

Stormwater Pollution Prevention Plan
for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E
Tronox, LLC
Henderson, Nevada

May 4, 2010

Prepared For:

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- 2 Detailed Site Map

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- A State of Nevada Division of Environmental Protection Stormwater General Permit
NVR100000
- B BMP Inspection Forms
- C Tronox Phase B Remediation Program Schedule



**1.0 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)
FOR CONSTRUCTION ACTIVITIES**

Project Name:..... Phase B Soil Removal at Tronox
Henderson Facility

Project Location:..... Tronox Henderson Facility
Henderson, Nevada

Assessor's Parcel Number (APN):..... 178-13-501-001 ¹

Owner: Tronox LLC

Owner Representative:..... To be determined

Owner's Address:..... 560 North Lake Mead Drive,
Henderson, NV 89015

Owner's Phone:..... (702) 651-2200

Construction Dates: April 1, 2007 to
December 31, 2010

**Person Responsible for
Inspection of the SWPPP MEASURES:** Jim Carolan (Owner
Representative's SWPPP Manager,)

Owner Representative SWPPP Manager's Address: 560 North Lake Mead Drive,
Henderson, NV 89015

Owner Representative SWPPP Manager's Phone: . (510) 504-6927

Implementing the SWPPP: Contractor's SWPPP Manager
(to be determined)

Contractor's SWPPP Manager **Address:** To be determined

Contractor's SWPPP Manager **Phone:** To be determined

Notice of Intent Filing Date:..... To be determined

¹ There are approximately 20 APNs associated with Phase B Soil Removal at the Tronox Henderson Facility, according to information available at the Clark County Assessor's Office website at <http://www.accessclarkcounty.com/assessor>.



2.0 OWNER CERTIFICATION STATEMENT

Owner Approval and Certification of SWPPP

Project Name: Phase B Soil Removal
at Tronox Henderson Facility

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. I also confirm that a stormwater pollution prevention plan (SWPPP) has been completed, will be maintained at the project Site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations.

Initial Certification

Print Name: _____ Title: _____, Tronox LLC

Signed: _____ Date: _____

Annual Re-Certification

Print Name: _____ Title: _____, Tronox LLC

Signed: _____ Date: _____



3.0 CONTRACTOR'S CERTIFICATION STATEMENT

SWPPP Acknowledgement by the Contractor

Project Name: Phase B Soil Removal
at Tronox Henderson Facility

The Contractor(s) responsible for implementing this SWPPP for the duration of the Phase B Soil Remediation Contract acknowledges by signing below that they have read this SWPPP and are knowledgeable about its content, requirements, and their responsibility thereunder. I certify under penalty of law that I understand the terms and conditions of the State's General Permit (NVR100000) that authorizes stormwater discharges associated with industrial activities from the construction Site identified as part of this certification.

Company 1: _____ Title: _____

Print Name: _____ Title: _____

Signed: _____ Date: _____

Company 1: _____ Title: _____

Print Name: _____ Title: _____

Signed: _____ Date: _____



4.0 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) has been developed for the proposed Phase B Soil Removal at the Tronox Henderson Facility located in Henderson, Clark County, Nevada (the Site). This SWPPP has been prepared in accordance with the requirements of the State of Nevada Division of Environmental Protection's Stormwater General Permit NVR100000 dated September 14, 2007. A copy of the General Permit is included in Appendix A.

The purpose of the SWPPP is to identify the potential sources of pollution that may reasonably be expected to affect the quality of potential stormwater discharges from the Site in relation to activities described in this Plan. The SWPPP describes the implementation practices that will be used to reduce the pollutants in stormwater discharges associated with construction activities related to building abatement and demolition, removal of structures including above and underground utilities, and excavation, potential temporary stockpiling, loading and off-Site transport of soil for disposal. The stormwater management practices and measures described in this SWPPP are in compliance with the terms and conditions of the Stormwater General Permit NVR100000.

4.1 Site Location and Description

The Site is located ½-mile southwest of the intersection of Boulder Highway and West Warm Springs Road within the Black Mountain Industrial (BMI) complex in an unincorporated section of Clark County in Henderson, Nevada approximately 13 miles southeast of Las Vegas and 2 miles northeast of the City of Henderson's downtown. The general location and layout of the Site are presented as Figures 1 and 2. The main facilities at the project Site are currently operated by Tronox LCC, a producer of industrial chemicals, including electrolytic manganese dioxide, elemental boron, and boron trichloride.

The Site is generally rectangular in shape with the long side in the north-south direction. Elevations across the Site range from 1,677 to 1,873 feet above mean sea level. The land surface slopes toward the north at a gradient of approximately 0.023 feet per foot (ft/ft). The developed portions of the Site have been modified by grading to accommodate plant facility buildings, surface impoundments, access roads, a landfill and other Site features.

The major buildings that exist on the Site include Unit Buildings 1 through 6. These buildings were the main buildings for the World War II magnesium production. Unit Building 3 is currently used by Tronox for offices and storage. Unit Buildings 5 and 6 are currently used by Tronox for production. Building 5 is also used for some storage. Unit Buildings 1, 2, and 4 are not currently used and have been partially demolished. Other buildings exist on the Site including an administrative office building, a wash room building, Tronox production facilities,



the Veolia treatment facilities, a laboratory building, former perchlorate production facilities, and others. Included within the Site is a 600- by 750-foot area owned and operated by Chemstar. Three ponds exist at the northern end of the Site that will be in use during the remediation and will be retained by Tronox.

The Site is crossed by asphalt concrete roads, unpaved roads and railroad spurs. Two of the rail spurs are still in service. An extensive network of underground utility lines exist, including both active and inactive utilities. A drainage ditch (Beta Ditch) crosses the Site from west to east. During the main production era, the Beta Ditch was the main drainage for liquid wastes that flowed to the pond area to the east. Currently the Beta Ditch is plugged off near the eastern end. Drainage from the Beta Ditch from the Tronox Site will no longer be allowed.

Manganese tailings have been stockpiled and capped with soil over approximately 8.6 acres in the eastern central portion of the Site. This material is a non-hazardous solid waste product generated in the production of electrolytic-grade manganese dioxide. The total volume of this stockpile is approximately 213,000 cubic yards (ENSR, 2007). Tronox plans to relocate this historic tailings stockpile to the Apex landfill, consistent with its ongoing transport and disposal of the manganese tailings generated by its current manufacturing operations. The historic tailings pile will be removed from the Site between approximately May to July, 2010. This work will involved installation of various erosion and sediment control measures in accordance with Tronox's existing NPDES stormwater permit and SWPPP. These measures include installation of silt fences and gravel bag barriers to limit sediment erosion and retain runoff on the Site. Therefore, removal of the manganese tails will not be governed by this SWPPP.

Within the boundaries of the Site are the Sale Parcels A, B, C, D, E, F, G, H, and I. These Parcels are at the edges of the Site at the north, west, and south sides (see Figure 5 of RAW). The Sale Parcels are not currently in use. This RAW does not include any removal actions on the Sale Parcels. Excavation of impacted soil on the Sale Parcels has been addressed in accordance with a work plan submitted to and approved by the Nevada Division of Environmental Protection (NDEP; Basic Environmental Company, 2008). Excavation and removal of soil from the Sale Parcels began in March 2010 and will be completed in April 2010.

The entire Site encompasses a total of approximately 450 acres. Approximately 213 acres will be accessed during construction activities, including soil excavation over 170 acres. The remaining 237 acres in the southern portion of the Site will not be accessed during the project and are not subject to this SWPPP. For soil remediation evaluation purposes, the Site has been broken down into five main areas of work know as Remediation Zones (RZs) RZ-A, RZ-B, RZ-C, RZ-D, and RZ-E. The general location and layout of the Site including the RZs are presented as Figures 1 and 2.



5.0 PROJECT DESCRIPTION

The construction activities addressed in this SWPPP will be conducted in accordance with the approved RAW and its support plans. The following support plans will be implemented as part of the RAW:

- Dust Mitigation Plan and Clark County Dust Control Permit (Northgate, 2010b);
- Perimeter Air Monitoring Plan (Northgate, 2010c); and
- Transportation Plan (Northgate, 2010d).

The scope of work generally involves the abatement and demolition of several buildings and the removal of structures including above and underground utilities to provide access for removal of soil in the proposed excavation areas. Following clearance of the proposed excavation areas, the main scope of work focuses on the phased excavation, potential temporary stockpiling, loading and transport of approximately 440,000 cubic yards of soils to one or more approved off-Site land disposal facilities.

The scope of work for this SWPPP identifies the stormwater management practices and measures that will be implemented as part of the remediation project. A Notice of Intent (NOI) for stormwater discharges during construction will be submitted prior to implementing the RAW, and a copy of the NOI will be appended to the SWPPP.

5.1 Nature of Proposed Construction Activity

The scope of work for the removal action at the Site involves the following steps: 1) Abatement and demolition of several buildings and other Site features; 2) excavation of impacted soils in accordance with the RAW; 3) transportation of the above materials to one or more approved off-Site disposal facilities; and 4) completion of grading.

5.2 Intended Sequence of Major Soil Excavation and Removal Activities

Construction activities will be implemented in 4 phases associated with the sequential building and soil removal at proposed areas within the Remediation Zones RZ-B, -C, -D and -E. Soil removal will start within RZ-B in the southern portion of the Site advancing north towards RZ-D. This sequence of work will proceed downslope, from areas of higher elevation to areas of lower elevation at the Site.



The Tronox Phase B Remediation Program Schedule (Appendix C) presents a detailed construction sequence. However, the sequence may be subject to modification during field implementation and construction that may occur simultaneously in several RZs depending on resources and feasibility.

The preliminary sequence of major activities is expected to be as follows:

- Mobilize personnel and equipment to the Site;
- Set-up Site support facilities, including project trailers, parking areas and temporary security fencing;
- Install erosion and sedimentation control measures;
- Construct required access roads and haul roads across the Site;
- Establish decontamination areas and Site exit stations;
- Abatement and demolition of several buildings and removal of structures including above and underground utilities located in the proposed excavation areas;
- Clear and grub brush and vegetation located in the proposed excavation areas;
- Excavation of the proposed areas will occur in four sequential phases: RZ-B, -C, -D, and -E. Each phase includes abatement and demolition of buildings, excavating of chemically impacted soil at proposed areas up to a depth of 10 feet below the existing ground surface (bgs), potential temporary stockpiling, loading and transport of the excavated soil for off-Site disposal, and finish grading of the excavated areas; and
- Remove the support facilities and demobilize from the Site.

5.3 Site Area

Construction activities are expected to access an area of approximately 213 acres at the Site. Below is a summary of areas anticipated to be accessed and excavated at each RZ:

- Approximately 42 acres will be accessed in the RZ-B Area (of that, approximately 12 acres will be excavated).
- Approximately 62 acres will be accessed in the RZ-C Area (of that, approximately 20 acres will be excavated).
- Approximately 103 acres will be accessed in the RZ-D Area (of that, approximately 42 acres will be excavated).
- Approximately 6.2 acres will be accessed in the RZ-E Area (of that, approximately 4 acres will be excavated).



Figure 3 of the RAW, Excavation Polygons Map, includes a depiction of each RZ and associated excavation areas.

5.4 Run-off Coefficients

Run-off coefficients are estimated for each RZ using run-off coefficients for varying percentages of impervious areas and desert surface characteristics presented in Table 601, Section 600 of the Hydrologic Criteria and Drainage Design Manual published by the Clark County Regional Flood District (CCRFD; CCRFD, 1999). The individual pre-project run-off coefficients are 0.87 for RZ-B, 0.51 for RZ-C, 0.66 for RZ-D, and 0.28 for RZ-E based on an estimated percentage of impervious area for each RZ and associated run-off coefficient. The weighted average pre-project run-off coefficient for the Site is calculated as follows:

$$\text{Pre-Project RZ-B} = 42 \text{ acres} \times 0.87 = 36.1$$

$$\text{Pre-Project RZ-C} = 62 \text{ acres} \times 0.51 = 31.8$$

$$\text{Pre-Project RZ-D} = 103 \text{ acres} \times 0.66 = 68.1$$

$$\text{Pre-Project RZ-E} = 6.2 \text{ acres} \times 0.28 = 1.7$$

$$\text{Average Pre -Project Run-Off Coefficient} = (36.1 + 31.8 + 68.1 + 1.7) / 213 = 0.65$$

The pre- and post-construction run-off coefficients vary for each RZ and on average, due to the removal of impervious surface materials including asphalt and building foundation. The individual post-project run-off coefficients are 0.85 for RZ-B, 0.49 for RZ-C, 0.64 for RZ-D, and 0.25 for RZ-E based on an estimated percentage of post-construction impervious area for each RZ and associated run-off coefficient. The weighted average post-project run-off coefficient is calculated as follows:

$$\text{Post -Project RZ-B} = 42 \text{ acres} \times 0.85 = 35.3$$

$$\text{Post -Project RZ-C} = 62 \text{ acres} \times 0.49 = 30.6$$

$$\text{Post -Project RZ-D} = 103 \text{ acres} \times 0.64 = 66.0$$

$$\text{Post -Project RZ-E} = 6.2 \text{ acres} \times 0.25 = 1.6$$

$$\text{Average Post -Project Run-Off Coefficient} = (35.3 + 30.6 + 66.0 + 1.6) / 213 = 0.63$$



5.5 Receiving Water(s) Identification

Regional surface water drainage is generally to the north and east. Surface water flow occurs for brief periods of time during periodic precipitation events, and eventually drains to the Las Vegas Wash, which is approximately 2.6 miles north of the Site's northern border. The Site is not located within the 100-year floodplain of the Las Vegas Wash.

Four jurisdictional wetlands are present in the northern portion of the Site that contains water during portions of the year. These seasonal wetlands occupy approximately 13 acres. The seasonal wetlands are located outside of the limits of the soil removal areas. Stormwater within the Site will be contained and managed in accordance with the measures described in Sections 6.0 and 7.0 of this SWPPP, and will not be discharged to either the on-Site seasonal wetlands or Las Vegas Wash.

5.6 Soil Types

According to the United States Department of Agriculture's Natural Resources Conservation Service (USDA NRCS) Soil Survey for the Las Vegas Valley Area, Nevada, Part of Clark County (USDA NRCS, 2006), the soil types present at the Eastside Common Areas consist of the Arizo very gravelly fine sandy loam 2 to 8 percent slopes, the Caliza-Pittman-Arizo complex 0 to 8 percent slopes, the Caliza very gravelly sandy loam 2 to 8 percent slopes, and Slickens. The soil types present at the Tronox Henderson Facility consist of the Caliza extremely cobbly fine sandy loam 2 to 8 percent slopes and Urban Land. All of these soils are well drained with a low-water holding capacity. Based on soil samples collected from the Site during previous investigations, the soils are primarily sand and gravel with occasional cobbles consistent with the depositional environment of an alluvial fan. The Site is located on alluvial fan sediments with a surface that slopes to the north-northeast at a gradient of approximately 0.02 ft/ft towards the Las Vegas Wash. Alluvial soils were deposited from the McCullough and River Mountain ranges located to the southwest and southeast of the Site.



6.0 PRACTICES AND MEASURES

Best management practices will be implemented during soil removal and associated building abatement and demolition activities to: 1) prevent and/or minimize accelerated erosion and sedimentation; and 2) control, minimize and/or prevent releases of impacted soils entrained with stormwater discharges at and from the Site. All erosion and sediment controls will be constructed according to the *Nevada Best Management Practices Handbook* published by the State Conservation Commission in 1994 (SCC, 1994) and the *Nevada Contractors Field Guide for Construction Site Best Management Practices (BMPs)* published by NDEP in 2008 (NDEP, 2008).

The following subsections describe the best management practices (BMP) that will be implemented during the building demolition and soil removal activities. A series of berms currently located at the northern boundary of the RZ-D area will be incorporated into the Site BMPs. These berms will also be used to control and manage any stormwater that does not infiltrate into Site soils.

6.1 Stormwater Best Management Practices

Best management practices will be employed during all major soil disturbing activities at the Site, as described in Section 5.2. The following table presents the BMPs required for each major soil disturbing activity, as applicable.

| Construction Activity | BMPs |
|---|--|
| Mobilize personnel and equipment | <ul style="list-style-type: none"> • Not applicable |
| Setup support facilities | <ul style="list-style-type: none"> • Construction entrance • Staging areas • Good housekeeping |
| Install erosion and sediment control measures | <ul style="list-style-type: none"> • Fiber rolls • Silt fence • Fabric inserts • Rock filled bags (Install fiber rolls, silt fence barrier and J-hooks, and rock filled bag barrier at Site perimeter; install fiber rolls, fabric inserts and rock filled bag barriers at existing storm drain system inlets) • If controls become clogged with sediment, they shall be cleaned or removed and replaced. |
| Construct access roads and haul roads | <ul style="list-style-type: none"> • Existing berms |
| Establish decontamination area and track-out stations | <ul style="list-style-type: none"> • Existing and planned berms • Gravel pad including dry decontamination |



| Construction Activity | BMPs |
|---|--|
| | procedures at exclusion zone (excavation area) exits as needed <ul style="list-style-type: none"> • Wheel wash stations at Site exits |
| Abatement and demolition of buildings within proposed excavation areas | <ul style="list-style-type: none"> • Good housekeeping • Existing up-gradient berms or diversions • Fiber rolls down-gradient of building removal (contractor may implement alternative BMPs upon engineer approval) |
| Removal of above ground structures within proposed excavation areas | <ul style="list-style-type: none"> • Good housekeeping |
| Remove utilities within proposed excavation areas | <ul style="list-style-type: none"> • Good housekeeping • Fiber rolls down-gradient of utility excavation • Cap traversing storm drains and install temporary pipes to divert storm water (contractor may implement alternative BMPs upon owner approval) |
| Clear and grub in proposed excavation areas | <ul style="list-style-type: none"> • Good housekeeping • Existing features (berms at Site perimeter) |
| Excavate soil at proposed areas in four phases | <ul style="list-style-type: none"> • Slope shaping (grading) • Existing down-gradient berms • Fiber rolls (install fiber rolls up-gradient of proposed excavation areas) |
| Potentially stockpile soil for subsequent transport and off-Site disposal | <ul style="list-style-type: none"> • Boundary berms at stockpile perimeter |
| Transport of materials generated during abatement, demolition and excavation for disposal at a landfill | <ul style="list-style-type: none"> • Decontamination Stations • Trackout Pads • Existing berms along the haul road • Removal of visual contamination on haul routes prior to anticipated rain events • Full time street sweeper during on-road (4th Street) hauling activities |
| Construct detention basins (excavate beta-ditch, close gaps in existing retention perimeter berm at Site boundary by installing earthen mounts) | <ul style="list-style-type: none"> • Existing berms, • Boundary berms/slopes |
| Demobilization | <ul style="list-style-type: none"> • Not applicable |

6.2 Soil Stabilization

Stabilization measures are designed to reduce the erosion potential of stockpiled soil and soil in disturbed areas by shielding the soil surface from direct erosive impacts, by slowing the rate of water run-off and by physically holding the soil in place using a controlled application of water to form a crust or other appropriate measures.



Stabilization practices will be implemented in disturbed areas as soon as practicable after the completion of excavation and grading activities have ceased. Care will also be taken during the remedial activities to minimize the areal extent of the disturbed areas and protect existing vegetation to the extent possible.

6.2.1 Temporary Soil Stabilization Practices

Temporary stabilization practices will be implemented on soil stockpiles and disturbed portions of the Site where construction activity is expected to cease for 14 days or more and will not be resumed within 21 days. Dust control will be conducted as a temporary stabilization practice for disturbed areas and on haul roads to prevent or reduce the movement of wind-borne dust particles. Disturbed areas where excavation activities are determined to be complete will be watered to form a crust immediately following disturbance or a synthetic organic fluid or equivalent will be applied.

6.2.2 Permanent Soil Stabilization Practices

Permanent stabilization practices will be implemented on disturbed portions of the Site where construction activities have been completed. These measures include slope shaping as part of the final grading. The grading of the proposed excavation areas will be performed in accordance with the design documents. The design of the proposed excavation areas considered soil erosion and runoff potential for setting the finished grade.

6.2.3 Soil Stabilization Timing

The stabilization practices will be coordinated with the initiation and completion of the excavation and grading activities, as applicable. Stabilization measures will be initiated as soon as practicable where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the Site has ceased, unless earth-disturbing activities will be resumed within 21 days.

When all required RAW activities at a RZ have been implemented, the maintenance of the erosion control measures left in place will become the responsibility of the owner.

6.2.4 Installation and Maintenance

Stabilization practices will be installed in accordance with good engineering practice and the methods described in the *Nevada Best Management Practices Handbook* (SCC, 1994) and the *Nevada Contractors Field Guide for Construction Site Best Management Practices* (NDEP,



2008). Additional stabilization practices listed in these manuals may also be used at the Site if needed. The location of the stabilization measures will be based on visual observation and the extent of disturbance within the work areas of the Site. The anticipated locations of these measures are depicted on Figure 2. The Contractor will be responsible for the implementation and maintenance of these practices, as described in Section 7.0. Upon permanent stabilization of the Site, the NDEP Notice of Termination will be filed.

6.3 Structural Practices

Structural practices are designed to prevent erosion and minimize sediment at the Site to the extent practicable. Structural practices will be implemented in and around the construction areas to divert or filter flows from exposed soils, reduce flow velocities or temporarily store flows and limit runoff from the exposed areas of the Site. The following structural practices will be used at the Site during the implementation of the remedial activities:

- **Existing Earthen Berms** - Existing earthen Site perimeter berms present at the Site. In addition, earthen mounds will be constructed to close gaps along the existing Site perimeter berms. These mounds will remain in place during the implementation and after completion of remedial activities.
- **Earthen Berms** - may also be constructed along the perimeter of temporary stockpiles to contain stormwater from areas where material will be temporarily staged. These berms will be removed during loading and transportation of the stockpiled material for off-Site disposal.
- **Fiber Roll Sediment Barriers** - Fiber roll sediment barriers will be used down-gradient of work zones and at the Site perimeter to retain sediments by retarding flow and intercepting and filtering stormwater runoff. Fiber roll sediment barriers will be installed at existing storm drain system inlets to retain sediments and filter stormwater runoff.
- **Fabric Inserts** – Fabric Inserts will be installed in the storm drain drop inlets as an additional line of protection to filter out sediment in storm water.
- **Silt Fence Barriers** - Silt Fence Barriers will be used at the Site perimeter to retain sediments by retarding flow and intercepting and filtering stormwater runoff.
- **Rock Filled Bag Barriers** - Rock Filled Bag Barriers will be used at the Site perimeter to retain sediments by retarding flow and intercepting and filtering stormwater runoff. Rock Filled Bag Barriers will be installed at existing storm drain system inlets to retain sediments and to filter stormwater runoff.
- **Temporary Pipes** - Storm drains traversing through remediation areas will be removed, as necessary, and capped at manholes prior excavation to prevent water intrusion from remediation areas into active storm drain system and flow from the storm drains into the



excavations. Upland stormwater will be temporarily diverted via above ground pipes or flexible hoses using mobile pumps to transfer water between capped storm drain sections during construction. Storm drain sections and inlets from within the remediation areas will be replaced, and caps at manholes will be removed following completion of excavation in the remediation areas.

- **Straw Bale Sediment Barriers** - Straw bale sediment barriers may be used across swales and in ditches and drainage areas to retain sediments by retarding flow and intercepting and filtering stormwater runoff.
- **Rock Apron** - Rock apron will be placed at culvert outlets to dissipate stormwater flow.
- **Permanent Sediment Basins** - One or more permanent detention basin will be installed in the northern portion of the Site (RZ-D area) prior to removal of soil from the proposed excavation areas. The northern detention basin will consist of the existing perimeter berm including a planned mound at the northern boundary of the Site. The northern basin will be used to collect stormwater run-off during the grading activities, as well as run-off waters after the completion of the project. Following excavation and plugging of the western inlet and eastern outlet, the beta-ditch in the center of the Site will provide a permanent detention basin to collect stormwater from southern drainage areas after the completion of construction activities. The detention basins will allow for the settling of any sediment entrained in the stormwater run-off prior to infiltration or evaporation.
- **Stabilized Construction Entrances/Exits** - Stabilized construction entrances/exits will be installed at each work area and the Site exit to facilitate the removal of sediment/soil from construction equipment and transport vehicles prior to exiting the work area or the Site. Site entrances/exits will consist of wheel wash stations for vehicles and trucks exiting each Site exit. The stations will be located at each access to paved public roadways. If vehicles and trucks are required to enter excavation areas, exits will consist of gravel pads.

6.3.1 Structural Practices Timing

The installation of structural measures will be coordinated with the initiation of the construction phase in the areas where abatement, demolition or soil removal activities are scheduled and where material will be temporarily staged, if necessary. The sediment and erosion control measures may be adjusted as Site conditions permit during the remedial activities. When the work areas are stabilized or work has been completed per the design, the temporary erosion and sediment control measures will be removed from the Site as directed by the owner.

When soil removal at a RZ is complete, discharges from that area will be permitted separately, and the installation and maintenance of the erosion control measures left in placed will become the responsibility of the owner.



6.3.2 Installation and Maintenance of Structural Practices

The erosion and sediment control measures will be installed in accordance with the methods described in the *Nevada Best Management Practices Handbook* and the *Nevada Contractors Field Guide for Construction Site Best Management Practices*. Additional erosion and sediment control measures listed in this manual may also be used at the Site if needed. The location of the erosion and sediment control measures will be based on visual observation of surface water migration pathways at the Site. The anticipated locations of these measures are depicted on Figure 2. The Contractor will be responsible for the implementation and maintenance of these controls for the duration of construction associated with the Building Demolition and Soil Removal as described in this SWPPP. Controls will be inspected, cleaned, repaired or replaced as necessary, before and after every storm event and periodically throughout the project. In addition, the contractor will identify and protect storm drain inlet locations at the Site prior to initiation of the construction phase.

6.3.3 Sediment Management

Accumulations of sediment in the detention basins will be removed when the design capacity has been reduced by approximately 50%. Accumulations of sediment entrained in the fiber rolls, silt fence, and other sediment barriers will be removed as necessary to ensure proper operation. The removed sediments will be consolidated within a future-designated area at the Site.

6.4 Post Construction Stormwater Management Controls

The owner will manage post-construction stormwater controls including post-construction BMP maintenance, as necessary.

6.5 Non-Stormwater Discharge Management

Non-stormwater discharges associated with construction including

- Water used to wash vehicles where detergents are not used (except remediation equipment and transport trucks, which will be handled separately, stored in tanks, analytically tested, and disposed in accordance with NDEP requirements);
- Water used to control dust provided effluent or other wastewater are not used;
- Potable water sources including water line flushing;
- Fire hydrant flushing; and
- Pavement wash waters where spills or leaks of hazardous materials have not occurred.



These non-stormwater discharges will be routed through structural control measures to remove any sediments entrained in the water prior to temporary storage and reuse as dust control or evaporation.

6.6 Other practices

6.6.1 Good Housekeeping

Good housekeeping practices will be implemented to minimize accidents and maintain a high quality of work. The following good housekeeping practices will be implemented during the remedial activities:

- Erosion and sediment control measures will be adequately positioned, properly constructed and maintained throughout the duration of the project;
- Clearing operations will be confined to the limits of excavation. Existing vegetation will be protected to the extent possible;
- All materials stored on-Site will be stored in a neat, orderly manner in their appropriate containers;
- Erosion and sediment control measures will be effective in retaining sediments on-Site;
- Controls will be installed such that sediment transported from the Site onto city roads will be minimized;
- Stabilization practices will be effective in permanently stabilizing disturbed areas;
- Corrective measures will be implemented as soon as practicable after a deficiency is noted;
- Good housekeeping practices will be incorporated into discussions during the daily safety meetings; and
- Trash and other waste debris will be picked up on a daily basis and placed in the appropriate containers for off-Site disposal.

6.6.2 Material Storage and Construction Waste Disposal

Hydraulic oils, motor oils, and lubricants will be stored in the on-Site lubricant storage cabinet. Quantities of these items should not exceed 20 gallons. If larger quantities of these items are required to be on hand, the Contractor will review the storage and containment of those items at such time. All appropriate health and safety requirements for storing this material on-Site will be followed.



Diesel fuel may be stored at the Site in double-walled tanks. The tanks may consist of up to 12,000-gallon tanks surrounded by adequate spill protection as required for fueling operations. All appropriate health and safety requirements for storing this material will be followed. Permits will also be obtained as required by governing law.

Construction materials expected to be stored on-Site during the construction activities may include aggregate, structural fill, liner, etc. These materials will be stored at the material staging area located in the vicinity to the support zones, as depicted on Figure 2. Stockpiles of granular materials will be covered, as needed, with polyethylene sheeting on a daily basis to prevent wind dispersion of the stockpiled materials when not in use.

Portable restroom facilities will be located at active excavation areas and at each support facility or decontamination zone for use by Site personnel. Restrooms will be serviced by a third party on a regular basis.

All non-hazardous construction debris and general office trash will be disposed in a dumpster placed on-Site. Trash receptacles will also be placed in the storage trailers for the collection of non-hazardous trash and debris. These waste materials will be disposed off-Site at a Subtitle D disposal facility, such as the Republic Services, Inc. landfill located in Apex, Nevada. Spent personal protective equipment (PPE) generated during the remedial activities will be placed in designated Site containers and disposed of properly.

Impacted soil excavated from the RZs will be direct-loaded for transport or temporarily staged in designated material staging areas or in excavation areas for subsequent transport to an approved off-Site disposal facility.

6.6.3 Hazardous Waste Storage and Disposal

Hazardous wastes generated during the abatement and demolition of buildings, removal of the structures and utilities, and soil removal activities which will require off-Site disposal will be contained as appropriate and transported to an approved off-Site disposal facility.

6.6.4 Spill Prevention and Response

Pollution prevention measures will include implementation of BMPs. If a reportable quantity of oil or hazardous material release is discovered, the Contractor will notify the National Response Center at (800) 424-8802 immediately. The US EPA will be notified verbally within 24 hours and in writing within 14 days. Complete emergency response and spill cleanup procedures are detailed in the Site-specific Health and Safety Plan. The SWPPP will also be modified to include



the date of the release, the circumstances leading to the release and the steps taken to prevent reoccurrence of the release. If greater than 1,320 gallons of oil or oil products (i.e., diesel fuel) are stored or used on-Site during the remedial activities, a Spill Prevention, Control and Countermeasures Plan shall be developed by the Contractor to further describe the spill prevention and response procedures for the Site.

6.6.5 Off-Site Vehicle Tracking

Trucks used to transport excavated soils will be required to stay on established haul roads located outside of the exclusion zone. If trucks are required to enter the exclusion zone (proposed excavation areas), dry decontamination procedures will be implemented in order to remove soil residuals from the undercarriage members (i.e., truck tailgates and side boards) will be swept clean using brooms and other hand tools. An inspection of the vehicle will be conducted to verify that no contaminated material or soils will be tracked off-Site. If necessary, steam cleaning procedures will be implemented to further reduce or eliminate off-Site tracking of mud or dirt from the Site if straight decontamination or dry decontamination is determined to be less effective for tracking Site soils onto public roadways.

Several construction entrance/exits including tire wash stations will be constructed at the Site exits to help reduce vehicle tracking of soils from the Site onto public roads. The exits will be swept as needed to remove any excess mud, dirt or rock tracked from the Site. Any incidental soil tracked from the load-out area will be immediately cleaned up. The construction exits will be constructed in accordance with the *Nevada Best Management Practices Manual* and the *Nevada Contractors Field Guide for Construction Site Best Management Practices*.

Vehicular traffic will be restricted to a speed limit of 15 mph on the Site and vehicles will be required to stay on established Site haul roads to the extent possible.

6.6.6 Dust Control

A *Dust Mitigation Plan and Clark County Dust Control Permit* will be prepared for abatement, demolition and soil removal activities at the Site that describes in detail dust control measures including speed limits, application of dust palliatives and the frequent application of water on haul roads, staging areas, during demolition and to form a crust on soil stockpiles and disturbed areas at the Site (Northgate, 2010b). Dust control will be conducted to prevent or reduce the movement of wind-borne dust particles. Disturbed areas where excavation activities are determined to be complete will be watered to form a crust immediately following disturbance or a synthetic organic fluid or equivalent will be applied.



6.6.7 Soil Stabilization at Culverts

There is an outlet culvert located approximately 400 feet east of the intersection of West Road and Progress Road that discharges run-off collected in the storm drain system in the southern portion of the Site into the Beta-ditch. In addition there are two adjacent culvert outlets located 250 feet south of the intersection of Avenue E and 9th Street that discharge run-off collected at the Leach beds/Manganese Tailings Area into the beta ditch via an open flow drainage parallel to 9th Street. Figure 2 shows the locations of the storm drain outlet culverts. Soil stabilization measures at the culvert location will include implementation of BMPs such as placement of rock apron to dissipate flows from on-Site culvert outlets. BMPs immediately located at the Beta-ditch shall be implemented upon completion of the excavation at RZ-E.

6.6.8 Run-off Controls at Remediation Zones

Uncontaminated areas will be protected from runoff water originating from contaminated areas by maintaining the general order of excavation and sequence of construction as described in Section 5.2. Excavation activities will generally progress from higher elevations (south) to lower elevations (north), reducing the potential for stormwater runoff from chemical-impacted areas to drain towards clean areas.

Additionally, in order to protect uncontaminated areas from potentially contaminated runoff, existing physical barriers such as the Beta Ditch and existing berms at the northern boundary of the Site (RZ-D) will be maintained during construction.

6.6.9 Off-Site discharges

No post-construction off-Site discharges from the Site are expected during and upon completion of the project.



7.0 INSPECTION AND MAINTENANCE PROCEDURES

Inspection and maintenance of the control measures are a major part of effective erosion and sediment control programs. Qualified personnel who are knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess conditions at the Site that could impact stormwater quality and the effectiveness of the BMPs selected to control the quality of the stormwater discharges will conduct the Site inspections and verify that the BMPs are maintained as appropriate during the construction period as described below.

7.1.1 Responsible Parties

The Owner Representative's Storm Water Pollution Prevention Manager (SWPPM) assigned to this project is Jim Carolan of Northgate. A complete list of contacts and responsible parties is shown on the first page of this SWPPP.

The Owner Representative's SWPPM shall have primary responsibility and significant authority for the inspection and amendments to the approved SWPPP. The SWPPM will be available at all times throughout the duration of the project. Duties of the Owner Representative's SWPPM include, but are not limited to, the following:

1. Verifying compliance with the SWPPP and the General Permit;
2. Conducting routine inspections, as described in this SWPPP;
3. Coordinating with the Contractor to verify that all the necessary corrections/repairs are made immediately, and that the project complies with the SWPPP, the General Permit, and approved plans at all times;
4. Providing updates/amendments to the SWPPP, as needed; and
5. Submitting Notices of Discharge, Termination and reports of Illicit Connections or Illegal Discharges.

The Contractor's SWPPM shall have primary responsibility and significant authority for the implementation of the approved SWPPP and maintenance during soil remediation work. The Contractor's SWPPM will be available at all times throughout the duration of the project. Duties of the Contractor's SWPPM include, but are not limited to, the following:

1. Verifying compliance with the SWPPP and the General Permit;
2. Implementing all elements of the SWPPP, including but not limited to:
 - Implementing prompt and effective erosion and sediment control measures;
 - Implementing all non-storm water management, and materials and waste



- management activities such as: general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; and spill control;
3. Eliminating unauthorized discharges;
 4. Mobilizing crews to make immediate repairs to the control measures in accordance with the SWPPP as the assigned authority by the Owner/Contractor;
 5. Coordinating with the Owner/ Subcontractors to verify that all the necessary corrections/repairs are made immediately, and that the project complies with the SWPPP, the General Permit, and approved plans at all times;
 6. Notifying all Subcontractors of SWPPP compliance requirements (Section 3.0).

7.1.2 Inspection

The inspections will consist of a walkthrough of all areas of the Site disturbed by construction activity and areas used for the storage of materials that are exposed to precipitation. Specifically, observations will be made of those disturbed areas that have not undergone final stabilization, areas used for the storage of materials that are exposed to precipitation that have not undergone final stabilization, and structural control measures. Erosion and sediment control measures will be inspected to verify they are functioning properly and that they are positioned adequately for the control of run-off and sediment. Stormwater inlets will be inspected during storm or runoff events for evidence of sediment accumulation or flow restriction, and overtopping. Locations where vehicles enter or exit the Site will be inspected for evidence of off-Site sediment tracking. Discharge locations, where accessible, will be inspected for evidence of, or the potential for, pollutants entering the drainage system and the receiving water(s). Storm drain outfalls will be inspected during and immediately following meteoric events to assess the turbidity of the stormwater and evaluate the efficacy of the BMPs. Areas where petroleum products are stored, used or handled will be inspected for spills or leaks from vehicles and equipment. The inspections will be documented as described in Section 7.1.1.2.

7.1.2.1 Schedule

Routine inspections will be conducted at the Site to ensure that the BMPs are functional and the SWPPP is being properly implemented. Inspections will be performed at least once every seven calendar days and within 24 hours of the end of a storm event that produces at least 0.5 inches of rainfall.

Weather observations, including the total amount of rainfall per 24-hour period, will also be measured and recorded on a daily basis. The following sources may be used to obtain weather forecasts and observations for the Henderson, NV area:



- The National Weather Service at www.wrh.noaa.gov
- The Weather Channel at www.weather.com

7.1.2.2 Report and Records

7.1.2.2.1 Construction Activities Log

Records associated with the construction activities that will be maintained with the SWPPP include the following:

- Dates when major grading activities occur;
- Dates when construction activities temporarily or permanently cease on a portion of the Site; and
- Dates when stabilization measures are initiated. This information will be recorded on the construction activity log included in Appendix B.

7.1.2.2.2 Inspection Report

Inspections will be performed by “qualified personnel” which means a person knowledgeable in the principles and practice of erosion and sediment controls and who possesses the skills to assess conditions at the Site that could impact stormwater quality and the effectiveness of the BMPs selected to control the quality of the stormwater discharges. Inspection results will be documented on an inspection report form and will include the following information, at a minimum:

- Name and qualification of the person conducting the inspection;
- Date the inspection was conducted;
- Findings of the inspection, including locations of discharges of sediment or other pollutants from the Site, photographs of BMPs taken during the course of the remediation, locations of BMPs that need to be maintained, locations of BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed that did not exist at the time of the inspection;
- Corrective actions taken to correct deficiencies; and
- Date the corrective action was implemented.

Incidents of non-compliance with the permit will also be documented on the inspection forms and maintained with the SWPPP for the duration of the construction activities. The documentation will include specific information on the cause of the non-compliance and actions



that were taken to prevent any further causes of non-compliance. For those reports where incidents of non-compliance were not identified, the report will contain a certification that the facility is in compliance with the SWPPP and the Stormwater General Permit and will be signed by the Contractor's Project Manager.

A copy of this SWPPP, associated inspection logs, and SWPPP photographs will be maintained on-Site for the duration of the project at the Owner Representative's field office. Figure 2 shows the location of the field office.

The inspection forms will be retained by the Owner as part of the SWPPP for a period of at least three years or longer if required by NDEP from the date that permit coverage expires or the Site is finally stabilized. Example inspection forms are included in Appendix B to this SWPPP.

7.2 Maintenance

Based on the results of the inspections, the BMPs will be maintained, repaired or replaced. If the Site inspections reveal that the BMPs are not operating effectively or if the effective capacity has been reduced by 50%, then maintenance will be performed before the next anticipated storm event or as soon as possible if maintenance before the next anticipated storm event is not practicable. Tronox/Northgate anticipates that the BMPs around storm drain drop inlets may require regular cleaning and replacement of fiber roles and fabric inserts, as needed. The actions taken to maintain the BMPs will be documented as described in Section 7.1.1.2.2.

7.3 Updates to the SWPPP

This SWPPP has been prepared and will be maintained and updated to be consistent with all federal, state and local requirements for all applicable stormwater, sediment and erosion Site plans or permits. Any updates or revisions required to the SWPPP will be made and fully implemented within 7 business days of the date a deficiency is identified during a Site inspection. Updates or revisions to the SWPPP will also be required if:

- a change in the design, construction, operation, or maintenance at the construction Site that has a significant effect on the discharge of pollutants to waterways of the U.S. that has not been previously addressed in the SWPPP;
- during inspections, monitoring, or investigation by the owner or local, state or federal officials, it is determined that the discharge of stormwater or sediment is causing or contributing to water quality exceedances, or the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the construction Site.



If implementation of the BMPs required by the SWPPP revision is impracticable before the next storm event, then the BMPs will be implemented as soon as possible thereafter. The updates or revisions to the SWPPP will be documented on the SWPPP update form included in Appendix B. These forms will be maintained with the SWPPP for the duration of the construction activities.



8.0 REFERENCES

- Basic Environmental Company 2008. Removal Action Work Plan for Soil, Tronox Parcels “C”, “D”, “F”, “G” AND “H” Sites, Henderson, Nevada, July 1, 2008.
- ENSR Corporation (ENSR) 2007. *Volume Determination of Manganese Tailing Pile*, Tronox LLC Facility. Henderson, Nevada. April 2007.
- Nevada Division of Environmental Protection (NDEP) 2007a. State of Nevada Division of Environmental Protection Stormwater General Permit NVR100000, September 14, 2007.
- NDEP. 2008. Nevada Contractor Field Guide for Construction Site Best Management Practices, June 2008.
- Northgate Environmental Management, Inc. (Northgate) 2010a. Removal Action Work Plan for Phase B Soil Remediation Zones RZ-A through RZ-E, Tronox Facility, Henderson Nevada. March 2010.
- Northgate. 2010b. Dust Mitigation Plan and Clark County Dust Permit, March 2010, Remediation Zones RZ-A, RZ-B, SZ-C, RZ-D, and RZ-E, Tronox Facility, Henderson, Nevada, March 2010.
- Northgate. 2010c. Perimeter Air Monitoring Plan, March 2010, Remediation Zones RZ-A, RZ-B, SZ-C, RZ-D, and RZ-E, Tronox Facility, Henderson, Nevada, March 2010.
- Northgate. 2010d. Transportation Plan, March 2010, Remediation Zones RZ-A, RZ-B, SZ-C, RZ-D, and RZ-E, Tronox Facility, Henderson, Nevada, March 2010.
- State Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2006. Soil Survey of Clark County Area, Nevada, 2006.
- State Conservation Commission (SCC) 1994. *Nevada Best Management Practices Handbook*, 1994.



FIGURES



APPENDIX A
STATE OF NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
STORMWATER GENERAL PERMIT NVR100000



**APPENDIX B
BMP INSPECTION FORMS**



**APPENDIX C
REMEDIATION SCHEDULE**

