Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that were used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures were met. Attach additional information if necessary.

The soil response action is based on removal of Category I materials and select Category II materials with COCs above select PCLs, covering of residual Category II materials, and construction of WCUs. The response action also includes control of COC migration in stormwater runoff. The performance measurements for each of these components are described below.

SOIL REMOVAL PERFORMANCE

The performance measure for soil removals involved grid-based confirmation sampling and comparison of sample results to the residential $^{Tot}Soil_{Comb}$ PCLs in the northeastern portion of East Property AA; the C/I $^{Tot}Soil_{Comb}$ PCLs in the remainder of the East Property AA, Plant Entrance Arroyo AA, Area 12 of the PBA (RAP Attachment 2A.8, Arcadis 2016e), the TCT's portion of Pile 1, the LC AA, the Floodplain AA and the East Sliver, Paisano parcel; and the $^{SW\text{-}GW}$Soil PCLs at the Former Antimony Building/Storage Yard on the Plant Site.

Confirmation of soil excavations was performed by collecting soil samples from 50-ft by 50-ft grids within the excavated areas. Within each grid square, five discreet aliquots were collected. One aliquot was collected in the central portion of the grid. The remaining four were collected at the mid-point of diagonal lines extending from central sample to the corners of the grid. The five aliquots were then composited on site. The composite sample was screened through a Number 10 sieve to remove coarse gravel and debris.

Then the sample was screened on site using an x-ray fluorescence (XRF) device. Field portable XRF analyzers irradiate samples with x-rays, which are absorbed by the sample atoms. When an atom absorbs the source x-rays, the radiation causes electrons in the atom's inner shells to be dislodged from their orbital. The electron vacancies are filled by electrons cascading in from the outer electron shells. Electrons in the outer shells have higher energy states than the inner shell electrons. When the outer shell electrons cascade down to the inner shell vacancies, they release energy in the form of x-rays, which are characteristic of that given element. The XRF analyzer measures the x-rays emitted by the sample's electrons. Samples were screened for concentrations of arsenic, cobalt, copper, iron, lead, molybdenum and zinc.

If concentrations of the metals screened with the XRF exceeded relevant PCLs, TCT removed an additional 1-foot-thick layer of soil within the grid square. This process continued until the XRF results were below the relevant PCL. TCT then submitted the passing XRF sample either in laboratory grade 8-ounce glass jars or in the plastic bag used for the XRF analysis. Sample information was entered on a chain-of-custody document, the samples were preserved with ice and submitted to a Texas State-certified analytical laboratory for chemical analysis. Laboratory soil samples were analyzed for antimony, arsenic, cadmium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, and zinc to demonstrate the relevant PCLs had been met.

When the reported results for a metal concentration in only one or two confirmation soil samples in an area were elevated, TCT performed a Dixon's test and calculated the 95% UCLs using the USEPA ProUCL Version 4.1 software to determine whether the values were outliers. Results for iron in one grid square in the South Terrace Arroyo AA (Storage Yard) exceeded the $^{SW\text{-}GW}$Soil PCL for iron. Based on the Dixon's test outlier evaluation (**Attachment 1C.5 and Appendix 7**), the difference was statistically significant and the result was considered an outlier; therefore, no further response was deemed to be warranted in that grid square.

The following tables present confirmation sample data:

- Category I and II Removals in East Property AA: **Attachment 1C.2.1** Tables 1 through 4,
- Plant Entrance AA: **Attachment 1C.3** Table 1,
- Storage Yard in South Terrace and Pond 1 Arroyo AAs: **Attachment 1C.5** Table 1,
- TCT Pile 1 in Lower PBA AA: **Attachment 1C.6.5** Table 1,
- West Cemetery in LC AA: **Attachment 1C.7** Table 1, and
- Floodplain AA: **Attachment 1C.8.1** Table 1.

The following figures show locations of all removal areas and sampling grids:

- Site-wide summary: **Figure 1A-1**,
- Category I and II Removals in East Property AA: **Attachment 1C.2.1** Figures 2 through 5,
- Plant Entrance AA: **Attachment 1C.3** Figure 1
- PCB-impacted soil removals in Pond 5/6 Arroyo and Acid Plant AAs: **Attachment 1C.4.1** Figure 1,
- Storage Yard in South Terrace and Pond 1 Arroyo AAs: **Attachment 1C.5** Figure 1,
- TCT Pile 1 in Lower PBA AA: **Attachment 1C.6.5** Sheet 1,
- West Cemetery in LC AA: **Attachment 1C.7** Figure 1, and
- Floodplain AA: **Attachment 1C.8.1** Figure 1.

East Property AA

Area 4

Area 4 is a former slag and waste storage area occupying approximately 4 acres along the North Arroyo in the East Property AA as illustrated on Figure 1 of **Attachment 1C.2.1**. The work plan presented in RAP Attachment 2A.5 indicated that the eastern portion of Area 4 had Category I material to a depth of approximately 4 feet bgs, representing approximately 5,000 cy. Additional Category I material was characterized to the west and excavated during the soil removals. All Category I material was disposed of in the Cell 4 WCU.

Category I Removal Area

Category I material thickness ranged from approximately 3 to 4 feet in the surficial deposit areas originally identified as Areas 1a, 3, and 4 and up to 20 feet in the former Category I Landfill Areas 1 and 22. These areas are shown on Figure 1 in RAP Attachment 2A-5 (Arcadis 2016e). A total of approximately 60,000 cubic yards (cy) of material was estimated to be present in the vicinity of the former Category I Landfill including Areas 1, 1a, 3, and 22. The clean cover material in these areas was confirmed to have residual concentrations of COCs below residential $^{Tot}Soil_{Comb}$ and to range in thickness between 3 and 7 feet. Historically, in the Category I Removal Area, Category I material was reported to have been placed on top of Category II material. Therefore, the Category I excavation area was situated over and within the footprint of the Category II Removal Area. Category I materials were separated from Category II materials and were disposed of in the Cell 4 WCU. Category II materials from these excavations were placed in the Category II Material Storage Area, illustrated on Figure 1 of **Attachment 1C.2.1**.

Category II Removal Area

A portion of the Category II Removal Area was situated within the 100-year floodplain and included disposal piles of Category I waste, demolition material, and Category II slag, along with sediment deposition from runoff originating from the East Mountain AA. TCT collected soil samples in a grid pattern and analyzed metals concentrations using XRF. Samples at each location were collected at increasing depths until the measured metal concentrations were below the relevant PCLs. A total of 277 confirmation samples was collected on 50-ft grids, as illustrated on Figure 4 of **Attachment 1C.2.1**, and sent to an analytical laboratory for analysis to confirm that residential PCLs were achieved as part of the Category II

Removal. Category I materials were segregated from Category II materials and were disposed of in the Cell 4 WCU. Category II materials from these excavations were placed in the Category II Material Storage Area.

Plant Entrance AA

The Plant Entrance Arroyo AA included a PCLE Zone around the paved, low-lying truck entrance at the south entrance to the Plant Site (**Figure 1A-2**). The PCLE Zone was based on concentrations of arsenic and lead above C/I $^{Tot}Soil_{Comb}$ PCLs in the upper two feet of soil. As outlined in **Worksheet 1.0**, TCT performed limited excavation in this area to retain stability of steep slopes, roadways and railroad infrastructure (**Attachment 1C.3**). TCT excavated surface soil to a depth of between one foot and two feet and placed the material beneath the Plant Site protective ET soil cover. Following excavation, a 5-point composite confirmation soil sample was collected and analyzed to confirm that C/I PCLs for direct contact with soil were achieved. In 2017 this area will be treated with a surface sealant.

Plant Site AAs

South Terrace Arroyo and Pond 1 AAs

Former Antimony Processing Building

At the former Antimony Processing Building, TCT removed soil stockpiles and used an industrial sweeper to remove remaining loose soil in the area (**Attachment 1C.5**). Confirmation sampling will be conducted in this area in 2017.

Storage Yard

In the former Storage Yard south of the former Antimony Processing Building, soil contained concentrations of COCs, primarily antimony, arsenic, and lead exceeding the $^{SW-GW}$Soil PCLs. This soil was excavated to a depth of up to 10 feet and placed beneath the ET cover on the Plant Site (RAP Appendix 2.5 and **Attachment 1C.5**). TCT collected confirmation soil samples on a 50-ft by 50-ft grid in the excavated area with additional excavation until the relevant PCLs were achieved.

TCT will excavate and conduct confirmation sampling in the eastern portion of this area in 2017 following the removal of the live 440-volt electrical cable on the ground surface.

Pond 5/6 Arroyo and Acid Plant AAs

PCBs at the Powerhouse

Excavation of PCB-containing soils was performed at one location just outside the Powerhouse (AE11) (RAP Appendix 3.3 (Arcadis 2016e)). PCB-containing materials at a number of other sample locations within or just outside of the Powerhouse (AE1, AE9, AE10, ERM6, and ERM7) were removed during demolition of the building (**Attachment 1C.4.1**). All PCB-containing materials from the Powerhouse demolition were either disposed off-site in a TSCA-regulated facility (for materials containing greater than 50 mg/kg PCB) or within the Cell 4 WCU (for materials containing less than 50 mg/kg PCB). Following excavation, confirmation samples were collected and analyzed to confirm that PCLs were achieved.

Converter Building/Cottrells Area

Excavation of soils near sample location PCB-03 (approximately 100 ft northeast of the former copper smokestack) was conducted in 2013 (**Attachment 1C.4.1)**. Soils exceeding the TRRP C/I direct contact criteria of 7.1 mg/kg were identified west of the original sample location. These soils were removed and disposed in the Cell 4 WCU in 2013 prior to the stack demolition.

In a third area surrounding sample location AE5, approximately 150 feet east of the former copper smokestack, reported concentrations of total PCBs exceeded the C/I PCL for direct contact with soil, with a maximum concentration of 611 mg/kg total PCBs. Some of this material has not been removed because the stack demolition schedule delayed completion of the removal program.

In addition, three locations where PCBs were reported in equipment as shown on Figure 1 of **Attachment 1C.4.1** remain to be sampled. These response actions will be performed in 2017. Soil or concrete samples will be collected and analyzed from AE2 and ERM11 in the vicinity of the former Acid Plant and at ERM14 in the area of the Cottrell's electrostatic precipitators. Sampling was not conducted previously in these areas due to the presence of material stockpiles. Further sampling and soil removal will be conducted at AE5 and approximately 30 feet north.

The PCL for inhalation of PCBs adsorbed to fine particulate in wind-blown dust [($^{Air}Soil_{Inh\text{-}VP}$) is 47 mg/kg] (Arcadis 2016a). As noted in the Conceptual Site Model and Protective Concentration Level Report (Arcadis 2016a), PCBs have the ability to volatilize and migrate through soil caps. As a result, areas with PCB concentrations above 47 mg/kg will be excavated (Arcadis 2016a and Texas Administrative Code Section 530.33[e][2]). Based on analytical results, PCBs exceeding 47 mg/kg in soil or concrete will be delineated and removed, and confirmation sampling will be performed to document achievement of the action level of 47 mg/kg. Following removal, the affected portion of the Plant Site soil cover will be replaced.

PBA AA

Area 12

Area 12 is between the UPRR railroad tracks and I-10 in the Triangle Area. This area was previously remediated by ASARCO in 2006. Figures and tables documenting the removal action were presented in RAP Attachment 2A-8 (Arcadis 2016e).

La Calavera AA

The La Calavera AA includes Parcel 13, which will be part of the TxDOT Loop 375 construction project, and property north and west of the ASARCO Cemetery. During plant operations, Category I waste material was placed north of the cemetery and in a portion of Parcel 13. TCT excavated this material and placed it in the Cell 4 Landfill. TCT also removed Category II fine-grained slag from areas adjacent to the east and south side of the Asarco Cemetery. Confirmation samples were collected and analyzed on a 50-ft by 50-ft grid to confirm that C/I PCLs were achieved. These activities are described in the Parcel 13 Closure Report (Arcadis 2016d) and summarized in **Attachment 1C.6.4**.

In addition to the work described in the Parcel 13 Closure Report, TCT removed Category II material consisting of scattered slag and debris from an area west of the cemetery (**Attachment 1C.7**). A confirmation sample was collected and analyzed to confirm the achievement of direct contact C/I PCLs for direct contact with soil.

Floodplain AA and Paisano Drive

Floodplain

The Floodplain includes property between Paisano Drive and the Rio Grande formerly known as Smeltertown. Multiple small areas with concentrations of metals above C/I $^{Tot}Soil_{Comb}$ PCLs were delineated in the PCLE Zone. Surface soil from these areas has been removed and placed as Category II material beneath the Plant Site ET soil cover. Following excavation, TCT conducted 5-point composite confirmation soil sampling and analysis to confirm achievement of C/I PCLs for direct contact with soil (RAP Appendix 2.2 (Arcadis 2016e) and **Attachment 1C.8.1**). One area remains to be excavated. In 2017, TCT will complete soil removal in this area and conduct confirmation sampling.

East Sliver, Paisano

The East Sliver, Paisano parcel is the southernmost parcel between the BNSF railroad tracks and West Paisano Drive. Two soil samples indicate exceedance of C/I PCLs for direct contact with soil in the northern two-thirds of this area (RAP Appendix 2.4 (Arcadis 2016e) and **Attachment 1C.8.3**). In 2017 TCT will excavate soils from the northern two-thirds of this area and conduct soil confirmation sampling to

document achievement of C/I PCLs.

Sample Collection and Analysis and Data Validation

TCT collected and analyzed a total of 924 confirmation samples. These samples were collected in accordance with letters to TCEQ dated December 7, 2012 regarding East Borrow Source Environmental Sampling Procedures for Interim Channel Backfill and East Category I Landfill Removal Plan (Malcolm Pirnie 2012) and dated April 9, 2012 regarding XRF Analysis for Metals Soil Samples (Malcolm Pirnie 2012) as further described in **Appendix 5**. TCT submitted the samples to a laboratory for analysis using Methods 6020B and 7471A.

Laboratory reports are included in **Appendix 6**. The data in these laboratory reports were evaluated in data usability summary reports (DUSRs), also included in **Appendix 6**. In summary, confirmation sample data are valid, usable, and defensible. Further details are provided below.

Sample Collection

Sample collection was conducted in general accordance with the letter to TCEQ dated December 7, 2012 regarding East Borrow Source Environmental Sampling Procedures for Interim Channel Backfill and East Category I Landfill Removal Plan (Malcolm Pirnie 2012) and the QAPP included as Appendix B of the Remedial Action Work Plan (Malcolm Pirnie 2011a)) with the following exceptions:

- Throughout the soil removal and confirmation sampling program, TCT collected and analyzed a total of 1,547 parent samples and a total of 45 field duplicates. Field duplicates were collected at a rate of 3 for every 100 samples rather than either the frequencies of 5 per 100 samples (1 per 20 samples) or 10 per 100 samples (1 per 10 samples), both of which are noted in the QAPP (Malcolm Pirnie 2011).
- The relative percent difference (RPD) for field duplicates exceeded the control limit of 35 percent in approximately 20 percent of the samples. However, soil is considered a heterogeneous matrix and often a control limit of 50 percent or 100 percent is used. In some instances, this resulted in a J flag indicating the value was estimated. Even though the data was qualified, the data usability was not diminished. As such, these data are considered valid and useable.

Sample Analysis

Sample analysis was conducted in general accordance with the QAPP (Appendix B of the Remedial Action Work Plan (Malcolm Pirnie 2011a)) with the following exceptions:

- In some instances, neither a laboratory matrix spike/matrix spike duplicate (MS/MSD) nor a laboratory duplicate for inorganic parameters was analyzed for an analytical batch, whereas the QAPP noted analysis of a laboratory MS/MSD or laboratory duplicate for every analytical batch. This deviation does not significantly impact the usability of the data.
- In several instances, hold times were exceeded for mercury and PCBs; however, PCBs are stable and hold times of up to one year do not present a data usability issue. The delay and exceedance of mercury holding times was associated with a request for and approval of a site-specific PCL for arsenic for the East Property soil removals.
- Samples were analyzed by DHL Analytical Laboratories as well as TestAmerica, whereas the QAPP indicates the use of TestAmerica. Arcadis initially submitted samples to TestAmerica; however, after encountering data quality issues in TestAmerica data reporting, Arcadis submitted

samples to DHL Analytical Laboratories.

Data Validation

Data validation and development of DUSRs was conducted in general accordance with the QAPP with the following exceptions:

- USEPA National Functional Guidelines of July 2002 were used for data verification, including reviewing data and accepting, rejecting or qualifying data based on established criteria, rather than National Functional Guidelines of 2004. At the Tier II level of data usability review, no difference exists between 2002 and 2004 versions of National Functional Guidelines.
- Texas Review and Reporting of COC Concentration Data, RG-366/Texas Risk Reduction Program-13, December 2002 (RG-366/TRRP-13) was used for data verification rather than the 2010 version. This project was initiated under the Texas Risk Reduction Rules; therefore, the qualifiers required under Texas Risk Reduction Program do not apply.
- In some DUSRs, a control limit of 50 percent was applied when evaluating relative percent difference (RPD) between the parent sample and the field duplicate for soil samples, rather than a control limit of 35 percent. The National Functional Guidelines do not specify an actual value. While a control limit of 35 percent is commonly used for water matrices, soil matrices are typically less homogenous and RPDs exhibit greater variability; therefore, a higher control limit of 50 percent or 100 percent is justifiable. A review of RPDs for parent samples and field duplicates in soil samples indicated that 20 percent of analytes exceeded 35 percent. These data are considered valid and useable.
- In instances where the parent and/or duplicate sample concentrations are less than or equal to 5 times the method quantitation limit (MQL), a control limit of two times the MQL was applied for water matrices or three times the MQL is applied for soil matrices rather than applying a control limit of the MQL. Soil is very heterogeneous and in such instances, use of a control limit three times the MQL is justifiable.

Results for antimony in soil samples collected from the East Property Area 4 in April 2014 were qualified with R qualifiers indicating that the data were rejected. In these qualified samples, the method quantitation limit (MQL) ranged from 0.040 mg/kg to 1.02 mg/kg, with a dilution factor of 5. Assuming that in samples qualified with an R, the values for antimony are approximately the value of the reporting limits, then these results are two orders of magnitude below the PCL for direct contact with residential soil, which is 15 mg/kg. Considering a dilution factor of 5, using the highest MQL value of 1.02 mg/kg and multiplying by 5, the result is 6.0 mg/kg, which is less than one-half the PCL for direct contact with residential soil. Among the 76 confirmation samples collected in Area 4, the highest reported value for antimony is 4.02 mg/kg for sample A4-F6 at an MQL of 1.02 mg/kg. Although the results for these antimony results are validated as “rejected” data, the results are not anticipated to reflect impacts to soil above the PCL for arsenic for direct contact with residential soil.

COVER PERFORMANCE

The covers prevent direct exposure to COCs with concentrations greater than the $^{Tot}Soil_{Comb}$ PCLs and minimize infiltration of water through soils with concentrations greater than the ^{GW}Soil PCLs, thereby controlling the soil to groundwater pathway. Operation and maintenance activities are ongoing to assure the integrity of the covers is retained. Cover performance is based on evaluation of groundwater data, including both groundwater quality data and groundwater elevation data.

Monitoring wells have been selected in upgradient and downgradient locations to demonstrate changes to groundwater quality in response to placement of the cover system. Additional groundwater monitoring wells will be installed within each AA containing the Plant Site composite cover and in the individual covered areas (Boneyard, Fines Pile, and Category II Material Storage Area). The purpose of the new wells within the areas containing covers is to demonstrate that concentrations of COCs in groundwater do not increase following completion of the covers. Additionally, the groundwater elevation will be monitored in select well pairs to evaluate the control of the groundwater gradient in each of the Plant Site AAs (PBA, Acid Plant Arroyo AA, Pond 5/6 Arroyo AA, Pond 1 Arroyo AA, and South Terrace Arroyo AA).

This monitoring and evaluation will be documented in the Groundwater RACR.

Construction Quality Assurance

TCT placed stockpiled material remaining from former operations, along with suitable excavated material from the Site, as fill material to be placed under low permeability covers. TCT placed these materials in accordance with specifications as documented through field and laboratory testing in construction quality assurance documents included in Attachment 1C:

- East Property Category II Stockpile/Material Storage Area: **Attachment 1C.2.2**
- Plant Site Basement Backfill: **Attachment 1C.4.2**
- Plant Site Utilities Abandonment: **Attachment 1C.4.4**
- Plant Site Subgrade Category II Placement: **Attachment 1C.4.5a**

To minimize infiltration and erosion and transport of Site impacted soils, TCT has installed a liner in the Lower Parker Brothers Arroyo Channel in accordance with specifications as documented in **Attachment 1C.6.3**.

Covers are being completed in the following areas in accordance with specifications. These activities will be documented in construction quality assurance documents included in the 2017 Soil RACR:

- East Property Category II Stockpile/Material Storage Area – ET soil cover: **Attachment 1C.2.2**
- Cell 3 – ET soil cover: **Attachment 1C.4.3** and **Attachment 1C.4.5b**
- South Pad - ET soil cover: **Attachment 1C.4.5b**
- North Pad including Boneyard and Little Mesa areas – ET soil cover: **Attachment 1C.4.5b**
- North Pond and associated ditches – FML cover: **Attachment 1C.4.5b**
- Cell 4 – ET soil cover: **Attachment 1C.6.2**
- Lower Parker Brothers Arroyo Channel – FML cover: **Attachment 1C.6.3**
- Fines Pile – ET soil cover: **Attachment 1C.6.4**

In 2017 TCT will finish placing a cover on the partially complete North and South pads at the Plant Site, as well as the Boneyard and the East Property Category II Stockpile/Material Storage Area, as noted in the summary of 2017 Soil RACR activities at the end of **Worksheet 1.0**.

TCT will monitor cover performance by collecting groundwater samples from wells located within covered areas as noted in **Worksheet 2.0** of this 2016 Soil RACR and further described in RAP Worksheet 3.1 (Arcadis 2016e).

WCU PERFORMANCE

The WCUs prevent direct exposure to COCs with concentrations greater than the $^{Tot}Soil_{Comb}$ PCLs, and O&M activities are ongoing to assure that the integrity of the covers is retained. Each WCU also has a liner to prevent releases of COCs to underlying soil and groundwater; however, because the WCUs at the Site lay over existing groundwater PCLE zones, the portion of the groundwater PCLE zone beneath the WCUs will be excluded from the requirement to meet the general groundwater response objectives. Beyond the perimeter of the WCUs, the groundwater response objectives will be monitored. WCU performance will be based on evaluation of groundwater quality data. Monitoring wells have been selected at locations upgradient and downgradient from the WCUs to demonstrate changes to groundwater quality in response to placement of the cover system. Groundwater quality data will be used to determine whether a potential release of COCs to groundwater has occurred from the WCU.

ASARCO completed Cells 1 and 2 prior to establishment of TCT. TCT is placing covers on Cells 3 and 4 in accordance with specifications as summarized in **Attachment 1C.4.3** and **Attachment 1C.6.2**, respectively. These activities will be documented in construction quality assurance reports to be included in the 2017 Soil RACR.

Problems

Complete the table for the response action. When the response action consisted of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: Slope Stabilization

List the problems that were encountered during the response action, describe the impact of each problem, and the response to the problem.

Description of the Problem	Impact	Did this cause a response action failure?		Corrective Response
		Yes	No	
Erosion	Possible reduction in gradient control due to increased infiltration; Potential damage to channel improvements and PRB monitoring wells		x	Slag slopes on the southern side of the LPBA were regraded to 2H:1V to increase the factor of safety as proposed in a letter to TCEQ dated April 30, 2013 as shown in Section 1C.6.1.

Erosion during major storm event on September 12, 2013: Flow of stormwater off crest of western Plant Site surface near Ponds 1A and 1B (also known as the Twin Ponds)	Resulted in formation of a rill on the western slope of Plant Site and subsequent flow of stormwater and sediment off-site, down the western slope, across BNSF tracks and into the American Canal; resulted in possible reduction in gradient control due to increased infiltration		X	TCT placed clean fill berm along entire length of property/crest of slope to prevent water from flowing down the western slope. TCT placed fill between the western berm of the Plant Site and the crest of the slope to stop runoff trapped between berm and crest of slope from draining into newly formed erosion channel. TCT used a pump and 4-inch drain hose to pump runoff from the ponded area on the Plant Site to the Retention Pond. BNSF used a loader to remove deposited sediment that had sloughed onto railroad tracks at toe of slope. Soils were loaded in trucks, transported to the Site and managed as Category II material. In late spring 2014 TCT cleaned out the sediments that had flowed into the American Canal.

Response Action Name/Designation: Waste Control Units

List the problems that were encountered during the response action, describe the impact of each problem, and the response to the problem.

Description of the Problem	Impact	Did this cause a response action failure?		Corrective Response
		Yes	No	
Cell 4 landfill liner integrity compromised during initial filling	Holes in liner may allow infiltration		X	TCT repaired damage to the liner as documented in a Construction Quality Assurance report attached to a letter to TCEQ dated December 10, 2013
Hydraulic oil spilled on soils within the unlined footprint of Cell 4 during construction			X	Due to a hydraulic line failure on an excavator, approximately 50 gallons of hydraulic fluid was released and reported to TCEQ on December 6, 2011. TCT excavated affected material, stored in bins and placed within the completed Cell 4 Landfill. TCT documented the cleanup process, including confirmation sampling, in a letter report to TCEQ dated January 11, 2012.

Response Action Name/Designation: Stormwater BMPs (Gabions and Check Dams)

List the problems that were encountered during the response action, describe the impact of each problem, and the response to the problem.

Description of the Problem	Impact	Did this cause a response action failure?		Corrective Response
		Yes	No	
Sediment possibly discharged during high-flow precipitation events	Possible stormwater discharge with total COC concentrations above benchmarks due to entrainment of impacted soils		X	The gabion structures in the East Mountain AA have effectively controlled stormwater discharges since installation in 2012, with only one measurable event occurring during September 2014 when 4.23 inches of precipitation was reported (NOAA, 2015). The gabions in the East Mountain AA are remotely located and away from any usable haul roads. Several alternatives to clean the sediments from the gabions were evaluated. Ultimately, TCT determined that removal of sediments by vacuum truck using temporary piping to be the most effective means. In February 2016 TCT completed sediment removals from behind the rock gabions. The gabion maintenance event successfully removed 14 cubic yards (cy) of sediment from behind the rock gabion structures. Sediment removed from gabions was assumed to have elevated concentrations of metals, and TCT disposed of the material in Cell 4. Since that first removal activity, gabion maintenance is being performed using a similar method of placing temporary piping and removing the sediments with a vacuum truck. Relatively small volumes of sediment (10 to 15 cubic yards) are being generated per removal event, with limited availability for exposure to off-site receptors between removal events. Vacuumed sediments are being disposed in Cell 4 until its closure, after which time the sediments will be disposed in an authorized regulated landfill. Automatic stormwater samplers have been deployed to collect samples from the next qualifying precipitation event. Results of this ensuing event will determine the effectiveness of the BMP.