

September 28, 2012

Ms. Shannon Harbour, PE
Bureau of Corrective Actions
Nevada Division of Environmental Protection
901 South Stewart Street, Suite 4001
Carson City, NV 89701

**Re: AP-5 Pond Solids Characterization and Disposal Work Plan
Nevada Environmental Response Trust Site, Henderson, Nevada**

Dear Ms. Harbour:

On behalf of the Nevada Environmental Response Trust (the Trust), this AP-5 Pond Solids Characterization and Disposal Work Plan has been prepared for the Nevada Division of Environmental Protection (NDEP) to characterize and remove the residual solids remaining in an on-site lined surface impoundment (the AP-5 pond) at the Nevada Environmental Response Trust Site (the Site) (Figure 1). The objective of this work plan is to methodically and efficiently characterize the solids to facilitate proper handling, management, and disposal.

This plan has been prepared in response to NDEP's approval letter dated June 28, 2012 to implement ENVIRON International Corporation's (ENVIRON) *Proposal to Discontinue Treatment of AP-5 Pond Water at NERT Facility*, dated March 30, 2012 (ENVIRON, 2012a). The proposal recommended implementation of the following four steps:

1. Permanently close the valve that allows flow of Lake Mead water into the AP-5 pond.
2. Pump all remaining water present in the AP-5 pond to the GW-11 pond and from there to the on-site groundwater treatment plant.
3. Characterize residual solids in the AP-5 pond for off-site disposal.
4. Remove residual solids from the AP-5 pond for disposal at an appropriately permitted off-site disposal facility.

To date, step one has been implemented and step two has been completed to the extent possible utilizing the existing AP-5 pond pumping system. This work plan describes the activities proposed to implement steps three and four. Data collected from characterization sampling in step three will inform removal and disposal methods to be implemented during step four.

Once steps one through four are completed, all subsequent decommissioning work regarding the AP-5 pond (e.g., liner removal, underlying soil sampling, remediation as necessary) will be undertaken as part of the site-wide Remedial Investigation/Feasibility Study (RI/FS) that is currently being planned and therefore is not discussed herein. All AP-5 pond waste characterization and disposal work will be conducted in accordance with the *Site Management Plan (SMP) Nevada Environmental Response Trust Site, Clark County, Nevada* dated May 2012 (ENVIRON, 2012b).

BACKGROUND

The AP-5 pond is designated as excavation control area (ECA) #D8 in the SMP (Figure 2). The AP-5 pond is included in ECA #D8 because the pond and associated utilities have to date been obstructions that have prevented the characterization and any required excavation of soils beneath the pond footprint (ENVIRON, 2012b).

The AP-5 pond is an approximate 0.8-acre lined impoundment with a 1,817,000-gallon capacity (ENSR, 2008). The pond was installed with a double-lined system consisting of a 40-mil high density polyethylene (HDPE) bottom liner, a polypropylene geotextile side liner, and a 60-mil HDPE upper liner. The AP-5 pond was historically used for temporary storage of solutions from the ammonium perchlorate (AP) production process and the AP Plant Cooling Tower for recycling back into the process. The AP-5 pond also received overflow from the AP Cooling Tower (ammonium, perchlorate, and sodium chloride).

The AP-5 pond was constructed in 1983 and was removed from service in 2001. In accordance with the April 13, 2005 Administrative Order on Consent, Tronox, the former owner of the Site, began pumping AP-5 pond water to the on-site groundwater extraction and treatment system (GWETS) in August 2006 as part of the decommissioning process. After initial dewatering of the pond, Veolia Water North America (Veolia), operators of the GWETS have periodically pumped non-potable (Lake Mead) water to the pond to solubilize residual ammonium perchlorate in the pond solids. The resulting water has been discharged to the GWETS in batches via the GW-11 pond. The GW-11 pond is an 11-acre, lined surface impoundment that provides holding capacity for extracted groundwater prior to treatment. The GWETS discharges to the Las Vegas Wash under National Pollutant Discharge Elimination System (NPDES) Permit # NV0023060. Since the AP-5 pond pumping operation began in 2006, an estimated 1,176 tons of perchlorate have been removed from the AP-5 pond and treated in the GWETS.

Based on recent data collected at the Site, the AP-5 pumping program appears to have effectively reduced the mass of perchlorate present in the pond to *de minimis* levels (ENVIRON, 2012a). The last transfer of AP-5 water to GW-11 occurred in January 2012, and subsequently discharged to the GWETS. This work plan addresses the characterization, removal, and subsequent disposal of the remaining AP-5 pond solids at an appropriate waste disposal facility.

TASK 1 – CHARACTERIZATION SAMPLE COLLECTION

As of September 17, 2012, the approximate maximum thickness of material remaining in the AP-5 pond was 40 inches. Based on visual observations by Site personnel, the majority of pond material consists of residual solids. The calculated volume of residual solids is approximately 2,400 cubic yards using an estimated area of 19,400 square feet (based on observed pond solids in a June 2012 Google aerial photograph) and maximum measured thickness (Figure 3). Any remaining free liquids in the pond will be pumped to the GWETS prior to the implementation of Task 3, as discussed below.

Sample Collection

AP-5 pond residual solids will be sampled for waste disposal characterization in general accordance with the SMP Section 4: *Risk Management for Soil* (ENVIRON, 2012b). One composite sample will be collected from randomly selected locations for every 250 cubic yards of pond solids for the first 1,000 cubic yards and an additional sample will be collected for each additional 1,000 cubic yards. Composite samples will consist of four representative subsamples. If solids are observed to be stratified, a representative sample of each stratum present will be collected and composited. A minimum of six composite samples will be collected based on the estimated 2,400 cubic yards of residual solids remaining in the AP-5 pond.

Residual solid samples will be collected using scoops, trowels, shovels, and hand augers. Sampling equipment designed to collect soft sediments will be used to collect high water content samples (i.e., sludges). Samples will be placed in sample containers provided by a state-certified laboratory. The specific sampling tool will be selected to assure comparability, obtain adequate sample volume, and limit the degree of hazard during sample collection. Care will be taken to not impact or damage the underlying liner while sampling. All work is anticipated to be performed in Level D Modified personal protective equipment (PPE) and will follow all guidelines outlined in the Site-Specific health and safety plan (HASP) to be prepared for the work.

All sample containers will be clearly labeled with the following information:

- Client name, project title, project number
- Sample location
- Sample identification number
- Date and time of collection
- Type of sample
- Initials of sampler
- Container number (i.e. "Container ___ of ___")

After labeling, each sample will be sealed in a Ziploc-type plastic bag and refrigerated or placed upright in a cooler. Wet ice in double Ziploc-type bags will be placed in the cooler with the samples to maintain a temperature of 4 degrees Celsius ($^{\circ}\text{C}$) \pm 2 $^{\circ}\text{C}$ prior to and during transport to the laboratory.

Standard chain-of-custody (COC) procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis.

TASK 2 – SAMPLE ANALYSIS AND WASTE PROFILING

The waste disposal facility selected to receive the solids will require analytical testing that best reflects the waste stream or process(es) that generated the AP-5 pond solids. The analyses to be conducted on the waste characterization samples include the following typical waste profiling analyses:

- Eight Resource Conservation and Recovery Act (RCRA) metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) (EPA Method 6010/6020/7471).
- Total and Reactive Cyanide (EPA Method 9012A/SW-846 7.3.3.2)
- Total and Reactive Sulfide (EPA Method 9030M/9034M/SW-846 7.3.4.1)
- Flash Point/Ignitability (EPA SW-846 Method 1010A)
- Paint Filter Test (EPA Method 9095A)
- Corrosivity (EPA Method 9045)
- Phenol (EPA Method 8270)
- Polychlorinated Biphenyls (PCBs) (EPA Method 8082)
- Oxidation Reduction Potential (ORP) (Standard Method 2580B or equivalent)
- Volatile Organic Compounds (VOCs) (EPA Method 8260)

- Semivolatile Organic Compounds (SVOCs) (EPA Method 8270)
- Organochlorine Pesticides (EPA Method 8081A or EPA SW-846 3500/3550/8140)
- Herbicides (EPA SW-846 3500/3550/8150)

In addition to the above analyses, the waste will also be analyzed for the following specific compounds that may be present in the waste, based on what is known about the waste stream:

- Ammonia as Nitrogen (EPA Method 350.1)
- Perchlorate (EPA Method 6860)
- Hexavalent Chromium (EPA Method 7199/3060A)

Note that elevated concentrations of certain constituents could, in some cases, necessitate re-extraction using the Toxicity Characteristic Leaching Procedure (TCLP) extraction method (EPA Method 1311) and reanalysis by the above analytical method(s).

Laboratory services will be provided by Test America Laboratories, Inc., a Nevada-certified laboratory located in Denver, Colorado. Samples will be analyzed using a standard turnaround time (TAT) of 10 days.

The analytical results of waste characterization samples will be reviewed by ENVIRON for waste profiling purposes. If the results indicate that residual solids may be profiled as non-hazardous, a waste profile and analytical results will be transmitted to the Republic Services Apex Regional Landfill outside Las Vegas, Nevada for approval. If the results indicate that residual solids must be profiled as hazardous waste, a waste profile and analytical results will be transmitted to the US Ecology Hazardous Waste Treatment and Disposal facility in Beatty, Nevada for approval.

TASK 3 – AP-5 POND RESIDUAL SOLIDS REMOVAL AND DISPOSAL

Pre-Removal Activities

Prior to beginning field activities for removal of the solids in the AP-5 pond, ENVIRON will obtain a Dust Control Permit from the Clark County Department of Air Quality (CCDAQ) and prepare a Site-Specific HASP to protect the health and safety of field personnel and the public. Health and safety procedures, including use of PPE, work zones, and other engineering and/or institutional controls outlined by the HASP, will largely depend on the physical and chemical properties of the residual solids material, as determined in Task 2. Following the establishment and demarcation of safe work zones at the Site (e.g., exclusion zone, contamination-reduction zone, and support zone), ENVIRON will work with Tronox, Veolia, and the Trust to identify and mark the locations of all aboveground and underground utilities crossing through the work area, and will place a notification call to Underground Service Alert (USA), Nevada's one-call utility notification system. Aboveground utilities that are directly related to the AP-5 pond (e.g., hoses, pumps and associated equipment) will be disconnected and removed from the pond as necessary. In addition, as the pond still contains some standing liquid, a vacuum truck and hoses will be used to remove the liquid from within the pond in the event the existing AP-5 pond pumping system is unable to facilitate the transfer to the GWETS. The liquid will be transported and pumped into GW-11 and from there to the GWETS system.

Removal of Residual Solids

Removal of the residual solids from within the AP-5 pond will be conducted by a Nevada-licensed environmental services subcontractor under the oversight of ENVIRON personnel. Based on our current understanding of the physical and chemical characteristics of the waste material (to be

confirmed during Task 2 activities), it is anticipated that two skid-steer vehicles will be used to handle the residual solids. The skid-steer vehicles will be mounted on tracks to facilitate access and movement within the pond, and the skid-steer tracks and loader buckets will be constructed with plastic or rubber surfaces designed to preserve the integrity of the polyethylene pond liner. If necessary, clean fill soil will be used to construct earthen ramps leading up to the pond berm and from the pond berm down to the base of the pond. On-site clean borrow soil will be used if available, and if not available, imported clean fill material will be used. After safe routes for equipment and personnel ingress/egress have been established, the skid-steer vehicles will enter the pond and push the residual solids into a stockpile within the lined pond area. Stockpiling of residual solids within the pond is expected to facilitate drainage of free liquids from the material. After the residual solids have been stockpiled and allowed to drain sufficiently, the skid-steer vehicles will be used to carry the residual solids out of the pond via the established ingress/egress route. A water truck filled with potable water and equipped with sprayer nozzles and hoses will be used to suppress any dust that may be generated by equipment moving in the work area in accordance with the Dust Control Permit. After the material has been removed from the pond, the potable water will be used to rinse and remove any residue remaining on the liner and skid-steer vehicles. The residual free liquids will then be conveyed to the GWETS.

It is anticipated that the methods described above will allow the residual solids to be entirely removed from the pond without disturbing the pond liner. However, if it appears that the pond liner may be damaged by the movement of the skid-steer vehicles during the removal action, the pond liner will be removed immediately following the removal of the residual solids and will be disposed at an appropriate disposal facility. Soil beneath the liner will be managed in accordance with SMP Section 4: *Risk Management for Soils* (ENVIRON, 2012b).

Waste Containment and Storage Prior to Disposal

Residual solids that are removed from the pond by the skid-steer equipment will be placed directly into leak-tight roll-off bins that have gasketed gates and are designed for containment of solid waste that may contain free liquids. Bins will be placed within portable secondary containment berms. The bins will be covered and secured after each bin is full and at the end of each work day. It is anticipated that six roll-off bins will be required if the residual solids are profiled as non-hazardous and can be disposed at Republic Services Apex Landfill. If the solids are profiled as hazardous, it is anticipated that an additional six to ten roll-off bins will be required due to the longer distance from the Site to the nearest hazardous waste disposal facility, as described below.

Disposal

The residual solids (contained in leak-tight roll-off bins) will be removed by a subcontracted licensed hauler under the oversight of ENVIRON personnel and delivered to an appropriate disposal facility, depending on the characterization and waste profiling of the waste material. Procedures for both non-hazardous and hazardous waste disposal scenarios are described below.

Scenario 1: Disposal of Waste Classified as Non-Hazardous Waste

If the residual solids are profiled as non-hazardous waste, trucks will remove the roll-off bins containing the waste material from the Site and transport them to the Republic Services Apex Landfill or another non-hazardous waste disposal facility under standard bill of lading documentation and/or non-hazardous waste manifests, in accordance with state law. A transportation route will be established and spill containment and response procedures will be provided to all truck drivers. Trucks will be visually inspected prior to leaving the Site to ensure that the outer surfaces of bins are free of waste material and loads are properly secured and covered. Trucks will begin hauling the

waste material once approximately three roll-off bins are filled and secured. After bins are emptied at the non-hazardous waste disposal facility, the bins will be returned to the Site for re-filling.

Scenario 2: Disposal of Waste Classified as Hazardous

If the residual solids are profiled as hazardous waste, trucks will remove the waste material from the Site and transport it to the US Ecology Hazardous Waste Treatment and Disposal facility in Beatty, Nevada under hazardous waste manifest documentation, in accordance with state and federal law. A transportation route will be established and spill containment and response procedures will be provided to all truck drivers. Trucks will be visually inspected prior to leaving the Site to ensure that the outer surfaces of bins are free of waste material and the loads are properly secured and covered. Trucks will begin hauling the waste material once approximately six roll-off bins are filled and secured. Due to the distance of approximately 130 miles from the Site to the hazardous waste disposal facility, in order to minimize standby time an additional six to ten roll-off bins and three to six additional haul trucks will be used.

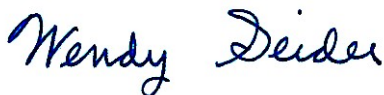
TASK 4 – REPORTING

A description of AP-5 pond solids characterization sampling, removal, and disposal activities will be presented in a technical report. Supporting information, including analytical results, COC documentation, waste disposal profile forms, waste manifests, and photo documentation of the removal activities will be included in appendices.

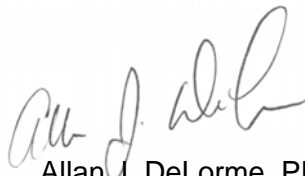
SCHEDULE

Task 1 field activities will commence within 30 days of receipt of approval of the work plan. It is anticipated that Tasks 1 and 2 described in this plan can be completed in three weeks. The start date and duration of Task 3 field activities are dependent on the classification of the waste material and the availability of subcontractors at the time of approval. It is anticipated that the removal and disposal of the waste will require approximately four weeks. A technical report will be submitted to NDEP within six weeks following completion of the field work.

Sincerely,



Wendy Seider, CEM #2102
Senior Manager



Allan J. DeLorme, PE
Managing Principal

cc: Jay Steinberg, NERT
BMI Compliance Coordinator, NDEP, BCA, Las Vegas
Brian Rakvica, McGinley and Associates, Las Vegas
NDEP c/o McGinley and Associates, Reno

ec: Greg Lovato, NDEP
Stephen Tyahla, US EPA Region 9
Mark Paris, BMI
Ranjit Sahu, BMI
Ed Modiano, de maximis
Joe Kelly, Montrose
Paul Sundberg, Montrose
Lynne Preslo, Montrose

Brian Waggle, Montrose
Curt Richards, Olin
Chuck Elmendorf, Stauffer
Nick Pogoncheff, Stauffer
George Crouse, Syngenta
Craig Wilkinson, TIMET
Kirk Stowers, TIMET
Victoria Tyson, TIMET
Jeff Gibson, AMPAC
Matt Paque, Tronox
Fredrick R. (Rick) Stater, Tronox
John Holmstom, Tronox

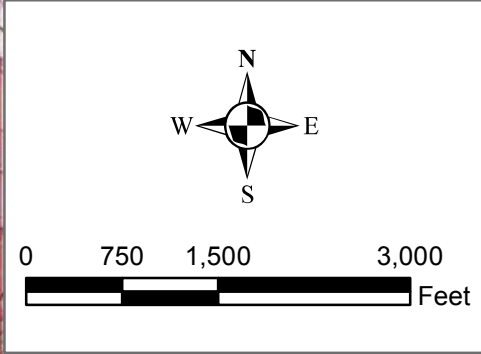
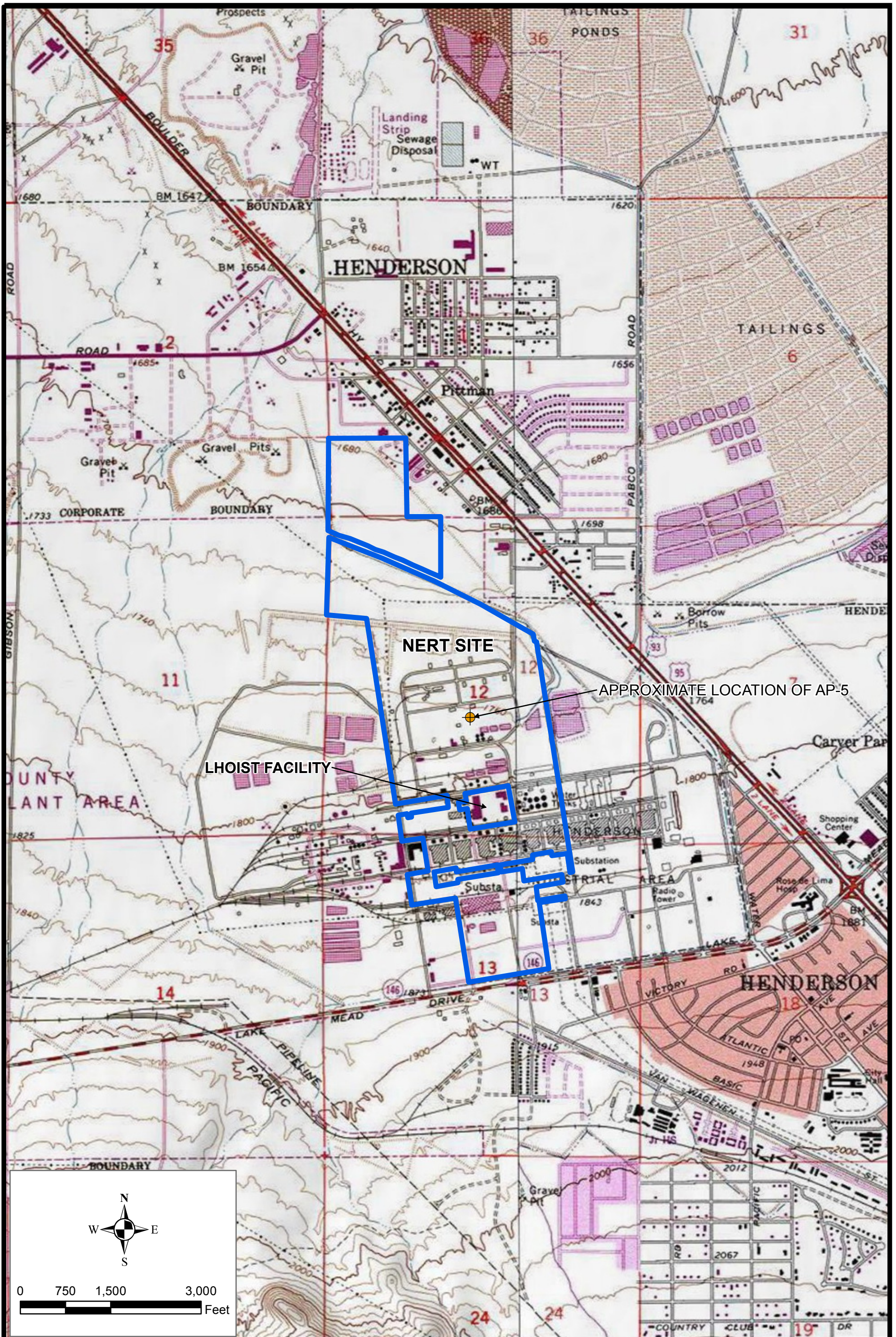
Attachments

- Figure 1 Site Location Map
Figure 2 Excavation Control Area D8: AP-5 Pond and Associated Utilities
Figure 3 AP-5 Residual Solids Characterization Sample Areas

References

- ENSR. 2008. *Phase B Source Area Investigation Work Plan, Area II (Central LOUs), Tronox LLC Facility, Henderson, Nevada.* June.
- ENVIRON International Corporation (ENVIRON). 2012a. *Proposal to Discontinue Treatment of AP-5 Pond Water at NERT Facility. Nevada Environmental Response Trust Site, Clark County, Nevada.* March 30.
- ENVIRON. 2012b. *Site Management Plan (SMP) Nevada Environmental Response Trust Site, Clark County, Nevada.* May 30.
- Nevada Division of Environmental Protection (NDEP). 2012. *Response to: Proposal to Discontinue Treatment of AP-5 Pond Water at NERT Facility Dated: March 30, 2012.* June 28.

Figures



Site Location Map
 Nevada Environmental Response Trust Site, Henderson, Nevada

Figure
1

2200 Powell St., Suite 700, Emeryville, CA 94608

Drafter: RS Date: 9/17/2012 Contract Number: 21-29100H Approved by: Revised:

Path: Q:\DRAWINGS\2129100H\Figure1_Location.mxd



Data Sources:
ESRI 2010 Bing Maps

Legend

 Excavation Control Area (ECA) D8



2200 Powell St., Suite 700, Emeryville, CA 94608

Excavation Control Area D8: AP-5 Pond and Associated Utilities
Nevada Environmental Response Trust Site, Henderson, Nevada

Drafter: RS

Date: 9/25/2012

Contract Number: 21-291000H

Approved by:

Revised:

Figure

2


Path: C:\DRAWINGS\21291000H\21291000H-ECA_RZD.mxd



Edge of Residual Solids
Area = 19400 SQ FT

Edge of Pond Liner

LEGEND:

 4 Point Composite Sample Area

Note:

Six four-point composite samples (one from each subarea) will be collected within the shaded area.



SCALE IN FEET

AERIAL SOURCE: GOOGLE EARTH PRO June 21, 2012.



2200 Powell St., Suite 700, Emeryville, CA 94608

AP-5 Residual Solids Characterization Sample Areas

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure

3

Drafter: RS

Date: 9/14/12

Contract Number: 21-29100H

Approved:

Revised: