

APPENDIX I
APPLICANT PROJECT MITIGATION

**RIPSEY WASH TAILINGS STORAGE FACILITY
ENVIRONMENTAL PROTECTION MEASURES AND MONITORING
(CORPS FILE NO. SPL-2011-1005-MWL)**

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FIGURES

(follow text)

- Figure 1. Vicinity Map
Figure 2. Project Plan View

1. INTRODUCTION AND BACKGROUND

ASARCO LLC (Asarco) has identified the need for an additional tailings storage facility (TSF) to support ongoing mining operations at the Ray Mine in Pinal County, Arizona (*Figure 1*). The construction of a TSF and associated infrastructure (the Project) will require the discharge of fill material to surface drainage features that are considered waters of the United States by the US Army Corps of Engineers (Corps), thus requiring a Clean Water Act (CWA) Section 404 permit.

A variety of environmental protection measures have been incorporated into the Project design that are either voluntary or intended to meet the applicable standards of the Arizona Department of Environmental Quality (ADEQ), the Arizona State Mine Inspector's Office, Bureau of Land Management, and the Corps.

The proposed TSF will impact Ripsey Wash and its tributaries as well as an unnamed drainage east of Ripsey Wash (*Figure 2*). The TSF is designed to support up to approximately 750 million tons of tailings through the remaining life of ongoing sulfide ore mining at the Ray Mine. Tailings will be applied to the TSF using a centerline construction method for the first approximately 18 years (depending on production volumes), after which an upstream construction method will be used for the remaining life of the facility. Two rock-fill starter dams will be constructed, one in Ripsey Wash and one in the unnamed drainage. Underdrains will be constructed beneath the two starter dams and seepage from the drains will be collected in two reclaim ponds, the Main and East Reclaim Ponds. An upstream diversion dam will be constructed across Ripsey Wash at the southern end of the ultimate impoundment footprint. Stormwater from the upstream watershed will be routed around the TSF via a stormwater diversion channel on the eastern side of the TSF and a series of detention ponds, pump stations, and pipes on the western side of the TSF (*Figure 2*).

In addition to its CWA Section 404 permit application, Asarco has obtained or will obtain the following major permits for the Project:

- Aquifer Protection Permit (APP) (ADEQ)
- 401 Water Quality Certification of Section 404 Permit (ADEQ)
- Arizona Pollutant Discharge Elimination System Mining Multi-Sector General Permit and Construction General Permit (AZPDES Mining MSGP and CGP) (ADEQ)
- Title V permit amendment (Pinal County)
- Mined Land Reclamation permit (Arizona State Mine Inspector)

The purpose of this memorandum is to provide a list of the proposed environmental protection and monitoring measures that would be implemented as part of the Project to support the Project analysis under the National Environmental Policy Act. The primary environmental protection measures that have been incorporated into the project design as of the date of this memorandum are summarized in the sections below.

This memorandum addresses:

- air quality
- surface water protection measures
- groundwater protection measures
- fuel storage and hazardous materials transport measures
- waste management
- noxious weed prevention
- closure and reclamation
- emergency preparedness
- wildlife
- recreational and visual resources

Mitigation for unavoidable impacts to waters of the United States are addressed separately, in Asarco's revised Clean Water Act Section 404 Conceptual Mitigation Plan.

2. AIR QUALITY

Construction activities at the TSF will require a dust control permit from Pinal County, and Asarco and its contractors will be subject to the fugitive dust control requirements contained in Chapter 4, Article 3 (§ 4-3-060 *et seq.*) of the Pinal County Air Quality Control District's code of regulations. Fugitive dust control measures will include watering and other measures developed pursuant to that permit.

The TSF will also be added as an area source to the existing Title V permit held by the Ray Mine and subject to controls that the County deems appropriate for such sources. During the operational phase, the emphasis will be on the control of windblown dispersion. The supernatant pond maintained on the top of the tailings will help keep that area wet and prevent tailings from being blown away from the facility. In addition, Asarco is investigating the use of a binding agent or tackifier on the downgradient slope of the TSF as it is being operated. If dry areas appear on the surface of TSF, a binding agent will also be applied to those areas.

During both construction and operation, if visual observation suggests that excessive dust is being generated, a Method 9 trained operator will determine whether opacity (no greater than 20 percent at the property boundary) and other permit standards are being met.

After the switch from centerline to upstream construction, Asarco plans to begin reclaiming the outer slopes of the TSF. Following the completion of a set of three 10-foot lifts, a 60-foot setback (bench) will be created before the next set of lifts is begun. At that point, Asarco will reclaim the recently completed series of lifts through the placement of rock material on the exterior of the TSF. (This is referred to as concurrent reclamation and is required by Part 2.2.4.1 of the aquifer protection permit for the TSF, No. 511395.) This practice will help reduce the potential for windblown dispersion.

In addition, Asarco plans to pave the proposed realigned segment of the Florence-Kelvin Highway and an additional three (3) miles east and west of the proposed realigned segment of the Florence-Kelvin Highway with asphalt (*Figure 2*), thus further reducing the potential for dust generation from Project-related traffic and public traffic along the Florence-Kelvin Highway.

3. SURFACE WATER PROTECTION MEASURES

Stormwater flows from the upstream watershed will be diverted around the eastern and western sides of the TSF. A large detention basin will be constructed in Ripsey Wash upstream of the TSF to temporarily detain water before it is released to Zelleweger Wash. In addition, seven smaller detention facilities will be constructed in unnamed tributaries to the southwest of the facility (where rough topography precludes the installation of a diversion channel), which will temporarily detain water before it is released to Zelleweger Wash.

3.1. STORMWATER DIVERSIONS

The diversion of stormwater is intended to (1) convey upgradient stormwater around the proposed tailings facility and allow it to flow to the Gila River, as currently occurs; and (2) protect the tailings facility from potential adverse impacts associated with heavy upstream flows from larger storm events.

Upgradient Dam and Spillway

Stormwater from undisturbed watershed areas upstream of the TSF would be diverted around the TSF and allowed to continue to ultimately flow to the Gila River. A large detention dam (designed to handle flows from a 500-year, 24-hour storm event) would be constructed in the upper part of Ripsey Wash, just upstream of the proposed TSF footprint (*Figure 2*). Detained water would be pumped to Zelleweger Wash through pipes. In the highly unlikely event of a greater storm event, this detention dam structure would be installed with an emergency spillway that would allow flow in excess of the design storm event to discharge into the tailings impoundment. During the operational life of the TSF, the detention dam would be raised about 10 feet to detain the stormwater volume from the probable maximum precipitation event and would remain a permanent feature.

East Diversion Channel

To intercept stormwater flow on the eastern side of the proposed Ripsey Wash TSF, an approximately 17,625-foot (about 3.3-mile-long) diversion channel would be constructed to handle flow from a 100-year, 24-hour storm event (*Figure 2*). Flow intercepted by this diversion channel would be routed to an unnamed wash to the east of the facility.

An energy dissipater at the outfall location within the unnamed drainage east of Ripsey Wash would be constructed to control discharge velocity to reduce the potential for down-drainage erosion.

West Diversion Pipeline and Detention Ponds

Water from the upper Ripsey Wash watershed is intercepted by a detention dam and routed around the Ripsey Wash TSF by pumping through a piping system for discharge into Zelleweger Wash, a drainage located west of Ripsey Wash (*Figure 2*). A series of seven smaller interceptor detention dams on the western side of the Ripsey Wash TSF would serve to intercept upstream stormwater flow and pump it to Zelleweger Wash. When stormwater collects behind these detention dams, it will be pumped to Zelleweger Wash (through the same outfall location as water from the main detention dam is released to Zelleweger Wash).

An energy dissipater at the outfall location within Zelleweger Wash would be constructed to control discharge velocity to reduce the potential for down-drainage erosion.

3.2. STORMWATER POLLUTION PREVENTION PLAN

In addition to the diversion of unimpacted stormwater around the proposed TSF, Asarco will also implement measures to contain and control stormwater that impacts the TSF. Pursuant to the AZPDES Mining MSGP, a Stormwater Pollution Prevention Plan (SWPPP) has been developed for the construction and active operation of the TSF. Pursuant to this SWPPP, structural and non-structural control measures will be employed to contain or treat runoff and divert run-on from disturbed areas as well as the TSF (once constructed). In addition, pursuant to the AZPDES Construction General Permit (CGP), a SWPPP will be developed for the construction of the proposed tailings delivery, reclaim water pipelines, and other offsite infrastructure including the proposed pipeline bridge that would cross the Gila River, a proposed drain-down pond, and the electrical switchgear that would be located north of the Gila River.

During construction, measures would be developed to address sediment runoff. It is anticipated that some stormwater will be allowed to discharge during the construction phase after being treated to reduce sediment. The SWPPP for the Project has been designed to comply with the requirements of Part 8.G.4 of the Mining MSGP, which addresses control measures for the construction phase of mining operations. Control measures at the proposed Ripsey Wash TSF during the construction phase will focus on sediment control (using silt fences, wattles, sandbag barriers, sediment traps, and detention basins). Good housekeeping measures will also be implemented to further mitigate sediment loading of stormwater. In addition, the stormwater diversions discussed above will be constructed early in the project, thereby helping to control stormwater volume and velocity within the site. Pursuant to the Mining MSGP (Part 8.G.4.3), inspections will be conducted at least once every 30 days and within 24 hours of each storm event resulting in a discharge during the construction phase. A comprehensive annual inspection will also be conducted (pursuant to Part 4.3.1 of the Mining MSGP). Visual inspection of stormwater discharges will occur twice per wet season, as practicable, pursuant to Part 4.2 of the Mining MSGP (likely using representative outfalls given the size of the site).

The primary control measure during the operational phase will be containment to prevent the discharge of stormwater that has contacted the TSF. Dikes at the top of the tailings impoundment will contain the incidental stormwater accumulated in the supernatant pond and prevent discharge to surface waters. Four contact water channels designed to handle peak flows associated with the 100-year, 24-hour event will convey stormwater to two large retention basins (the Main and East Reclaim Ponds, described further

below, which are designed to receive seepage and underflow from the impoundment). These two impoundments will be designed to contain flows from the 100-year, 24-hour storm event, in combination with expected underflow volumes, while still maintaining 2 feet of freeboard. Finally, four small ponds will be created along the western side of the TSF at topographical low points (*Figure 2*). These ponds will detain stormwater run-on from upgradient areas and prevent it from contacting the TSF. Pumps and pipes will convey accumulated run-on to Zelleweger Wash.

During the operational phase, quarterly inspections are required under the Mining MSGP (4.1.1), as is a comprehensive annual inspection. Inspections will verify there is not excessive erosion of sideslopes and embankments and that diversion channels are free-flowing and contain no trash or debris. Necessary maintenance will be performed accordingly. If any discharge occurs, visual monitoring is required, as is general analytical monitoring under Part 8.G.8.1 of the Mining MSGP.

The final 401 certification issued by ADEQ for the project includes a number of specific conditions applicable to activities occurring in surface waters, focused on stormwater control, erosion prevention, sediment loading and pollution prevention.

3.3. SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN

The proposed TSF will likely include oil-filled operational equipment associated with project infrastructure (e.g., pumps, transformers, electric distribution switchgear). In addition, it is possible that a maintenance shop will be constructed at the TSF; if this occurs, oil may be stored at that location. The Ray Operations' existing Spill Prevention, Control, and Countermeasures (SPCC) Plan will be amended to encompass the oil stored at the TSF site. The SPCC Plan addresses how the Ray Operations complies with the requirements of 40 C.F.R. Part 112, including secondary containment, contractor storage, employee training, and emergency response requirements. Any oil-filled operational equipment or oil storage containers 55 gallons or greater will be located in secondary containment. Asarco will add any oil storage containers 55 gallons or greater at the TSF to the routine visual inspections currently conducted under the current SPCC program. Oil storage containers are currently inspected on a quarterly basis, and will occur at the same frequency for all regulated containers at the TSF site. In addition to the visual inspections, bulk storage containers will be periodically inspected for integrity.

3.4. RECLAIM (SEEPAGE CONTROL) PONDS AND ENCASING OF TAILINGS PIPELINE WITH ASSOCIATED DRAIN-DOWN POND

In addition to serving as stormwater containment ponds, the Main and East Reclaim Ponds will also collect water from the alluvial cutoffs, the planned underdrain channel and seepage collection systems that will be constructed in Ripsey Wash and the unnamed eastern drainage. This is designed to prevent any TSF seepage from migrating toward the Gila River. Pursuant to a special condition in the final Section 401 certification for the project, Asarco is required to provide a redundant power source to pumping stations, in order to prevent overtopping of the seepage collection ponds in the event of a power outage or electrical failure.

The portion of the tailings and reclaim water pipelines that crosses the Gila River will be sleeved within an exterior casing. If the interior pipeline leaks, the leaked material will be captured by the outer casing and gravity-feed to the proposed Drain-down Pond located on the northern side of the Gila River. This design feature is intended to prevent discharge into the Gila River. Encasing of those portions of the tailings delivery and reclaim water lines where spills could reach a surface water is required pursuant to a special condition of the final 401 certification for the project issued by ADEQ.

4. GROUNDWATER PROTECTION MEASURES

Project components are subject to the requirements of the State of Arizona's APP Program (Arizona Administrative Code R18-9-101 through 113) as approved by ADEQ. The TSF will be constructed using Best Available Demonstrated Control Technology (BADCT) for tailings impoundments to protect groundwater. For the proposed TSF, Asarco used a combination of individual and prescriptive BADCT elements, as described in ADEQ's Mining BADCT Guidance Manual. These elements include:

- presence of bedrock at shallow levels through most of the proposed TSF footprint
- slime sealing upstream of the embankment
- cut-off walls and seepage collection trenches in Ripsey Wash and the unnamed eastern drainage
- use of a geosynthetic liner in some locations and slime sealing in the portion of the TSF where the Hackberry Fault crosses beneath Ripsey Wash alluvium
- construction of an underdrain channel to convey water past the portion of the impoundment where the Hackberry Fault crosses beneath Ripsey Wash alluvium
- cycloned tailings embankment construction to obtain a non-liquefiable stability zone
- diverting stormwater from upstream areas around the impoundment
- control and collection of stormwater runoff from the slopes of the tailings embankment
- double-lined non-stormwater ponds with leak-detection systems (Main and East Reclaim Ponds, Drain-down Pond)

For some facilities, the design includes elements that surpass prescriptive BADCT as outlined in the BADCT Guidance Manual. For example, the Main and East Reclaim Ponds, as well as the Drain-down Pond, incorporate a double HDPE liner with a leak-detection system design. Prescriptive BADCT for non-stormwater ponds (as set out in Section 2.2.2.4 of the BADCT Guidance Manual) calls for only a single liner with no leak-detection system.

As part of the approved APP, Asarco has completed initial groundwater sampling of wells down-gradient of the TSF facilities to establish existing groundwater quality conditions. Those same wells will be used to monitor groundwater conditions at the site during construction, operations and closure. Based on the initial water quality monitoring results, ADEQ has established alert levels and action protocols in the permit (No. 511395). Other APP compliance conditions include:

- Water quality monitoring and compliance with aquifer quality limits set forth in the APP;
- Implementation of a Contingency Plan which is activated when an alert level, performance standard or aquifer quality limit is exceeded;
- Weekly, monthly and annual operational monitoring and maintenance requirements;
- Requirements for compliance during any temporary cessation of operations; and,
- Requirements for closure and post-closure of the TSF.

Proposed groundwater protection measures are described more fully below.

4.1. INTERNAL CONTAINMENT DAM AND SEEPAGE COLLECTION

The western side of the proposed Ripsey Wash TSF is underlain by the Hackberry Fault, expressed as a zone of fractures and breccia that have a higher permeability than the surrounding bedrock. Prior to the construction of the starter dam in the area of the Hackberry Fault zone, Asarco would remove vegetation material for the length of the fault zone, both beneath the starter dam and immediately up-drainage of the starter dam, along the trace of the fault zone (where the fault line intersects the surface). Asarco would also remove much of the alluvial material above the trace of the fault zone beneath the starter dam.¹ The exposed trace of the Hackberry Fault would then be compacted using a vibratory compactor or similar machine. Immediately down-gradient of the fault zone, a containment dam oriented approximately perpendicular to the starter dam would be constructed. The upgradient slope of the starter dam in the vicinity of the fault zone and the up-drainage side of the inside containment dam would be lined with an 80-mil HDPE (or equivalent) liner. Up-gradient of the internal containment dam, and immediately up-gradient of the trace of the fault zone, Asarco would begin the placement of tailings material such that the tailings fines would seal the fault zone and prevent seepage under the starter dam at the site where it intersects the Hackberry Fault zone. Underdrains will be constructed within the TSF basin to convey water past the portion of the impoundment where the Hackberry Fault crosses beneath the Ripsey Wash alluvium. A monitoring well down-gradient of the tailings embankment within the Hackberry Fault zone will be placed to serve as a point of compliance with the Project's ADEQ APP. The purpose of this well is to characterize and monitor groundwater conditions within the fault zone during operations and as part of post-closure activities (see *Section 4.3*).

Down-gradient of the starter and containment dams, Asarco plans to install seepage trenches to intercept any water seepage that might migrate under the TSF through the alluvium material located above the bedrock. The trenches would be excavated into bedrock to depths ranging from a few feet on the outer reaches of the washes to approximately 100 feet in the middle of the Ripsey Wash drainage. Pumps and piping would be installed in the seepage trenches to route any collected water to two lined reclaim ponds (the Main and East Reclaim Ponds).

The Main and East Reclaim Ponds will be double-lined non-stormwater impoundments located in the main drainages (Ripsey Wash and the unnamed eastern drainage) down-gradient of the TSF. The ponds will

¹ This material will be integrated into the starter dam.

collect seepage and underflow from the TSF in addition to containing stormwater runoff that has contacted the TSF. Both ponds will be designed to contain runoff associated with a 100-year, 24-hour storm event, as well as normal operating volumes of seepage and underflow, while still maintaining two (2) feet of freeboard. Water collected in the ponds will be pumped back to the Ray Mine for reuse. Both reclaim ponds will be double-lined with a leak-collection and recovery system that exceeds the prescriptive BADCT requirement for a non-stormwater pond. In addition, as noted above, a special condition in the final 401 certification for the project requires Asarco to provide a redundant power source for pumps associated with the Main and East Reclaim Ponds, to prevent overtopping in the event of a loss of power.

The key design elements discussed above are incorporated into the requirements of the facility's APP (No. 511395), chiefly in Section 2.2 of that permit.

4.2. DRAIN-DOWN POND

The Drain-down Pond will be constructed near the lowest elevation of the Ripsey Wash TSF tailings and reclaim pipelines (*Figure 2*). When the pipeline is shut down for an extended period of time, the contents of the pipeline will be discharged into the Drain-down Pond. The ability to drain the pipelines is necessary to prevent sediment from settling in the pipe and for maintenance purposes.

The Drain-down Pond will be a double-lined impoundment with a leak-collection and recovery system. This exceeds the prescriptive BADCT criteria for non-stormwater ponds, which call for a single liner without a leak-collection and recovery system. The pond will be designed to contain precipitation associated with the 100-year, 24-hour storm event plus the volume of material associated with a drain-down of the pipelines while still maintaining two (2) feet of freeboard. These design elements are required by Section 2.2.1.4 of the facility APP, No. 511395.

4.3. GROUNDWATER MONITORING WELLS

Asarco has installed four monitoring wells downstream of the tailings embankment that serve as the points of compliance in the APP for the TSF (*Figure 2*). The wells have been used to characterize groundwater quality before TSF construction and operations commence, and will also be used to monitor groundwater quality throughout facility operations (beginning in the quarter prior to construction) and for some period of time after closure. Two wells are located in Ripsey Wash, one is in the unnamed drainage east of Ripsey Wash, and one is within the Hackberry Fault zone (*Figure 2*). Pursuant to the APP, alert levels have been set for various constituents in each of these wells, the exceedance of which will trigger certain contingency obligations. The APP (No. 511395, Section 4.2) for the proposed Ripsey Wash TSF requires quarterly monitoring of the four point of compliance wells for 32 chemical and physical parameters.

The APP also identifies the location of two additional point of compliance wells that will be installed if ADEQ determines they are needed.

5. FUEL STORAGE AND HAZARDOUS MATERIALS TRANSPORT MEASURES

Any fuel or other petroleum products stored in bulk storage containers at the site of the TSF will be stored in above-ground tanks situated within impervious secondary containment systems having a containment capacity of at least 110 percent of the volume of the largest tank therein. If present, such tanks would be located at the dry shop and miscellaneous support facilities area (*Figure 2*) and would be covered by the Ray Operations SPCC plan discussed above. The SPCC plan also addresses fuel transfers and includes an appendix containing tank truck unloading procedures.

Asarco personnel handling hazardous materials receive appropriate training that meets the applicable requirements prescribed by ADEQ, the Environmental Protection Agency, and the US Department of Transportation. Additionally, employees receive safety training required by the Mine Safety and Health Administration and other training prescribed by Asarco. Asarco requires that contractors transporting hazardous materials to or from the Project certify that their drivers meet all the applicable training requirements prescribed by law and perform in accordance with Asarco environmental policies and safety standards. Truck deliveries would arrive at the Project from State Route 177, northeast of the Project, using the Florence-Kelvin Highway.

6. WASTE MANAGEMENT

Solid waste generated at the office, dry shop, and miscellaneous support facilities associated with the Project will be transported to the ADEQ permitted Ray Mine landfill for disposal in accordance with the terms of ADEQ's approval to operate that landfill (granted in July 2016, pursuant to the solid waste general permit found at A.A.C. R18-13-802). If any waste generated at the Project site constitutes a hazardous waste, or is otherwise not appropriate or authorized for disposal in the onsite landfill at the mine, it will be sent off-site for disposal consistent with ADEQ regulations. For example, used oil will be transported by a contracted recycling company and recycled in accordance with state and federal used oil regulations.

In addition to disposal Ray Operations has an extensive recycling program to manage scrap metal, high density polyethylene (HDPE), tires, e-waste and universal waste.

7. NOXIOUS WEED PREVENTION

Noxious weeds could be carried to the site via light vehicles or mobile construction equipment coming to the site from locations where infestations of weeds are present. Noxious weeds of concern are identified and compiled by the Natural Resources Conservation Service.

Asarco would use land management practices to reduce the spread of noxious weeds, including:

- To the extent that seeding or revegetation of the Project occurs, only seed mixes with certified native weed-free species would be used.
- All straw wattles used on site to reduce soil erosion will be composed of non-invasive plant species.
- Avoid moving weed-infested gravel, rock and other fill materials to relatively weed-free locations. Gravel and fill will come from weed-free sources.

- The disturbed project area will be evaluated at the end of each growing season for noxious and invasive weed (as listed by Pinal County and/or the State) establishment. If noxious weeds are found onsite, Asarco will control and eradicate those weeds to the extent possible using a Licensed Commercial Pesticide Applicator (LCPA) and appropriate mechanical, chemical, or biological techniques.
- Clean off-road equipment (power or high-pressure cleaning) of all mud, dirt, and plant parts before moving into relatively weed-free areas.
- Minimize the removal of roadside vegetation during construction, maintenance and other ground-disturbing activities.

8. CLOSURE AND RECLAMATION

Asarco will prepare and submit a reclamation plan to the Division of Mined Land Reclamation, Arizona State Mine Inspector in accordance with the requirements of the Arizona Mined Land Reclamation Act, A.R.S. § 27-901 *et seq.* and the Arizona Mined Land Reclamation Rules, A.A.C. R11-2-101 *et seq.* This plan will be developed to meet state reclamation requirements.

Closure of the TSF was also addressed in the closure and post-closure strategy submitted with the APP application.

8.1. CLOSURE AND RECLAMATION COMPONENTS

Asarco's closure and reclamation plan for the TSF would include permanent decommissioning and closure, removing support facilities and infrastructure, re-contouring the TSF to establish drainage off the site, and placing rock material over the surface of the TSF to reduce the potential for wind and water erosion. In Arizona, under the jurisdiction of the Arizona State Mine Inspector, closure and site reclamation must consider public safety, which would include stable landforms. APP closure requirements would also apply; these focus on reducing the potential for future discharges to groundwater.

Concurrent reclamation would be employed once the facility transforms to the upstream construction method in order to provide permanent low-maintenance achievement of reclamation goals. (Concurrent reclamation is required by Section 2.2.4.1 of the facility APP, No. 511395.) Asarco plans to place rock material on the down-drainage slope of the tailings embankment after the centerline construction work is finished. At this point, the face of the centerline tailings embankment would be ready for rock placement work as the embankment slope would remain a permanent feature.

Asarco also plans to conduct concurrent reclamation on the slopes of the upstream tailings embankment after the transition to upstream construction methods. As each set of three 10-foot lifts is completed, Asarco would begin to reclaim those lifts at the same time as it begins the construction of new lifts. Rock material excavated from onsite quarries or borrow sites would be placed on the final slope created after three individual lifts are made and the setback is completed on the third lift.

At the permanent cessation of milling operations, Asarco would dewater, close, and reclaim the TSF. As permanent closure approaches, Asarco would minimize the amount of excess water within the TSF decant

pond. Upon closure, Asarco would allow the remaining water in the TSF to evaporate. This would cause the surficial layers of the tailings to dry and gain strength, which in turn would allow equipment to operate on the tailings surface for rock material placement. Spray evaporators could be used to enhance the evaporation of the existing decant pond(s). It is estimated that 7 to 10 years may be required to achieve final drying and settlement of the tailings material.

A permanent diversion channel would remain on the eastern side of the facility. In addition, Asarco would continue to maintain and operate the detention dams and stormwater pumping and piping system designed to route stormwater around the western side of the Ripsey Wash TSF.

The final surface of the dried tailings impoundment may require some shaping to eliminate the potential for ponding and to provide positive stormwater drainage off the impoundment and into the permanent diversion channels. Construction equipment such as scrapers and bulldozers would be used to reshape the tailings. The tailings surface would be graded to achieve drainage to the east to the permanent diversion channel (constructed prior to the operation of the TSF) that would connect to the unnamed wash on the eastern side of the facility.

Rock material would be placed over the TSF once final grading is completed. This rock material would minimize wind and/or water erosion of the tailings material. The final cover rock material would be granitic conglomerate excavated from the borrow area within the tailings impoundment footprint. Prior to facility closure, Asarco would excavate and stockpile this rock along the perimeter and within the footprint of the TSF; this rock would then be available for final cover material.

8.2. POST-MINING LAND USES

In addition to providing safety and stability, reclamation measures should be designed to achieve productive post-mining land uses ([PMLUs] - A.R.S. § 27-973). The currently anticipated PMLU envisioned for the TSF is solar power generation; a photovoltaic array would be placed atop the TSF pile after capping as outlined in the APP closure and mined land reclamation plans is completed. Asarco has already successfully partnered with a utility (Tucson Electric Power) and a private company (Clenera Renewable Energy) to develop a solar generating facility (the Pima Mine Road Solar Generating Facility, also known as the Avalon Solar Project) near one of its other mines (the Mission Complex in Sahuarita Arizona). Given that it is expected to be many decades before the new TSF is closed and reclaimed, it is possible that the identified PMLU will change. If this occurs, a revised PMLU will be identified and the reclamation plan will be revised as necessary. Regardless of the final PMLU, APP closure and mined land reclamation activities will be closely coordinated.

8.3. PUBLIC SAFETY

One of the primary objectives of the Arizona State Mined Land Reclamation Act is to ensure public safety. The following measures will be implemented as part of reclamation to reduce or eliminate potential hazards within disturbed areas after Project closure, as well as during Project construction and operations:

- construction of physical barriers such as fences and berms

- placement of warning signs
- stabilization of slopes
- demolition of unneeded buildings
- proper disposal of debris

8.4. ROADS

The post-reclamation configuration of roads will be designed to meet the access requirements for future uses, maintenance and security functions, and environmental monitoring. Roads that are retained as part of PMLU objectives will have public access controls (e.g., gates) for safety purposes and will be maintained in accordance with designated PMLUs.

Whether any access roads are to be reclaimed at closure (as opposed to being maintained for security and maintenance purposes or to facilitate the PMLU) has yet to be determined. For any that are reclaimed, the following reclamation measures will be employed:

- Slopes on both sides of the roadway will be graded to blend in with the surrounding terrain. Where possible, drainages will be established to provide stable drainage conditions. Typical sediment barriers will be placed in accordance with reclamation standards.
- After contouring and grading are completed, road surfaces will be ripped and underlying materials will be scarified to a depth of 1 to 2 feet to reduce compaction and to prepare a seed bed. The prepared roadbeds will then be revegetated with a certified weed-free native seed mix.

9. EMERGENCY PREPAREDNESS

The new TSF will be addressed in the Integrated Contingency and Emergency Response Plan (ICP) developed by the Ray Mine. This plan serves as the official contingency plan under the current area-wide APP (see A.R.S. 49-243(K)(3) and A.A.C. R18-9-A204) and has been updated to reflect the contingency requirements imposed by ADEQ as part of the permit for the new TSF. In addition, the ICP: (1) addresses how to respond to releases of CERCLA hazardous substances; (2) identifies how to respond to accidental releases of RCRA hazardous waste; (3) summarizes the reporting and contingency requirements of the Mine's individual AZPDES permit; and (4) addresses general spill response procedures, including identifying contacts, responsibilities, and internal and external reporting procedures. As noted above, oil storage at the TSF will be addressed in the Mine's revised SPCC plan, which also contains spill response procedures. Collectively, these plans, along with the specific contingency provisions contained in the various permits (e.g., APP), provide a comprehensive approach to responding to unexpected spills and releases that could threaten health, safety, and the environment.

10. WILDLIFE RESOURCES

Abandoned mine features (AMFs) that have previously supported wildlife use within the footprint of the TSF will be closed to prevent wildlife use prior to construction activities. AMFs will be surveyed and

excluded from wildlife prior to their closure to the extent possible. Wildlife exclusions will be conducted on four adits (IO-156, F-1, F-2 and F-3) and one shaft (IO-189) based on the results of previous survey of abandoned mine lands.² Monitoring and wildlife exclusions for other AMFs within the TSF footprint during the AMF closures will also be completed. This will entail survey of each feature and flushing wildlife from them immediately prior to the closure of the features.

Mitigation activities for Sonoran Desert Tortoise are intended to address unavoidable Project impacts to tortoises and tortoise habitat resulting from the Bureau of Land Management (BLM) mineral material sale. Asarco has identified mitigation activities to protect desert tortoises with the goal of conserving tortoises and educating its onsite workers and personnel about the Sonoran Desert Tortoise.

The proponent shall develop and implement a worker education program that addresses (i) the occurrence and distribution of the desert tortoise within the construction area; (ii) measures being implemented to protect the tortoise and its habitat in the construction area; and (iii) specific protective protocols to follow should desert tortoises be encountered in the field. Training on Sonoran Desert Tortoise handling procedures will be provided to Asarco employees and contractors on an annual basis as practical and as needed. The training will follow the Arizona Game and Fish Department Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Project (revised September 22, 2014).

Within 48 hours prior to surface-disturbing activities within BLM mineral materials borrow source areas and a buffer zone of 200 feet around such areas, survey will be conducted by a qualified biologist for tortoises and their burrows. All tortoises found on the ground surface within construction corridors will be moved by a qualified biologist a minimum of 500 feet (but no more than 0.5 mile away from their original location) from the outside edge of disturbance areas and placed in a shaded location. Tortoise burrows that cannot be avoided during construction activities will be excavated and backfilled. Any tortoises observed within the burrow would also be moved to a safe location at a minimum of 500 feet from the outside edge of the disturbance area.

Tortoises that wander onto site-wide construction areas during construction periods will be removed to safe locations. If a tortoise is endangered by any site-wide construction activity, that activity shall cease until the tortoise is moved to safety. Tortoises will only be handled by individuals trained in Arizona Game and Fish Department Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Project (revised September 22, 2014).

Between March 15 and November 15, a walking clearance of working areas (around equipment, in trenches etc.) will be performed by a designated qualified person each morning and evening to check for tortoises. Asarco will obtain all necessary permits for handling desert tortoise prior to any surface disturbance activities or construction.

² Based on survey conducted by WestLand in 2013 and 2014 as described in: Westland. 2014. Ray Mine Tailings Storage Facility Ripsey Wash Analysis Area Abandoned Mine Feature Survey. Report dated February 6, 2014.

The relocated portions of the Florence-Kelvin Highway will be appropriately maintained and signed to minimize potential wildlife/vehicle collisions. Appropriate speed limits will be set (35 mph).

Roads constructed for project development outside of the ultimate TSF footprint that are no longer required to support construction or operations will be reclaimed to preexisting habitat conditions to the extent possible.

For planned Project power lines, Asarco will install an “avian-safe” power pole configuration designed to minimize bird electrocution risk by providing sufficient separation between phases and between phases and grounds to accommodate the wrist-to-wrist and head-to-foot distances of a bird. Consequently, 60 inches of horizontal separation, which can accommodate the wrist-to-wrist distance of an eagle (which has a wingspan of approximately 54 inches), is used as the standard for raptor protection. Likewise, vertical separation of at least 48 inches can accommodate the height of an eagle from its feet to the top of its head (which is approximately 31 inches).

Two avian species found in habitat along the Gila River have been listed under the Endangered Species Act (ESA); these are the southwestern willow flycatcher (endangered) and the yellow-billed cuckoo (threatened). The proposed project will impact small areas of proposed and designated critical habitat for these species. Mitigation measures are included in the Biological Opinion (BO) prepared by the U.S. Fish and Wildlife Service (USFWS). The following are mitigation measures to lessen potential impacts to these species:

Asarco has identified four compensatory mitigation sites located along the San Pedro River (Sites A through D) that are approximately 29 river miles upstream from the Project and payment to the Lower San Pedro River Wildlife Area in Lieu Fee Project managed by the Arizona Game and Fish Department as mitigation for unavoidable Project impacts to waters of the U.S., and to enhance habitat for southwestern willow flycatcher and yellow-billed cuckoo. All proposed mitigation activities are associated with perennial or intermittent aquatic resources, support or have the potential to support high-value mesoriparian and hydroriparian habitats, and provide regional conservation benefit. The San Pedro River mitigation sites are adjacent to existing Corps-approved mitigation projects that have been developed in support of previous Corps permitting efforts at the Ray Mine and are contiguous with or near other conservation properties that have been established by the Bureau of Reclamation, the Salt River Project, and the Arizona Game and Fish Department. The riparian and aquatic habitats within the mitigation sites will be preserved, enhanced, and/or restored to benefit wildlife, including southwestern willow flycatcher and yellow-billed cuckoo.

Project construction, including construction of the pipeline bridge and associated infrastructure, relocation of the Florence-Kelvin Highway and SCIP powerline, and construction of the seepage collection system in Ripsey Wash, is likely to be determined in large part by the time at which the necessary permits are obtained and the timing of related Project construction activities. If pipeline bridge construction is required during the breeding season of southwestern willow flycatcher and/or yellow-billed cuckoo, vegetation removal along the Gila River would occur outside the breeding season(s) (April 15 to September 15 for the southwestern willow flycatcher and May 15 to September 30 for the yellow-billed cuckoo). Early clearance of vegetation is intended to preclude southwestern willow flycatcher and/or yellow-billed cuckoo from establishing territories and nest sites in the pipeline bridge construction corridor. Upon the clearance of

vegetation within the bridge construction area along the Gila River, it is anticipated that birds would be expected to move on to other unoccupied sites on the Gila River and that there would be no (direct) mortality of individual southwestern willow flycatchers or yellow-billed cuckoos resulting from the Project.

11. RECREATIONAL AND VISUAL RESOURCES

The construction specifications for the relocation of the Arizona Trail will be developed based on the January 2017, Gradeline Survey Report as approved by BLM, Pinal County and the Arizona Trail Association (ATA). Asarco will fund the design and construction of a new trail head and the realigned portion of the Arizona Trail, and 3 years of maintenance of the newly aligned portion of the trail as agreed upon by BLM, Pinal County, ATA and Asarco. Asarco will secure or grant any legal access required to cross privately-owned property along the trail realignment. Asarco will also provide funding to be agreed upon between Asarco and the ATA to support the ATA's objective related to providing additional amenities to hikers along the trail within the vicinity of the Ripsey Wash TSF.

On its private lands outside of areas fenced in connection with the construction and operation of the new TSF, Asarco will not eliminate any existing access roads and OHV trail connections between Kearny and the Florence-Kelvin highway through the southern portions of Ripsey Wash unless doing so becomes necessary to accommodate future Asarco needs or for public safety reasons.

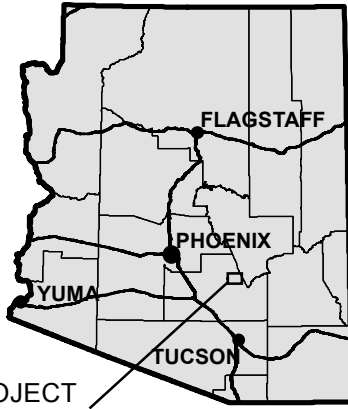
Manual construction techniques for the relocation of the trail will be utilized when practical to minimize adverse visual effects as seen from the trail due to machine construction methods.

Where practical, Asarco will paint project related structures in neutral colors to reduce color contrasts with the surrounding landscape.

Project lighting will be designed and installed to minimize night-sky impacts, limit the number of lights required for safety and security, and direct lighting fixtures downward or provide hooding to minimize upward lighting.

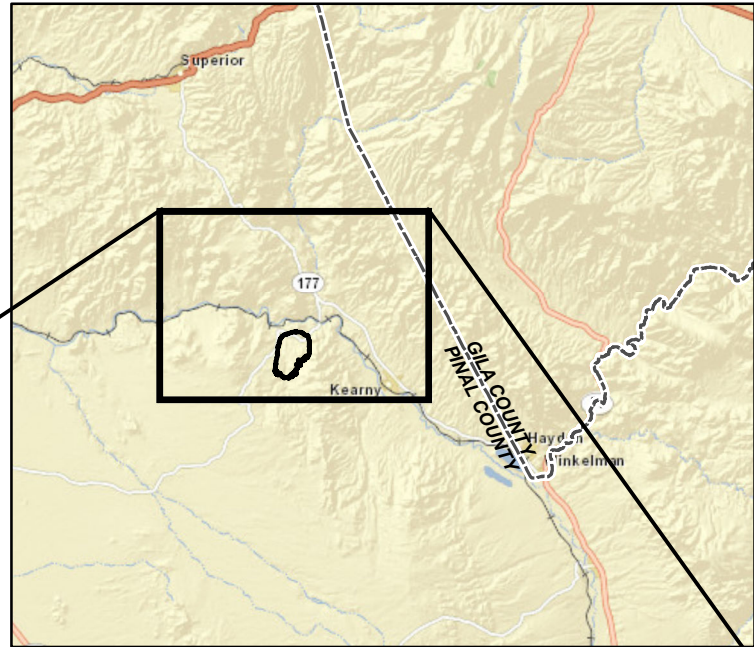
FIGURES

ARIZONA







PROJECT LOCATION

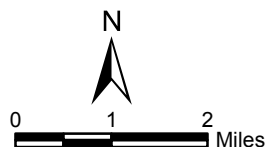
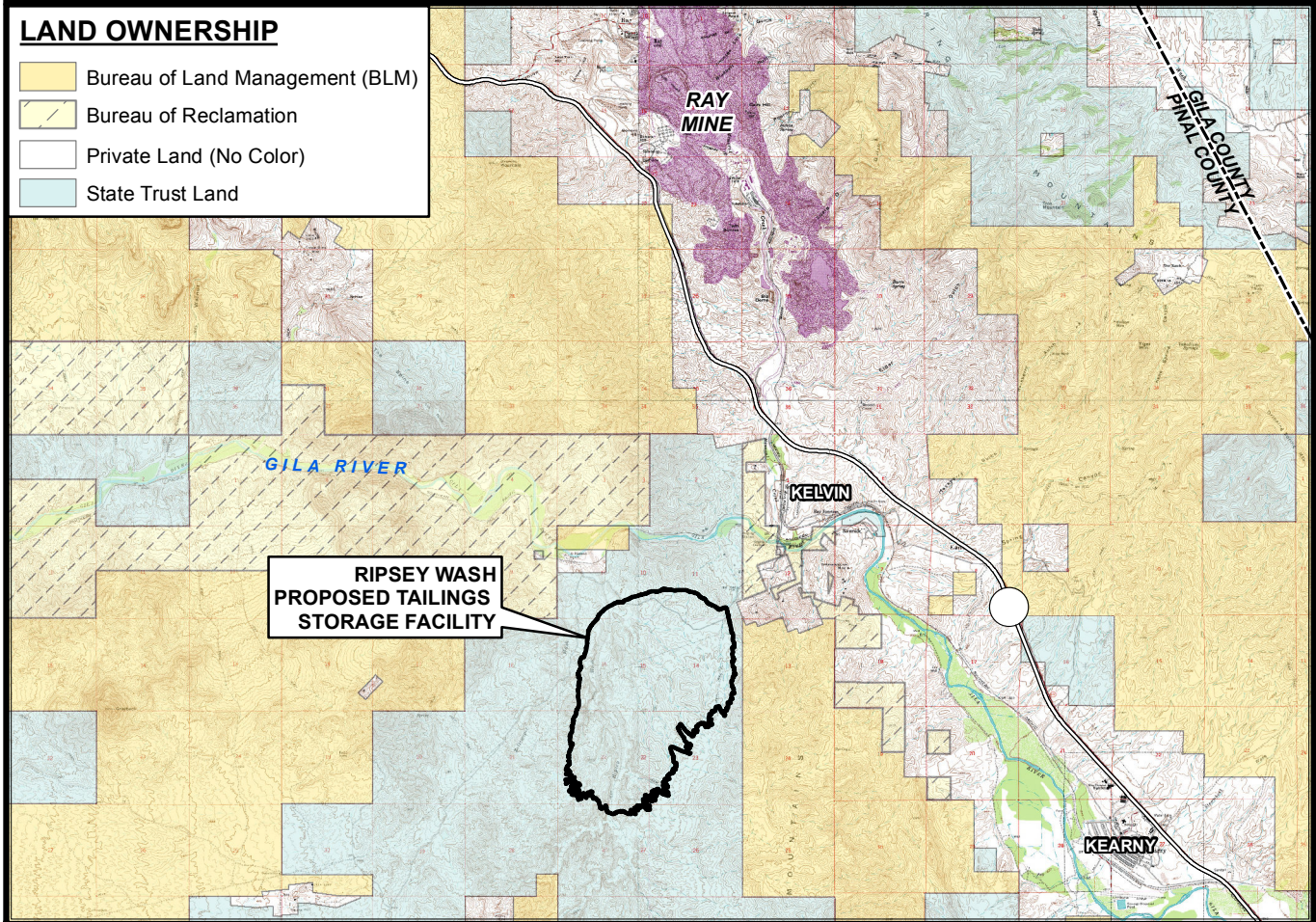
EASTERN PINAL COUNTY



Approximate Scale 1 Inch = 10 Miles

LAND OWNERSHIP

-  Bureau of Land Management (BLM)
-  Bureau of Reclamation
-  Private Land (No Color)
-  State Trust Land



Revised Surface Disturbance (October-26-2017)

- (1) Tailings Storage Facility - 1,974 ac
- (2) Stormwater Diversion Infrastructure - 123 ac
- (3) Onsite TSF Infrastructure - 424 ac
- (4) Offsite TSF Infrastructure - 50 ac
- (5) Florence-Kelvin Highway Relocation - 37 ac
- (6) Florence-Kelvin Highway Paving - 22 ac
- (7) AZ Trail Realignment - 4 ac
- (8) SCIP 69kV Powerline Relocation - 2 ac outside of Onsite TSF Infrastructure

Ripsey TSF Design Data

- Toe Channel/Run-off Channel
- Stormwater Diversion Pipeline (60' Wide)
- Project Powerline
- Project Access Roads
- Seepage Trench
- Proposed Tailings Delivery Pipeline (30' Wide)
- Proposed Reclaim Pipeline (30' Wide)
- Proposed Fresh Water Pipeline (30' Wide)

REVISED TOTAL SURFACE DISTURBANCE = 2,636 acres

