Former ASARCO Smelter
Remediation Challenges and Project End Vision

Presented to
El Paso Group of the Sierra Club

Centennial Theatre, UTEP
El Paso, Texas

January 30, 2013
Topics

- Trust Purpose
- Project Phasing & Timeline
- Remedy Components
  - Demolition
  - Soils Remedy
  - Groundwater Remedy
- Funding
- Project End Vision
Trust Purpose

Purpose: Carry out the requirements of the Texas Custodial Trust

- Addressing contamination on and in structures, soils, surface water and groundwater
- Remediating the Site to standards that are protective of human health and the environment with the oversight of TCEQ
- Ultimately to sell the property, maximizing the return to the Trust
Project Phasing

- **PHASE I**
  Site Demolition

- **PHASE II**
  Surface Soils and Surface Water

- **PHASE III**
  Ground Water

- **PHASE IV**
  Site Disposition
Remediation Timeline Estimate
Site Remedy Components

- **Demolition**
  - Remove all infrastructure to remove future mechanical and potential chemical hazards

- **Soils**
  - Cells (designated waste disposal)
  - Mono-Fill Cover (across entire plant property)

- **Groundwater**
  - PBRs
  - Hot Spot Removals and Source Management
Demolition Phasing
Time Lapse Demolition Video
Revised: Surface Soils Remedy

ONSITE CONTAINMENT CELL

Similar to the remedy proposed as part of the bankruptcy proceedings, wastes will be contained onsite. Category I materials will be contained in a TCEQ approved lined and capped landfill.

SOIL COVER

The Trust is proposing to install up to five feet of cover on top of the Site to increase the ease for installation of utilities and infrastructure during redevelopment.
Waste Types and Final Disposition
Category I Landfill – Cell 4
Waste Cell Liner and Cover Cross-Section
(currently under TCEQ/EPA review)
Waste Disposal: Design Drawing Details

Landfill Liner System at Landfill Floor and Sideslope Intersection

Leachate Collection and Removal System (LCRS) Sump
Waste Disposal: Design Drawing Details

Final Cover System

Design drawings are posted on the Project Website:
How This Prevents COCs from Migrating into the Water Table

- **Lining System/LCRS Creates a Barrier**
  - The liner system at the bottom of the landfill is impervious (GCL is 5 x 10E-9 cm/sec), preventing leachate from migrating below the landfill.
  - Modeling of the liner/LCRS has indicated that even if holes are present in the landfill sump, leachate will not reach the groundwater table.
  - Monitoring wells will confirm chemicals of concern (COCs) are not impacting groundwater.

- **Operations Will Minimize Head on Lining System**
  - Category I waste materials are dry
  - Rain water will be collected and ponded water will be removed
  - LCRS sump will be monitored monthly during operations
  - Any accumulated leachate will be evacuated from the sump
  - Clean soil cover will be placed on slopes as waste is accumulated
  - LCRS will be operated until no liquids are observed in sump for four consecutive quarters after closure and monitored thereafter
How This Prevents COCs from Migrating to the Water Table (cont.)

- **Mono-fill Cover System**
  
  - Robust, proven, engineered, sustainable mono-fill cover/surface water drainage system will be placed to prevent infiltration and erosion while promoting positive drainage off landfill.
  
  - Mono-fill soils are selected to create a robust, sustainable evaporation, transpiration layer through which precipitation cannot infiltrate.
  
  - Trust and their Engineer are using established site-specific design procedures. Design will be reviewed and approved by TCEQ and EPA.
  
  - Engineered soil mono-fill covers have been used extensively across the country, and are particularly appropriate for arid climates, such as El Paso, where a clay cover would dry out and desiccate, creating cracks.
  
  - Mono-fill cover systems are being implemented in El Paso by the City of El Paso and Fort Bliss for their landfills.
  
  - Landfill will be monitored to confirm cover system is operating as designed.
Parker Brothers Arroyo is critical to the groundwater remedy. The Trust proposed remedy will remove and contain slag, create an aesthetic surface water conveyance, and reduce impacted groundwater flux.
Parker Brothers Arroyo: Time-Lapse Video
Parker Brothers Arroyo: Final Vision
East 140 Property – Work Completed and Future Activities

- **Completed Work**
  - Expanded on work previously conducted:
    - Grid based sampling to further delineate impacts and consider additional metals (400’ x 400’ grid)
    - Installation of test pits to determine the physical extent of potential Category I and II material

- **Future Activities**
  - Excavations to remove impacted materials to meet residential standards (~95,000 cy identified to date)
  - Excavation of clean borrow material (as determined by grid sampling (100’ x100’ grids) for use onsite
  - All excavations will be confirmed with grid confirmation sampling to document clean closure
Soil Sampling Results

Concentrations Below Residential Standards
Concentrations Above Residential Standards and Below Commercial/Industrial Standards
Concentrations Above Commercial/Industrial Standards

Test Pit Locations
East Property Impacted Material Movements
Previous GW Remedy - TCEQ

- 3000-ft long slurry wall
- Extraction system, 80 wells
Previous GW Remedy – TCEQ

Key Assumptions

**Included**
- 3000-ft slurry wall along Paisano Dr for containment of groundwater
- Groundwater treatment plant designed for 80 gpm capacity
- Extraction network of 80 wells along floodplain
- 50-year O&M period

**Not Included**
- Water management to reduce enhanced recharge along Parker Brothers arroyo, underestimates peak groundwater flows
- Floodplain treatment, allows for a significant amount of arsenic already stored in the floodplain to continue to discharge to the Rio Grande
- Source control measures associated with deep soil impact in Parker Brothers Arroyo, extends treatment and monitoring period
Groundwater Conceptual Site Model

- Groundwater flow occurs primarily along former arroyos.
- Flux-based approach employed: Contaminant flux = discharge volume x discharge concentration. Areas of highest contaminant flux are primary remediation targets.
- The Parker Brothers arroyo has the largest drainage area and carries most flow.
- Flow from the arroyos discharges to the floodplain and ultimately to the Rio Grande River.
- The American Canal interacts with Site groundwater (gain/loss).
- Enhanced groundwater recharge occurs near unlined channels and ponds and from upgradient drainages east of I-10.
Revised Groundwater Treatment Remedy

Trust Proposed Remedy
- Create groundwater to surface water diversion (keeping clean water clean)
- Source removal and treatment
- In-situ groundwater treatment
- Rio Grande Floodplain – polishing of groundwater if necessary
GW Remedy – Trust Proposed

Key Assumptions

- Three 200-ft long 40-ft deep PRBs along Parker Brothers Arroyo
- Three 400-ft long 70-ft deep in-situ sequestration transects in the Pond 5&6, Pond 1 and South Terrace Arroyos
- In-situ stabilization of Acid Plant EP-114 area (arsenic concentration ~ 100 mg/L), 6,000 cu yards
- 15-year O&M period
- Parker Brothers Arroyo Water Management Plan, keep clean water clean, reduce arsenic flux, extend remedy longevity
- Source Control: excavate Ephemeral Pond Area and cap and cover Fines Pile and Boneyard
- If necessary, In-situ Floodplain Sequestration, treat residual arsenic mass stored in the floodplain to reduce arsenic load to the Rio Grande
Water Management and Drainage Improvement

- Lined Retention Basins
- Lined Drainage Swales
- Lined Diversion Structure
- Groundwater Diversion Structure
- New Cat I Landfill
- Fines Pile
- Drop Structures

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## Remedy Planning: Expanded Scope

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<thead>
<tr>
<th>Original Scope</th>
<th>Expanded Scope</th>
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<tr>
<td><strong>Demolition</strong></td>
<td><strong>Plant infrastructure demolition</strong></td>
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<td><strong>Asset Recovery</strong></td>
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<td><strong>Soils</strong></td>
<td><strong>Move material to landfill</strong></td>
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<td></td>
<td><strong>Cap plant site with asphalt</strong></td>
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<td></td>
<td><strong>Move Fines Pile to landfill</strong></td>
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<td></td>
<td><strong>Limited or no removal of material from East Property (landfill material only) or Ephemeral Pond (none)</strong></td>
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<td><strong>Groundwater</strong></td>
<td><strong>Pump and treat system along property boundary at Paisano</strong></td>
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Benefits of a Revised Remedy

- Removes the need to maintain long-term, energy intensive pumping and water treatment systems
- Decreases long-term Site stewardship
- Using as many onsite resources as possible to decrease energy footprint
- Reduces the amount of water that would be treated by keeping “clean water clean”
- Maintains more natural water flows to the Rio Grande
- Provides more redevelopment opportunities and works in conjunction with the City of El Paso’s Master Plan and SmartCode designed to increase city density and prevent urban sprawl
- Promotes environmental stewardship of Parker Brothers Arroyo east and west of I-10 by providing for more open spaces to the citizens of El Paso
Remedy Planning: Cost Estimates

### Original Cost Estimates

**2008 TCEQ Cost Estimate (in millions)**

- Demolition of Structures: $8.9
- Soils Remedy: $15.7
- Groundwater Remediation: $21.9
- Post Closure Care: $3.3
- Other Expenses: $2.2
- **Total**: $52.0

### 2013 Cost Estimates

**2013 Cost Estimate (in millions)**

- Demolition of Structures: $6.4
- Soils Remedy: $40.6
- Groundwater Remediation: $8.0
- Post Closure Care: $5.0
- Other Expenses:
  - Trust: $4.5
  - Asset Recovery: $8.6
  - Housekeeping: $3.1
  - Public Outreach: $1.6
- **Total**: $77.8

(1) Additional budget from asset recovery.
Project End Vision
End Vision of Remediated Site
Trust’s Vision
Questions