



UST REVOLVING FUND PROGRAM BASELINE ASSESSMENT GUIDANCE DOCUMENT

1.0 PURPOSE AND INTENT OF THE BASELINE ASSESSMENT

The purpose of the Baseline Assessment is to conduct a technically proficient and cost-effective subsurface investigation around and / or beneath the existing or former Underground Storage Tank (UST) system at a site. Pursuant to ARS 49-1052(D), “The scope of the baseline assessment shall address likely release areas and shall include a collection of sufficient information to allow for a determination of the current environmental condition of the property.”

2.0 GENERAL BASELINE ASSESSMENT GUIDELINES

A. All work conducted shall follow the UST requirements in federal, state and municipal statutes, regulations, policies and/or guidelines.

B. All work conducted shall be under the direction of a person who is an Arizona Registered Geologist or Arizona Professional Engineer (“the professional registrant”) pursuant to ARS 49-1052(C).

C. The professional registrant must ensure that all required approvals are obtained including notices, authorizations and permits from the Arizona Department of Water Resources (“ADWR”), local municipalities and other governmental agencies as required. Drilling subcontractors must be licensed through ADWR pursuant to Arizona Administrative Code R12-15, 804, R12-15-805 and R12-15-806.

D. All soil and groundwater sample collection and handling procedures must be in accordance with A.A.C. R18-12-280 and the ADEQ UST Program Quality Assurance Program Plan.

E. When the baseline assessment uncovers a suspected or confirmed release, the owner/operator shall comply with the release reporting requirements pursuant to ARS 49-1004 and shall initiate corrective actions pursuant to ARS 49-1005.

3.0 BASELINE ASSESSMENT COMPONENTS

The recommended Baseline Assessment program includes five phases of work: (1) Project Planning, (2) Field Investigation, (3) Laboratory Analyses, (4) Report Preparation, and (5) Agency Notification. Each phase includes individual tasks that, when followed in general order, are designed to properly prepare and execute the assessment and meet the intent of ARS 49-1052(D). Individual phases and associated tasks are described in greater detail in the following sections.

3.1 Project Planning

3.1.2 ADEQ File Review / Records Review

Prior to finalizing drilling locations and mobilizing to the site, all available ADEQ UST and Leaking Underground Storage Tank (LUST) files for the property should be reviewed under the supervision of the Professional Registrant. An appointment to review the LUST and facility files can be made with the ADEQ

Records Center at RecordsCenter@azdeq.gov or by calling 602-771-4380. Review of ADEQ UST and LUST files may reveal valuable information to allow for a more efficient and effective Baseline Assessment including but not limited to:

- Location of current UST system and installation date
- UST construction, capacity and history of products stored
- Location of former UST systems and removal date / closure type
- Location of former LUST releases and residual contaminants left in place (if any)
- LUST case closure criteria (i.e. HBGLs, Residential SRLs, Non-Residential SRLs, Declaration of Environmental Use Restriction)
- Soil types, depth to groundwater and groundwater gradient (for LUST releases)

Any relevant records available from the site owner/operator should also be reviewed including but not limited to, Phase I and Phase II Environmental Site Assessments, as-built drawings and tank/line tightness records.

3.1.3 Geologic / Hydrologic Evaluation

ADEQ recommends researching the local depth to groundwater, lithologic conditions, nearest surface water and depth to bedrock, if applicable. Possible sources of information include ADWR well records, ADEQ WQARF records, topographic maps, ASTM historical records search, case files from former on-site LUSTs or nearby LUSTs, irrigation district records, and other sources as appropriate.

3.1.4 Scope of Work Development

Based on the information gathered in the planning process described in sections above, a scope of work should be developed to include the following:

- On-site safety hazards and traffic control
- Planned soil boring locations, number of borings and boring type (i.e. angle or vertical)
- Planned drilling depth and sampling frequency
- Laboratory analyses to be conducted (based on existing and historical products stored in the tanks at the site)
- Drill rig type
- Waste containment, temporary storage, and disposal
- Borehole backfill method/ materials
- Surface restoration

3.2 Field Investigation

All field investigation activities shall be conducted under the supervision of the Professional Registrant.

3.2.1 Verification of Utilities / Borehole Clearing

Prior to initiating any drilling activities, potential boring locations shall be compared to all subsurface utility markings (public and private) to avoid intersecting and damaging utilities during boring advancement. In addition, all utility surface markings shall be compared with the Arizona 811 call ticket (formerly Arizona Bluestake) to verify that all identified utilities have responded to the ticket. Finally, all borehole locations shall be physically checked for potential unmarked and/or private utilities via either hand excavation or air knife. Depth for physically clearing the borehole shall typically be advanced to a minimum of 4 feet bgs but shall ultimately be determined at the discretion of the Professional Registrant based on native soil types and whether fill material (i.e. pea gravel, a/b fill) is observed.

3.2.2 Drilling and Soil Sampling

Soil borings should be located to investigate around/ beneath the former or existing UST system including tanks, product lines and product dispensers. Soil boring locations will vary depending on site configurations and limitations such as overhead electric lines, underground product lines, underground utilities and drill rig access. As such, soil borings should be located as close to the potential release area as possible without compromising the structural integrity of the UST system equipment or other subsurface lines. Soil boring locations should be located no greater than 10 lateral feet from the edges of the tank zone, fuel piping, and fuel dispensers.

All soil borings that do not reach groundwater shall be backfilled with soil cuttings unless there are obvious signs of a release based on field observations. All soil borings should be abandoned in accordance with ADWR regulations. Investigative Derived Waste (IDW) generated during the Baseline Assessment is discussed further in Section 3.2.5. Boring locations shall be restored to the condition of the surrounding surface upon completion of work. A discussion of soil boring placement, sample intervals and minimum sampling depths are included in the following sections. Please note – site specific details will determine the actual depth of sampling.

Underground Storage Tanks

Depending on the site configuration and physical limitations, angle soil borings should be used to investigate beneath the UST when feasible. Angle soil borings should not exceed 30 degrees from vertical and shall be placed at a safe lateral distance from UST and associated equipment to avoid rupturing equipment and causing a release of product to the subsurface. Please note, the Professional Registrant should also avoid drilling into pea gravel surrounding the tanks as this can cause a void in the tank basin and compromise the underlying support for the tank.

It is recommended that the Professional Registrant overseeing the investigation use trigonometry and field observations based on experience and professional judgement to determine the safe lateral distance prior to drilling an angle boring. The following steps are offered as an example of determining safe lateral distance for placement of an angle soil boring beneath an UST:

- Prepare a scaled site plan to work with in the field (to be completed during Site Reconnaissance);
- Identify the tank bottom depth (may require assistance from owner / operator personnel);
- Identify the edge of the tank basin. Please note that extra caution and professional judgement should be used when the edge of the UST basin is not obvious based on surface observations;
- Use trigonometry to plan a safe lateral distance to locate boring based on an angle ranging from 10 to 30 degrees (see examples in Attachment A);
- Manually excavate borehole to a minimum depth of approximately four feet below the ground surface to check for the presence of pea gravel, underground lines, etc. prior to drilling (borehole clearance depth shall ultimately be determined at the discretion of the Professional Registrant based on native soil types and whether fill material (i.e. pea gravel, a/b fill) is observed), and
- Use a magnetic protractor to measure and monitor angle of drill pipe prior to and during drilling activities.

A minimum of two soil borings should be drilled for each UST basin. The number of borings drilled, boring locations, and sampling intervals should be based on the judgement and experience of the Professional Registrant while considering the size of the tank, site limitations, lithology and depth to groundwater.

Angle boring(s) should be drilled to a minimum lineal depth of approximately 65 feet (approximate true vertical depth of approximately 60 feet bgs to intercept the soils beneath the approximate center of the tank basin at total boring depth.

If two vertical borings are chosen in lieu of drilling angle soil borings, each boring shall be located at opposite sides of the tank basin and drilled to a minimum depth of 30 feet bgs to allow access to soil adjacent and beneath the UST basin without compromising the structural integrity of the UST system. Vertical soil borings drilled adjacent to the tank zone should be drilled in positions shown in Attachment A.

At a minimum, soil samples should be collected at approximate 10-foot intervals (true vertical depth) beginning at approximately 10 feet bgs in vertical borings and approximately 15 feet bgs in angle borings(s) to allow for investigation of surficial native soil beneath the tank basin fill material (0-15 feet bgs) and subsurface soil (>15 feet bgs). Soil samples should be collected whenever subsurface conditions suggest contamination even if shallower than 10 feet bgs.

ADEQ requires that multiple soil samples be collected from each soil boring to assist the UST owner in characterizing any releases during the same field event. This additional data may be used by ADEQ to evaluate if the release can be closed without additional samples being required from the UST owner during another investigative field event.

Product Dispensers

One soil boring should be advanced beneath each product dispenser to a minimum of 15 feet bgs. Angle soil borings should be advanced when feasible. Soil samples should be collected at approximate 5-foot intervals beginning at 5 feet bgs. Soil samples should be collected whenever subsurface conditions suggest contamination even if shallower than 5 feet bgs. Due to the shallow depth required to investigate beneath product dispensers, soil borings may be advanced utilizing a low clearance drilling, direct push rig or hand auger. Angle soil borings should not exceed 30 degrees from vertical.

Product Lines

Product lines between the USTs and product dispensers should be investigate every lateral 20 feet or at obvious joints and elbows. Product lines and piping elbows that are within 10 feet of the product dispenser do not require investigation. Each soil boring along product lines should be advanced to a minimum of 10 feet bgs. Samples should be collected at 5 and 10 feet bgs. Soil samples should be collected whenever subsurface conditions suggest contamination. Due to the shallow depth required to investigate beneath product dispensers, soil borings may be advanced utilizing a low clearance drilling, direct push rig or hand auger.

3.2.3 Drilling and Soil Vapor Sampling (If Applicable)

Arizona Administrative Code (A.A.C.) Title 18- 7-203 allows soil vapor concentration to be used to estimate the total contaminant concentration in soil if ADEQ determines that the soil vapor concentration methodology will not be invalidated by the soil, hydrogeology, or other characteristics of the site. Soil samples are sufficient at most facilities; however, at facilities where the lithology inhibits collection of a representative soil sample (e.g. fractured bedrock or cobbles), ADEQ recommends soil vapor sampling. All soil vapor sampling shall follow ADEQ's Soil Vapor Sampling Guidance, revised April 21, 2017 which can be found at http://static.azdeq.gov/legal/subs_policy_svsg.pdf

3.2.4 Groundwater Sampling (If Applicable)

If site specific data reviewed during the Project Planning phase indicates the depth to groundwater estimated to be within 30 vertical feet bgs at the site, a minimum of one soil boring shall extend to beneath the soil / groundwater interface to allow for the collection of a groundwater sample. Soil samples should still be collected in accordance with Section 3.2.2 during advancement of the boring.

Prior to collecting a groundwater sample, an oil-water interface probe shall be used to measure the static depth to groundwater in the boring and to check for the presence of free product. To evaluate dissolved phase contamination, groundwater samples should typically be collected from beneath the drill pipe and if present, free product. Depending on subsurface conditions (i.e. heaving sands) and the judgment of the Professional Registrant, temporary wells may be installed if necessary to obtain an adequate groundwater sample.

3.2.5 IDW Profiling and Waste Disposal

All IDW generated during the drilling and sampling task should be contained in DOT rated 55-gallon drums or roll-off bins (as appropriate). Drums / bins shall be labeled with the following information:

- Site ID and address
- Container ID (i.e. Drum #1)
- Owner / Operator name
- Consultant contact name and number
- Date of waste generation
- Suspected contaminants and material (i.e. petroleum impacted soil)
- Indication the waste is unclassified – waste analyses pending

All IDW shall be profiled, transported and disposed of in accordance with A.A.C. R-18-13-13 or A.A.C. R18- 13-16 as applicable.

3.3 Laboratory Analyses

All soil and groundwater samples shall be analyzed by an Arizona Department of Health Services licensed laboratory as described in the following sections.

3.3.1 Soil Analyses

Soil sample extraction and analyses shall be conducted based on the history of all products stored in USTs at the facility (i.e. gasoline, diesel fuel, waste oil, aviation gas, Jet A, etc.) in accordance with the ADEQ UST Program Analytical Data Information available at: http://static.azdeq.gov/ust/analytical_data.pdf

3.3.2 Soil Vapor Analyses (If Applicable)

Soil vapor samples shall be analyzed by an ADHS certified laboratory using EPA Method TO-15 and shall be analyzed in accordance with the ADEQ UST Program Analytical Data Information available at: http://static.azdeq.gov/ust/analytical_data.pdf. If an active service station is present on the property, ADEQ recommends analyzing the soil vapor samples for fixed gases by EPA Method 3C or an equivalent method.

3.3.2 Groundwater Analyses (If Applicable)

Groundwater sample analyses shall be conducted based on the history of all products stored in USTs at the facility (i.e. gasoline, diesel fuel, waste oil, aviation gas, Jet A, etc.) in accordance with the ADEQ UST Program Analytical Data Information available at: http://static.azdeq.gov/ust/analytical_data.pdf

4.0 REPORT PREPARATION

4.1 Data Verification, Validation and Assessment

Field and analytical data will be reviewed, verified and validate in accordance with the September 2016 ADEQ UST Program Quality Assurance Program Plan under the supervision of the Professional Registrant.

Data sets should be verified during review to identify inconsistencies or anomalous values. Any inconsistencies discovered will be resolved as soon as possible by seeking clarification from field personnel responsible for data collection. Data validation shall include the following:

- Evaluation of field data for completeness and consistency
- Review field QC information
- Identification of deviations and evaluation of impact on data quality
- Summarize number and type of samples collected
- Review laboratory analytical reports to determine method, procedural and contractual QC compliance or noncompliance
- Review reported sample results collectively for the data set as a whole, including laboratory qualifiers
- Summarize data and QC deficiencies and evaluate the impact on overall data quality

Finally, data will be assessed in comparison with the Data Quality Objectives of the Baseline Assessment.

4.2 Baseline Assessment Report Form

Data obtained during the Baseline Assessment should be reported on the UST Baseline Assessment Report Form. According to ARS 49-1052(D), the report requires the professional registrant's interpretation regarding confirmation of an unknown release and evaluation of potential risk for the purpose of prioritizing corrective actions.

4.3 Agency Notification

Pursuant to A.R.S. § 49-1004 and 49-1052(E)(1), the tank owner or operator is required to report a confirmed LUST release to ADEQ as soon as practicable, but no later than 24 hours after the confirmed release is detected. The owner/operator is required to submit a 24-Hour Notification/Release Notification in accordance with AAC R18-12-251(A). Following the 24-Hour Notification of a confirmed release, all subsequent investigation and reporting required by A.A.C. R18-12 shall be conducted outside of the Baseline Assessment Scope.

REFERENCE DOCUMENTS

ADEQ UST website: <http://www.azdeq.gov/UST>

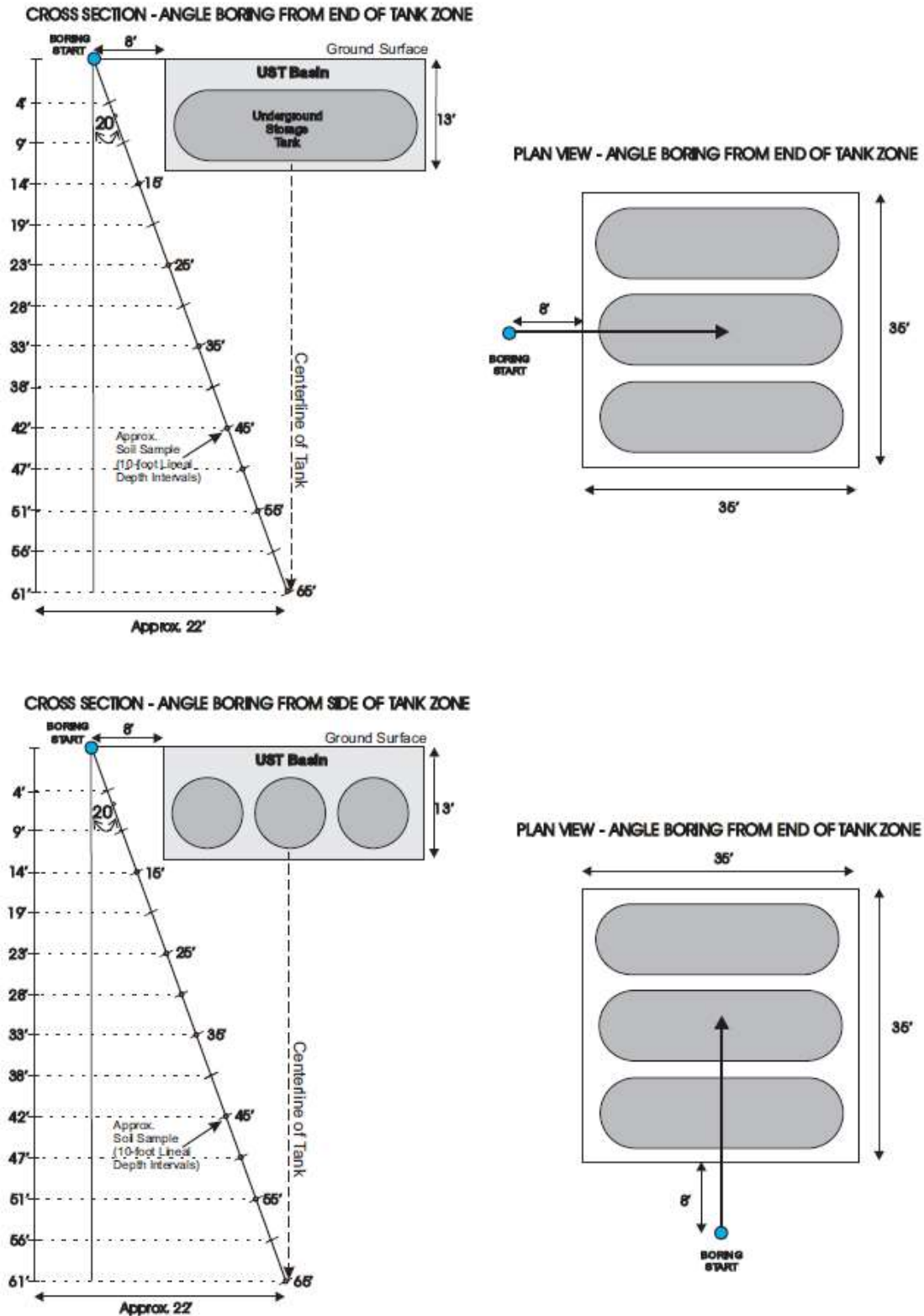
ADEQ Permanent Closure Guidance document: http://static.azdeq.gov/ust/ust_perm_closure.pdf

ADEQ's Waste Programs Division Site Investigation Guidance Manual dated October 2014:
http://legacy.azdeq.gov/environ/waste/download/SI_Guidance_Manual_Final.pdf

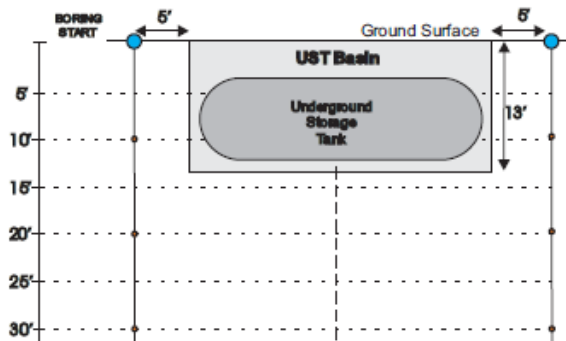
ADEQ Analytical Data Information: http://static.azdeq.gov/ust/analytical_data.pdf

ADEQ UST Program Quality Assurance Program Plan dated September 2016:
http://static.azdeq.gov/ust/ust_quality_assurance_plan.pdf

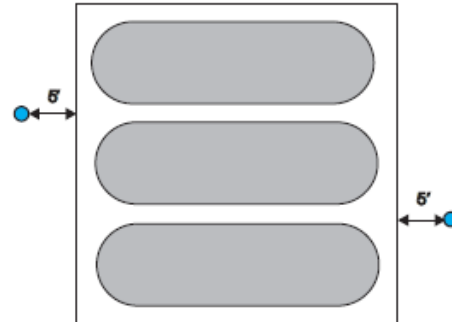
ATTACHMENT A



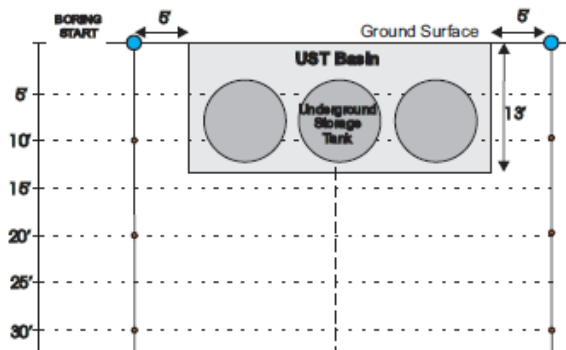
CROSS SECTION - VERTICAL BORINGS NEAR ENDS OF TANK ZONE



PLAN VIEW - VERTICAL BORINGS FROM END OF TANK ZONE



CROSS SECTION - VERTICAL BORINGS NEAR ENDS OF TANK ZONE



PLAN VIEW - VERTICAL BORINGS FROM END OF TANK ZONE

