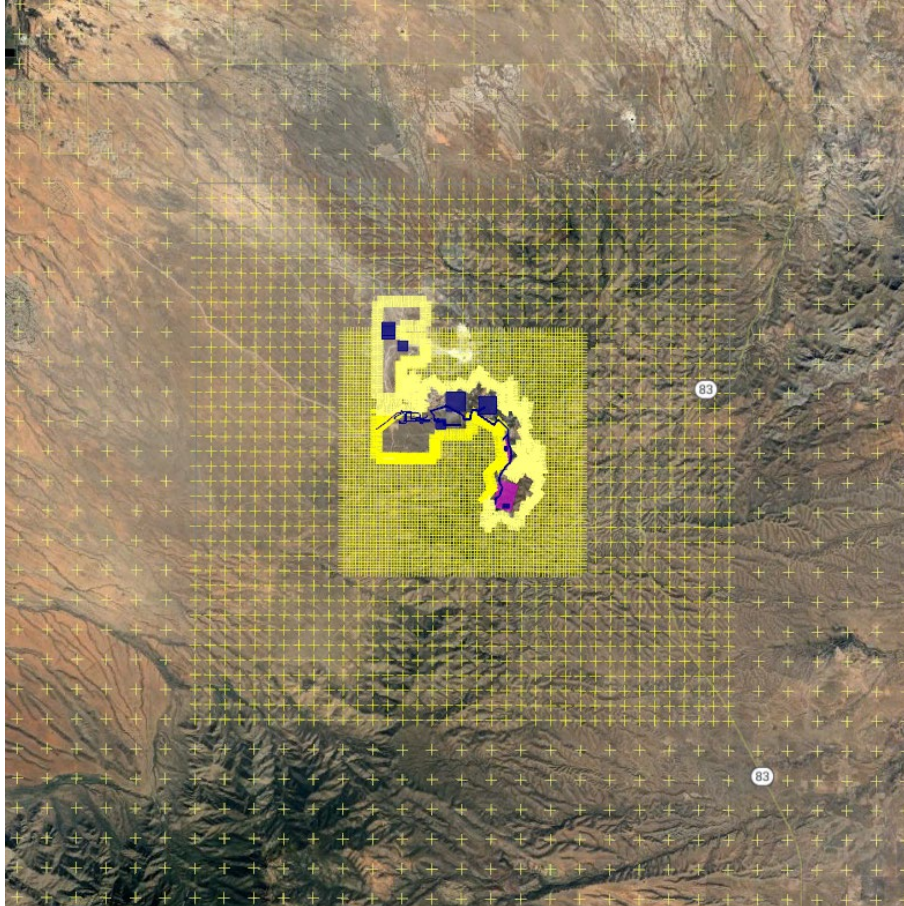
Control
Technology

NAAQS
Attainment
Demonstration



- Mathematical simulation of the dispersion of air pollutants into the atmosphere developed by EPA to evaluate impacts of a facility's emissions against the NAAQS.

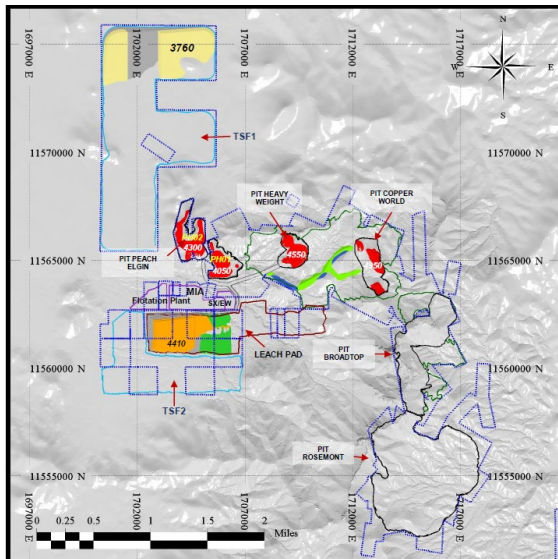




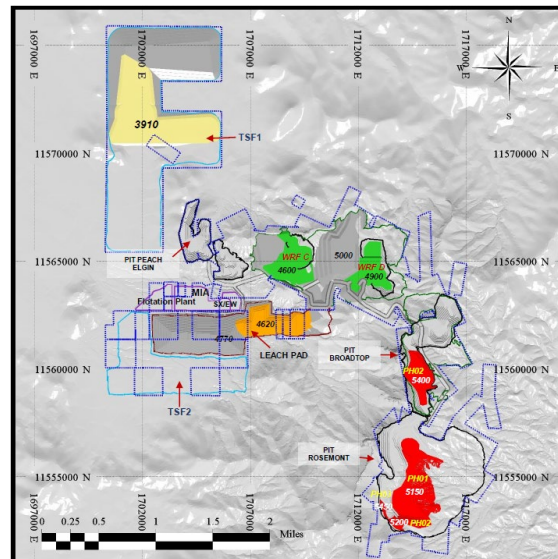
- Receptors placed in areas accessible to the public, including the section of Santa Rita Road passing through the project site.
- Receptor network covers a 10-kilometer (6.2-mile) range from the Copper World Project.
- Highest modeled concentrations occur close to the property boundaries.

Air Dispersion Model – Model Years

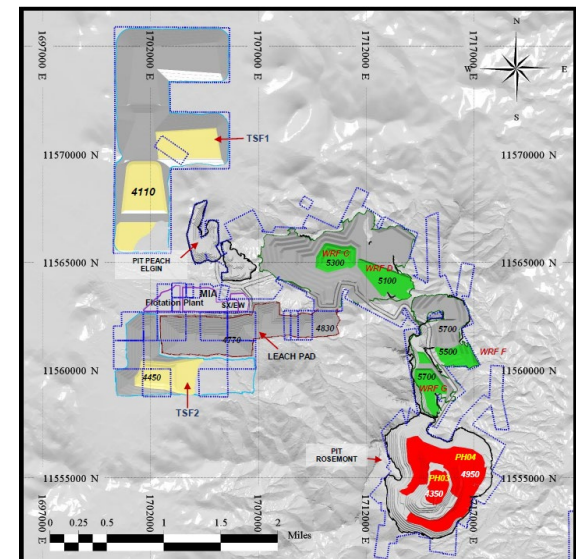
- Year 2: All operations taking place within a small footprint near the ambient air boundary.
- Year 8: Maximum out-of-pit vehicle miles traveled during years with the maximum mining rate.
- Year 14: Maximum total in-pit and out-of-pit vehicle miles traveled for all mining years.



Year 2



Year 8



Year 14



- Separate models required for East and West side of the Santa Rita Mountains due to significant variation in meteorological conditions.
 - Site-specific meteorological data from an on-site meteorological station located on the west side of the Santa Rita Mountains.
 - Site-specific meteorological data from the Rosemont Copper Project used to model impacts on east side of the Santa Rita Mountains.

Air Dispersion Model – Background Concentrations

Pollutant	Averaging Period	Background Monitor	Background Concentration	Timeframe
PM-10	24-Hour	Corona de Tucson (West)	Monthly	2019 to 2021
		On-Site Monitor (East)	47.7 µg/m ³	2007 to 2009
PM-2.5	Annual	Saguaro National Park East	3.9 µg/m ³	2019 to 2021
	24-Hour		9.1 µg/m ³	
Nitrogen Dioxide	Annual	Alamo Lake State Park	2.6 µg/m ³	2014 to 2016
	1-Hour		26.3 µg/m ³	
Sulfur Dioxide	3-Hour	Children’s Memorial Park	3.4	2019 to 2021
	1-Hour		2.6 µg/m ³	
Carbon Monoxide	8-Hour	Children’s Memorial Park	575 µg/m ³	2019 to 2021
	1-hour		920 µg/m ³	

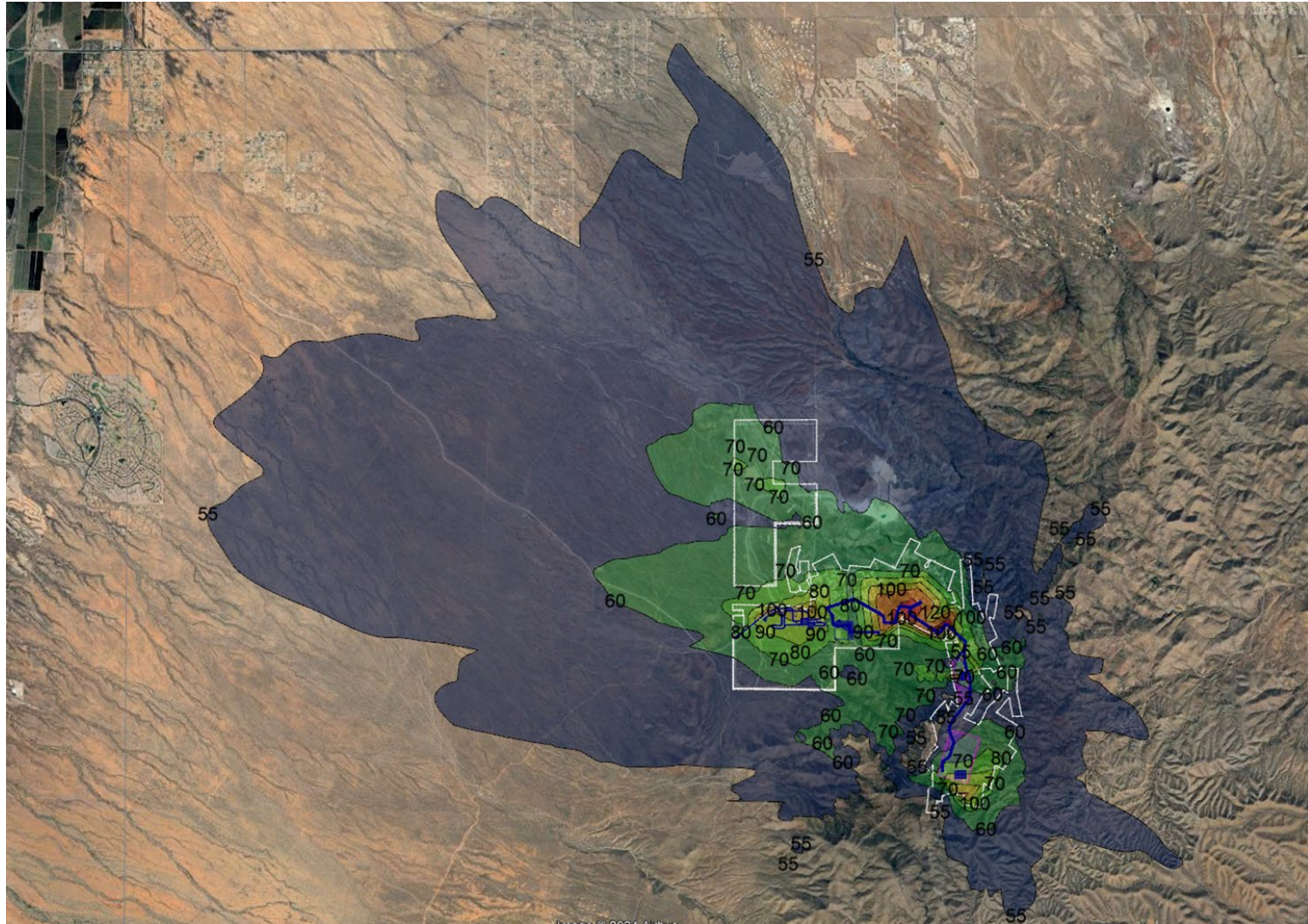
Year 8 Model Results – West

Pollutant	Averaging Period	Modeled Concentration	Background Concentration	Total Modeled Concentration	Primary NAAQS
PM-10	24-Hour	148.1 µg/m ³	Monthly	148.1 µg/m ³	150 µg/m ³
PM-2.5	Annual	4.97 µg/m ³	3.9 µg/m ³	8.87 µg/m ³	9 µg/m ³
	24-Hour	10.0 µg/m ³	9.1 µg/m ³	19.1 µg/m ³	35 µg/m ³
Nitrogen Dioxide	Annual	1.02 µg/m ³	2.6 µg/m ³	3.62 µg/m ³	100 µg/m ³
	1-Hour	107.8 µg/m ³	26.3 µg/m ³	134.1 µg/m ³	188 µg/m ³
Sulfur Dioxide	3-Hour	27.9 µg/m ³	3.4 µg/m ³	31.3 µg/m ³	1,300 µg/m ³
	1-Hour	68.3 µg/m ³	2.6 µg/m ³	70.9 µg/m ³	196 µg/m ³
Carbon Monoxide	8-Hour	1,796 µg/m ³	575 µg/m ³	2,371 µg/m ³	10,000 µg/m ³
	1-hour	7,842 µg/m ³	920 µg/m ³	8,762 µg/m ³	40,000 µg/m ³

Year 8 Model Results – East

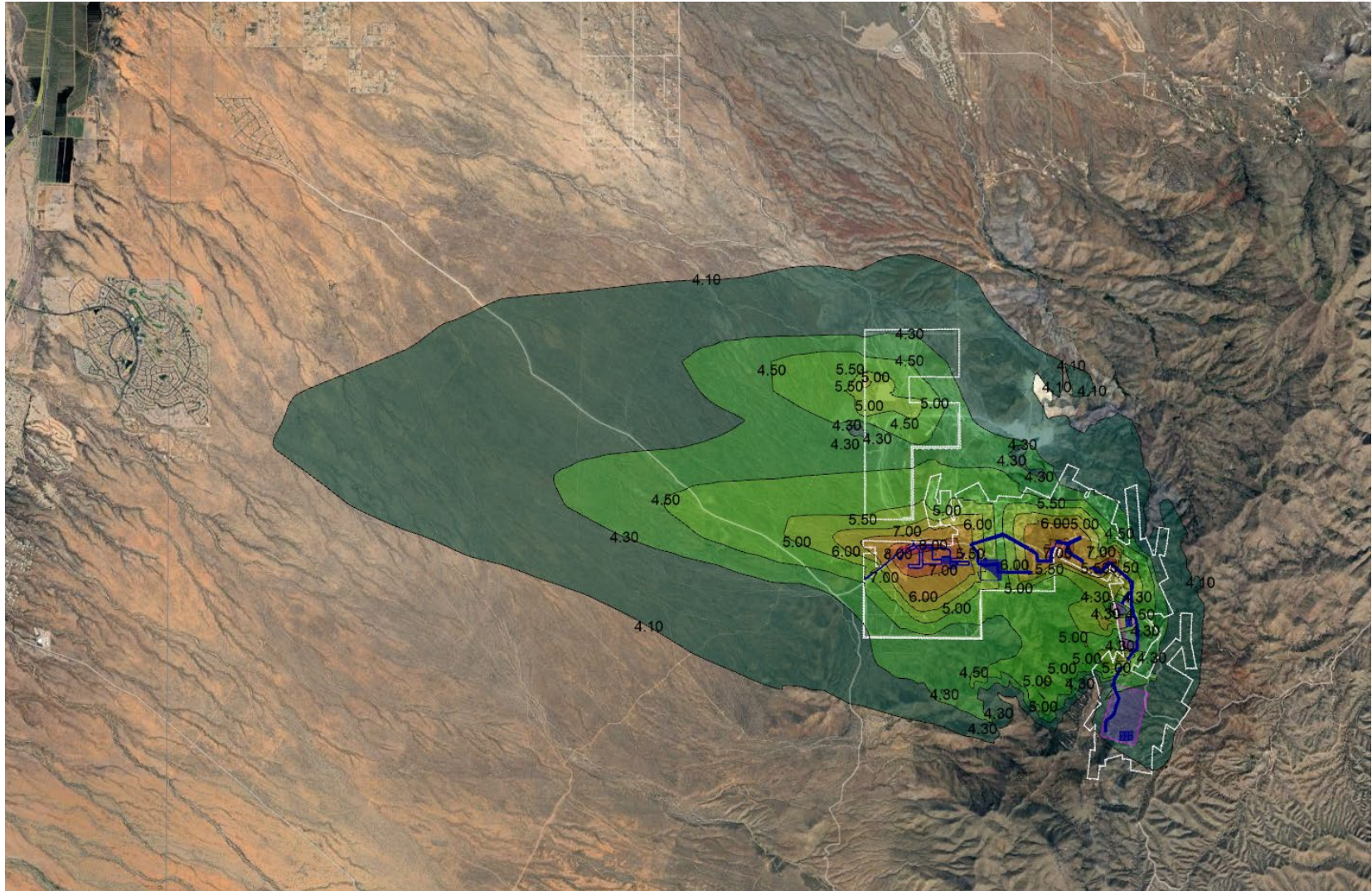
Pollutant	Averaging Period	Modeled Concentration	Background Concentration	Total Modeled Concentration	Primary NAAQS
PM-10	24-Hour	92.5 µg/m ³	47.7 µg/m ³	140.2 µg/m ³	150 µg/m ³
PM-2.5	Annual	4.10 µg/m ³	3.9 µg/m ³	8.00 µg/m ³	9 µg/m ³
	24-Hour	11.1 µg/m ³	9.1 µg/m ³	20.2 µg/m ³	35 µg/m ³
Nitrogen Dioxide	Annual	0.015 µg/m ³	2.6 µg/m ³	2.62 µg/m ³	100 µg/m ³
	1-Hour	88.49 µg/m ³	26.3 µg/m ³	114.79 µg/m ³	188 µg/m ³
Sulfur Dioxide	3-Hour	0.19 µg/m ³	3.4 µg/m ³	3.59 µg/m ³	196 µg/m ³
	1-Hour	0.25 µg/m ³	2.6 µg/m ³	2.85 µg/m ³	196 µg/m ³
Carbon Monoxide	8-Hour	1,773 µg/m ³	575 µg/m ³	2,348 µg/m ³	10,000 µg/m ³
	1-hour	5,249 µg/m ³	920 µg/m ³	6,169 µg/m ³	40,000 µg/m ³

Year 8 PM-10 Model Result – West



Total Concentration = Modeled Concentration + Background Concentration

Year 8 Annual PM-2.5 Model Result – West



Total Concentration = Modeled Concentration + Background Concentration

- Operating requirements are adopted in the permit to ensure that operations are consistent with the model, including:
 - Emissions Limitations/Operating Requirements
 - Air Pollution Control Equipment
 - Performance Testing
 - Control Equipment Parameter Monitoring
 - Fugitive Dust Control Plan
 - Tailings Dust Management Plan
 - Ambient Air Monitoring



COPPER WORLD PROJECT COMPLIANCE REQUIREMENTS

Operating Restrictions

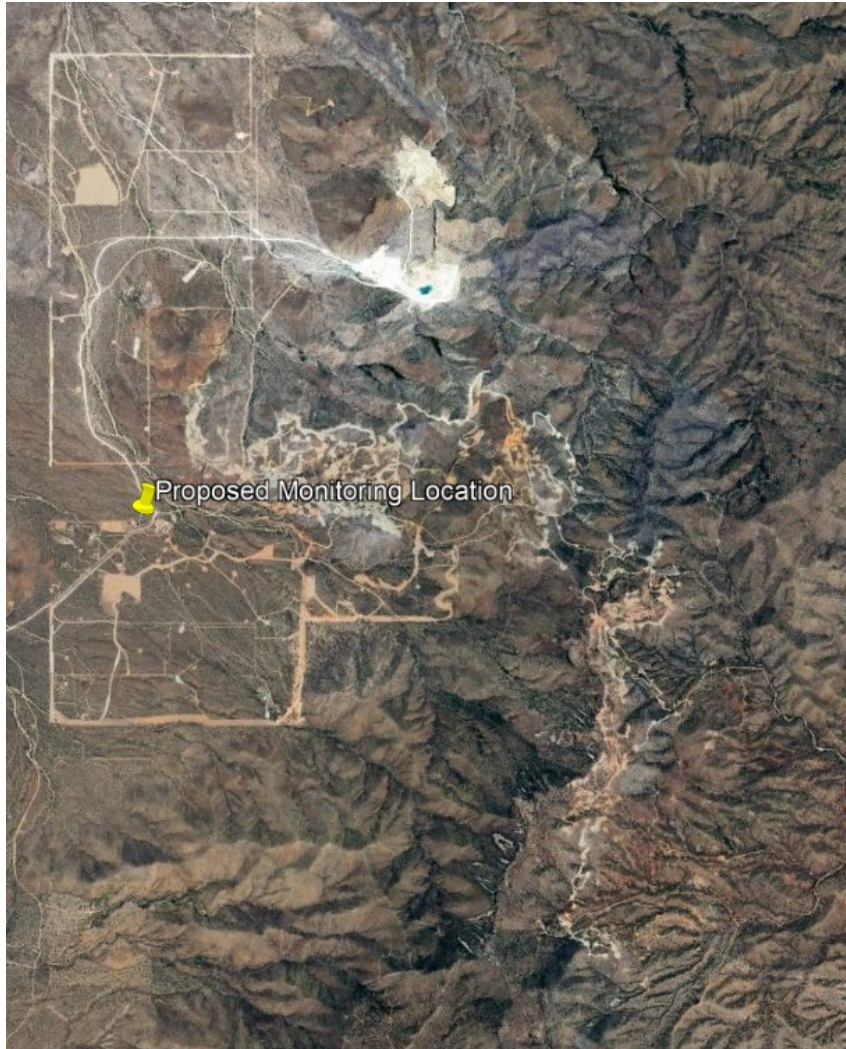
Operation	Operational Limitation	Compliance Demonstration
Mining Rate	200,000 tons of material mined per day	Recordkeeping
Drilling	Drilling Frequency Limitation	Recordkeeping
	Shrouds Pre-Watering Techniques	
Blasting	Ultra-Low Sulfur Diesel	Recordkeeping
	Blast Area, Frequency, and ANFO Quantity	
	Blasting Hours Limitation	
Fugitive Dust	Fugitive Dust Control Plan (Dust Suppressants)	Opacity Monitoring Recordkeeping
Tailings Management	Tailings Dust Management Plan (Dust Suppressants)	Opacity Monitoring Recordkeeping

Air Pollution Control Equipment

Emissions Unit	Control Device	Monitoring	Performance Testing
Ore Processing	Dust Collectors	Pressure Drop	Annual Performance Testing (Method 201A)
	Wet Scrubbers	Pressure Drop Scrubber Flow Rate	Annual Performance Testing (Method 5 and 202)
	Fogging Suppression Systems	Weekly Inspections	Not Applicable
Electrowinning Plant	Wet Scrubbers	Pressure Drop Motor Amperage Damper Position	Annual Performance Testing (Method 5 and 202)
Sulfuric Acid Plant	Wet Scrubber	Continuous Emissions Monitoring (NO _x and SO ₂)	Initial Performance Testing (Method 7E and 8)

Fugitive Dust Control and Tailings Dust Management Plans

Plan Component	Fugitive Dust Control Plan Requirements	Tailings Dust Management Plan Requirements
Visible Emissions Observation Frequency	Weekly	Twice per Day
Control Measure Inspection Frequency	Daily Inspections of Road Integrity by Mine Operations Supervisor	Daily Inspection for Easily Erodible Areas
	Biweekly Inspections by Copper World Environmental Staff	
Recordkeeping	Inspection Forms	Inspection Forms
	Dust Suppressant and Water Application	Stabilization Methods
Reporting	Annual Review of Dust Control Plan Effectiveness	Annual Review of Tailings Management Plan Effectiveness



- ADEQ will require Copper World to monitor for the following data on-site:
 - Meteorological Data
 - PM-10 Concentration
 - PM-2.5 Concentration
- Annual and quarterly reporting of monitoring data, with data made available upon request.



Thank you!

Balaji Vaidyanathan

Section Manager

Air Permits and Compliance

Vaidyanathan.Balaji@azdeq.gov

(602) 771-4527

Jeff Christensen

Permit Engineer

Air Permits Unit

Christensen.Jeff@azdeq.gov

(602) 771-0001

Aaron Tews

Community Liaison

Pima County

Tews.Aaron@azdeq.gov

(520) 471-1486



**Clean Air, Safe Water,
Healthy Land for Everyone**



Q&A SESSION

- This Q&A session is intended to be an informal opportunity to provide information on the air quality permit for the Copper World Project. Questions during this session will not be part of the official record for public participation.
- If you wish to submit comments on the official record, please submit them in writing, by email, or through SmartComment.
- A formal public hearing will also be held on September 10, 2024 at 6:00 p.m.