



Response to Enforcement Action for Failure to Complete Approved Site Remediation Activities, Tronox LLC, Henderson, Nevada Facility, NDEP Facility ID Number 8-000539

Prepared for the January 26, 2010 "Show Cause" Meeting

Below are responses to the Finding of Alleged Violation and Order (the "Order") issued to Tronox by the Nevada Division of Environmental Protection (the "Division") on December 14, 2010. The Order alleges that Tronox LLC ("Tronox"), its predecessors in interest and affiliates have failed to complete approved remediation activities for the known contamination at the Tronox facility in Henderson, Nevada (the "Site") and, among other things, seeks injunctive relief to ensure compliance with Tronox's remediation obligations going forward. Tronox provided a written reply to the Order on January 8, 2010.

This written response addresses the specific technical allegations in the Order and clarifies factual mistakes. Note that Tronox's responses are in italics. Further information was also provided at the Show Cause meeting held on January 26, 2010. In addition, the Company has provided additional relevant documents on an accompanying CD.

Tronox and the Division have spent a significant amount of time and resources addressing the remediation of the Site and have maintained a collaborative relationship throughout the process. The Company looks forward to maintaining the same productive relationship as it addresses remediation obligations going forward.

The enumerated allegations and statements are as follows:

Tronox shall complete the following acts at/or with respect to the Tronox Facility located within the Black Mountain Industrial ("BMI") Complex, 8000 West Lake Mead Parkway in Henderson, NV (hereinafter "the Site") by the dates specified:

1. Immediately maintain the Site in compliance with all federal, state, and local environmental laws to protect human health and the environment.

Response: *Tronox intends to maintain the Site in compliance with all federal, state, and local environmental laws to protect human health and the environment. Tronox has spent in excess of \$128 million since 1997 in remediation costs at the Site and has demonstrated its commitment to protecting human health and the environment. Please note that the correct street address for Tronox is 560 West Lake Mead Parkway (this does not change the facility's P.O. Box).*

2. Within ten (10) days of the date of this Order: Submit to the Division a written reply which states Tronox's intention to comply with the Order including its obligation to maintain the Site in compliance with all federal, state, and local environmental laws to protect human health and the environment.

Response: *As required, Tronox submitted a written reply to the Division on January 8, 2010.*

3. Within sixty (60) days of the date of this Order: Submit to the Division a detailed plan, including a detailed schedule and timeline, that explains how Tronox will assure that the existing groundwater treatment system ("GWTS") will remain fully functional, as defined herein, until the remedial actions are completed.
 - a. The term "fully operational" is defined as the pumping and treating of impacted groundwater in accordance with the Administrative Order on Consent issued by the Division on the following dates: September 9, 1986; April 25, 1991; August 1, 1996; July 26, 1999; October 8, 2001; and April 12, 2005; the following NDEP Bureau of Water Pollution Control Permits: NV 0023060; NEV 2001515; NEV 2001516; UNEV94218; and any additional permits and requirements as provided by the Division to determine that adequate capture and treatment is occurring to protect human health and the environment.

Response: *Tronox has an ongoing contract with Veolia Water North America to operate the groundwater collection wells and treatment systems. Funding for long term continued operation of the systems will be provided by a Trust established as part of the global settlement in connection with the Tronox bankruptcy. In addition, funding is available pursuant to a Chartis insurance policy and a settlement with the U.S. Navy (21% of perchlorate remediation costs beginning in 2011). Details of the Trust are being developed and will be provided to the Division as they become available.*

4. Within sixty (60) days, of the date of this Order: Submit to the Division a detailed plan, including a detailed schedule and time line which explains how Tronox will complete the Remedial Alternative Studies ("RAS") required under the August 1, 1996 Consent Agreement ("the Phase 2 Consent Order"). The RAS documents shall address the issue of source control and reduction, and optimization of groundwater treatment.

Response: *Tronox requests clarification and discussion on this issue in order to respond. In a December 17, 2009 meeting with Tronox, the Division indicated that its preference was for Tronox to use screening assessments rather than the formal RAS process. Tronox has scheduled a meeting with the Division on February 5, 2010 to discuss data from the Phase B Site Investigation and possible remediation alternatives. This issue can be discussed then as well. The Company's environmental insurance carrier, Chartis, will also participate in the meeting.*

5. Within sixty (60) days of the date of this Order: Tronox must provide documentation of financial assurance evidencing the existence of the funds necessary to conduct the required corrective actions at the Site.

Response: *Please see response to 3 above.*

6. Within thirty (30) days of the date of this Order: Tronox must present a plan for providing an emergency generator system for the GWTS or an alternate plan that is acceptable to the Division, to ensure continuous operation of the GWTS system.

Response: *Tronox maintains an agreement with Veolia Water North America to operate the GWTS. To protect the biological reactors in the event of an extended power outage, Tronox maintains an agreement with a local rental firm to provide a trailer mounted emergency power system capable of supplying sufficient power to operate the biological treatment plant, the chromium treatment plant and the on-Site groundwater collection wells. The rental motor-generator system has been utilized in the past at the Site when a Site power line was blown down by high winds. The rental diesel powered generator can be brought on-Site within approximately 12 hours of notification. Power to the Athens Road and Seep Area wells is supplied by Nevada Energy.*

7. Within thirty (30) days of the date of this Order: Tronox must provide a schedule for the complete removal of contaminated soils from the Site by December 31, 2010.

Response: *Tronox requests further clarification and definition in order to respond and in particular, Tronox would like to clarify what constitutes "contaminated soils" that require disposal.*

8. By December 31, 2010: Tronox must complete source control of contaminated soils at the Site.

Response: *Tronox and its contractor Northgate have a meeting scheduled on February 5, 2010 with the Division, Division consultants, and Chartis to discuss the latest data from the Phase B Site Investigation and alternatives for remediation of soil and complete source control. A plan will then be developed for complete source control.*

9. Within ten (10) days of the date of this Order: Submit to the Division a copy of all insurance policies that are currently being used to fund the environmental activities at the Site, together with documentation evidencing (a) claims and payouts made pursuant to such policies, (b) any expenses incurred as part of any self-insured retention pursuant to such policies, (c) the term of such policy, and (d) and [sic] any other information related to coverage concerning the Site.

Response: *The Tronox Henderson Site is covered by a \$100 million cost cap policy with Chartis (formerly AIG). Tronox satisfied an approximately \$61.3 million dollar self-insured retention and has received payments totaling about \$35.2 million under the insurance policy. Approximately \$64.8 million remains available on the policy, which expires, in part, at the end of 2010.*

A copy of the Chartis policy has been provided to the Division and is provided on the accompanying CD. Tronox's claim tracking spreadsheet is also provided on the CD.

10. Within ten (10) days of the date of this Order: Contact Jim Najima, Chief of the Bureau of Corrective Actions of the Division to arrange a meeting at the Division's Carson City

office to show cause why the Division should not seek civil penalties for the violations cited in the FOAV.

Response: *Contact with the Division was made by Kirkland & Ellis, legal counsel for Tronox, on December 19, 2009, and a meeting has been scheduled for January 26, 2010.*

C. RELEVANT BACKGROUND

1. Kerr-McGee Corporation, Kerr-McGee Chemical LLC, its affiliates, and successors-in-interest have owned and operated an industrial facility at the BMI Complex in Henderson, Nevada (the "Site") for approximately fifty years. Tronox, LLC took ownership of the Site in or about 2005. These entities are collectively referred to herein as the "Parties".

Response: *A predecessor of Kerr-McGee Chemical LLC purchased the Henderson Site from American Potash and Chemical Company in 1967. In 2005, Kerr-McGee Chemical LLC changed its name to Tronox LLC. Ownership of the site did not change.*

2. Ending in approximately 1998, the Parties produced ammonium perchlorate, magnesium perchlorate, potassium perchlorate and sodium perchlorate (collectively, "perchlorate") at the Site. As a result of manufacturing operations at the Site, additional contaminants are found in the groundwater at or near the Site in concentrations above the limits set by the NHL. These contaminants include: hexavalent chromium, perchlorate, asbestos, dioxins, total petroleum hydrocarbons, organochlorine pesticides, aluminum, antimony, arsenic, lead, mercury, radium, thorium, uranium, various semi-volatile and volatile organic compounds. The contaminated groundwater flows into the Las Vegas Wash, into Lake Mead and on to the Colorado River.

Response: *While several of the chemicals mentioned above may have originated at the Site, others are likely associated with neighboring facilities, and are not a result of manufacturing operations at the Site.*

As the Division is aware, Tronox is currently investigating groundwater impacts at the Site and operates three lines of groundwater extraction wells to minimize contamination reaching Las Vegas Wash.

3. Pursuant to its authority under the NWPCL, and the NHL, the Division issued an Administrative Order on Consent on September 9, 1986 to Kerr McGee Chemical Corporation (the "1986 Consent Order") requiring the remediation of the hexavalent chromium contamination in groundwater. Pursuant to the 1986 Consent Order, the Parties installed a system of monitoring and interceptor wells and groundwater treatment systems at and around the Site and the larger BMI Complex to slow the migration of impacted groundwater.

Response: *This system included installation by Tronox, in coordination with the Division, of twelve pumping wells on its Site (part of the current interceptor well line) and construction of a system to destroy hexavalent chromium in recovered groundwater. Additional monitor wells were also installed around the Site.*

4. On April 25, 1991, the Division entered an Administrative Order on Consent (the "Phase 1 Consent Order") with land and facility owners within the BMI Complex which set the first phase of a three phase process to investigate, characterize, and if necessary, remediate the hazardous waste releases in the common areas, as well as individually owned sites, within the BMI Complex and surrounding lands and waters.

Response: *Since this time, the Parties have worked cooperatively with the Division to identify 69 potential source areas on the Site and the Division has issued "No Further Action" determinations for about 20 of the potential source areas, although these were subsequently revoked due to the Division's change in approach.*

5. Based upon the reports received pursuant to the Phase 1 Consent Order, the Division issued an Administrative Order on Consent on August 1, 1996 to Kerr-McGee Chemical Corporation (the "Phase 2 Order") to require additional investigation, characterization, and if necessary, remediation of waste releases at or associated with the Site which may pose a threat to human health, welfare, or the environment.
6. In 1997, perchlorate was detected in the Colorado River. The source of this contamination was subsequently traced to the groundwater beneath the Site. On July 26, 1999, the Division issued an Administrative Order on Consent to Kerr-McGee Chemical, LLC (the "1999 Consent Order") requiring the establishment of groundwater collection and treatment facilities to remediate this perchlorate contamination.

Response: *When perchlorate was first identified in Las Vegas Wash, the Company made a deliberate business decision to immediately support delineation of the perchlorate plume and to install remediation equipment rather than wait to follow the more formal remedial investigation/risk assessment process, which would likely have delayed installation of a remedy for 5-10 years. The Company made the decision to move expeditiously and worked cooperatively with the Division in an effort to immediately protect human health and the environment*

7. Following the installation of such remedial systems, the Division issued an Administrative Order on Consent to Kerr-McGee Chemical LLC on October 8, 2001 (the "2001 Consent Order"), and again on April 12, 2005 (the "2005 Consent Order"), modifying and refining the remedial technologies and systems employed at the Site.

Response: *Throughout this process, the Company and the Division worked cooperatively in addressing groundwater remediation issues. As refinements were made in the groundwater systems, amended orders were issued by the Division. Background information follows.*

The Company tested and installed an ion-exchange system to treat water from a natural groundwater seep (the "Seep") near Las Vegas Wash. The Seep flow was about 360 gallons per minute, containing about 100 mg/L perchlorate. Capture of the Seep flow and treatment with single-use ion-exchange resin (subsequently incinerated) significantly reduced the quantity of perchlorate entering Las Vegas Wash (see Division Figure) on the accompanying CD showing reduction in perchlorate entering Las Vegas Wash).

After successful temporary control of perchlorate in the Seep area near Las Vegas Wash and construction of an 11 acre pond to receive water from on-Site wells, the Company evaluated alternatives to the very costly single-use ion-exchange resin. The Company performed extensive pilot testing on a new regenerable resin process developed by Calgon Carbon Corporation. The Company proposed to construct the new 825 gallon per minute (gpm) plant at a cost of \$14.3 million. In addition, collection systems for Seep area groundwater and an extraction well field at Athens Road (now Galleria Drive) were added to the existing on-site interceptor well field. The Company proposed installation of a barrier (slurry) wall on the Site extending to a depth of 60 feet to enhance groundwater collection at the upgradient interceptor wells. All of this work was then memorialized in the 1991 Consent Order.

The Company then proceeded with construction of the systems. However, despite the extensive pilot testing, the new regenerable ion-exchange technology experienced severe start-up difficulties and in September 2002, it was permanently shut down. The Company employed single-use ion-exchange resin to treat the full 825 gpm groundwater flow until a new biological treatment plant could be pilot tested, engineered and started up in 2004. Costs for the single-use resin used during bioplant construction, which took approximately 1.5 years, were approximately \$1 million per month.

The biological treatment plant was sized to treat 1,000 gpm of groundwater. It continues to operate today, reducing inlet perchlorate concentrations of about 400 ppm to less than 10 ppb. Combined with the three groundwater well fields and the Seep surface collection system, the overall system has resulted in a 95 percent reduction of perchlorate entering Las Vegas Wash (see Division Figure on accompanying CD).

In order to treat the contents of a lined pond on the Site and to improve bioplant effluent clarity, Tronox approached the Division regarding expansion of the biological treatment system. While the hydraulic capacity is limited by discharge pipeline constraints, installation of a fifth primary bioreactor was proposed to treat the roughly 1000 tons of perchlorate in the on-site AP-5 pond. The Division documented approval of the Kerr-McGee proposal for treating the AP-5 contents and installation of an effluent filtration system in the 2005 Consent Order.

To date, about 3,000 tons of perchlorate have been removed from groundwater and 1,100 tons of perchlorate have been removed from the AP-5 pond. Tronox is proceeding with plans to close AP-5 this year.

8. Since 2007, Basic Remediation Company ("BRC") has managed a Corrective Action Management Unit ("CAMU") pursuant to a RCRA permit to address source contaminants within the BMI Complex. The CAMU has been permitted to accept contaminated soils from individual corporate landowners within the BMI Complex, at significant cost savings due to its proximate location. Upon information and belief, BRC intends to cap off the CAMU in late 2010, thereby precluding any further deposits of contaminated soils.

Response: *Tronox had anticipated that disposal costs for the nearby BMI CAMU would be the lowest of the three options for soil disposal. However, Tronox has recently been*

informed by BMI that the CAMU may not be the most cost effective disposal option for Tronox soils and that the CAMU may be limited to handling about 250,000 cubic yards of Tronox soil. As reflected in a January 22, 2010 letter to the Division, the Republic landfill at Apex appears to be the least expensive alternative for soil disposal. Accordingly, Tronox proposes that remediation soils from Parcels C, D, F, G and H be disposed at the Apex landfill unless a less expensive option is identified. This will be discussed at the February 5, 2010 meeting.

9. Upon information and belief, Tronox is the beneficiary of an insurance policy with Chartis to address remediation at and around the Site, including the removal of contaminated soils to a CAMU. Upon information and belief, the Chartis insurance policy expires on December 31, 2010.

Response: *As noted in Division Order response 9 above, a copy of the Chartis policy has been provided*

II FINDINGS OF ALLEGED VIOLATIONS: The Division finds and alleges as follows:

- A. **Finding:** Without waiving any claim against Kerr-McGee Chemical Corporation, Kerr-McGee Chemical, LLC, Anadarko Petroleum Corporation, its affiliates, predecessors-in-interest, and successors-in-interest or any other party, the Division finds that Tronox is a successor-in-interest, and an owner and operator of the Site subject to all laws, rules, regulations and standards promulgated by the State Environmental Commission ("SEC"), and all orders and permits promulgated by the Department, as delegated to the Division.
- B. **Finding:** The Parties are in violation of NAC 445A.227, 445A.2271, 445A.22725, and 445A.2273 of the NWPCL, and NRS 459.565 of the NHWL for failing to complete required assessments and reports of the effectiveness of the pump and treat groundwater system ("the GWTS"). These actions also give rise to the violation of the 1986 Consent Order, the Phase 2 Consent Order and the 2001 Consent Order which were executed in accordance with this authority.

Response: *As will be shown in responses to specific comments below, Tronox has made every effort to comply with Division requirements.*

1. Pursuant to its authority under NRS 445A.445 (1), NAC445A.227, 445A.2271, 445A.22725, and 445A.2273 of the NWPCL, and NRS 459.475(1) and 459.565 of the NHWL, the Division issued multiple administrative orders on consent to the Parties requiring the investigation, characterization, and remediation of releases at or associated with the Site which may pose a threat to human health, welfare, or the environment.

Response: *As noted previously, Tronox has worked cooperatively with the Division in identifying investigative and remedial actions to be performed at the Site. These efforts have been memorialized in the Consent Orders cited.*

2. Pursuant to the 1986 Consent Order, paragraph 6, the Parties are required to demonstrate on a monthly basis that overlapping cones of depression are achieved. This has not been done, nor has any acceptable alternative been performed or proposed.

Response: *This demonstration has been done. Overlapping cones of depression are present at the Site as evidenced by the inward flow analyses in the December 23, 2009 Interim Capture Report. The well locations were approved by the Division and the water level in these wells has been measured monthly since their installation. The Appendix D map displaying these wells and the “trough of depression” has been submitted to the Division in each remedial performance report provided to the Division since 1986.*

3. Pursuant to the 1986 Consent Order, paragraph 7, “if the monitoring results required in Paragraph 6, occurring six (6) months after initial operation of the intercept system, demonstrate that the system is not effectively collecting the intended groundwater plume, the Department may require KMCC to implement the Contingency Plan set forth in Paragraph 8”. Paragraph 8 states “KMCC shall prepare and submit to the Department for review and approval an Intercept System Contingency Plan, pursuant to the schedule set forth in Appendix B. this Plan will set forth additional measures to be implemented to improve and update the installed Intercept System to correct, to the extent possible, the deficiencies identified.”

According to Appendix B of the 1986 Consent Order “the schedule of implementation for the proposed groundwater mitigation program at the Henderson Facility with time for completion after approval by the Nevada DEP” for the Intercept System Contingency Plan was 7 months. On December 18, 1986, the Division approved the “electrochemical reduction process for chromium-removal”. Upon information and belief this is the approval date referenced in Appendix B, and thus the Intercept System Contingency Plan should have been submitted in July 1987. Upon information and belief, the Parties failed to submit a contingency plan.

Response: *The Intercept System Contingency Plan, Appendix E, was submitted to the Division on April 15, 1987 (included on the accompanying CD). Please note this is also evidenced by the inclusion of Kerr-McGee’s Appendix E content in the Division’s digital image of the 1986 Consent Order. See page 131 of 220 of the digital image on NDEP’s ftp web site*

4. Pursuant to the 2001 Consent Order, Section II.B., the Parties are required to install an extraction well system at the Athens Road area of the Site (as further described by the 2001 Consent Order), designed to remove up to 400 gallons per minute of groundwater with the objective of capturing perchlorate flux at this location. As noted herein, the Parties have failed to demonstrate this capture.

Response: *Tronox is capturing the bulk of water flowing through the Athens Road area (about 260 gpm). This is evidenced in the Interim Capture Report (December 23, 2009). However, recent construction by the City of Henderson has destroyed or buried several monitor wells needed for complete evaluation. A plan has been proposed to the Division to replace these wells and optimize capture by extending the ART 7 well in the second quarter of 2010. Again, the key measure of effective perchlorate capture is the 95 percent reduction of perchlorate entering the Las Vegas Wash (see Figure).*

Tronox submitted an interim capture analysis to the Division as Appendix B to the Annual Remedial Performance Report for Chromium and Perchlorate Tronox LLC, Henderson Nevada July 2007-June 2008 (Prepared by ENSR and Tronox LLC, August 28, 2008). In a subsequent response dated October 6, 2008, the Division requested

that the capture report be revised to address several technical issues and reissued as a “stand-alone” submittal, which report Tronox revised (see comment 8 in the October 6, 2008 NDEP response letter).

5. The Division advised Tronox that the GWTS does not appear to be providing adequate capture at either the Plant Site well field or at the Athens Road well field (each as further described in the Orders).

Response: *Adequate capture is being achieved at both the Plant Site and Athens Road well fields. Tronox continues to optimize capture. As noted in response #4 above, the Division received a Tronox capture evaluation report in August 2008 indicating capture in excess of 90 percent at both the on-site and Athens well fields. Numerical modeling performed by a Division contractor (McGinley and Associates) in 2007 indicated over 99 percent perchlorate recovery, though a “data gap” was identified requiring Tronox to demonstrate “inward flow” to the well field at downgradient monitor wells. A revised capture evaluation report, submitted by Tronox on December 23, 2009, shows on-site perchlorate capture of over 99 percent. The Division has expressed concerns about possible leakage around the east and west ends of the barrier (slurry) wall, but Tronox’s quantification of “leakage” around the ends of the barrier wall shows a negligible amount (1.6 pounds per day out of nearly 700 pounds per day) being extracted by the interceptor well system. In the most recent December 23, 2009 report, at Athens Road (now Galleria Drive), capture is estimated at over 90 percent. The report also included proposals to further enhance capture.*

6. The Division has advised Tronox that the Seep Area well field (as described in the Orders) fails to provide capture of contaminants, and Tronox is currently flow-rate limited to address the Seep Area. The Parties have failed to provide an assessment and report indicating that additional capture is unnecessary in this area, nor have they attempted to capture additional contaminants.

Response: *Currently there is 90 – 95% capture in the Seep area and an assessment and report has been provided to the Division. Tronox has worked cooperatively with the Division in addressing these issues. Over the past 10 years Tronox has advised the Division regarding Seep area well field operations in quarterly and semi-annual reports. Tronox regularly optimizes pumping rates of individual wells to maximize the recovery of perchlorate in the Seep area and to utilize the limited hydraulic capacity of the biological treatment system and the associated pipelines. The 95 percent reduction in perchlorate mass measured at Northshore Road on Las Vegas Wash demonstrates the effectiveness of capture. The Division received an achievement award from the USEPA in recognition for overseeing the successful Tronox remediation of the perchlorate plume. Furthermore, USEPA was sufficiently satisfied with the capture activities that it discontinued issuing quarterly update reports.*

7. The Division has advised Tronox to install additional wells and to explore alternate treatment processes such in-situ bioremediation in the Seep Area.

Response: *In conjunction with the Division, Tronox has considered in-situ biological treatment since the initial perchlorate destruction technologies were evaluated in 1998.*

The in-situ process is generally limited to areas with lower perchlorate concentrations (<400 ppm combined ClO₃ and ClO₄) to avoid plugging formations. Last year, Tronox presented to the Division an approach for an in-situ biological treatment pilot test (see Shaw in-situ proposal on the accompanying CD). While the Division was supportive of the test, Tronox financial issues as a result of the bankruptcy precluded initiating this work without an understanding from Chartis under the insurance policy that insurance reimbursement would be available. In November 2009, Chartis rejected coverage of the in-situ test citing Endorsement 15 of the Policy (see CD), which precludes coverage for more than one groundwater treatment technology being operated at the Site. Tronox will continue to explore funding options, including pursuing coverage under the insurance policy and alternatively, under the separate Chartis BMI groundwater insurance policy.

8. On March 28, 2007, the Division notified Tronox that it must evaluate and report on the effectiveness [(of) sic] the GWTS. The Division requires this information so that it may accurately determine the necessity of further corrective action.

Response: *Tronox has continued to evaluate and report to the Division on the effectiveness of the GWTS. A complete capture report was included as Appendix B of the August 28, 2008 Semi-Annual Remedial Performance Report submitted to the Division.*

9. The Division has attempted to obtain this required information from Tronox informally without success. Between August 29, 2006, and August 28, 2007, the Division reiterated this requirement to Tronox on at least four occasions.

Response: *As noted in response 8 above, Tronox worked with the Division to monitor perchlorate capture and has worked cooperatively with the Division to respond to Division requirements.*

10. Tronox refuses to comply with these directives. Tronox contends that its existing insurance policy under Chartis will not cover multiple treatment systems such as an [sic] in-situ bioremediation. And to date Tronox has refused to install additional wells.

Response: *Tronox has made every effort to comply with Division requests. With respect to the existing insurance policy, Chartis rejection of funding for an in-situ biological treatment test is demonstrated in its (November 30, 2009) letter (see accompanying CD).*

11. Tronox submitted a work plan to evaluate the effectiveness of the GWTS (also known as the Capture Zone Analysis) on May 30, 2007, a revised work plan on August 30, 2007, and a second revised work plan on November 29, 2007.

Response: *This is further evidence of the Company's compliance with requirements.*

12. On December 11, 2007, the Division approved the revised work plan dated November 29, 2007.

13. Tronox has failed to fully implement the approved work plan. Specifically, Tronox has failed to install the required wells in the Seep Area. Without the installation of these wells, any evaluation of the GWTS will be incomplete.

Response: *Tronox has implemented the approved work plan in all respects except with respect to property where it has not been granted access. Tronox does not own the land where the three new monitoring wells are to be located. The property belongs to BMI, which has refused to allow drilling of the new wells unless Tronox gives up its exclusive access to the Seep Area pumping wells and agrees to move the wells. Tronox has maintained that it cannot move the wells while maintaining capture. The Division has been kept up to date with Tronox efforts to obtain access. Tronox is ready to drill the three new wells as soon as access is granted. Tronox requests that the Division consider its options in assisting the company in obtaining access to the area.*

14. As of the date of this FOAV, Tronox has failed to provide to the Division a complete evaluation of the effectiveness of the GWTS.

Response: *Tronox has submitted an interim report documenting capture both on-Site and at Athens Road. When BMI access issues are resolved, Tronox will complete the evaluation of capture at the Seep Area.*

- C. FINDING:** The Parties are in violation of the Phase 2 Consent Order, Section III. Parties Bound. The Phase 2 Consent Order was executed by Kerr-McGee Chemical Corporation. The notification requirements of Section III. regarding change of corporate status have not been complied with.

Response: *Tronox is the corporate successor to Kerr-McGee Chemical Corporation. A notice of the name change from Kerr-McGee to Tronox was filed with the Nevada Secretary of State on September 22, 2005.*

- D. FINDING:** The Parties are in violation of the Phase 2 Consent Order, Section IV. Work to Be Performed.

1. On October 3, 2005, the Division agreed to allow Tronox to complete a phased approach to the investigation of the sources of contamination at the Site. The data obtained from the required investigation is to be used to generate a Remedial Alternative Study ("RAS") to fulfill the Parties' obligations under the Phase 2 Consent Order.

Response: *Tronox needs clarification from the Division regarding the need for a RAS. As late as December 17, 2009, Division representatives indicated that Site remediation could be performed using "screening" assessments rather than the formal RAS process. Division representatives opined that the RAS process would likely require two years to complete and would therefore not be effective in moving soils exceeding Division guidelines into the BMI CAMU. The two-year RAS approach is not compatible with the Order which requires excavation of "contaminated soil" by the end of 2010.*

Tronox will present a range of remediation alternatives to the Division at the scheduled February 5, 2010 meeting. Tronox can conduct soil remediation by excavation to BCLs,

alternative excavation limits, and/or application of institutional controls. Chartis consent however, will be needed.

2. Tronox has shown a history of inappropriate delay in the completion of the investigation. Between October 3, 2005 and November 2, 2007, the Division met with Tronox sixteen times to discuss the first phase of this investigation. (Phase A).

Response: *There was no inappropriate delay by Tronox. Tronox complied with requirements even in instances where the Division changed requirements.*

3. After approximately six months of delays and discussions, Tronox implemented and reported to the Division on November 2, 2007.
4. Between April 5, 2007 and December 4, 2008, the Division met with Tronox twenty-four times to discuss the second phase of this investigation ("Phase B"). The Phase B work plan was broken into six segments – Areas I through IV for soils, one segment for soil gas, and one for site-wide groundwater. Each of these segments required numerous revisions, delays, and Division mark-ups before they were acceptable and approved.

Response: *Tronox has held weekly conference calls with the Division to provide updates on Phase B progress. Complex work plan revisions for the Phase B Area Investigations have required considerable time and effort. Tronox appreciates the assistance of the Division staff in the process of generating the approved plans.*

5. The Phase B Work plan has only recently been completed on November 12, 2009.

Response: *Tronox has been on schedule with this work plan.*

6. On October 7, 2009 Tronox discussed the draft results of the Area I Phase B investigation with the Division. To date, Tronox has failed to submit either draft or final results to the Division.

Response: *Results from the Area I investigation were submitted on schedule one week before the October 7, 2009 meeting with the Division, Tronox supplied both hard copies and electronic copies of Tables and Figures showing the draft Area I Phase B results. Eighteen 11"x17" drawings were presented, showing the sample points where Division BCLs were exceeded. Tronox also submitted a Data Validation Summary Report (DVSR) for Area I to the Division, as scheduled, on December 21, 2009.*

7. Tronox advised the Division that it will further investigate Area I based upon their initial, and to date undisclosed, results. Additional sampling was proposed on November 19, 2009. Tronox's sampling proposal was wholly deficient, and the Division requested the submission of additional information to complete the sampling proposal.

Response: *Tronox and Chartis suggested at the meeting that since the Phase B investigation work plan called for collection of shallow soils and soils at a depth of 10 feet, it would be beneficial to sample soils at depths to 24 inches to identify the extent of contamination. Tronox subsequently submitted an abbreviated work plan proposing that soil borings be advanced adjacent to those Phase B soil borings which exceeded BCLs for dioxin or hexachlorobenzene. Samples were to be collected at 12-18 and 18-*

24 inch intervals below ground surface. Drawings showing the Area I boring locations with BCL exceedances were provided for the October 7, 2009 meeting. The Division then requested a list of the supplemental borings to be sampled and a drawing showing proposed locations be provided. The additional information was provided, and the Division approved the work plan the next day.

8. The Division has repeatedly expressed concern to Tronox and Chartis that remediation appears necessary, and that Tronox and Chartis have failed to provide an appropriate schedule to ensure that this work is completed in a timely fashion.

Response: *This is to be addressed at the already scheduled February 5, 2010 meeting.*

9. Tronox's responses to the Division's requests are unacceptable and in bad faith. The Phase 2 Consent Order has been in place for over 13 years, and Tronox has not produced a RAS for any media (soil, groundwater, etc.) or for any area of the Site, as required by the Phase 2 Consent Order.

Response: *There has been no indication from the Division that Tronox's responses were unacceptable. Nor has there been any bad faith on the part of Tronox. While the process has been streamlined at times, this informal process has allowed for work to progress more effectively. Tronox has worked successfully with the Division in reducing perchlorate entering Las Vegas Wash by about 95 percent.*

Tronox has spent over \$128 million in remediation projects at the Henderson Site. Included in the total are nearly \$2 million for Phase A Site investigations and \$6 million for Phase B Site investigations. Tronox and Chartis have included an additional budget place holder of \$28 million for Site soil remediation in 2010. The budget will be adjusted as Site investigation data become available.

10. Without completion of the Deliverables required by the Phase 2 Consent Order, remediation contemplated by a Phase 3 Consent Order is stalled.

Response: *To date, Tronox has not been contacted by the Division regarding a Phase 3 Consent Order other than as a participant to the Phase 3 Consent Order meeting for the BMI Common Areas.*

- E. **FINDING:** The Parties are in violation of the Phase 2 Consent Order, Section XVII. Reimbursement of Division Oversight Costs. Tronox has failed to reimburse the Division for \$37,024.52 as invoiced on April 6, 2009.

Response: *Chartis has agreed to reimburse the Division for its oversight costs in the amount of \$37,024.52.*

- F. **FINDING:** The Parties are in violation of RCRA §§ 3004(u) and 3008(h) and 40 C.F.R. Part 265, Subpart H, and the 1986 Consent Order, paragraph 28. The Parties have failed to provide adequate financial assurance to address the unacceptable risks to human health and the environment posed by the contaminants at the Site.

Response: The areas of the Site where such financial assurance is required to be in place may be removed and closed as a part of the ongoing Site remediation, thus removing the obligation to maintain financial assurance.

1. The Site is subject to corrective action under RCRA 3004(u) and 3008(h).
2. The financial assurance provided by Kerr-McGee Chemical Corporation in the Post Closure Permit Application date July 24, 1987 is no longer viable as Kerr-McGee Chemical Corporation is in default of its financial assurance obligations.
3. Pursuant to the 1986 Consent Order, Paragraph 28, the Parties agreed to unconditionally guarantee performance of its obligations thereunder, and to affirm their financial capability on an annual basis upon request by the Division.

Response: See the response above.

4. The Division finds that financial assurance provided by Tronox through the Chartis insurance policy is now insufficient.
 - i. Upon information and belief, the Chartis Policy is due to expire on December 31, 2010.
 - ii. Remediation at the Henderson Facility is estimated to take more than ten years, well in excess of the twelve months of coverage remaining under the Chartis Policy.

Response: Tronox does not have a formal projection on the duration of Site groundwater cleanup but expects there will be sufficient funding to maintain the GWTS operation in accordance with the terms of the \$115 million environmental trust being set up as part of Tronox bankruptcy proceedings and a US. Navy settlement of 21% of perchlorate remediation costs after 2010.

- iii. Upon information and belief, the Chartis Policy disallows coverage of in-situ bioremediation in the See Area, contrary to the directive of the Division.

Response: Chartis rejected a Tronox request for coverage of an in-situ bioremediation pilot test at the well transect including PC-98R and MW-K5 (not the Seep Area). Tronox has since been evaluating options for proceeding with the pilot test. Tronox has discussed the pilot test with the Division and has been seeking support for an Underground Injection Control (UIC) permit which would be required for such a pilot test. To the best knowledge of Tronox, the Division has not issued a directive for Tronox to proceed with the pilot test.

G. FINDING: The Parties are in violation of NRS 445A.465 for allowing pollutants discharged from a point source or fluids could be carried into the waters of the State by any means.

1. The delays caused by the Parties in violation of the Administrative Orders on Consent as outlined herein have caused undue delay of source control at or around the Site.

Response: There were no undue delays in violation of the Administrative Orders on Consent. In coordination with the Division, Tronox initially focused its attention on controlling groundwater leaving the Site to reduce perchlorate and hexavalent chromium

reaching Las Vegas Wash. Investigations of the 70 potential source areas on the Site (soils, including the US Vanadium Site) are under way and data are being provided to the Division.

2. Over 800,000 cubic yards of contaminated soil are believed to remain on Site, resulting in exponentially higher costs of maintaining the GWTS, and frustrating the process of remediation.

Response: *Tronox will be meeting with the Division on February 5, 2010 to discuss this. The key constituents destroyed by the GWTS are hexavalent chromium and perchlorate. These constituents are not found to drive the soil volume estimates in Areas I, II or IV.*

As to excavation volumes, in April 2009 Tronox developed a very preliminary draft "place holder" or gross estimate of 600,000 cubic yards (including manganese tails) of soils on the Site which might require excavation (a copy provided on accompanying CD). The Division was informed of the estimate. When the Area I soil results became available, the soil place holder was increased to 800,000 cubic yards due to the surficial dioxin and hexachlorobenzene contamination. However, until the vertical extent of contamination is completed, the volume estimate cannot be confirmed.

3. The Parties currently have the ability to access the CAMU within the BMI Complex with capacity to hold the contaminated soils from the Site.

Response: *BMI initially indicated CAMU space availability for 600,000 cubic yards of Tronox soil. More recently, BMI indicated about 250,000 cubic yards of available space. Tronox has contacted other landfills as alternatives for disposal. It has been determined that the Apex landfill may be the best alternative.*

4. Immediate source control will significantly reduce the overall costs of the GWTS and remediation.

Response: *Immediate source control of soils will not reduce the overall costs of the GWTS. Hexavalent chromium and perchlorate exceeding BCLS in Site soils from Areas I, II and IV, result in small excavation volumes. Potential impacts from the vadose zone leaching are being evaluated and are expected to be discussed at the February 5, 2010 meeting with the Division.*

H. FINDING: The Parties' failure to operate the GWTS will result in imminent degradation of the Las Vegas Wash, Lake Mead and the Colorado River, and an imminent and substantial threat to human health, in violation of NRS 445A.305, NRS 459.400, NAC 445A.144.

1. Based upon the modeling conducted by the Division, with the assumption of a Las Vegas Wash base load of sixty pounds per day of perchlorate, the following is estimated:
 - a. The loading of perchlorate will increase by 23% immediately upon the GWTS being shut down.

- b. The loading of perchlorate will increase by over 100% within 18 months of the GWTS being shut down.
- c. The loading of perchlorate will increase by over 860% within 24 months of the GWTS being shut down.

Response: *Tronox has no intention to discontinue operation of the GWTS. Tronox has spent tens of millions of dollars in successfully capturing the perchlorate plume emanating from the Site. As noted above, a 95 percent reduction in the mass of perchlorate entering Las Vegas Wash has been demonstrated.*

- 2. Based upon information provided by Veolia Water North America, the operator of the GWTS, the following is estimated:
 - a. The microbial culture used in the GWTS will die within two to three days of the GWTS being shut down.
 - b. It may take between six and twelve months to re-establish the microbial culture within the GWTS, should it die.

Response: *Tronox has no intention to discontinue operation of the GWTS.*

- 3. Based upon information provided by the Southern Nevada Water Authority (SNWA) and modeling conducted by their environmental contractor Flowsience, the following is estimated:
 - a. Concentrations of perchlorate in Lake Mead are expected to increase by 1200% within 24 months in the event that the GWTS is shut off.

Response: *Tronox has no intention to discontinue operation of the GWTS. See response to #1 above.*

- b. Concentrations of perchlorate in the Colorado River system and the Metropolitan Water District intake pipeline are expected to increase by 300% within 24 months in the event that the GWTS is shut off.

Response: *Tronox has no intention to discontinue operation of the GWTS. See response to #1 above.*

- 4. Upon information and belief, over 25 million people rely upon these water bodies as a source of drinking water.
- 5. The Division finds the degradation of these water bodies is an unacceptable and imminent threat to human health under NRS 445A.305, NRS 459.400, NAC 445A.144.

Response: *Tronox has no intention to discontinue operation of the GWTS. See response to #1 above.*

6. Upon information and belief, Tronox may seek to abandon the Henderson Site after a sale of its assets in bankruptcy. The abandonment of the Site, and/or any loss of power or disabling of the GWTS will cause an imminent and substantial threat to human health. Tronox must present a plan to the Division demonstrating the continuation of the GWTS system, including an emergency generator back-up system for the GWTS, or an alternate plan that is acceptable to the Division.

Response: *Tronox does not intend to abandon the Henderson Site. Through meetings during the week of January 25, 2010 and written follow-up, Tronox will demonstrate the continuation of the GWTS. See response to #1 above.*

III. CONCLUSION: Based upon the information set forth herein, the Nevada Division of Environmental Protection has determined that Tronox, LLC is in violation of the following provisions of the Nevada Administrative Code (NAC), the Nevada Revised Statutes (NRS), the Resource Conservation and Recovery Act (RCRA), and Division Administrative Orders on Consent.

Response: *As indicated in the responses above, Tronox has worked cooperatively and effectively with the Division in successfully addressing remediation at the Site.*

1. NAC 445A.227, 445A.2271, 445A.22725, 445A.2273, and NRS 459.565. Failure to complete required assessments and reports of the effectiveness of the pump and treat groundwater system ("the GWTS").
2. Phase 2 Consent Order, Section III. Parties Bound.
3. Phase 2 Consent Order, Section IV. Work to be performed.
4. Phase 2 Consent Order, Section XVII. Reimbursement of Division Oversight Costs.
5. RCRA §§ 3004(u) and 3008(h) and 40 C.F.R. Part 265, Subpart H. Financial Assurance.
6. 1986 Consent Order, paragraph 28. Financial Assurance.
7. NRS 445A.465. Allowing pollutants discharged from a point source or fluids injected through a well to remain in place where the pollutants or fluids could be carried into the waters of the State by any means.
8. NRS 445A.305, NRS 459.400, NAC 445A.144. The Division has a duty to address the imminent and substantial threat to human health and the environment caused by the Site.

Response: *As indicated in the responses above, Tronox has worked cooperatively and effectively with the Division in successfully addressing remediation at the Site.*