Remedial Investigation Scope Development
Nevada Environmental Response Trust Site

NDEP Meeting
June 28, 2012

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Meeting Objectives

- Reach a Common Understanding and Identify Path Forward for the RI and HHRA
  - Conceptual Site Model
  - Risk Assessment
    - General approach for soil, soil gas, and groundwater
    - Other Key Issues: (*e.g., soil background dataset)*
  - Data Gaps (preliminary evaluation)
  - Preliminary Remedial Action Objectives
  - Near-term Deliverables and Schedule

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Conceptual Site Model

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Conceptual Site Model

- Summarizes our understanding of:
  - Existing Site conditions
  - Potential historical and ongoing contaminant sources and release mechanisms
  - Potential contaminant migration pathways
  - Potential exposure pathways
  - Potential (human/environmental) receptors

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Conceptual Site Model

- ENSR CSM: 2005
  - Based on Site conditions as of ~2004
  - Compiled and integrated available Site information
  - Focused on 69 LOUs identified as of 2005
  - Used to support identification of data gaps
  - Led to Phase A and Phase B work plans and soil and groundwater investigations

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Conceptual Site Model

NERT 2012 CSM

- Update the ENSR CSM
  - Phase A/B investigation results
    Interim Soil Removal Action completed
  - Changes in extraction and groundwater treatment systems
  - *Preliminary* evaluation of soil leaching to groundwater (Northgate evaluation based on soil results prior to removal action and using preliminary LSSLs)
  - Risk assessments have been completed for Sale Parcels A, B, C, D, F, G, and H

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Identify Site Areas and Boundaries

The "Site"

- Property (~416 acres as of 6/12)
  - Sale Parcels (A, B, C, D, F, G, H)
  - Facility (Tronox leased and non-leased areas)
- Downgradient groundwater plume

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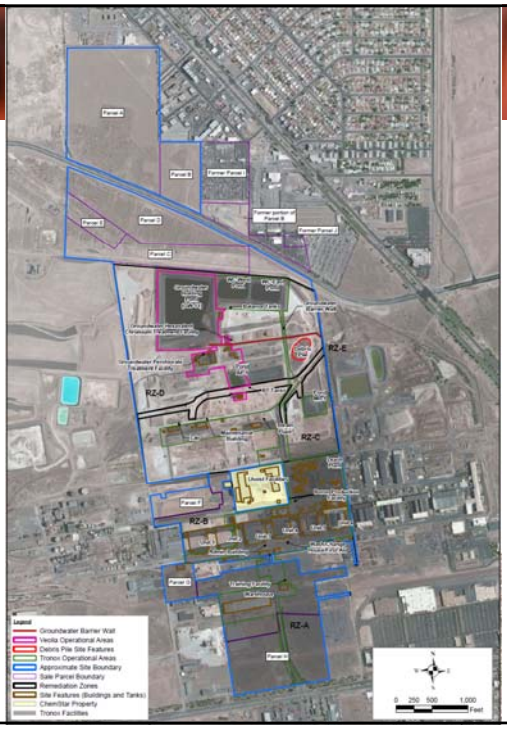

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CSM: Contaminated Media

- Existing Environmental Conditions for
  - Soil (and soil gas)
    - Surface and near surface (<10 ft bgs)
    - Deep (>10 ft bgs)
  - Groundwater
    - Underlying property
    - Downgradient

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Facility: Soil Removal Action (0<10 ft)

Soil removed

- Polygon excavation areas (up to 10 ft) ***soil concentrations > worker BCLs***
- Discolored soils

- Established Excavation Control Areas (ECAs)

Facility: Post Removal Soil Conditions

Human Health

- Interim Soil Removal addressed primary human health concerns (i.e., direct soil contact pathways)
- SMP established measures to ensure protection of workers engaging in current and future subsurface soil activities
- Post-removal grading program
  - Resulted in some areas with soil concentrations >BCLs within 0-10 feet below the "new" ground surface
  - These areas are not identified as ECAs in the SMP

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Facility: Post Removal Soil Conditions

Soil to Groundwater Pathway

- LSSLs (site-specific, leaching-based soil screening levels) were used to conduct a preliminary evaluation
- Surface/near surface soils
  - for ***most*** chemicals, areas with concentrations >LSSLs were removed (i.e., worker BCLs < LSSLs)
  - perchlorate is the primary exception
- Subsurface soils
  - Preliminary evaluation: only perchlorate >LSSLs

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Facility: Soil Gas Conditions

- Phase B Investigation (May 2008)
  - Soil gas samples collected from 95 locations at the Trust Property (including Sale Parcels)
  - Analyzed for 71 VOCs
- Soil Gas HRA (2010)
  - Approach
    - 8 VOCs identified as COPCs for evaluation
    - current and future commercial workers
    - inhalation of VOCs in indoor and outdoor air
    - cancer risks and HIs estimated on a sample-by-sample basis
  - HRA Results
    - Cancer risks ranged from $<1 \times 10^{-6}$ to 1×10^{-4}
    - Hazard Indices < 1

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Facility: Indoor and Ambient Air

- Indoor Air Quality (IAQ) and Ambient Air Studies
  - Sampling conducted in spring and winter of 2010
  - Indoor and outdoor samples analyzed for:
    - Chloroform
    - Carbon tetrachloride
    - TCE
- Results
  - Average indoor concentrations < occupational standards
  - Indoor cancer risks < 10^{-5} for a commercial worker *(risk for chloroform in one wash house shower sample was > 10^{-5} and was attributed to chlorinated water)*
  - Outdoor cancer risks < 10^{-5} for a commercial worker

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Sale Parcels: Current Status

- Sale Parcels I, J, and part of B
  - Parcels sold in 2008 to Rolly Properties LLC (Parcels B & I) and Robert and Sandra Ellis (Parcels B & J)
- Sale Parcels A and remaining Parcel B
  - Soil characterization, remediation, and risk assessment completed
  - NDEP issued No Further Action Letter for soil < 10 ft deep on April 8, 2008

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Sale Parcels: Current Status

- Sale Parcels C, D, F, G, and H
  - Soil characterization, remediation completed in 2010
    - Remaining areas with residual concentrations >BCLs
      - Areas not remediated due to such as the BMI haul road, paved roads and rail lines (*haul road to be addressed when BMI removes the road)*
  - Closure and Post-Remediation HRA (2012)
    - Cancer risks within the acceptable risk range
      - Cumulative soil and soil gas cancer risk: $\leq 2 \times 10^{-6}$)
      - Asbestos $< 1 \times 10^{-6}$ (except construction worker exposure to amphibole fibers [3×10^{-5}])
    - Hazard Indices <1
    - Currently under review by NDEP

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Sale Parcels: Current Status

- Parcel E
  - Location of extraction wells for OSSM groundwater treatment system
  - No characterization or remediation planned
  - Sale of Parcel E not currently planned

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RI Soil and Soil Gas Risk Assessment Approach

Preliminary Remedial Action Objectives

- Soil RAOs
  - Mitigate potential risks to workers
  - Use institutional controls to restrict future land use

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Facility Soils: Proposed Risk Assessment Approach

- Surface and near surface soils (0-10 ft below "new" ground surface) can be placed into one of four categories:
  - Category 1: soils in ECAs
  - Category 2: soil concentrations <BCLs *(not an ECA)*
  - Category 3: soil concentrations >BCLs *(and not an ECA)*
  - Category 4: soils not previously sampled or available information considered inadequate

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Facility Soils: Proposed Risk Assessment Approach

- Category 1 Soil Areas
  - Excavation Control Areas (ECAs)
    - Areas of known soil contamination left in place
    - Building perimeter soils
    - Uncharacterized potentially contaminated soils
  - Risk Assessment Approach
    - Risks managed through the SMP
    - Discuss risks semiquantitatively (Quantitative risk assessment not required)

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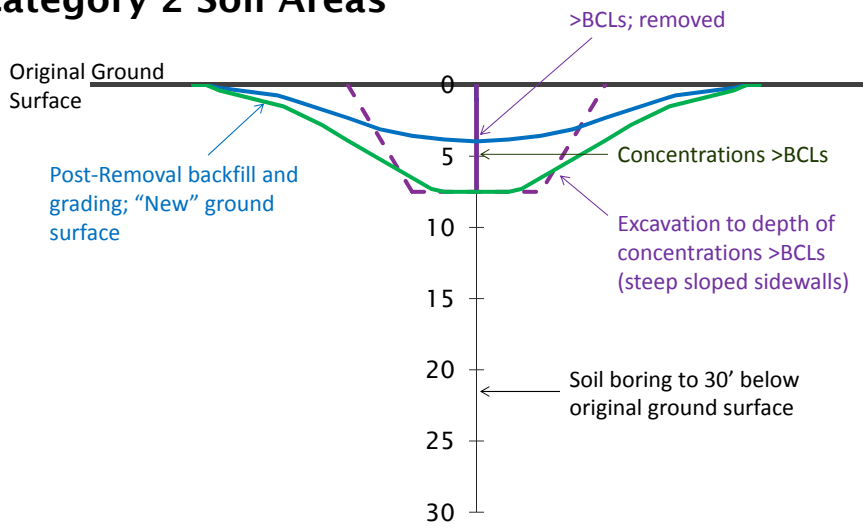
Facility Soils: Proposed Risk Assessment Approach

Category 2 Soil Areas



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Facility Soils: Proposed Risk Assessment Approach

- Category 2 Soil Areas
  - Areas with concentrations < BCLs (0-10 ft)
    - Not excavated (all concentrations <BCLs)
    - Removed polygon excavation areas and discolored soils *(pre-removal contamination was <10 ft bgs or area backfilled to original grade)*
  - Risk Assessment Approach
    - Discuss risks semiquantitatively *(Quantitative risk assessment not required)*

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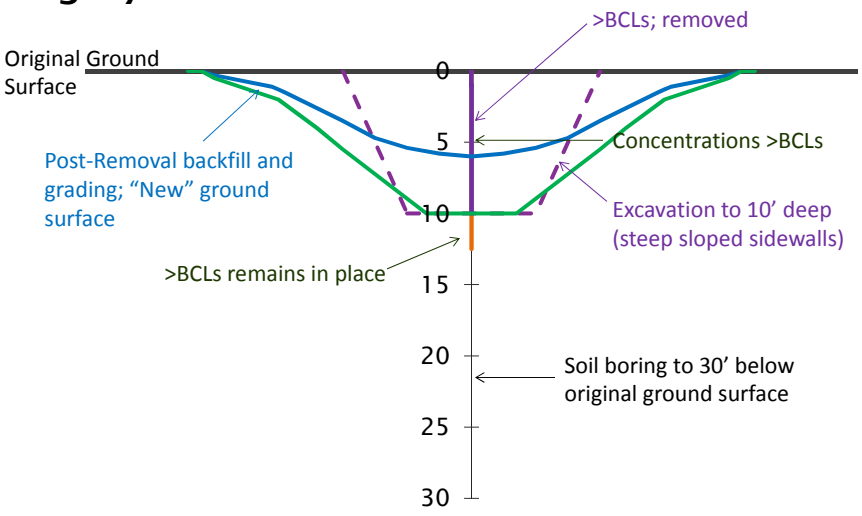
Facility Soils: Proposed Risk Assessment Approach

Category 3 Soil Areas



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Facility Soils: Proposed Risk Assessment Approach

- Category 3 Soil Areas
  - Excavation areas that were not backfilled to original grade and with residual concentrations > BCLs at 0-10 feet below "new" ground surface
  - Not currently identified as an ECA
  - Risk Assessment Approach
    - Conduct a quantitative risk evaluation (soil pathways)
      - use existing subsurface samples for the assessment
      - resample surface and near-surface soils if existing subsurface samples inadequate to support the risk assessment

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Facility Soils: Proposed Risk Assessment Approach

- Category 4 Soil Areas
  - Soils not previously sampled or available info considered inadequate
    - Debris pile
  - Risk Assessment Approach
    - To be determined, e.g., area identified as an ECA or collect samples and conduct risk assessment

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Soil Categories

DRAFT

Legend

- Category 1: Soils in ECAs
- Category 2: Soil Concentrations <BCLs (not an ECA)
- Category 3: Soil Concentrations >BCLs (not an ECA)
- Category 4: Soils not previously sampled or available information considered inadequate

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Sale Parcels: Proposed Risk Assessment Approach

- Parcels A, B, C, D, F, G, H
  - Status
    - Risk assessments completed for soil and soil gas
    - Risks within acceptable risk range
    - Currently under review by NDEP
  - Risk Assessment Approach
    - Summarize results of the soil, soil gas, and indoor air HHRAs *(Additional quantitative risk assessment not required)*
- Parcel E
  - Status
    - Investigation, remediation, and risk assessment not yet performed
    - Sale not currently planned
  - Risk Assessment Approach
    - Soil characterization would be necessary to perform risk assessment, if a risk assessment is required

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Other Risk Assessment Topics

- Background data sets
  - Site soil data set from RZ-A
  - Soil data set developed for the BMI Complex and Common Areas
- Risk Management for Soil
  - BCLs
    - ". .if maximum or UCL95 concentrations <BCLs, no further action or study… is warranted…"
  - Cancer risks: evaluate relative to NCP range of 10^{-6} - 10^{-4}
  - Hazard indices >1
- Upgradient VOC plume entering the Site?
- Ecological risk

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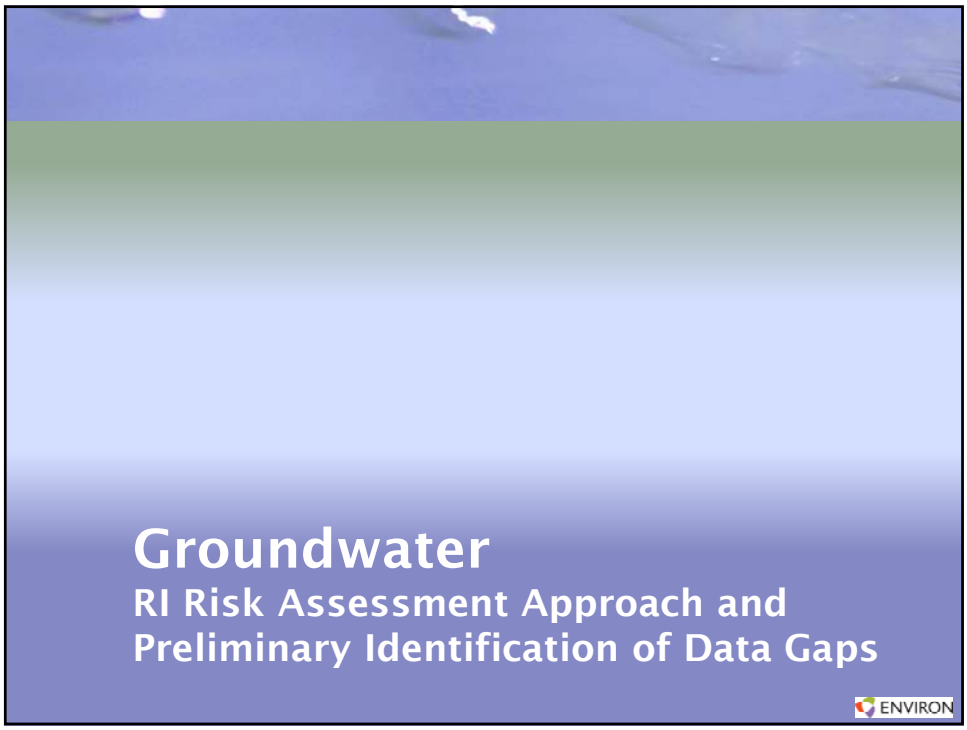

Preliminary Remedial Action Objectives

Short-Term Objective

- Mitigate migration of Property-related contaminants to Las Vegas Wash
  - Continued operation of existing GWETS
  - Optimization/enhancement of GWETS

Long-Term Objectives

- On-Site Groundwater Control
  - Meet ARARs/TBCs at downgradient site boundary
- On-Site vadose zone source control
- Downgradient aquifer restoration

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Groundwater: Risk Assessment Approach

- Site Groundwater (Property and downgradient)
  - Not currently used or reasonably anticipated to be used in the future as a drinking water source
    (Water quality ([e.g., high TDS] likely precludes use of water in the future as a drinking water source)
- Risk Assessment Approach
  - To support risk management decisions, compare groundwater quality with regulatory standards and guidance values such as MCLs and action levels
  - Risks will not be quantified for direct exposure pathways (e.g., consumption)

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Groundwater: Preliminary Identification of Data Gaps

- On-Going Performance Evaluation of Existing GWETS
  - Capture Zone Evaluation
  - Alternative Operating Strategies
- Vertical extent of Property-related contamination
  - Shallow water-bearing zone is well characterized
  - Characterization of intermediate and deeper zones is limited
- Background concentrations
  - Background concentrations of naturally occurring constituents and TDS have not been established

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Proposed Deliverables and Schedule

Deliverables

- CSM *(incorporate into RI/FS Work Plan)*
- RI/FS Work Plan
  - Introduction, Site Background, and Physical Setting
  - CSM
  - Data Gaps Identification and Work Plan Rationale
  - Sampling and Analysis Plan
  - Health and Safety Plan
  - Community Involvement Plan (currently under NDEP review)
  - Risk Assessment Work Plan
  - RI/FS Schedule
  - Technology Screening & Proposed Treatability Studies

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Proposed Deliverables and Schedule

RI Schedule (July – Aug)

- Receive NDEP approval of GW model (early July)
- Revise CZE (July-Aug)
- NDEP Approval of CIP (July)
- Set up public information repository (Aug)

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Proposed Deliverables and Schedule

RI Schedule (Sept – Dec 2012)

- NDEP review/approval of CZE (Sept)
- RI/FS Work Plan (Oct)
- NDEP RI/FS WP review (Nov)
- Finalize RI/FS WP and receive NDEP approval (Dec)

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Proposed Deliverables and Schedule

RI Schedule (Jan – July 2013)

- Data Gap Field Investigation (Jan-Mar)
- Lab Analysis, Data Evaluation (Feb-Mar)
- Data Gap Field Investigation Report?
- Update CSM and CZE (Apr)
- Perform Baseline Risk Assessment (Feb-May)
- Prepare Draft RI Report (Jan-Jun)
- NDEP Draft RI Report Review (July)
- Finalize RI Report

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Proposed Deliverables and Schedule

Treatability Studies Schedule
(Fall 2012 – 2013)

- Prepare Treatability Study Work Plans (Oct-Nov)
- NDEP Review of Work Plans (Dec)
- Finalize Work Plans (Jan 2013)
- Contractor Procurement (Jan 2013)
- Implement Studies (2013)

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