Excavation Plan
for Phase B Soil Remediation of RZ-D
Addendum to the Removal Action Work Plan
Tronox LLC
Henderson, Nevada

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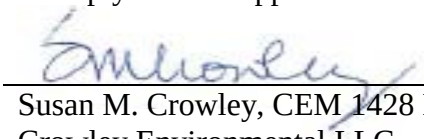
Responsible Certified Environmental Manager (CEM) for this project

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and, to the best of my knowledge, comply with all applicable federal, state and local statutes, regulations and ordinances.



Susan M. Crowley, CEM 1428 Exp.:03/08/11
Crowley Environmental LLC

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1.0 INTRODUCTION

Northgate Environmental Management, Inc. (Northgate) has prepared this Excavation Plan (EP) for Remediation Zone D (RZ-D) at the Tronox LLC (Tronox) facility located in Henderson, Nevada (the Site). This EP is an addendum to the *Removal Action Work Plan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E* (RAW) issued May 4, 2010 and approved by the Nevada Division of Environmental Protection (NDEP) May 12, 2010. The EP presents the methods and procedures to be used to implement the remedial alternative approved by NDEP for RZ-D to address contaminated soil within 10 feet below ground surface (bgs) at the Site. The scope of work presented in this EP is based on the NDEP-approved scope of work contained in the RAW and incorporates the results of a pre-confirmation sampling program (described in Section 1.2) performed to identify the limits of the cleanup actions. Soil remediation work will be performed in accordance with this EP, including the Standard Operating Procedures (SOPs) established by Basic Remediation Company (BRC, 2009a-j) for the Black Mountain Industrial (BMI) complex and the *Quality Assurance Project Plan* (QAPP; AECOM and Northgate, 2009). A human health risk assessment will be conducted for RZ-D in accordance with the *Health Risk Assessment Work Plan* (HRA WP; Northgate, 2010a).

The objective of this EP is to present a cleanup strategy that complies with the NDEP Order issued to Tronox on December 14, 2009 to remove impacted soil from RZ-D by the end of 2010.

The remediation limits presented in this excavation plan have been developed based on human health criteria including commercial worker and construction worker BCLs, modified risk-based goals for dioxins/furans and background concentrations for metals in soil. This EP currently does not address the soil-to-groundwater pathway. A separate site-wide leaching evaluation has been conducted and received by NDEP on June 12, 2010. As the evaluation is finalized, errata to this plan will be provided to address this pathway.

For purposes of the EP and designation of potential remediation areas, “contaminated soil” is generally defined as soil containing chemicals of potential concern (COPCs) at concentrations exceeding NDEP worker Basic Comparison Levels (BCLs), or modified risk-based goals for dioxins/furans agreed upon by NDEP[1]. For metals in which the background concentrations that exceed BCLs, “contaminated soil” is defined as concentrations that exceed the maximum concentration of the background data set (i.e., 7.2 mg/kg for arsenic). There are no NDEP BCLs for asbestos. Therefore, asbestos-related “contaminated soil” is defined as one or more long fibers (amphibole) and/or more than five long fibers (chrysotile) per sample. The final soil cleanup goals will achieve a cumulative theoretical upper-bound incremental carcinogen risk level point of departure of 1×10^{-6} and a target organ specific non-cancer hazard index of 1 for

each decision unit at the Site. If needed, NDEP may re-evaluate these goals in accordance with United States Environmental Protection Agency (USEPA) guidance.

1.1 Site Description

The Tronox Site is a portion of a larger complex that was first developed by the U.S. government in 1942 as a magnesium plant for World War II operations. The active portion of the Tronox LLC facility currently produces electrolytic manganese dioxide, used in the manufacturing of alkaline batteries; elemental boron, a component of automotive airbag igniters; and boron trichloride, used in the pharmaceutical and semiconductor industries and in the manufacturing of high-strength boron fibers for products including sporting equipment and aircraft parts. RZ-D consists of approximately 130 acres primarily occupied by active, existing groundwater and process water holding pond areas, including GW-11 and WC-West and WC-East (see Figure 1). Several buildings are present in RZ-D, including the active Veolia facilities that are used for groundwater treatment and several older storage historic buildings. A closed hazardous waste landfill is present in the northwest corner of RZ-D. Other features include active soil/bentonite groundwater cutoff trench and infiltration trenches. A complete description of the Site, history of its use, and historical environmental investigations are presented in the RAW.

1.2 Background

At the completion of the Phase A and B Investigations and the Area I and II supplemental soil sampling, a pre-confirmation sampling program was developed in concert with NDEP to refine remediation planning and establish the vertical and horizontal extent ("cutlines") of the proposed excavations in shallow soils (0 to 10 feet bgs). The cutline identification also allowed final risk assessment calculations to be prepared in parallel with the excavation of contaminated soils, further facilitating completion of remedial excavation by the end of 2010 as required by the NDEP Order dated December 14, 2009 (NDEP, 2009).

1.3 Data Evaluation

Chemical analyses of soil samples collected in RZ-D during the Phase A and B Investigations show that there are locations within the upper 10 feet of soil where dioxins/furans, hexachlorobenzene (HCB), other semi-volatile organic compounds (SVOCs), asbestos, metals, pesticides, and/or perchlorate exceed the various BCL criteria. Remedial excavation areas for RZ-D have been developed using the Phase A and B soil analytical data supplemented by the pre-confirmation sampling. The excavation areas define portions of the site where soil exceeds BCL or other comparison criteria, as specified on Figure 1. Figure 1 shows the excavation area boundaries and the chemical data upon which they are based.

A CD containing the soil sample analytical data from borings advanced during the Soil Investigation Programs is included in Appendix A. Appendix A also contains a set of summary tables presenting the sampling data for those chemicals identified to be remediated in RZ-D: dioxins/furans, hexachlorobenzene (HCB), other semi-volatile organic compounds (SVOCs), asbestos, metals, pesticides, and/or perchlorate.

The Appendix A tables provide the following information:

- All data for all chemicals to be remediated for each soil boring in RZ-D (Table A). Cells highlighted in orange indicate soil concentrations for one or more of the constituents exceeding defined comparison criteria and soil will be excavated. These data will not be retained in the post-remediation health risk assessment (HRA). Cells highlighted in green indicate soil concentrations not exceeding defined comparison criteria. These data will be retained in the post-remediation HRA. Cells highlighted in yellow indicate data still pending. Cells highlighted in purple indicate soil concentrations to remain above their respective cleanup criteria based one of the following: (1) concentration is located at depth at or below 10 feet bgs and no further remediation will occur as area will be backfilled to original grade, or (2) soil is located in an engineering and institutional control area and will not be excavated.

- Separate tables are also provided for each RZ-excavation area (Tables A-1 through A-31) that include data from the defining (def) and bordering (bor) soil borings. These tables provide the post-confirmation data, as well as original data that will be used in the HRA following excavation.

For RZ-D, dioxin, HCB and asbestos concentrations will remain in some areas above BCL as soil is located in engineering and institutional control areas such as the trade effluent pond berms and these areas will have engineering controls including an asphalt-based cap (See Section 2,1,1). Additionally, there are locations in which dioxin and HCB are located at depths greater than 10 feet bgs and no further remediation will occur as the area will be backfilled to original grade. There are two instances in which arsenic concentrations above 7.2 mg/kg are located at 10 feet bgs to 11 feet bgs and will not be excavated (SSK7-02 at 9.2 mg/kg and RSAK8 at 12.3 mg/kg) and one instance in which a perchlorate concentration of 1320 mg/kg is located at 10 to 11 feet bgs (SA72).

In instances where chemicals are not risk drivers, but excavation is occurring due to other chemicals (i.e., SVOCs and metals that are not being remediated as concentrations are below their respective cleanup criteria), the existing data for those chemicals will be used in the risk assessment. For example, as shown in Appendix A tables, if an excavation is based on arsenic, the pre-confirmation data (green cell) for arsenic will replace the elevated arsenic concentrations

(orange cells), but the existing data for the other remaining chemicals that are not above comparison criteria (highlighted in green) will be retained in the HRA. With regard to Beta-BHC and 4,4-DDE, if either one of these two constituents are above the BCL, data for both will be replaced with pre-confirmation data as the entire suite of data is available. The same is true for asbestos in that if either amphiboles or chrystotile fibers exceed comparison criteria, both data points will be replaced with confirmation data. Additionally, there are instances when all depths within a soil column are highlighted in orange even though there are some shallow results that are below the BCL (i.e., excavation to 3 feet based on 2-3 feet bgs result when 1-2 feet bgs result does not exceed BCL). Therefore, Appendix A tables will include instances in which some cells are highlighted orange even though the soil concentrations are below their respective comparison criteria.

Finally, in instances of excavation in which backfill will be used, it is anticipated that chemical concentrations representing backfill soil will be generated and all existing data within the backfill depth zone will be replaced with representative backfill concentrations. The representative backfill concentrations will be discussed and agreed upon with NDEP prior to use in the HRA. As part of the RZ-D risk assessment, an evaluation of all validated data will be conducted to document soil concentrations removed from further evaluation due to soil removal activities and remaining chemical concentrations. The risk assessment will discuss the sufficiency of the data to identify the COPCs and select an Exposure Point Concentration (EPC) for the exposure scenarios evaluated in the HRA. The EPC for use in the risk assessment is likely to be the maximum COPC concentration within the entire RZ area (i.e., RZs -B, -C and -D) following polygon excavations. In some instances, a 95 % upper confidence limit may be used to evaluate an in which sufficient vertical and lateral data have been collected.

As pending data become available, errata to this report will be prepared presenting the data and any changes in excavation areas or depths of excavations.

1.4 RZ-D Site Conditions

RZ-D is a four sided polygon in shape, with the long axis running roughly east /west. The southern boundary of RZ-D is the northern side of the Beta Ditch, as shown on Figure 1. In general the land surface in RZ-D slopes northward at a gradient of approximately 0.023 feet per foot. However, Northgate understands that the soil used to construct the embankments for the ponds was generated by excavation soil from the northern portion of RZ-D. Therefore, the ground slope is steeper in this area. The developed portions of RZ-D have also been modified by grading to accommodate plant facility buildings, access roads, and other features.

The Site is crossed by asphaltic concrete roads and dirt roads. A network of active and inactive underground utility lines is present under the roads and some open areas at the Site. Figure 2 presents the approximate locations and types of utilities that are present in RZ-D, and it represents the summation of the information provided by Tronox on known utility lines. The locations of the lines have been field-checked by Northgate where surface expressions of the utilities are present. It is likely that unknown utilities, both active and inactive, also exist on the Site and may be encountered during remediation. Field procedures to address the possibility of encountering unknown utilities will be included in the contractor plans and specifications. It is Northgate and Tronox's intent that the contractor be responsible for locating, avoiding, and protecting underground and aboveground utilities during remedial activities.

2.0 SCOPE OF WORK

The remediation program at RZ-D will consist of soil excavation and off-Site disposal. The proposed excavation areas were generated using information gathered during the Soil Investigation Programs, a conceptual site model (CSM) review, and a field check of the existing Site conditions.

Based on NDEP guidance and the results of the Soil Investigation Programs, Tronox will excavate contaminated soil to the excavation boundaries and depths shown on Figure 1 and presented in Table 1, with a several exceptions as discussed in this section. Table 1 also shows the chemical group(s) driving the target excavation depths for each excavation area. Excavated soil will be transported for permanent off-Site disposal at the Republic Landfill in Apex, Nevada or other approved landfills in accordance with sampling results and landfill acceptance criteria.

All work conducted as part of this EP will be performed in accordance with the following plans:

- Dust Mitigation Plan and Clark County Dust Permit (to be submitted by the Remediation Contractor);
- *Perimeter Air Monitoring Plan* (PAMP; Approved by NDEP on May 12, 2010);
- *Stormwater Pollution Prevention Plan* (Approved by NDEP on May 12, 2010) ;
- Contractor's Site-Specific Health and Safety Plan (HSP; to be submitted by the Remediation Contractor); and
- *Transportation Plan* (Approved by NDEP on May 12, 2010).

These plans are part of the RAW (Northgate, 2010), with the exception of the contractor's Dust Mitigation Plan, Clark County Dust Permit, and the Site Specific Health and Safety Plan.

2.1 Excavation Boundary Constraints

RZ-D has been subdivided into 32 excavation areas identified as RZ-D-01 through RZ-D-31 and RZ-D-1A, as listed in Table 1 and shown on Figure 1. Many of the excavation areas identified for RZ-D are constrained by various site features. This section describes in detail, on an excavation area-specific basis, the constraints for the proposed excavations. These constraints are also listed in Table 1 under "Excavation Boundary Modification."

2.1.1 Buffer Strip Ponds GW-11 and WC-West and WC-East

A 50-foot wide buffer strip has been proposed by Tronox based on a geotechnical engineering analysis of the stability of the embankments around active Ponds GW-11, WC-West and WC-East. The proposed buffer strip extends from the toe-of-slope of the exterior slopes to 50 feet outside the toe-of-slope; see Figure 1 for location of the proposed engineering and institutional control area including the buffer strips. The purpose of the buffer strip is to protect the ponds currently in use by Tronox from slope instability potentially caused by undercutting the toe of embankments. The toe-of-slope of excavation areas abutting the buffer strip will coincide with the buffer strip boundary. Buffer strips are discussed further in Section 4, Engineering and Institutional Controls. The engineering controls described in Section 4 will be constructed in accordance with the Project Plans and Specifications at the end of the remediation phase of work in RZ-D. A report presenting the findings of the geotechnical analysis is being prepared by Tronox and will be submitted as a stand-alone report.

2.1.2 Property Lines

Five of the proposed excavation areas (RZ-D-01, RZ-D-06, RZ-D-07, RZ-D-24 and RZ-D-25) are constrained by the Tronox Site property lines. Because soil sampling has only been performed in areas owned by Tronox, no data exists in adjacent areas. Prior to excavation, confirmation samples at the limits of the proposed excavation areas that border the property line will be collected at a minimum of one sample per property line boundary excavation or one sample per 150 lineal feet, whichever is greater. Samples will be collected near the proposed excavation sidewall at a height coinciding with the maximum concentration in the nearest sample. Samples will be analyzed for the chemical(s) driving the excavation as shown in Table 1.

2.1.3 Trade Effluent Pond Berms

Seven of the proposed excavation areas abut the former Trade Effluent Pond berms in the northeast corner and in the north east corner of RZ-D (RZ-D-01, RZ-D-02, RZ-D-03 through RZ-D-05, RZ-D-23, and RZ-D-24). In these locations, the limits of the excavation have been shown at the toe-of-slope. Pre-confirmation sampling indicate that the berms are clean (analytical results from soil samples collected are below BCLs) to the depth of sampling; however, no sampling has been done in the deep portion of the berms or below the berms. Tronox proposes that the berm soil will be used as backfill, provided it is clean and suitable for reuse and will perform additional sampling in those areas not previously sampled to verify that the deeper berm soil and the soil below the berms meets the cleanup criteria.

2.1.4 Railroad Embankments

Proposed Excavation areas RZ-D-13 and RZ-D-14 include the inactive curving rail alignment in the southwest portion of RZ-D. This inactive portion of tracks and appurtenant subsurface soil and ballast material will be removed in proposed excavation areas, as shown on Figure 1.

2.1.5 Asphalt Pavement

Excavation areas RZ-D-30 and RZ-D-31 are separated by 9th Street. Tronox is not proposing to remove 9th Street in this area. Ninth Street is heavily used and is one of the oldest historic roads on the Project Site. It is Tronox's opinion that this historic pavement area preceded the event(s) that resulted in asbestos contamination. In addition, the thickness of the pavement section (asphalt concrete and aggregate base at least 1-foot in thickness) is equal to or exceeds the proposed 0.5 foot thickness of soil requiring removal.

2.1.6 Veolia Facilities

The Veolia facility is in operation 24 hours-per-day, 7 days a week treating contaminated groundwater and cannot be taken off-line for extended periods of time. Proposed excavation area RZ-D-26 has been truncated to the north by the presence of the Veolia facilities. The contamination in this area appears to be relatively shallow, approximately 0.5 feet. Excavation will be performed as close to the facilities as is possible and is considered structurally sound by Tronox's engineers. Figure 1 depicts the planned excavation limits for RZ-D-26.

2.1.7 Infiltration Trenches

The excavation areas north of the infiltrations trenches (RZ-D-16 and RZ-D-19 through RZ-D-21) have been partially truncated to avoid impacting the trenches. The trenches are used to infiltrate clean Lake Mead water to replace the contaminated groundwater that is extracted south of the soil bentonite barrier wall. The analytical data, although limited, for soil between and south of the trenches suggest that the soil meets the cleanup goals. Tronox is proposing to verify these conditions by collecting additional samples between the trenches at the locations shown on Figure 1 as purple hexagons.

2.1.8 Field Observations

The eastern boundaries of excavation areas RZ-D- 06 and 07 have been established based on based on topographic maps and visual field observations of the limits of contaminated historic fills. The observations suggest that fill materials were the source of the contamination. Therefore,

the limits of the fill were selected as the limits of excavation. Two additional soil borings are proposed at the estimated eastern limits of RZ-D-06 and RZ-D-07 to verify the extent of the excavations.

2.1.9 Utility Lines

Currently, no excavation boundary modifications are proposed for existing utilities except for a limited restriction around the high-voltage power line foundations in the areas of RZ-D-01 and -02. However, as shown on Figure 2, a number of overhead and buried utilities are present in proposed excavation areas. It is Tronox's intent to excavate to the boundaries and depths shown on Figure 1. As the work proceeds, depending on the location and depth of active utilities, it may become necessary to keep some existing soil in place for support of utilities that cannot be moved or temporarily taken out of service. If and when these situations arise, Tronox will contact NDEP to discuss the situation and proposed measures.

2.2 Depth Constraints Driven by Arsenic

A number of the proposed excavation areas are driven by arsenic. Based on NDEP input, Tronox has adjusted the proposed excavation areas to remove soil within ten feet of the ground surface where concentrations of arsenic exceed the background concentration of 7.2 mg/kg. A previous issue centered on RZ-D-24 (now RZ-D-25). As requested by NDEP, the proposed excavation of RZ-D-25 is now 1 foot bgs.

3.0 REMEDIATION

3.1 Work Area Preparation

This section describes the preparation activities that will be performed prior to excavating and transporting soil from RZ-D excavation areas. As described in the RAW, the following remediation support features will be established/constructed prior to performing soil excavation activities, as delineated in Figure 5 of the RAW:

- Access routes for authorized visitor and contractor Site ingress and egress;
- Haul roads to the public access roads;
- Clearing and disposal of vegetation in excavation areas, access and haul roads;
- Dust-control water source(s);
- Visitor area;
- Management/engineering trailers;
- Parking areas for workers, vehicles, and heavy equipment;
- Debris storage area; and
- Vehicular and personnel decontamination areas.

Portions of RZ-D contain excess soil materials and debris. Prior to beginning soil excavation in the excavation areas, debris will be sampled in place and tested for contaminants. A Sampling and Analysis Plan will be prepared and submitted to NDEP for approval that will present Tronox's proposed procedures to sample the debris. Based on test results, the debris will either be left on site or disposed of at an appropriate landfill. Uncontaminated debris may be moved from the work area and disposed or stockpiled in non-working areas. It is also possible that this uncontaminated debris may be recycled and used as fill.

Remnants of asbestos pipe insulation were observed on the ground surface in a number of locations in the northwestern corner of RZ-D. A portion of asbestos-wrapped pipe, still buried, was observed in the north-south trending Trade Effluent Pond embankment between the GW-11 pond and the western property line. Site preparation in this area will require that the insulation remnants be removed from the ground surface prior to remedial excavation. Northgate expects that the north-south berm will also be excavated and the soil reused, provided analytical testing shows the materials are suitable. When the berm is removed, an asbestos removal contractor will be retained to remove the asbestos-wrapped pipe.

3.2 Well Abandonment

Eighty-five active wells are located within RZ-D, as shown approximately on Figure 3. Based on the location of planned excavation areas, 17 of the wells (AA-MW-16, I-C, M-70, M-83, M-22A, M-84, M-85, M-86, M-87, M-88, M-18, M-74, M-132, M-133, M-37, I-A-R, and 1-K) will be impacted during remediation activities. Eight of these wells are in areas where excavations depths are expected to be less than 2 feet. Tronox does not expect that these wells will need to be removed. Three of the wells are in an area where excavation is planned for a depth of 10 feet. Tronox will discuss the disposition of these wells with NDEP prior to excavation to determine if specific wells will require replacement or if sufficient coverage exists such that replacement is not required. If replacement is required, these wells could be protected during excavation and backfilling by marking and placing barricades and caution tape, or they could be properly abandoned prior to excavation. If wells become damaged beyond repair, they will be properly abandoned and if replacement is required, similar wells will be reinstalled after the remediation work is completed. Well abandonment procedures will be performed in accordance with Nevada Division of Water Resources (NDWR) requirements.

3.3 Excavation

This section describes the excavation of contaminated soil from RZ-D. The excavation areas are shown on Figures 3, with areas impacted by asbestos shown in blue and the remainder of excavation areas shaded in tan. The target depths of excavation areas are shown on Figure 1 and summarized in Table 1.

In general, the cutlines represent the lateral limit of the bottom of the excavation area. The limits and depths selected for the excavation areas are based on the soil data collected and the NDEP worker BCLs, background for arsenic, and risk-based cleanup goals. The criteria used for the selection is presented in Table 2.

The excavations will generally be sloped or benched outward and upward from the cutline at a slope of 1:1 slope (horizontal to vertical). In cases where the excavation abuts a structure, feature or property line that cannot be removed, the cutline represents the top-of-slope. Temporary fencing will be placed along the perimeter of excavations 5 feet or more in depth and in areas where the excavations represent a potential traffic or safety hazard. If excavations are to be left un-backfilled, the side slopes will be flattened to 3:1 (horizontal to vertical). During construction, portions of the excavation sidewalls may also be flattened or the excavation partially backfilled to facilitate vehicle traffic or soil handling activities.

The target excavation depths may be revised based on visual staining, odors monitoring instrumentation readings or other indications. Depths may also be modified in the field as utilities and other buried structures are encountered. Northgate will obtain NDEP approval of any changes to the excavation depths shown in Table 1 and Figure 1 as field work progresses and if special cases are encountered.

It is anticipated that excavations deeper than 1 foot will be performed with heavy earth-moving excavators. Excavations less than 1 foot deep will be performed either with an excavator or motor grader (blade). The contractor may elect to stockpile soil in the excavation area or may load the soil directly into trucks for off-Site disposal.

A pipe rack utility corridor trends north and south and is located along the northern extension of 9th Street (see Figure 2). The corridor passes through an excavation area before reaching the WC-East Pond area. The pipe corridor is elevated in this location. The excavation is planned for a depth of 10 feet, and Northgate anticipates that the excavation can be performed in this area. The pipe rack will need to be supported during the excavation. This could be accomplished through underpinning the existing piers (by carrying loads to soil below the excavation depth) or the pipe could be rerouted temporarily around the work area. Tronox will determine the best method to address the pipe rack and will describe the method in plans and specifications for RZ-D remediation.

3.4 Post-Excavation Backfilling

Tronox will backfill some of the excavations in RZ-D with clean material. Backfill will be required to maintain vehicle access in excavation areas where roadways exist. Tronox also intends to backfill all excavations that are 10 feet or more in depth. The areas proposed for backfilling and the extent of the proposed backfill is summarized in Table 1. If backfilling to the previous surface grades is not proposed, Tronox will discuss these areas with NDEP.

Backfilling will be performed by the contractor in accordance with the remediation plans and specifications. Backfill materials will be tested by Northgate for geotechnical engineering and environmental compliance requirements. Test results will be provided to NDEP before the material is accepted for use in backfilling. It is anticipated that soil backfill borrow sources will be from clean areas on the project Site. “Clean areas” are defined as areas with soil concentrations meeting the NDEP worker BCLs, background for arsenic and modified risk-based cleanup goals for dioxins/furans. In addition, other off-Site sources are being investigated.

Analytical test results indicate that the existing upper portion of the north-south Trade Effluent Pond berm in the north-west corner of RZ-D is soil meeting the BCLs and other criteria and is

suitable for use as backfill. When the remediation contractor excavates the hazardous waste landfill, the berm material could be placed and compacted in the landfill area and minimize hauling distances.

3.5 Air Monitoring

Air monitoring will be performed for fugitive dust emissions, chemicals of concern and volatile chemical emissions in accordance with the PAMP (Appendix B of the RAW) and the Contractor's HSP. The RZ-D specific list of constituents that will be monitored are presented in Table 1 of the PAMP. Because of the relatively small size of the excavation area in comparison to the overall Site, it is Northgate's opinion that perimeter monitoring at the edges of individual excavation areas is not necessary to demonstrate that the dust control measures are adequate. Tronox proposes to perform the perimeter air monitoring at the Site perimeter as described in the PAMP. In addition, PM10 real-time monitoring will be performed on selected workers in the work area. Perimeter and worker air monitoring will be used to evaluate the effectiveness of dust control measures in mitigating emissions. If emissions exceed the action levels outlined in the PAMP, actions will be taken to bring the emissions into conformance with the plan. Mitigation actions include additional soil wetting, covering exposed soil stockpiles, use of dust palliatives, ceasing operations if the wind velocity exceeds the value set in the PAMP, and ceasing operations until effective measures are implemented.

4.0 INSTITUTIONAL AND ENGINEERING CONTROLS

It is Tronox's intent to excavate contaminated soils in RZ-D excavation areas to the lateral extent and to the depths described in Table 1 and shown on Figure 1. Currently there are two locations where institutional or engineering controls are proposed within RZ-D. These areas are shown on the figures and include:

- The embankments, pond areas and the areas of the buffer strips around Ponds GW-11, WC-West and WC-East, and
- The Veolia groundwater treatment building and facilities.

Analytical data collected from soils in the pond embankment around GW-11, WC-West, WC-East and the buffer zone areas indicate that there is some contaminated soil in these areas. However, the ponds and embankments are in an integral part of the operating Tronox and Veolia facilities and cannot be removed and remediated at this time. Additionally, a buffer zone is needed to allow the planned remedial excavations to remove contaminated soil from the areas near the ponds and maintain embankment stability. In order to protect Tronox workers, Site visitors and the public, engineering controls are proposed for the exposed-soil portions of embankments (there are portions of the embankments that are covered with an existing membrane liner which currently serve as an engineering control) and the buffer strip. The proposed engineering controls will be an asphaltic-based cover: either asphalt concrete pavement and an aggregate base layer or a double chip seal layer over aggregate base, or equivalent. These covers should be capable of sustaining light truck traffic without damage and should provide a reasonably long life with a low level of required maintenance.

The Veolia water treatment building and facilities are in the central portion of RZ-D. The building and facilities operate 24 hours a day treating recovered groundwater for perchlorate and hexavalent chromium. The building and facilities cannot be taken off line for extensive periods of time; therefore remediation of soil beneath the building or the operating facilities is unfeasible at this time. The proposed excavation area has been extended to the north and is now adjacent to the building and facilities. The impacted area in the vicinity of the facility will be excavated to a depth of 0.5 ft bgs, as shown on Figure 1. A confirmation sample will be collected next to the facility to assess if asbestos contaminated soil is adjacent to the building and facilities.

If a decision is made to institute institutional or engineering controls, the procedures will be in accordance with *Revised Environmental Covenants, Institutional and Engineering Control Plan* submitted by Tronox on June 9, 2010 and delivered on June 10, 2010 for NDEP review and comment.

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APPENDIX A
RZ-D ANALYTICAL DATA

Remediated Soil Data
Tables A-1 through A-30

Analytical Data
(Provided on CD)