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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 2, 2016

Mr. Roberto Puga, P.G.
Trustee, Texas Custodial Trust
Project Navigator, Ltd.
One Pointe Drive, Suite 320
Brea, CA 92821

Re: TCEQ Comments to *Revised Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report*, dated April 11, 2016
Former ASARCO Smelter Site, El Paso, Texas
TCEQ SWR No. 31235; EPA ID No. TXD990757668; Customer No. CN603597782; Regulated Entity No. RN100219021

Dear Mr. Puga:

The Texas Commission on Environmental Quality (TCEQ) and US Environmental Protection Agency (US EPA) have reviewed the above referenced revised report. The April 11, 2016 report was submitted in response to TCEQ letter dated April 29, 2015 issued in response to review of the Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report, dated December 2014, submitted by Malcolm Pirnie on behalf of the Texas Custodial Trust. The purpose of the December 2014 report was intended to evaluate and address aspects of the affected property assessment requirements of 30 Texas Administrative Code (TAC) §350.51-350.55 that were not previously addressed by the October 17, 2014 Revised Supplemental Remedial Investigation Report approved by the TCEQ and USEPA in a letter issued February 2, 2015. The October 17, 2014 Revised Supplemental Remedial Investigation Report was submitted to satisfy the remedial investigation requirements of 30 Texas Administrative Code (TAC) §335.553(b)(1) of the TCEQ's Risk Reduction Rules (30 TAC 335, Subchapter S). Enclosure 1 provides specific comments to the response s to TCEQ Comments on the December 2014 SLERA and Appendix M of the April 11, 2016 document (Revised Tier 2 Screening Level Ecological Risk Assessment Report). Additional comments regarding review of the remainder of the report are provided in Enclosure 2.

An original and one copy of a response clarifying the enclosed comments should be submitted to the TCEQ Remediation Division for review within 60 days of the date of this letter at the letterhead address using mail code number MC-127. Additional copies should be submitted to the TCEQ Region 6 Office in El Paso and EPA Region VI Office in Dallas, respectively.

Please call me at (512) 239-6542 if you need additional information or wish to discuss these comments or the due date.

Sincerely,

Eleanor T. Wehner

Eleanor T. Wehner, P.G.
Project Manager
VCP-CA Section
Remediation Division

ETW/mdh

Enclosures: Enclosure 1 - Interoffice Memorandum dated May 25, 2016, April 11,2 016 Revised Tier 2 Screening Level Ecological Risk Assessment (SLERA); Appendix M, and Responses to TCEQ Comments on the December 2014 SLERA; *Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report*, Former ASARCO El Paso Smelter Site, El Paso, Texas, from Ms. Vickie Reat, TCEQ Remediation Division

Enclosure 2 – TCEQ Comments to *Revised Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report*, dated April 11, 2016, Former ASARCO El Paso Smelter Site, El Paso, Texas

cc: Mr. Scott M. Brown, P.E., Project Manager, Malcolm Pirnie, Inc., 410 N. 44th Street, Suite 1000, Phoenix, AZ 85008

Mr. Chuck Barnes, Enforcement Division, U.S. EPA Region 6, 1445 Ross Avenue Suite 1200, Mail Code: 6EN, Dallas, TX 75202-2733

Ms. Lorinda Gardner, Region Director, TCEQ Region 6 Office, El Paso

ENCLOSURE 1 of 2

TCEQ Interoffice Memorandum

To: Eleanor Wehner, Project Manager, VCP/Corrective Action Section, Remediation Division

From: Vickie Reat, Technical Program Support Team, Division Support Section, Remediation Division

Date: May 25, 2016

Subject: April 11, 2016 Revised Tier 2 Screening Level Ecological Risk Assessment (SLERA); Appendix M; and Responses to TCEQ Comments on the December 2014 SLERA
Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report
Former ASARCO El Paso Smelter Site, El Paso, Texas
SWR No. 31235
Prepared by Malcolm Pirnie, Inc. for the Texas Custodial Trust ("the Trust")

I have reviewed the subject documents. This SLERA reflects changes since the Trust's submittal in December 2014. My evaluation of remaining issues, along with a summary of the primary changes to the SLERA, is presented in this memo.

Outstanding Issues

The majority of TCEQ's previous comments on the draft SLERA have been addressed with the revised SLERA and responses to comments. The Trust's efforts to resolve these issues are appreciated. However, there are some outstanding issues that must be resolved before the SLERA can be approved. Rather than revise the SLERA a second time, TCEQ suggests submittal of a SLERA addendum report to address the remaining issues.

1. For the raccoon and the black-crowned night heron aquatic exposure pathways, the dose for fish (as food) was estimated using a water-to-fish uptake factor. Please calculate the fish dose (as food) modeled from water and sediment.

2. Regarding the groundwater-to-surface water pathway, the groundwater exposure point concentrations (discharge-weighted concentrations provided in Appendix N) exceeded the chronic aquatic life criteria for arsenic and selenium. The arsenic groundwater exposure point concentration was 0.447 mg/L compared with the criterion of 0.319 mg/L (total concentration adjusted for Rio Grande Segment 2314 hardness and total suspended solids).

   The selenium groundwater exposure point concentration was 0.0434 mg/L compared with the criterion of 0.005 mg/L. The discussion in Section 5.1 states that there was no adjustment for dilution in surface water (i.e., use of a

Re: Revised Tier 2 SLERA (Appendix M); and Responses to TCEQ Comments on the December 2014 SLERA; Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report; Former ASARCO El Paso Smelter Site, El Paso

groundwater-to-surface water dilution factor). The discussion states that these results indicate that arsenic and selenium are present in groundwater adjacent to the Rio Grande at concentrations that may pose a risk to aquatic receptors in the Rio Grande, and that the ecological-based surface water protective concentration levels (PCLs) for arsenic and selenium will be addressed in calculation of critical groundwater PCLs as part of the Affected Property Assessment for the site. This may not be necessary depending on the appropriate dilution factor. In any case this remains a "loose end." The groundwater-to-surface water PCL for selenium may be controlled by the background groundwater concentration[1].

3. The less conservative LOAEL[2] hazard quotients for aquatic-based wildlife receptors incorporate area use factors and exposure factors (EFs). An EF of 0.5 was applied to the dose since groundwater is expected to discharge to the river only about half of the year. Yet water is theoretically in the river year round and could be impacted by the site from runoff and groundwater discharge. Removing the EF from the dose, TCEQ calculated LOAEL-hazard quotients of 1.46 (selenium) for the night heron, and 2.27 (lead) and 2.31 (selenium) for the sandpiper. The LOAEL-hazard quotient for thallium was 5.47 for the raccoon. This finding is likely spurious as it was based on one detection of thallium in surface water. Please evaluate the exposure pathways for the night heron and the sandpiper (for selenium and lead) without the EF, or provide a more compelling rationale for this exposure modification. Also please evaluate the selenium exposure pathway (for groundwater (as surface water) and sediment), assuming an appropriate and justified groundwater-to-surface water dilution factor for the aquatic-based wildlife receptors. The groundwater concentration should be modelled as the surface water concentration (with dilution) as discussed in Section 3.9.2.6 of the TCEQ ERAG (TCEQ, 2014).

4. Risk from Exposure to Copper in Surface Soil of East Mountain Assessment Area - Previous comment 16 had questioned the determination that a PCL for copper was not warranted for the East Mountain Assessment Area based on uncertainty related to potential uptake of copper into the food chain along with low quality habitat. New text in Section 5.4.3:

[1] Page 4-1 of the *Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report* (ARCADIS, April 2016) states that "the UPL for selenium is 0.035 mg/L, which is below its MCL of 0.05 but higher than the surface water quality criterion of 0.005 mg/L."
[2] LOAEL = lowest observed adverse effect level

Re: Revised Tier 2 SLERA (Appendix M); and Responses to TCEQ Comments on the December 2014 SLERA; Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report; Former ASARCO El Paso Smelter Site, El Paso

- discusses the reduced bioavailability of metals in slag as evidenced by the *in vivo* bioavailability tests in juvenile swine and *in vitro* extractions for arsenic and lead in site soils
- suggests that copper in site soil is likely to have similar properties of decreased bioavailability due to the source being slag material from the smelting process
- discusses the encapsulation of metals in slags
- discusses the bioavailability testing for lead and arsenic and TCEQ's previous approval of site-specific bioavailability factors for these metals in the development of human health PCLs
- discusses soil-to-plant uptake studies in plants for soils impacted by slag, and
- concludes (again) that the high degree of uncertainty related with the potential uptake of copper into the food chain along with low quality habitat indicate that an ecological-based PCL for copper in soil of the East Mountain AA is not required to protect ecological receptors at the site.

TCEQ appreciates the added text. *Nevertheless, absent a site-specific bioavailability study or invertebrate uptake study (or both), TCEQ cannot accept this proposal.* If the copper (soil ingestion) dose for the shrew was adjusted down by 44% (the adjustment for lead in the soil ingestion dose), the LOAEL hazard quotient would still be 1.59. It would take this, in combination with a reduction of the invertebrate dose by 50%, to reach a LOAEL hazard quotient around unity. Since desert shrews consume arthropods more readily than earthworms, *TCEQ suggests using a grasshopper uptake factor (0.103 dry-weight; 0.0165 wet-weight) from Pascoe et al., 1996. With this change in the dose calculations, a bioavailability factor similar to that for lead and arsenic would result in a LOAEL-hazard quotient around unity.* As an aside, use of this same paper for an arthropod cadmium uptake factor would result in a LOAEL-hazard quotient for cadmium (for the desert shrew) of less than unity.

We understand that the Trust could estimate the bioaccessibility of copper in soil to the desert shrew using methods similar to U.S. EPA, 2004 and Ruby, et al., 1996. If this evaluation is determined to be appropriate, *the literature methods used should be modified as necessary to represent the pH of the shrew stomach and intestine, the liquid-to-solid ratio expected in the gut, and the expected time and temperature that ingested matter is expected to be retained in the gut.* To our knowledge, most small mammal bioaccessibility studies have focused on arsenic and lead. We are not aware of any studies evaluating the

bioaccessibility of copper in soil (or food) to small mammals. *Please address this uncertainty in any planned studies. Please also consider the following literature: Kaufman, et al., 2007; Koch and Reimer, 2012; Moriarty, et al., 2012; Ollson, et al., 2009; Rodriguez, et al., 1999; and Saunders, et al., 2011.*

TCEQ's Summary of Selected Changes to the SLERA

- Additional discussion and documentation (in Attachment 1 and within the SLERA text) of the potential presence of threatened and endangered species within the East Mountain AA including: 1) April 7, 2015 ARCADIS US memo summarizing April 1, 2015 habitat evaluation by Alexander M. Mathes; 2) July 13, 2015 Texas Parks and Wildlife Department (TPWD) letter stating that the Mountain short-horned lizard and Chihuahuan Desert lyre snake have the potential to occur within the East Mountain Area ; 3) December 2015 ARCADIS US memo to TPWD that describes an October 2015 3-day field survey that was specifically a presence or absence survey for the Mountain short-horned lizard and the Chihuahuan Desert lyre snake; and 4) TPWD stamp, signature, and date on #3 indicating no impact.
- Addition of a quantitative evaluation of potential risks to the greater earless lizard, which is present in the East Mountain area. The calculations used avian toxicity reference values adjusted with an uncertainty factor of 0.10.
- Evaluation of the potential risks to aquatic-based wildlife receptors (western sandpiper, black-crowned night heron, and raccoon) that may be exposed to site chemicals of concern (COCs) in surface water and sediment of the Rio Grande.
- Evaluation of surface water and sediment COCs in the Rio Grande based on samples collected in September 2015 (sediment; 8 sample locations) and March and August 2015 (surface water; 8 sample locations). The March samples were collected during low-flow conditions, and the August samples were collected during high-flow conditions.
- Additional discussion of flow dynamics in the Rio Grande (and groundwater recharge or discharge) related to operation of the Elephant Butte Reservoir upstream.
- Revision of groundwater exposure point concentrations based on the discharge-weighted groundwater concentration (for comparison with surface water screening values).
- Addition of terrestrial receptors indicative of the Texas desert-arid food web (i.e., desert shrew, coyote, bobwhite quail) for the East Mountain and South Arroyo soil exposure pathways.

Re: Revised Tier 2 SLERA (Appendix M); and Responses to TCEQ Comments on the December 2014 SLERA; Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report; Former ASARCO El Paso Smelter Site, El Paso

- Expanded discussion of the ecology and exposure assumptions for each of the measurement receptors.
- Removal of the subsurface soil exposure pathway for the South Arroyo as a result of slag and waste material removal. Concentrations of molybdenum were detected in confirmation samples up to 122 mg/kg, so molybdenum was added to the list of COCs for the South Arroyo.
- Revision of the soil-to-plant uptake factors for copper and lead.
- Removal of the seasonal use factor in the dose calculations for terrestrial avian receptors.
- Expanded discussion (in Section 3.2 of the report and Attachment 3) of the past bioavailability studies for arsenic and lead that were performed on site soils for application in human-health based risk assessment and PCL development. Based on these studies, the ecological risk assessment used bioavailability factors of 0.40 for arsenic, and 0.44 for lead.

References Cited

Kaufman CA, Bennett JR, Koch I, Reimer KJ. 2007. Lead bioaccessibility in food web intermediates and the influence on ecological risk characterization. Environmental Science and Technology. 41: 5902–5907.

Koch I, Reimer K. 2012. 3.24 - Bioaccessibility extractions for contaminant risk assessments. Comprehensive Sampling and Sample Preparation. Volume 3. pp 487-507.

Moriarty MM, Koch I, Reimer KJ. 2012. Arsenic speciation, distribution, and bioaccessibility in shrews and their food. Archives of Environmental Contamination and Toxicology. 62:529-538.

Ollson CA, Koch I, Smith P, Knopper LD, Hough C, Reimer KJ. 2009. Addressing arsenic bioaccessibility in ecological risk assessment: A novel approach to avoid overestimating risk. Environmental Toxicology and Chemistry. 28: 668-675.

Pascoe GA, Blanchet RJ, Linder G. 1996. Food chain analysis of exposures and risks to wildlife at a metals-contaminated wetland. Archives of Environmental Contamination and Toxicology. 30: 306-318.

Re: Revised Tier 2 SLERA (Appendix M); and Responses to TCEQ Comments on the December 2014 SLERA; Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report; Former ASARCO El Paso Smelter Site, El Paso

Rodriguez RR, Basta NT, Casteel SW, Pace LW. 1999. An in vitro gastrointestinal method to estimate bioavailable arsenic in contaminated soils and solid media. Environmental Science and Technology. 33: 642-649.

Ruby MV, Davis A, Schoof R, Eberle S, Sellstone CM. 1996. Estimation of lead and arsenic bioavailability using a physiologically based extraction test. Environmental Science and Technology. 30: 422-430.

Saunders JR, Knopper LD, Koch I, Reimer, KJ. 2011. Inclusion of soil arsenic bioaccessibility in ecological risk assessment and comparison with biological effects. Science of the Total Environment. 412-413: 132-137

TCEQ. 2014. Conducting Ecological Risk Assessments at Remediation Sites in Texas. Revised Draft. January 2014. Texas Commission on Environmental Quality. RG-263. Available at: http://www.tceq.state.tx.us/remediation/eco/eco.html.

U.S. EPA. 2004. Estimation of Relative Bioavailability of Lead in Soil and Soil-Like Materials using in Vivo and in Vitro Methods; Draft final report; U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response: Washington, DC.

TCEQ letter dated June 2, 2016
ENCLOSURE 2 of 2
TCEQ SWR No. 31235

TCEQ Comments to *Revised Conceptual Site Model, Pathway Evaluation, and Protective Concentration Level Report*, dated April 11, 2016, Former ASARCO El Paso Smelter Site, El Paso, Texas

Responses and proposed actions, as applicable, associated with C-1, C-4, C-5, C-6, C8 to C13, C-15, C-19 to C-22, are acceptable. Please ensure the final Response Action Plan (RAP) captures all required updates associated with these comments, as applicable.

The TCEQ requires additional information to address the following comments:

1. *TCEQ Response to C-2, Section 2.3.4 Soil-to-Sediment and C-10 3.5.5.2 Parker Brothers Arroyo (PBA) – Soil:* As current discharge monitoring reports (DMRs) note the maximum concentration across all outfalls during each annual event, please ensure the final RAP submittal provides for sampling and monitoring of <u>all</u> individual outfalls SW1 through SW5, and at a sampling frequency greater than once/year [in addition to qualifying (0.5 inch) precipitation events]. Areas draining the East Mountain (via gabions) and the Floodplain should also be included and subject to a similar, enhanced monitoring plan in the final RAP.

2. *TCEQ Response to C-3, Section 2.4.3 Receptor Survey and Water Well Search - East Mountain:* The text and Figure F-2 explains how the flow-weighted average concentrations are calculated for SW -1, and the results for September 2014 and August 2015 rainfall events are provided in Table 2-10. Please clarify the basis of the stormwater benchmark and how it relates to the Daily Maximum Limits in the TPDES permit. Also, clarify how the flow values for the different rainfall events were determined (information presented in Figure F-2). The TCEQ notes the analytes did not include antimony, copper, manganese, nickel and zinc. *Please ensure the monitoring program established in the final RAP captures these additional metals in the analyte list proposed for the stormwater monitoring program.*

3. *TCEQ Response to C-7, Section 3.5.1 East Mountain Assessment Area*: The response indicates no changes to the report were made because no PCLs were proposed for the East Mountain. Please note the evaluation of potential risks to omnivorous mammals (as represented by the desert shrew) from copper in soil is a residual issue that requires resolution. *Refer to Comment No. 4 of the May 25, 2016 Comments to the SLERA provided in Enclosure 1 of this letter to document resolution of this comment.*

4. *TCEQ Response to C-14, Section 4. Protective Concentration Level Development:* This comment relates to the establishment of critical low flow for the Rio Grande in support of the groundwater-to-surface water dilution factor calculations. The response indicated supporting calculations were based on the last few years of flow data (i.e. 2008-2011) as opposed to a longer span. The TCEQ understands the most current flow data (i.e., 2008-2011) was selected as a conservative approach to capture the most current impacts to flow in the Rio Grande as a result of recent changes in operations associated with Elephant Butte Reservoir. The Remediation Division requested support from the Water Quality Division (WQD) to determine the critical low flows for this segment of the Rio Grande. Based on a period of record beginning 1/1/1983 and ending 12/31/2011, the WQD determined a seven-day, two-year low flow (7Q2) of 2.1 cfs and a harmonic mean flow (HMF) of 6.2 cfs. To expedite the path forward, we request that the Trust use these flow values to determine the appropriate groundwater-to-surface water dilution factors. As a conservative measure (and less complicated approach), the 7Q2 can be used for all groundwater COCs for this pathway.

Alternatively: 1) the aquatic life surface water PCLs can be paired with the 7Q2 flow to determine the corresponding dilution factor and groundwater-to-surface water PCLs; and 2) the human health surface water PCLs (and chloride and sulfate PCLs) can be paired with the HMF to determine the corresponding dilution factor and groundwater-to-surface water PCLs. If requested, TCEQ can provide documentation from the WQD concerning their low flow determinations. *[Please note the gradient values calculated and presented in Appendix H (associated with response to C-13) and calculations associated with responses to C-16, C-17, C-24 and C-28 will need to be updated if the flows for the Rio Grande are modified to capture the updated dilution factor.]*

5. TCEQ Response to C-16, 4.1 Groundwater PCLs: Response is acceptable; however, in reviewing Table 4-3 (and 4-8), the TCEQ noted an additional error on the mercury surface water PCL referenced in the table. The table references 0.0013 mg/L (i.e., the value for aquatic life). Please note the human health (water and fish) value for mercury is much lower; 1.22×10^{-5} mg/L. *Please correct the tables accordingly.*

   Also, although the discharge weighted calculation approach provided in TRRP-15eco was intended to be used for ecological pathways, please clarify how the City of El Paso currently obtains its water from the Rio Grande as a source(s) of public drinking water relative to the location of the groundwater/surface water interface associated with the site to ensure adequate protection of human health. In other words, since the discharge weighted calculation averages groundwater discharge across the interface, we want to be sure that this averaging approach is protective relative to where the city's intake is located.

6. TCEQ Response to C-18, Section 4.1 Groundwater PCLs: The Table 4-4 Kd values were revised to reflect inputs provided in 30 TAC 350.73 (f)(1)(C) of the TRRP rule to derive the groundwater-to-sediment PCLs; however, where the TRRP rule does not provide a Kd value (cobalt, copper, molybdenum), please indicate it's referenced source.

7. TCEQ Response to C-23, Section 4.4 Sediment PCLs; C-25, Section 4.5.1 East Mountain Assessment Area - Plant Site: Responses are acceptable; however, note some of the copper/*wildlife exposure pathway issues remain pending in the SLERA. Refer to Comment No. 4 of the May 25, 2016 Comments to the SLERA provided in Enclosure 1 of this letter to ensure adequate resolution of the comments.*