APPENDIX E

VISUAL SIMULATIONS
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I. INTRODUCTION

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. The construction of an additional tailings impoundment (the Project) would require the discharge of fill to surface drainage features that have been identified as waters of the United States by the U.S. Army Corps of Engineers (Corps).

An analysis of alternatives is required to demonstrate compliance with guidelines established under the Clean Water Act (CWA) Section 404(b)(1) (40 CFR §230) for avoidance and minimization of impacts to jurisdictional waters. Nine alternatives at six potential Project locations were analyzed as part of the Clean Water Act Section 404(b)(1) Alternatives Analysis prepared for the Project in accordance with the 404(b)(1) guidelines.

Of the six sites considered in the Alternatives Analysis, E Dam, Devils Canyon, West Dam, and Granite Mountain were deemed impracticable and are not considered further in this investigation. The remaining two sites represent five alternatives, Ripsey Wash (Ripsey Wash Alternatives 1 to 3) and Hackberry Gulch (Hackberry Gulch Alternatives 1 and 2). Ripsey Wash Alternatives 1 and 2 and Hackberry Gulch Alternative 1 were dropped from further consideration because alternatives at these sites were developed that have fewer impacts to waters. Ripsey Wash Alternative 3 and Hackberry Gulch Alternative 2 are currently still being evaluated by Asarco (Figure E-1). Asarco has identified Ripsey Wash Alternative 3 as its proposed action in its CWA Section 404 permit application to the Corps (Corps File No. SPL-2011-1005-MWL).

The Corps identified visual resources as a topic that needed to be addressed in the Draft Environmental Impact Statement (EIS) that was released by the Corps on January 29, 2016 in accordance with the requirements of the National Environmental Policy Act. This report was initially provided July 23, 2014 to aid in the evaluation of visual impacts that would result from the construction of Ripsey Wash Alternative 3 and Hackberry Gulch Alternative 2. Asarco proposes minor changes to select project elements in response to comments on the Draft EIS. Proposed changes include the following:

- Realignment of the Tailings Delivery, Reclaimed Water, and Fresh Water Pipelines and Project Powerline Corridor to Reduce Greenhouse Gas Emissions
- Adjustment to the Florence-Kelvin Highway Realignment to Reduce Visual Impacts to the Arizona Trail
- Adjustment of the Relocation of the San Carlos Irrigation Project (SCIP) 64 kV Powerline Realignment to Reduce Visual Impacts to the Arizona Trail
• Paving Portion of the Florence Kelvin Highway West of the Proposed TSF to Reduce Dust Emissions

• Slight Realignment of the Arizona National Scenic Trail (Arizona Trail) Relocation East of the Proposed TSF to Reduce Switchbacks to make the Trail More Sustainable and Reduce Maintenance Requirements

This report also incorporates a new visual analysis point located along the proposed Arizona Trail realignment that was added per the Corps’ request, and presented in a supplemental visual simulation report on August 23, 2017. The information presented in this report includes a description of the methods used to prepare and present visual simulations, as well as the results of the visual simulations.

2. METHODOLOGY

On December 2, 2013, Susan Corser of ECA Community Planning (ECA), as well as representatives from the Bureau of Land Management, the U.S. Forest Service, and WestLand Resources, Inc. (WestLand), met in the field near the town of Kearny, Arizona, to review and discuss possible locations for visual simulations of the Ripsey Wash and Hackberry Gulch alternatives. Based on the findings of that field work and subsequent research performed by ECA, six Key Observation Points (KOPs 1-6) were identified (Figure E-1). An additional KOP along the proposed realignment of the Arizona Trail was identified by the Corps for review in June 2017 (KOP 7, Figure E-1).

On February 5, 2014, March 4, 2014, and June 13, 2017, a representative from WestLand took photos from each of the KOP’s and documented the location of each photograph using a Garmin Montana 650t handheld global positioning system (GPS) unit. The camera utilized for taking photographs was a Canon Rebel XT EOS digital camera with a Canon EFS 18–55 mm zoom lens. The lens was set at 33 mm to compensate for a crop factor of 1.6, thereby creating an equivalent focal length of 53 mm (33 mm lens setting x 1.6 crop factor = 52.8 mm output view), which creates a frame that mimics the field of view of the human eye. From each KOP, a series of overlapping photographs was taken of the existing landscape that would be affected by the Project.

After downloading the digital images, WestLand “stitched” together the photographs from each photo point using Adobe Photoshop. This “stitching” was done by eye. The width of each panorama was dictated by the size of the visual impact that would result from the construction of the Project. Minor corrections for colors were made in order to correct for small variations between the three photos.

Using ArcGIS 10.1 and 3D Analyst, WestLand merged the publicly available USGS Digital Elevation Model (DEM) (10 meter) with three-dimensional CAD data of the proposed projects provided by Asarco. The resulting DEM was then imported into AutoDesk InfoWorks (Version 2014) along with the locations of the photo points recorded by the GPS unit. WestLand rotated the DEM to correspond
with each photo point location and captured that digital perspective as a DEM image. The horizontal angles of these images varied between 45 to 105 degrees. Depending on the location of the KOP in relation to the Project alternatives, images that incorporated wider angles allowed for more comprehensive simulations of that Project alternative.

For each photo point, the captured DEM perspective was imported into Photoshop along with the corresponding stitched panoramic image. Using recognizable existing landmarks visible in both, the DEM perspective was aligned with the panorama. The portions of the Project in the DEM image were then isolated and placed over the panoramic image. The DEM image of the Project was then rendered in Photoshop using the colors and textures that are expected to result from the Project.

With respect to the printed size of the visual simulations, the simulated image was created with the intention that it be printed on 11- x 17-inch paper, to be included as a figure in the visual analysis.

Visual simulations from KOPs 1, 2, 3, 4 and 7 were modified to show the adjusted Florence-Kelvin Highway realignment and adjusted SCIP powerline alignment as part of Ripsey Wash Alternative 3 as currently proposed by Asarco.

3. RESULTS

Images of the existing landscapes, rendered simulations for Ripsey Wash Alternative 3 upon completion of the centerline construction and project completion, and the rendered simulations for Hackberry Gulch Alternative 2 upon project completion are presented as Figures E-2 through E-18 following this text.
KOP 1 – Florence-Kelvin Highway, Ripsey Wash Tailings Storage Facility, Completion of Centerline Construction

KOP 1 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
Note: Simulation indicates impoundment at completion of centerline construction before reclamation with rock surfacing.
PHOTOGRAPHIC INFORMATION

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<td>portion of Ripsey Wash</td>
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<td>Tailings Storage Facility</td>
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ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations Revised

Figure E-4. KOP 1 – Florence-Kelvin Highway
Ripsey Wash Tailings Storage Facility, Project Completion

KOP 1 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
Note: Simulation indicates impoundment at completion of the project before reclamation of the top 30 feet of tailings and surface of the tailings.
PHOTOGRAPHIC INFORMATION

Time of Photograph: 3:58 PM
Date of Photograph: 02.05.2014
Weather Condition: Lightly overcast
Viewing Direction: South to southeast
Latitude: 33.111533
Longitude: -111.009503
Elevation: 1897
Distance: 1.28 miles to nearest portion of Ripsey Wash Alternative 3

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised

Figure E-6: KOP 2 – Arizona Trail, Mile 4.3, Ripsey Wash Alternative 3
Completion of Centerline Construction

KOP 2 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
Note: Simulation indicates tailings impoundment at completion of centerline construction before reclamation with rock surfacing.
PHOTOGRAPHIC INFORMATION

Time of Photograph: 3:58 PM  
Date of Photograph: 02.05.2014  
Weather Condition: Lightly overcast  
Viewing Direction: South to southeast  
Latitude: 33.111533  
Longitude: -111.009503  
Elevation: 1897  
Distance: 1.28 miles to nearest portion of Ripsey Wash Alternative 3

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised

Figure E-7: KOP 2 – Arizona Trail, Mile 4.3, Ripsey Wash Alternative 3, Project Completion

KOP 2 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
Note: Simulation indicates tailings impoundment at completion of the project before reclamation of the top 30 feet of tailings.
PHOTOGRAPHIC INFORMATION

Time of Photograph: 1:57 PM  
Date of Photograph: 02.05.2014  
Weather Condition: Lightly overcast  
Viewing Direction: South to southwest

Latitude: 33.1057  
Longitude: -110.994414  
Elevation: 2128  
Distance: 0.27 miles to nearest feature of relocated highway

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised

Figure E-9: KOP 3 – Arizona Trail, Jake’s Overlook, Relocated Florence-Kelvin Highway & SCIP Transmission Line

KOP 3 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
PHOTOGRAPHIC INFORMATION

Time of Photograph: 11:55 AM
Date of Photograph: 02.05.2014
Weather Condition: Lightly overcast
Viewing Direction: Southwest
Latitude: 33.106491
Longitude: -110.979205
Elevation: 1795
Distance: Not applicable

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised
Figure E-10: KOP 4 – Kelvin Trail Access,
Existing Condition
PHOTOGRAPHIC INFORMATION

Time of Photograph: 11:55 AM
Date of Photograph: 02.05.2014
Weather Condition: Lightly overcast
Viewing Direction: Southwest

Latitude: 33.106491
Longitude: -110.979205
Elevation: 1795
Distance: 0.71 miles to nearest visible section of relocated highway

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised

Figure E-11: KOP 4 – Kelvin Trial Access, Relocated Florence-Kelvin Highway & SCIP Transmission Line

KOP 4 visual simulation revised February 26, 2018 to reflect changes to proposed project alignment
PHOTOGRAPHIC INFORMATION

Time of Photograph: 12.01 PM
Date of Photograph: 03.04.2014
Weather Condition: Lightly overcast
Viewing Direction: North

Latitude: 33.085821
Longitude: -110.92717
Elevation: 2030
Distance: Not applicable

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised
Figure E-12: KOP 5 – State Route 177
Existing Condition

WestLand Resources
PHOTOGRAPHIC INFORMATION

Time of Photograph: 12:01 PM
Date of Photograph: 03.04.2014
Weather Condition: Lightly overcast
Viewing Direction: North

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations

Figure E-13: KOP 5 – State Route 177, Hackberry Gulch Alternative 2, Project Completion

Note: Simulation indicates tailings impoundment at completion of the project before reclamation of the top 30 feet of the tailings.
PHOTOGRAPHIC INFORMATION

Time of Photograph: 1:21 PM
Date of Photograph: 02.05.2014
Weather Condition: Lightly overcast
Viewing Direction: East

Latitude: 33.107156
Longitude: -110.988557
Elevation: 2037
Distance: Not applicable

ASARCO LLC
Ray Mine Tailings Storage Facility
Visual Simulations – Revised
Figure E-14: KOP 6 – Arizona Trail, Mile 2
Existing Condition
PHOTOGRAPHIC INFORMATION

Time of Photograph: 1:21 PM  
Date of Photograph: 02.05.2014  
Weather Condition: Lightly overcast  
Viewing Direction: East

Latitude: 33.107156  
Longitude: -110.988557  
Elevation: 2037  
Distance: 1.87 miles to nearest portion of Hackberry Gulch Alternative 2

ASARCO LLC  
Ray Mine Tailings Storage Facility  
Visual Simulations – Revised  

Figure E-15: KOP 6 – Arizona Trail, Mile 2, Hackberry Gulch  
Alternative 2 Project Completion

Note: Simulation indicates tailings impoundment at completion of the project before reclamation of the top 30 feet of the tailings.
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PHOTOGRAPHIC INFORMATION

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Date of Photograph: 06.13.17
Weather Condition: Mostly sunny
Viewing Direction: West

Latitude: 33.077113
Longitude: -110.976332
Elevation: 2992
Distance: 0.40 miles to nearest portion of Ripsey Wash Tailings Storage Facility

Note: Simulation indicates impoundment at completion of centerline construction before reclamation with rock surfacing.
**PHOTOGRAPHIC INFORMATION**

- **Time of Photograph:** 9:42 AM
- **Date of Photograph:** 06.13.17
- **Weather Condition:** Mostly sunny
- **Viewing Direction:** West
- **Distance:** 0.40 miles to nearest portion of Ripsey Wash Tailings Storage Facility
- **Latitude:** 33.077113
- **Longitude:** -110.976332
- **Elevation:** 2992

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**ASARCO LLC**

**Ray Mine Tailings Storage Facility**

**Visual Simulations – Revised**

**Figure E-18. KOP 7 – Proposed AZ Trail Realignment**

Ripsey Wash Tailings Storage Facility, Project Completion

*Note: Simulation indicates impoundment at completion of the project before reclamation of the top 30 feet of tailings and surface of the tailings.*