northgate
environmental management, inc.

October 6, 2010

Shannon Harbour, P.E.
Nevada Division of Environmental Protection
2030 East Flamingo Road, Suite 230
Las Vegas, Nevada 89119-0818

Subject: Environmental Covenants, Institutional and Engineering Control Plan
Tronox Facility, Henderson, Nevada

Dear Ms. Harbour:

Tronox LLC (Tronox) is pleased to provide this Environmental Covenants, Institutional and Engineering Control Plan (the Plan) for the Tronox Facility, located in Henderson, Nevada to the Nevada Division of Environmental Protection (NDEP). The Plan describes the proposed institutional and engineering controls for specified areas at the Tronox Henderson facility (the Site). The Plan has incorporated comments from NDEP and addressed issues identified by NDEP in letters to Tronox dated June 4, 2010, July 30, 2010, August 31, 2010, and September 14, 2010. Our responses to NDEP's comments presented in the July 30, 2010 letter are provided as an attachment at the end of this letter.

The objectives of the Plan are to:

- Identify areas of the Site where institutional controls or engineering controls will be needed based upon our current understanding of chemical concentration data, facility operations, and Site features; and
- Establish a process for the long-term implementation of the above controls through the use of environmental covenants, as authorized by NRS 445D.010 *et seq*.

During our meeting on February 5, 2010, NDEP discussed its previous experience regarding the use of environmental covenants at other sites. We understand that the regulatory approval process may take considerable time, and that Tronox would bear the burden of proof to assure that an environmental covenant will be protective to potential receptors. We also understand that an environmental covenant must be recorded with the County Recorder.

BACKGROUND INFORMATION

Institutional and Engineering Controls

"Institutional controls" (IC) refer to administrative and/or legal measures that minimize the potential for human exposure to contamination by limiting land or resource use. Some examples of institutional controls include easements, covenants, well drilling prohibitions, zoning restrictions, and special building permit requirements. Institutional controls are often used in conjunction with engineering measures such as waste treatment or containment actions.

"Engineering controls" (EC) refer to physical measures to minimize the potential for migration of contaminants or to prevent exposure to contamination. Examples of typical engineering controls include slurry walls to prevent migration of groundwater, surface caps to prevent erosion of soil or human contact with soil, and vapor barriers to prevent the intrusion of volatile organic compounds into buildings.

Environmental Covenants

"Environmental covenants" refer to the statutory process for implementing, modifying, terminating and enforcing activity and use limitations, including institutional and engineering controls, as set in NRS 445D.010 *et seq*.

Current Use of Site

The Site has been used since the early 1940s for industrial purposes. Ongoing operations at the Site include the manufacture of manganese dioxide, boron trichloride, and elemental boron. The Tronox facility operates 24 hours a day, seven days a week, and employs approximately 90 workers. Existing Site improvements include over 15 buildings to support these manufacturing operations (see attached Figure 1). Other improvements include wastewater retention/treatment ponds, high-voltage electrical lines, gas lines, the groundwater treatment system, access roads, rail spurs, and various other features.

Buildings and other facilities that are currently operational at the Site include the following:

- Unit Buildings 1 through 6 and associated piping;
- Mn-1 Operational Pond;
- Leach Plant;
- Steam Plant;
- Maintenance Shop;

- Laboratory;
- Groundwater Treatment Facilities and BT Equalization Tanks;
- GW-11 and WC-West and WC-East Ponds
- Electrical Substations;
- Historic hazardous waste storage pad (two tanks in lined basin now overlie this area);
- Aboveground diesel storage tanks;
- Active Railroad Track Area parallel to and north of Avenue G; and
- High voltage electric power transmission towers.

Potential Future Uses of Site

The Site is zoned as "Industrial". Contemplated future uses include both industrial and commercial development. There is no plan to use any part of the Site for residential purposes, schools, hospitals, or other potentially sensitive land uses. Therefore, the potential need for institutional and engineering controls and our identification of the specific locations where those institutional and engineering controls will be implemented is predicated on the continued industrial or commercial use of the Site. Tronox is willing to implement deed restrictions to guard against the possibility of changes in land use in the future.

PLANNED INSTITUTIONAL AND ENGINEERING CONTROL AREAS OF SITE

Areas of Site with Soil Exceeding Remedial Goals

Chemicals of concern in Site soils include perchlorate, asbestos, arsenic, dioxin/furans, volatile and semi-volatile organic compounds (VOCs and SVOCs) and others. It is Tronox's intent to remediate all contaminated soils where feasible with the exception of perchlorate. "Contaminated soil" is generally defined as concentrations exceeding NDEP worker BCLs (or modified risk-based goals as agreed upon by NDEP) or leaching-based site-specific levels (LSSLs). For metals where background concentrations exceed BCLs (e.g., arsenic), "contaminated soil" is defined as concentrations that result in a determination that concentrations are greater than background for the whole of the remediation zone (RZ). There are no NDEP BCLs for asbestos; therefore, "contaminated soil" is defined as one or more long fibers (amphibole) and/or five or more long fibers (chrysotile).

In areas of the Site where existing infrastructure or facility operations preclude the removal (excavation) of contaminated soil, ICs, ECs, and alternative remedial methods are being considered, as appropriate for the specific contaminants. For example, we are currently

evaluating the feasibility of remediating perchlorate-impacted soils at depth using soil flushing or other remedial alternatives, and therefore these areas are not currently proposed for ICs or ECs.

Areas of the Site that are proposed for ICs or ECs are identified in Table 1 and Figure 1. It would be technically infeasible or cost-prohibitive to remediate most of these areas because they are located beneath existing operational facilities or within critical utility corridors where excavation would be unsafe and/or would likely damage utilities.

The chemicals of concern in the areas where ICs and ECs are being proposed are the following:

- dioxin
- benzo(a)pyrene
- asbestos
- arsenic
- perchlorate (only co-located with other COCs)
- hexachlorobenzene (HCB)
- manganese

For the above chemicals, the presence of buildings or pavement on top of contaminated soil results in that soil being "capped", and as such, the building or pavement provides the engineering control to prevent or greatly reduce potential exposure pathways. Areas where ICs and ECs are being requested will also be shown on the individual Remediation Zone Excavation Plans. The next section of the Plan provides a discussion of the rationale for implementing ICs and ECs and identification of the specific areas where ICs and ECs are proposed.

Areas of the Site Planned for Engineering and Institutional Controls

The two rationales for utilizing ICs and ECs in different areas of the Site are the following:

- Contaminated soil areas are located beneath existing, operational structures and it is technically infeasible or cost prohibitive to access these areas for excavation; and
- Contaminated soil areas are located in close proximity to utilities or other Site features (e.g., the active pond berms), and excavating soil in these areas poses a potential safety hazard and/or could result in damage to the utilities/features.

Table 1 lists the rationale for the ICs/ECs, the specific Site features that could be impacted by excavation, and the remediation zones (RZs) that are associated with the proposed IC/EC areas.

Details regarding each of the ICs/ECs, and the areas that are affected by them are provided below.

1. **Overhead utility rack adjacent to Unit Buildings is in use and cannot be removed.** The overhead utility rack extends across portions of RZ-B-06, RZ-B-07, RZ-10, RZ-12 and RZ-13, and therefore portions of these remedial zones cannot be excavated. The area around the concrete footings for the utility rack poles cannot always be excavated to the design depth without undermining the footings. We will investigate the size and depth of the pole footings prior to beginning remediation in this area. Soil will be excavated to a depth of one foot above the top of the footings, to ensure sufficient soil support for the footings. Below this depth, the excavations in this area will utilize a slope of 1.5:1 in order to remove the maximum amount of contaminated soil while maintaining the integrity of the concrete footings. However, some contaminated soil may remain in place, and ICs/ECs will be implemented to protect human health and the environment until the contaminated soil is removed.

2. **Sodium chlorite filter cake process area is part of an active process operation and cannot be removed.** The concrete slab for the process area is located in RZ-B-13, and is approximately 40’ x 40’ x 2’ thick. Therefore a portion of RZ-B-13 cannot be excavated. The concrete slab will function as an engineered control, capping the contaminated soil and preventing or greatly limiting the potential for contact with contaminated soil.

3. **An overhead pipe rack is in use, supporting live utilities. The footings below the pipe rack extend 3 feet below grade, and both the pipe rack and the footings cannot be removed.** The overhead pipe rack is located in RZ-B-20, and therefore a portion of RZ-B-20 will not be excavated. The area around the concrete footings for the pipe rack poles cannot always be excavated to the design depth because of the potential for undermining the footings. The depth of these footings is 3 feet below grade. Soil will be excavated to a depth of 2 feet below grade, to ensure sufficient soil support for the footings. Below this depth, the excavations in this area will utilize a slope of 1.5:1 in order to remove the maximum amount of contaminated soil while maintaining the integrity of the concrete footings. However, some contaminated soil may remain in place, and ICs/ECs will be implemented to protect human health and the environment until the contaminated soil is removed.

4. **Remediation zones extend under the footprint of Unit Buildings 1, 2, 3, 4 and 5. These buildings are still active and cannot be demolished as part of Site remediation or redevelopment activities.** RZ-B-01 and RZ-B-04 extend underneath the

footprint of Unit Building 1, RZ-B-06 and RZ-B-07 extend underneath the footprint of Unit Building 2, RZ-B-12 and RZ-B-13 extend underneath the footprint of Unit Building 3, RZ-B-19 and RZ-B-20 extend underneath the footprint of Unit Building 4, and RZ-B-22 extends underneath the footprint of Unit Building 5. Because of the building obstruction, portions of these remediation zones will not be excavated. The unit buildings will function as an engineering control, capping the soil and preventing or greatly limiting the potential for contact with contaminated soil.

5. **The road into the Chemstar plant is active and used by trucks entering and exiting the plant, and excavation cannot be performed in the road.** RZ-C-15, RZ-C-24, RZ-C-26 and RZ-C-27 extend underneath the road that leads into the Chemstar plant. Because this road is part of ongoing operations at the Chemstar plant, it is not possible to excavate in the area of the road, and the southern limit of this excavation must be moved to the north side of the pavement. The road is paved with asphaltic concrete, and this road functions as an engineered control, capping the soil and preventing or greatly limiting the potential for contact with contaminated soil.

6. **The steam plant and associated utilities and infrastructure in the vicinity of the steam plant, including pipe rack pole footings, the pole & vault for the 15 kv transmission line, a 15 kv transformer pad and multiple concrete equipment pads adjacent to the plant cannot be removed.** RZ-C-16 extends into the vicinity of the steam plant. Because of these obstructions, a portion of RZ-C-16 cannot be excavated. The area around the concrete footings for the pipe rack poles cannot always be excavated to the design depth without undermining the footings. We will investigate the size and depth of the pole footings prior to beginning remediation in this area. Soil will be excavated to a depth of one foot above the top of the footings, to ensure sufficient soil support for the footings. Below this depth, the excavations in this area will utilize a slope of 1.5:1 in order to remove the maximum amount of contaminated soil while maintaining the integrity of the concrete footings. However, some contaminated soil will remain in place, and ICs/ECs will be implemented to protect human health and the environment until the contaminated soil is removed in these areas. Areas where there are no concrete pads will be excavated to the design depth. The concrete pads and the steam plant slab will function as engineered controls, capping the soil and preventing or greatly reducing the potential for contact with contaminated soil.

7. **Gas lines, meters and telemetry wiring are in place and cannot be removed.** RZ-C-19 extends into an area where there are gas lines, gas meters, and telemetry wiring, and there is a potential to damage these features during excavation. Therefore, this portion of RZ-C-19 cannot be excavated and ICs/ECs are proposed to protect human health and the environment until the contaminated soil is removed in these areas.

8. **The diesel tank and the tank containment structure cannot be removed.** RZ-C-22, RZ-C-23 and RZ-C-27 extend underneath the tank containment structure, and the diesel tank and the tank containment structure cannot be removed. Therefore, portions of these remediation zones cannot be excavated. The power poles and wiring coming from the east and the piping going west from the tank may be temporarily removed to facilitate removing as much contaminated soil as possible from this area. The containment structure will function as an engineered control, capping the soil and preventing or greatly limiting the potential for contact with contaminated soil.

9. **The BT tanks and containment structure are actively used by Veolia as part of the treatment system for decontaminating groundwater, and cannot be removed. .** RZ-C-28, RZ-C-29 and RZ-C-30 extend underneath the tank containment structure, and the BT tanks and the tank containment structure cannot be removed. Therefore, portions of these remediation zones cannot be excavated. The containment structure, which is made of concrete, will function as an engineered control, capping the soil and preventing or greatly limiting the potential for contact with contaminated soil.

10. **Excavation within 10 feet of the NV Energy Transmission Line towers present on the Site cannot be performed.** RZ-D-02, RZ-D-03 and RZ-D-04 extend to the area around the NV Energy Transmission Line towers. NV Energy policy prohibits excavating within 10 feet of the footings for the towers. Therefore, portions of these remediation zones cannot be excavated. The excavations in this area will utilize a slope of 1.5:1 in order to remove the maximum amount of contaminated soil while maintaining the integrity of the concrete footings. The sloped excavations will begin 10 feet away from the towers, and therefore some contaminated soil will remain in place. ICs/ECs will be implemented to protect human health and the environment until the contaminated soil is removed in these areas.

11. **The Perchlorate Remediation Process pipelines collecting water and discharging to Las Vegas Wash are in place and cannot be removed.** RZ-D-15, RZ-D-21A, RZ-D-21B, RZ-D-21D, RZ-D-21E, RZ-D-21F, RZ-D-22 and RZ-D-23A extend into the area of the Perchlorate Remediation Process pipelines. Excavating in this area has the potential

to damage the pipelines, and therefore portions of these remediation zones cannot be excavated. ICs/ECs will be implemented to protect human health and the environment until the contaminated soil is removed.

12. **Equalization tanks for the groundwater treatment system are actively used by Tronox and cannot be removed.** RZ-D-15, RZ-D-18 and RZ-D-17C extend underneath the equalization tanks, and therefore portions of these remediation zones cannot be excavated. The equalization tanks are on concrete pads, and the pads will function as an engineered control, capping the soil and preventing or greatly reducing the potential for contact with contaminated soil.

13. **The groundwater ponds and berms and the WC ponds and berms are actively used by Tronox and cannot be removed.** The berms around the ponds contain contaminated soil, but this soil cannot be excavated because of the potential to compromise the integrity of the ponds. A 50-foot wide setback from the toe of the slope of the berms is proposed to ensure that the integrity of the berms and the ponds is not compromised. At NDEP's direction, engineering studies on the setback distance are under way and the setback distance may be modified. The final setback area will be capped at the surface with asphaltic chipseal, and this engineered control will prevent or greatly limit the potential for contact with the contaminated soil.

14. **The former hazardous waste storage area is beneath two tanks intermittently used by Tronox and cannot be completely removed.** RZ-B-07A, RZ-B-08 and RZ-B-09 extend into the hazardous waste storage area, and therefore portions of these remediation zones cannot be excavated. The hazardous waste storage area is overlain by high density polyethylene sheeting for containment of tank content, and this sheeting will function as an engineered control, capping the soil and preventing or greatly limiting the potential for contact with contaminated soil.

Environmental Covenant Plan Development and Implementation

Once NDEP approves the proposed ICs and ECs, Tronox will prepare an environmental covenant which will include a detailed map of the areas, a listing of the ICs and ECs to be implemented, and environmental covenant language to be officially recorded for NDEP's approval.

Preparation of Risk Management Plan

Tronox will prepare an Environmental Risk Management Plan (ERMP) that describes the ICs and ECs that have been implemented at the Site. Additionally, the ERMP will describe the soil, soil vapor, and groundwater management procedures to be followed to prevent inadvertent migration of COCs or potential exposure to COCs during Site activities. As appropriate, institutional controls, environmental covenants, and the ERMP may be memorialized in an environmental covenant, as authorized by NRS 445D.010 *et seq*.

CLOSING

We look forward to discussing this Plan and the specific institutional and engineering controls to be implemented at the Site with NDEP. Please call either of the undersigned if you have any questions.

Sincerely,
Northgate Environmental Management, Inc.

Deni Chambers, C.E.M., C.E.G., C.Hg.
Principal-in-Charge

Alan Leavitt, P.E.
Principal Engineer

Attachments:

1 Table 1: Summary of Areas Proposed for Institutional and Engineering Controls
2 Figure 1: Proposed Institutional/Engineering Control Areas
3 Response to NDEP's July 30, 2010 Comments to *Revised Environmental Covenants, Institutional and Engineering Control Plan dated June 9, 2010*