Appendix T
Historical Slag Assessment
October 7, 2013

Re: Texas Custodial Trust
   Former ASARCO Smelter Site, El Paso, Texas

Subject: Historical Slag Assessment

INTRODUCTION
To assist in delineation of soils and areas of historical slag placement a review of photographs, boring logs and topographic surface changes was completed. This information was used to develop a spatial understanding of areas where slag has historically been present to inform soils sampling programs and develop the site conceptual model.

The historical aerial photographs form the basis of this assessment and are included in this Appendix as Attachments. The photographs from 1936, 1947, 1950, 1967, 1979, 1988, 1995, and 2004 are oriented with north to the top of the page. Oblique photographs collected at unspecified date during the 1950s show the site from the north facing to the south, and from the south facing to the north. The railroad tracks located on the northern and northeastern boundaries of the site (Figure 1) represented a consistent landmark at the site and were used as a stable reference location to compare between aerial photographs.

Boring logs were used to support findings of the aerial photograph investigation. Boring logs are included in Appendix G and were collected during monitoring well and soil boring installation which occurred primarily during Phases II and III remediation works completed from 1999 through 2001 (ASARCO El Paso Copper Smelter Phase II Remedial Investigation Report, El Paso, Texas, July 10, 2000; ASARCO El Paso Copper Smelter Phase III Remedial Investigation Report, El Paso, Texas, 2001).

HISTORICAL SLAG PLACEMENT
Historically, the Parker Brothers Arroyo Investigation Area (IA) (incorporating the Boneyard, Fines Pile and Ephemeral Pond areas), along with select locations in the East Property IA, have been the primary areas of slag deposition (Figure 1). These areas were identified during Phase I and II investigations and show visible evidence of surficial slag. Historical aerial photographs provide an indication of the evolution of slag placement at the site, and allow determination of areas where slag has been historically present but is now no longer visually obvious.

In addition to areas where slag is visually observed at the surface review of boring log data found evidence of slag beneath the current surface, overlain by fill material. Subsurface slag can be correlated with surface slag deposition which occurred in the past and from various construction activities at the site that used slag for fill or topographic modifications.
The presence of slag in a historical context is discussed in more detail below for each of the arroyo based IAs.

**EAST PROPERTY AREA**
Slag is evident at the East Property in the oblique aerial photograph from the 1950s viewed from the south, but not the 1936, 1947, or 1950 photographs. At this time, the slag extended from the Fines Pile/Ephemeral Pond Areas east, across what is now the I-10, onto the East Property.

The 1967 aerial photograph shows the slag footprint now extends further eastward from the Fines Pile/Ephemeral Pond Areas, and by the time of the 1979 aerial, following construction of the I-10, the slag footprint extends further to the east, appearing to follow the drainage channel in this direction. In addition, a smaller slag pile is now evident on the East Property to the north of the original pile. It is apparent that the section of the I-10 between the Fines Pile/Ephemeral Pond and the East Property was constructed over an area of historical slag.

By the time of the 1988 aerial photograph, slag foot for the slag immediately to the east of the I-10 has decreased, have either been excavated, removed, or covered, and there is evidence of what appears to be slag removal in the 1988 aerial photograph. From 1988 to 2004, the slag footprint decreases further, and in 2004, excavation activities were completed to remove much of the obvious slag in this area. However, there are still several boring locations on the East Property (Figure 1) which indicate varying thickness of slag (between 0 ft and 15 ft) remains.

**ONSITE PLANT AREA:**
**PLANT ENTRANCE, POND 1, POND 5 AND 6, ACID PLANT AND SOUTH TERRACE ARROYOS**
Slag placement at the Plant Entrance, Pond 1, Pond 5 and 6, and South Terrace IAs was observed in the earliest historical photograph from 1936. Slag in these IAs generally aligns with the railroad tracks in the loading/unloading area. There is also evidence of Pond 1 and Pond 5 and 6 as defined areas, containing slag, in the 1936 aerial photograph. The placement of slag within the Plant Entrance, Pond 1, Pond 5 and 6 and South Terrace IAs is most obvious in the oblique aerial photo graphs from the 1950s, which show slag piles around the railroad tracks, and slag within the Pond 1 and Pond 5 and 6 disposal areas.

Slag placed in the Plant Entrance, South Terrace and Pond 1 IAs shows variability with time, and given the historical use in this area it is likely that much of the slag observed in the aerial photographs was placed for temporary storage, with exception of the Pond 1 disposal area. However, review of the boring logs (Appendix G) suggests that slag remains in these area (Figure 1) with variable thickness, extending from the surface, or at depth beneath other fill material. Slag thickness ranged from 8 to 20 ft in the Plant Entrance IA, with EP-89 indicating slag has been covered by fill material. In the South Terrace IA, slag extends from less than 1 ft bgs, to depths of between 4 and 33 feet bgs. The boring log for EX-9 in the South Terrace IA indicates significant subsurface between 22 and 62 ft bgs. Boring logs also show slag is present...
outside of the former Pond disposal area, from less than 1 ft bgs, to up to 48 ft bgs. Sub-surface slag that has been covered by fill material is observed, particularly on the western boundary of the Pond 1 Arroyo.

Where significant thickness of slag is observed, particularly covered slag, within the Pond 1, South Terrace and Plant Entrance Arroyos it appears associated with historical drainage channels. It is likely slag was used to fill in the original topography of these IAs and subsequently covered over.

The evolution of slag placement in the Acid Plant IA is difficult to assess based on the historical aerial photographs, however, there is evidence of slag extending from the Parker Brothers IA south, into the Acid Plant IA as early as 1936. The boring logs (Appendix G) show slag in the Acid Plant IA varies, but can extend up to 40 ft bgs. Again, where slag is present at significant thickness it is associated with historical drainage channels and/or along the western boundary of the Acid Plant IA. Based on the depth and thickness of slag and the changes in the historical topographic surface, it appears that slag placed in this area was used in part to re-grade the slope along the western boundary.

An inspection of the foundations of demolished buildings onsite was completed in 2011 in order to assess the need for any remediation beneath these buildings (Basement Assessment Technical Memorandum, December 2011). Building foundations and basements investigated include the Warehouse Building, the Engineering Building, the Former Antimony Smelter, the Unloading Building, the Mill Building, the Power House Cooling Tower Building, the North Contop-Slag Fill Area, the Converter Aisle, and the Reverberatory Furnace Area. The results of this investigation showed that the North Contop-Slag Area and the Converter Aisle may require further remedial actions due to the presence of slag within or directly beneath their foundations. These observations support the claim that slag was used as fill material to even out the topographic surface, and during construction activities.

PARKER BROTHERS ARROYO (INCLUDING FINES PILE, EPHEMERAL POND AND BONEYARD)
Slag is evident in these areas from as early as 1936, both in the Boneyard, and to the east of the railroad tracks in the Fines Pile and Ephemeral Pond Areas. The aerial photographs show the gradual expansion of slag contained in the Fines Pile and Ephemeral Ponds to the East, onto the East Property and also to the south, between the railroad tracks and the I-10. Slag placed in the Boneyard and the rest of the parker Brothers Arroyo IA makes up the largest area of slag placement, and the evolution of the slag footprint in this area to ultimately cover much of the northern corner of the onsite area is evident between the 1950s and 1990s.

The 1988 and 1995 aerial photographs in particular show the extent of slag in the vicinity of the railway tracks separating the Fines Pile and Ephemeral Pond from the rest of the Parker Brothers Arroyo.
The thickness of slag within the Parker Brothers IA based on boring log information is provided in Figure 1. The thickness varies widely, and can be up to 63 ft bgs in some areas. Slag also occurs at depth below other fill material.

LA CALAVERA
A small area of slag was first observed in the eastern portion of the La Calavera IA in the 1979 aerial photograph, suggesting it was placed here sometime between 1967 and 1979, potentially during construction of the I-10. The footprint of slag in La Calavera has not changed significantly over time, and slag in this area is surficial slag only which is planned for removal to landfill. The one boring log available for this area does not indicate the presence of slag (Figure 1).

ATTACHMENTS

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LEGEND:
- Property Boundary
- Historical Arroyo Trace Lines
- Approximate Extent of Current Slag or Smelter Related Material
- Onsite Waste Repositories
- Approximate Location of Sub-surface slag or concentrate

Investigation Area Boundaries:
- Acid Plant Arroyo
- East Mountain
- East Property
- Floodplain
- Parker Brothers Arroyo
- Plant Entrance Arroyo
- Pond 1 Arroyo
- Pond 5, 6 Arroyo
- South Terrace Arroyo
- La Calavera

APPROXIMATE EXTENT OF SLAG OR SMELTER RELATED MATERIAL

Graphical Scale:
- 0 feet
- 650 feet
- 1,300 feet

FORMER EL PASO SMELTER SITE
EL PASO, TEXAS

FIGURE 1
FORMER EL PASO SMELTER SITE
EL PASO, TEXAS

HISTORICAL IMAGE - USGS 1950 NORTH VIEW
FORMER EL PASO SMELTER SITE
EL PASO, TEXAS

HISTORICAL IMAGE - 1960