



LETTER OF TRANSMITTAL
1232.01.63

April 9, 2013

Weiquan Dong
Nevada Division of Environmental Protection
2030 East Flamingo Road, Suite 230
Las Vegas, nv 89119

Via: Electronic Mail

The following is enclosed:

Description	Date	No. of Copies
Response to NDEP's February 21, 2013 Comments to the <i>Manganese Tailings Removal Technical Memorandum, Nevada Environmental Response Trust Site, Henderson, Nevada</i> , dated November 9, 2012	4/5/13	1
ERRATA – <i>Manganese Tailings Removal Technical Memorandum, Nevada Environmental Response Trust Site, Henderson, Nevada</i> (Replacement Pages)	4/5/13	1

The item(s) are transmitted:

<input checked="" type="checkbox"/>	At your request	<input checked="" type="checkbox"/>	For your action
<input type="checkbox"/>	For your review/comment	<input type="checkbox"/>	For your files
<input type="checkbox"/>	For approval	<input type="checkbox"/>	For your information

Comments:

If you should have any questions, please contact me at (949) 716-0050 extension 101.

Sincerely,

Derrick Willis
Principal

cc: Deni Chambers, Northgate
Shannon Harbour, NDEP Carson City Office
James Dotchin, NDEP LV
Christa Smaling, BMI Compliance Coordinator, NDEP LV
Brian Rakvica, McGinley & Associates, Las Vegas NV
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Chuck Elmendorf, Stauffer Management Company, LLC
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Kirk Stowers, Broadbent & Associates
Victoria Tyson, Tyson Contracting
Enoe Marcum, WAPA





From: Deni Chambers, Northgate
Derrick Willis, Northgate

Date: April 5, 2013

To: State of Nevada, Department of Environmental Protection
Division of Environmental Protection

RE: Errata to the *Manganese Tailings Removal Technical Memorandum, Nevada Environmental Response Trust Site, Henderson, Nevada* (Dated November 9, 2012)

**Response to Comments on
Manganese Tailings Removal Technical Memorandum**

The following Errata to the *Manganese Tailings Removal Technical Memorandum, Nevada Environmental Response Trust Site, Henderson, Nevada* contains responses to the Nevada Division of Environmental Protection (NDEP) comments and concerns contained in NDEP's February 21, 2013 letter (Letter) to Nevada Environmental Response Trust. The Errata includes a revised report cover, revised title page, and revised pages 1, 2, 5-7, and 10-13 of the Manganese Tailing Removal Technical Memorandum, which should be used to replace the pages in the previously submitted (November 9, 2012) Memorandum.

Responses to NDEP's comments are presented below.

1. *Comment: Section 3.4 Removal Activities, NDEP provides the following comments based on the information provided in Appendix F Daily Records for Manganese Tailings Release Incidents:*
 - a. *1st bullet, the incident should be attributed to an electrical short and not to driver error.*
 - b. *2nd bullet, the incident date was 05/20/10 not 05/21/10 and the incident should be attributed to a belly gate pin failure and not to a sticking belly gate.*
 - c. *3rd bullet, the incident should be attributed to the intentional release by driver and not to driver error.*

Response: The comments above have been addressed and the changes made to Section 3.4 Removal Activities.

2. *Comment: Section 6.0 References, NDEP provides the following comments:*
- a. *The DVSR reports referenced in Section 4.3 Confirmation Sampling Results should be listed in the References section.*
 - b. *The NDEP approval status of all documents submitted to NDEP should be noted (i.e. date of NDEP approval or comment letter).*

Response: The DVSR report discussed in Section 4.3, paragraph 2, lines 2-4 has been added to the reference section as Northgate, 2010a. Other references have been re-numbered as necessary in the text and reference section. The dates of NDEP comment letters and approval letters received have also been added to the reference section.





northgate
environmental management, inc.

MANGANESE TAILINGS REMOVAL TECHNICAL MEMORANDUM

**Nevada Environmental Response Trust Site
Henderson, Nevada**

Prepared For:

**ENVIRON International Corporation
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Prepared By:

**Northgate Environmental Management, Inc.
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April 5, 2013

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**Manganese Tailings Removal
Technical Memorandum
Nevada Environmental Response Trust Site
Henderson, Nevada**

April 5, 2013

Prepared For:

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EXECUTIVE SUMMARY

The Manganese Tailings Pile (MTP) area is located north of the Manganese Leach Plant and south of Mn-1 Pond (MTP Area) on what is now known as the Nevada Environmental Response Trust Site in Henderson, Nevada (the Site). At the time of the MTP removal activities described herein, the Site was owned and operated by Tronox LLC (Tronox). On February 14, 2011 the Nevada Environmental Response Trust (NERT) took title to the Site pursuant to the settlement of Tronox's bankruptcy proceedings. Tronox subsequently leased back a portion of the Site, on which it continues to operate its chemical manufacturing business.

The MTP Area is approximately 8.6 acres in size. From 1975 to 2004, this area was used for the disposal of manganese tailings from the leach plant process which included the leach beds (the historic manganese tails). This material is a non-hazardous solid waste product generated in the production of electrolytic-grade manganese dioxide. Manganese tailings material from all locations at the Site were consolidated to the current location and covered with soil sometime prior to 1985. The tailings pile was periodically graded to maintain the desired shape and drainage. Since 2004, manganese tailings from the Tronox operations (current tailings production) have been shipped to an appropriate off-site landfill.

MTP removal activities were initiated on April 29, 2010 and completed on July 19, 2010. A total of 284,232 tons of tailings and minor debris were removed from the area. In accordance with a request by the Nevada Division of Environmental Protection (NDEP), a confirmation sampling program was implemented subsequent to tailings removal. Based on the results of the confirmation sampling program, additional shallow soil excavation was conducted concurrent with Phase B soil remediation in accordance with the Removal Action Work Plan (Northgate, 2010d), and the Revised Excavation Plan for Phase B Soil Remediation of RZ-C Addendum to the Remedial Action Work Plan (Northgate, 2010i). The post-confirmation sampling excavation was conducted to address soil that contained concentrations of manganese, arsenic, cobalt and/or asbestos that exceeded screening criteria.



1.0 INTRODUCTION

Pursuant to its agreement with ENVIRON International Corporation (NERT's environmental consultant), Northgate Environmental Management Inc. (Northgate) has prepared this Technical Memorandum (Tech Memo) documenting the removal of manganese tailings from the MTP at the Site. A Site Location Map is given on Figure 1 and a MTP Area Location Map is given on Figure 2.

This Tech Memo presents field activities related to tailings removal, confirmation sampling, and subsequent soil remediation and asbestos abatement conducted in the MTP Area.

The tailings removal, confirmation sampling, and subsequent remedial actions described in this report are based on information contained in the following documents:

- *Volume Determination of Manganese Tailings Pile* – Dated April 9, 2007 (ENSR, 2007);
- *Removal Action Workplan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E* – Dated May 4, 2010 (Northgate, 2010c);
- *Manganese Tailings Pile Confirmation Sampling Memo* – Dated July 9, 2010 (Northgate, 2010e);
- *Nevada Division of Environmental Protection (NDEP) Comment Letter* – Dated July 20, 2010 (NDEP, 2010a);
- *Revised Manganese Tailing Pile Confirmation Sampling Memo* – Dated July 26, 2010 (Northgate, 2010f);
- *Response to NDEP's July 20, 2010 Comments* – Dated July 26, 2010 (Northgate, 2010g);
- *Revised Excavation Plan for Phase B Soil Remediation of RZ-C Addendum to the Removal Action Work Plan* – Dated September 1, 2010 (Northgate, 2010i); and
- *Former Manganese Tailings Pile Area Remediation Memo* – Dated December 3, 2010 (Northgate, 2010j).

1.1 Scope of Report

The purpose of this report is to:

- 1) Describe the field activities related to manganese tailings removal;
- 2) Document activities and results of the confirmation sampling; and
- 3) Document scraping and removal of asbestos- and chemical-impacted soils within the MTP.



Copies of the soil disposal manifests and daily tracking logs are included in Appendix D and a copy of the waste profile is included in Appendix E. The route from the Site to Apex Landfill is shown on Figure 4.

3.4 Removal Activities

Removal of the tailings was initiated on May 6, 2010 and was completed on July 19, 2010. Soil from the pile was loaded into covered trucks and transported to Apex Landfill, approximately 37 miles from the Site.

The work was conducted in accordance with the RAW, DAQEM permit, the Site NPDES permit and ENTACT's Health and Safety Plan. Dust mitigation and monitoring was conducted by ENTACT under the oversight of Northgate. All removal work was conducted under the oversight of NDEP's field representatives.

Dust mitigation was conducted using the application of water via water trucks. The potential for tailings material contamination was controlled through the use of dust mitigation and monitoring, truck/wheel wash stations, and gravel track-out areas. Truck wheel wash and track out areas were utilized and maintained at the egress point of the MTP Area and the Apex Landfill. In addition, a street sweeper was utilized on a daily basis to sweep the paved transportation route (as shown in Figure 5) on the Site and the adjacent 4th Street.

Tailings were confined to the MTP Area, covered trucks, and the landfill with the exception of the following incidents:

- On May 12, 2010, a partial load (3 to 5 cubic yards) of manganese tailings was inadvertently released on Highway 15 due to an electrical short. The manganese tailings were recovered from the roadway using a loader and a sweeper. An incident report is included in Appendix F;
- On May 20, 2010, a partial load (2 to 3 cubic yards) of manganese tailings was inadvertently released on a Site road just outside of the MTP Area due to a belly gate pin failure. The manganese tailings were recovered from the roadway using a loader and a sweeper. An incident report is included in Appendix F; and
- On May 28, 2010, an ENTACT driver disregarded established protocols and intentionally released a partial load (5 to 8 cubic yards) of manganese tailings on a frontage road adjacent to the Apex Landfill. According to the incident report, the released material had been stuck to the sides of the truck due to the use of water to control dust, and as a result was left in the driver's truck following off-loading at the disposal site. The driver was



immediately fired and the manganese tailings were recovered from the roadway within approximately seven hours of the release using a loader and a sweeper. An incident report is included in Appendix F.

A total of 284,232 tons of manganese tailings and debris were removed from the area, of which, 0.4% was debris consisting of a minor amount of wood (approximately 3 to 5 cubic yards). This wood appears to be associated with the forms for constructing the concrete foundation of the former cooling tower covered by the MTP, which was investigated as part of the Phase B investigation.

During tailings excavation, an undetermined odor was detected from two isolated areas. During these occurrences, the excavation work was stopped in these areas, the areas were screened using a photoionization detector (PID), and sampling was conducted. A summary of these events is briefly described below:

- On May 14, 2010, ENTACT detected odors from an area in the northwest corner of the manganese tailings stockpile. Northgate isolated and performed a PID screening in a 35 foot by 20 foot section of this area. No PID readings were detected in the worker's breathing zones and low readings (less than 2 parts per million [ppm]) were detected in the sample container headspace, and the odor dissipated. Based on the results of the PID sampling and the attenuation of the odors, excavation continued; and
- On May 18, 2010, undetermined odors were detected in the northwest section of the MTP in an active excavation area along the northern side of the MTP Area. Northgate isolated and performed a PID screening in a 35 foot by 20 foot section of this area. No PID readings were detected in the worker's breathing zones; however, low readings (1.4 ppm) were detected in the sample container headspace. Two (2) samples, including one (1) primary and one (1) field duplicate were collected and analyzed for volatile organic compounds (VOCs). Samples were collected using a 2.5-inch by 6-inch stainless steel liner as well as a "LocNLoad" collection device to fill three (3) volatile organic analysis (VOA) containers for analysis.

The primary sample and field duplicate sample collected on May 18, 2010 reported concentrations of benzene at 0.51 and 0.69 micrograms per kilogram ($\mu\text{g}/\text{kg}$), respectively. The field duplicate also detected chloroform at 0.50 $\mu\text{g}/\text{kg}$. All three values were "J flagged" by the laboratory, indicating that the results reported were between the method detection limit and the method reporting limit and that the values were estimated. These results are below the NDEP Basic Comparison Level (BCL) of 1.44 milligrams per kilogram (mg/kg) for benzene (NDEP, 2010b). Based on the results of the analytical data, tailings removal work resumed in this area.



All accompanying field reports and sample results for these occurrences are presented in Appendix G.

During tailings removal work, a shallow and inactive vitreous clay pipe (VCP) was disturbed. This VCP has historically been used to transport non-contact cooling water and was connected to other inactive pipes that apparently contained a significant amount of water. Approximately 5 to 10 gallons per minute of water was discharged to the ground surface for approximately 24 hours before Tronox was able to find and close a valve. The pipe breakage was reported to NDEP by Tronox via e-mail on July 12, 2010. In the e-mail, Tronox indicated that the source of the water was stabilized Lake Mead water. The water was sampled on July 8, 2010 and was found to have a pH of 6.26, a conductivity of 3,340 micromhos per centimeter ($\mu\text{mho/cm}$), and concentrations of barium and mercury of 0.22 milligrams per liter (mg/L) and 0.002 mg/L, respectively. No other metals were detected. The letter and results of this sampling are included in Appendix H. The water pooled in the concrete foundation of the former cooling towers and did not extend outside the MTP Area. The water was allowed to evaporate from the concrete-lined cooling tower foundations.

Removal of the MTP was completed on July 16, 2010 and approved after field inspection by Mr. Devin Gordon of McGinley and Associates, the field representative for NDEP. Tailings removal completion was based on removal of the visually distinct tailings material to the interface of the tailings and underlying soil. Approximately 6 to 12 inches of soil at the tailings/soil interface were removed. Where concrete foundations were present in the center of the MTP Area, tailings above the foundations were hand-excavated to the concrete foundation. Barriers were placed denoting potential trip and fall hazards around the concrete foundations and exposed pipes, and a dust palliative was placed on the former MTP.

A small portion of the MTP extended south into the active Tronox production area as shown on Figure 6. This material was not excavated as part of the removal action and is included in Excavation Control Area C18 for the leach plant equipment and facilities (ENVIRON, 2012). The primary reason was to maintain a safe offset from the active Southwest Gas pipeline. The exposed face of residual tailings not removed from the production area was covered with approximately two feet of soil.

A tonnage summary for the manganese tailings removal is presented in Table 1. Copies of the daily field records maintained by Northgate are given in Appendix I.



Soil Remediation of RZ-C Addendum to the Removal Action Work Plan submitted to NDEP on September 1, 2010 (Northgate, 2010i).

It should be noted that the analytical data presented in Tables 3 through 10 also serves as the pre-confirmation sample data for the new remediation zones (RZ-C-45B, RZ-C-45C, RZ-C-45D) where the data highlighted reflects the soil to be excavated.



5.0 EXCAVATION OF SOIL EXCEEDING SCREENING CRITERIA

Based on the results of the confirmation sampling program, approximately 3,660 cubic yards of soil were excavated and transported to Apex. The work was done concurrently with and as part of the RZ-C remediation work in accordance with the Revised Excavation Plan for Phase B Soil Remediation of RZ-C Addendum to the Removal Action Work Plan (Northgate, 2010i). RZ-C-45A was excavated to 0.33 feet bgs, RZ-C-45B was excavated to a depth of 1 foot bgs, RZ-C-45C was excavated to a depth of 3 feet bgs, RZ-C-45D was excavated to a depth of 1 foot bgs, and RZ-C-45E was excavated to a depth of 2 feet bgs. Remediation of these remediation zones was completed by February 10, 2011.



6.0 REFERENCES

- ENSR Corporation (ENSR). 2007. Volume Determination of Manganese Tailings Pile. Tronox Facility, Henderson, Nevada. April 9.
- ENVIRON International Corporation. 2012. Site Management Plan (SMP), Nevada Environmental Response Trust Site, Clark County, Nevada. Revised April. (with May 23, 2012 and May 30, 2012 Errata)
- ERM-West, Inc. (ERM-West). 2008. BRC Field Sampling and Standard Operating Procedures, BMI Industrial Complex, Clark County, Nevada. December 2008.
- Nevada Division of Environmental Protection (NDEP). 2010a. Response to: TRX Letter Submittal RE: Manganese Tailings Pile Confirmation Sampling. July 20.
- NDEP. 2010b. User's Guide and Background Technical Document for NDEP Basic Comparison Levels (BCLs) for Human Health for the BMI Complex and Common Areas, Revision 5, August.
- Northgate Environmental Management, Inc. (Northgate). 2010a. Data Validation Summary Report, Phase B Investigation Area III Soil, Tronox LLC, Henderson, Nevada. February 18. Approved by NDEP on March 17, 2010.
- Northgate. 2010b. Final Revised Pre-Confirmation Work Plan, Remediation Zones RZ-A Through RZ-E, Phase B Investigation, Tronox LLC, Henderson Nevada. March 25. Approved by NDEP on March 30, 2010.
- Northgate. 2010c. Removal Action Work Plan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E, Tronox LLC, Henderson, Nevada. May 4. NDEP comment letter dated May 12, 2010.
- Northgate. 2010d. Removal Action Work Plan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E, Tronox LLC, Henderson, Nevada. June 22. NDEP comment letter dated August 9, 2010.
- Northgate. 2010e. Manganese Tailings Pile Confirmation Sampling, Tronox LLC, Henderson, Nevada. July 9. NDEP comment letter dated July 20, 2010.



Northgate. 2010f. Revised Manganese Tailings Pile Confirmation Sampling Memo. July 26. Conditionally approved by NDEP on August 11, 2010.

Northgate. 2010g. Response to Nevada Division of Environmental Protection's July 20, 2010 Comments on *TRX Letter Submittal RE: Manganese Tailings Pile Confirmation Sampling*, July 26.

Northgate, 2010h. Errata to the Removal Action Work Plan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E, August 13. Conditionally approved by NDEP on August 20, 2010.

Northgate. 2010i. Revised Excavation Plan for Phase B Soil Remediation of RZ-C Addendum to the Removal Action Work Plan, September 1. Conditionally approved by NDEP on October 25, 2010.

Northgate. 2010j. Former Manganese Tailings Pile Remediation Memo, December 3. Approved by NDEP on December 16, 2010.

Northgate. 2011. Data Validation Summary Report, Additional Pre-Confirmation Sampling, Tronox LLC, Henderson, Nevada, dated January 28. NDEP comment letter dated March 11, 2011.

