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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

(Las Vegas Office)

1771 E. Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

February 11, 2004

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Kerr-McGee Chemical Corporation LLC (KM)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Supplemental Phase II Report – Environmental Conditions Assessment*

Dear Ms. Crowley,


The Nevada Division of Environmental Protection (NDEP) has reviewed the:

*Supplemental Phase II Report – Environmental Conditions Assessment; Kerr-McGee Chemical LLC, April 25, 2001.*

NDEP's comments to the aforementioned report are contained in Attachment A. In summary, characterization work performed to date does not appear to be technically defensible and additional work will be required. Some specific points include: 1) a need to identify all potential contaminants associated with the site; 2) appropriate background sampling; 3) use of inappropriate action levels; and 4) existence of data gaps. Before additional work is completed, the NDEP recommends that Kerr-McGee Chemical LLC (KM) meet with the NDEP to discuss the comments and development of a plan to move forward.

By <sup>30th - per Rakiva 3-4-04</sup> ~~March 8~~, 2004, KM should provide to the NDEP a schedule for addressing the issues outlined herein. Should you have any questions or concerns, please do not hesitate to contact me at (702) 486-2870.

Sincerely,



Brian A. Rakvica, P.E.  
Staff Engineer III  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP – Las Vegas Office

BAR/bar

Encl: Attachment A

CC: Jim Najima, NDEP, BCA, Carson City  
Jon Palm, NDEP, BWPC, Carson City  
Todd Croft, NDEP, BCA, Las Vegas  
Jennifer Carr, NDEP, BCA, Carson City  
Jeff Johnson, NDEP, BCA, Carson City  
Valerie King, BWPC, Carson City  
Tamara Pelham, BWPC, Carson City  
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Washington, D.C. 20036  
Brenda Pohlman, City of Henderson, 240 Water Street, Suite 210, Henderson, NV 89015  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5,  
75 Hawthorne Street, San Francisco, CA 94105-3901  
Carrie Stowers, Clark County Comprehensive Planning, PO Box 551741, Las Vegas, NV, 89155-  
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Ranajit Sahu, BEC, 875 West Warm Springs Road, Henderson, Nevada 89015  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015

Attachment A  
NDEP Comments on the *Supplemental Phase II Report – Environmental Conditions Assessment*

1. **Submission of documents**
  - a. Two copies of all reports should be provided to Brian Rakvica in the Las Vegas office of the NDEP and two additional copies should be provided to Mr. Jeff Johnson in the Carson City office of the NDEP.
  - b. An electronic copy of all reports in PDF format should also be provided to Mr. Brian Rakvica.
  - c. All laboratory data should be formatted to comply with the Division's Electronic Data Deliverable's (EDD) format. These data packages will need to be compatible with Earthsoft's EquiS Data Management System (relational database written in Visual Basic and using the Microsoft Access engine). The specific formatting requirements of this data will be provided to KM under separate cover at a later date.
2. **Project Personnel**
  - a. NDEP needs to understand what personnel are being applied to this project. Please provide current resumes and/or curricula vitae for each project staff member. This is a multi-disciplinary project and the following expertise may be needed to complete this project: hydro-geologist, engineer, toxicologist, radiochemist, risk assessor, expert in fate and transport, statistician and chemist.
  - b. Please provide an organizational chart for the project team.
  - c. Please identify the Nevada Certified Environmental Manager (CEM) for this project.
3. **Presentation of Calculations and Data**
  - a. Calculations: When a significant calculation is performed and referenced in the text an example calculation should be included in the report. The formulae used and the reference for the formulae should also be shown for the example calculation. These example calculations could be summarized in an appendix to the report, in a footnote, or in the body of the text. The NDEP is also amenable to alternate presentation forms.
  - b. Data: Data for soil shall not be separated from data for groundwater. One drawing should be presented for each site-related chemical to illustrate the three dimensional extent of contamination. Information to be included on each drawing is summarized below.
    - i. All soil analytical data shall be presented.
    - ii. All potential source areas for the chemical being evaluated shall be clearly identified and highlighted. Potential source areas include areas where concentrations in soil exceed background and those portions of the facility where chemicals were used or stored. Source areas may include several Letter of Understanding (LOU) study areas.
    - iii. All groundwater analytical data shall be presented.

- iv) Iso-concentration contours for groundwater data illustrating the extent of the groundwater plume shall be presented. Property boundaries are not to be used for termination of the delineation of the chemical plumes.
  - v. Any location that is considered a background location for any chemical in soil or groundwater shall be clearly identified on all drawings.
  - vi. All site features that may impact contaminant transport (surface and subsurface) shall be identified.
- c. Drawings shall be self-explanatory without the need to refer to the text to interpret what is being presented. The presentation of more than one site-related chemical on a drawing is appropriate when the chemicals are similar (e.g.: VOCs, metals, etc.), are migrating together and have common sources. The above presentation is required to complete a conceptual site model. The conceptual site model should be updated as more data is collected.
4. **Averaging of Analytical Data**
- a. In previous reports, analytical data on several tables are averaged. The NDEP can not evaluate the adequacy of site characterization work based on analytical data that are averaged. Risk assessment is the only phase of the project where analytical data should be averaged. Analytical results should be presented discretely and compared to appropriate risk based criteria; Applicable or Relevant and Appropriate Requirements (ARARs); or approved background levels.
  - b. Composite soil samples are appropriate where justification is provided and NDEP approval is obtained. Composite samples may not be appropriate for risk-based closures without a rigorous statistical analysis.
5. **Phase II Consent Agreement Reporting and Public Involvement Obligations**
- a. KM is reminded that quarterly progress reports are due to the NDEP in accordance with Section XIII of the Phase II Consent Agreement.
  - b. KM is further reminded that participation in the Public Involvement Plan (PIP) is required in accordance with Section V.2. of the Phase II Consent Agreement. This PIP requires a copy of all key documents to be submitted to the Public Information Repository located at the James I. Gibson Public Library in Henderson, Nevada.
6. **Site Groundwater**
- a. The Nevada Revised Statutes and the Nevada Administrative Code consider all groundwater of the State of Nevada to be potential sources of drinking water; prohibit the discharge of pollutants into the groundwater without a permit; and require the source of any pollutant to be eliminated. It has been well documented that the water beneath the KM plant site has the ability to reach the Las Vegas Wash. The Las Vegas Wash is a tributary to Lake Mead. Lake Mead and the Lower Colorado River are the drinking water supply for over 20,000,000 people. The NDEP would like to stress the importance of: elimination of the migration of pollutants from

the KM site; delineation of the extents of the off-site contamination in the form of a conceptual site model (CSM); and management and remediation of all off-site pollutants. Characterization of off-site pollutants in groundwater may require broad suite analyses. These analyses should include (at a minimum) the following chemical classes: VOCs, SVOCs, PAHs, Pesticides, Radionuclides, Metals, Inorganics, Dioxins/Furans, and PCBs. Please note that the radionuclide analyses should include (at a minimum): the uranium series, the thorium series, radium 226/228 (and all daughter products), as well as potassium 40.

- b. It should also be noted that "Beneficial Use Standards" have been developed for the Las Vegas Wash and are presented in NAC 445A.144 and NAC 445A.199-NAC 445A.201.
- c. The NDEP requests that KM provide a summary of the on-going monitoring of the site groundwater. This summary should include a list of the monitoring wells; the analytes that each well is monitored for; and the frequency of the analysis.
- d. The Division requests that plume maps be developed for each of the site-related chemicals including data that extends off-site. See also comment 3.

7. **Pond GW-11**

- a. Pond GW-11 has received effluent from the chromium mitigation system and the perchlorate remediation system. The contaminants in this effluent have been evapo-concentrating in pond GW-11. It is the Division's understanding that the contents of pond GW-11 will eventually be processed through the new fluidized bed reactor (FBR).
  - i. Please provide any data on analyses that have been performed on the contents of Pond GW-11.
- b. Broad suite analyses may be appropriate for pond GW-11. It is not clear to the NDEP that the contents of pond GW-11 are well characterized.

8. **Chromium Mitigation System**

- a. The existing chromium mitigation system treats a limited quantity of groundwater on the plant site. From plume maps provided by KM, it is obvious that there is a large plume of chromium downgradient of the plant site slurry wall. KM has implemented a temporary remedial system to address the elevated hexavalent chromium concentrations at the Athens Road well field.
  - i. Please explain KM's long-term plan for the remediation of chromium (total and hexavalent) at the Athens Road well field. It appears to the Division that the concentrations will continue to increase in this location (based on available data).
- b. The existing total chromium plume maps terminate near the property boundary and are delineated to 1.0 ppm.
  - i. Please provide complete mapping of the existing total chromium plume down to ND(0.05 mg/l). Also, include a 0.1 mg/l contour (current MCL for total chromium).

- ii. It is requested that chromium plume mapping eventually be coordinated with the development of the perchlorate plume maps. Maps should be of identical orientation, scale and sampling date. Please identify a schedule by which this mapping can be coordinated with the perchlorate mapping.
  - iii. Please provide any information on sampling conducted to date for total and hexavalent chromium in the Muddy Creek Formation and Muddy Creek Aquifers.
- c. Please provide any available data for the influent concentrations of total and hexavalent chromium to the on-plant site chromium mitigation system.

9. **Site-Related Chemicals**

- a. The NDEP is concerned that site-related chemicals have not been adequately identified for the KM facility. Site-related chemicals include all raw materials, products processed, byproducts, waste products and any other chemical used at the facility. All degradation products associated with any chemical that may have been used at the facility are also site-related chemicals. All site-related chemicals need to be identified in accordance with USEPA guidance (see *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A, EPA/540/1-89/002, December 1989*). If it is unknown whether or not chemicals are present at the site, or if all chemicals associated with historical operations have not been adequately documented, then a broad suite analysis is warranted for those chemical classes that may be present. Please note that some chemicals associated with the site may not be covered by broad suite analyses. Site-related chemicals associated with the KM facility need to be identified and justified for each chemical class including but not limited to: metals, radionuclides, volatile organic compounds, semi-volatile organic compounds, dioxins, furans, pesticides, and polycyclic aromatic hydrocarbons (PAHs). A detailed discussion on site-related chemicals is required for any risk assessment. During risk assessment, the list of site-related chemicals is reduced to a list of chemicals of potential concern (COPC). Please note that the term COPC is specific to risk assessment and should only be used after the completion of site characterization and the development of a CSM.
- b.) For example, if the suite of metals associated with the site cannot be identified, then a broad suite of metals needs to be analyzed. Twenty-four metals are considered site-related chemicals for the Upper and Lower Ponds east of Boulder Highway (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium (total), chromium (VI), cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, titanium, tungsten, vanadium and zinc). These 24 metals should be included in the list of site-related chemicals for the KM facility or the abbreviated list of metals that were analyzed during the previous investigations needs to be justified.

- c. Another example is the unknown chemicals and wastes at the site. In the April 1993 Phase I Environmental Conditions Assessment there are several examples of unknowns at the site.
  - i. U.S. Government Activities – “Detailed records describing the quantities of waste produced and the location(s) for disposal...were not found during this study”.
  - ii. Other previous lessees on KM property – “The actual locations leased and operations conducted by these companies are not well documented”.
  - iii. Hardesty/Amecco Chemical – “residue from the manufacturing process was pumped directly into a steel tank truck and removed to a remote location and burned”. The by-products from this incomplete combustion process are unknown but may include: dioxins, furans, PAHs, as well as components of the residue that were burned. KM should identify this potential source area.
- d. The analytical methods for the list of site-related chemicals must be presented for review by the NDEP.
- e. The development of a comprehensive list of site-related chemicals should be the first priority for this project.

10. **Data Quality**

- a. In this report and previous reports elevated detection limits have been presented. These detection limits are at or above their (potential) corresponding screening levels. Examples include (but are not limited to): benzene, cadmium, ethylbenzene, selenium, and toluene.
- b. If a risk assessment is to be performed, the usability of this data will need to be demonstrated in accordance with US EPA Guidance.
- c. KM is requested to review this issue with their laboratories to determine the reasoning behind these elevated detection limits.
- d. KM is requested to review these issues and the remaining part of the quality assurance program (in accordance with Section VIII of the Phase II Consent Agreement) and submit a formalized response to NDEP.

11. **Action Levels**

- a. The NDEP has repeatedly stressed the importance of comparing data to appropriate action levels including letters dated June 10, 1998 and December 17, 1998.
- b. Please note that if a chemical is present, but below an established action level, it will not necessarily be removed from consideration or future analysis. This chemical may need to be carried through as a contributor to cumulative risk.
- c. Action levels should be protective of human health and the environment. Standards or criteria that can be used to evaluate human health or ecological risks include Maximum Contaminant Levels (MCLs), USEPA soil screening levels (SSLs), USEPA Ambient Water Quality Criteria (AWQC), ATSDR criteria, site-specific background levels, and USEPA Region IX Preliminary Remediation Goals (if used correctly, see below

- for additional details). KM should present a detailed evaluation of the derivation of the action levels to be used for this project.
- d. Please note that although NAC 445A.2272 does allow the use of TCLP maximum concentrations as action levels where the exposure pathway is to surface water or groundwater, TCLP maximum concentrations were established Federally to classify hazardous waste for disposal purposes; they were not established to evaluate human health and ecological risk. Further, there is no basis in regulations to extrapolate these concentrations for use as human health and ecological risk criteria for soil exposure. According to NAC 445A.2272, the most restrictive action level must be used, and at an appropriate level of concentration that is based on the protection of human health and safety and of the environment. Contaminant concentrations associated with human health and ecological risk criteria are generally much lower than TCLP criteria, especially when multiple chemicals are being evaluated. Human health risk criteria, and potentially ecological risk criteria, must be addressed prior to site closure if contaminated media (above applicable target risk levels) are not removed from the site.
  - e. USEPA Preliminary Remediation Goals (PRGs) can be used to determine action levels if the analysis is completed correctly. If more than one contaminant exists at a site, then the use of PRGs may not be appropriate.
  - f. It is critical that background concentrations be appropriately evaluated. Background concentrations need to be evaluated by collecting soil samples in an area that is not impacted by site operations. Use of ASTM or USGS background levels for wide geographic areas is not acceptable per the June 10, 1998 NDEP letter to KM. A separate work plan should be submitted that describes where background samples will be collected and how background concentrations will be evaluated. It is highly recommended that an appropriate background study be completed prior to additional site characterization sampling. The development of a Remedial Alternatives Study (RAS) after site characterization is completed will depend heavily on comparisons of background concentrations to contaminant concentrations detected at the facility. The NDEP suggests that KM review the guidance documents listed below.
    - i. U.S. Environmental Protection Agency, Guidance for Characterizing Background Chemicals in Soil at Superfund Sites, OSWER 9285.7-41 (EPA 540-R-01-003), June 2001.
    - ii. U.S. Environmental Protection Agency, Determination of Background Concentrations of Inorganics in Soils and Sediments at Hazardous Waste Sites, EPA/540/s-96/500, December 1995.
  - g. Due to the number of contaminants present at the facility, the lack of acceptable chemical-specific action levels or PRGs for many of the contaminants, and the potential that removal activities may not be cost-effective as a remedial option, KM should consider that a deterministic risk assessment might be required for site closure. A probabilistic risk assessment will not be accepted until after a deterministic risk assessment



is completed and it is determined that a probabilistic risk assessment is warranted. Risk assessment, if performed, shall be completed in accordance with USEPA guidance (see references below). Tentative cleanup goals for risk assessment are listed below.

- i. Non-carcinogens: Hazard Index = 1
  - ii. Chemical carcinogens: Target Risk =  $1 \times 10^{-6}$
  - iii. Radionuclides: Target Risk =  $1 \times 10^{-6}$
- h. Prior to performing a risk assessment, the usability of the data must be demonstrated in accordance with USEPA guidance (see reference below).
- i. It is not clear what the objectives of the investigation to date are. Decision rules to guide the characterization process are not clearly laid out. Also, it is not clear how KM will sufficiently evaluate the facility to justify closure. It is highly recommended that data quality objectives (DQOs) be completed in accordance with the reference below. Ideally, DQOs should have been completed prior to any site characterization work to streamline the data collection process. A brief discussion on data quality assessment (DQA) may also be warranted (see reference below). In summary, the NDEP needs to have a better understanding of how KM proposes to close the site and recommends that KM discuss the proposed DQOs with NDEP prior to submittal. Additionally, NDEP recommends submittal of DQOs as a separate, stand-alone document. It should be anticipated that these DQOs will be adjusted as the project proceeds.
- j. References
- i. U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, December 1989.
  - ii. U.S. Environmental Protection Agency, Guidance for Data Usability in Risk Assessment, April 1992.
  - iii. U.S. Environmental Protection Agency, Guidance for the Data Quality Objectives Process, August 2000.
  - iv. U.S. Environmental Protection Agency, Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, July 2000.

12. **Conceptual Site Model**

- a. The NDEP has repeatedly stressed the importance of the development of a conceptual site model (CSM) including in letters dated June 10, 1998 and December 17, 1998.
- b. Kerr-McGee has completed a significant amount of hydro-geologic investigative work for the perchlorate remediation project. This information should prove to be very helpful in the development of a CSM.
- c. It is suggested that the CSM be submitted under separate cover as soon as possible. For your information, all of the BMI Companies are preparing CSMs. It is suggested that the CSM include, but not be limited to, the following elements:
  - i. A list of site-related chemicals for soil and groundwater should be developed in accordance with USEPA guidance (see also comment

- 10). This list should identify chemicals that may have been disposed of but were not analyzed for during recent investigations. This list should also present risk-based criteria, such as USEPA Region IX PRGs, soil screening levels (SSLs), MCLs, and other criteria where appropriate. See also comment 11.
- ii. A discussion pertaining to the potential for contaminants in soil to leach to groundwater should be provided. Contaminant concentrations in soil should be compared to migration to groundwater SSLs developed by the USEPA at the DAF of 1 or site-specific SSLs could be developed.
  - iii. Preferential migration pathways, such as paleochannels on top of the Muddy Creek Formation; the fine grained facies of the Muddy Creek Formation (e.g. channel sands); and the coarse grained facies of the Muddy Creek Formation also should be evaluated. Kerr-McGee has already completed significant work on this for the perchlorate remediation project.
  - iv. Cross sections showing the shallow alluvial aquifer and the next deeper water-bearing zone should also be presented.
  - v. It does not appear that the nature and extent of the contaminant plumes are well understood. Iso-concentration drawings for contaminant plumes in soil and groundwater (including the vertical extent of contamination) that show the entire extent of the plume (including off site data) should be provided. See also comment 8.
  - vi. The conceptual site model should discuss surface drainage patterns, surface migration of contaminants, and contaminant migration pathways within the vadose zone and groundwater.
  - vii. The CSM should discuss exposure pathways for current and future receptors, including ecological receptors.
  - viii. Data gaps should be identified and additional investigation work to close the data gaps should be proposed.
  - ix. Unqualified data may be presented, however, KM must ensure that the data are presented in a manner that allows the NDEP to differentiate between qualified and unqualified data.
13. **Soil Sampling**
- a. In general, the soil sampling that has been conducted has been in the surface and near-surface. The limited sampling that was conducted is not sufficient to evaluate potential sources that may exist within the vadose zone. Soil samples need to be collected throughout the vadose zone to fully evaluate the extent of contamination in three dimensions and potential impacts to groundwater.
14. **Section 1.0, page 1-1**
- a. Second paragraph – Please correct the date for NDEP’s conditional approval of the Phase II Supplemental Work Plan from “December 17, 1999” to the correct date of December 17, 1998.
15. **Section 2.2.2, page 2-3**

- a. First paragraph – In the statement “*The spacing of seven successfully drilled perimeter borings comprises a nearby equidistant...*” replace the word “*nearby*” with the word “*nearly*”.
16. **Section 3.1, page 3-1**
- a. Total chromium results for soil were compared to a 100 mg/kg level. This is not an appropriate action level or screening level. For example, the USEPA SSL (DAF 1) is 2.0 mg/kg and the USEPA TCLP is 5.0 mg/kg. Background levels may be more conservative. Using either of the above concentrations, all soil samples are grossly elevated. It appears that the depth and breadth of chromium contamination has not been properly evaluated. Please note that the NDEP is using these SSLs for discussion purposes only. KM should calculate their own SSLs or verify that the model used by the USEPA to calculate the published SSLs fits the model for the KM site. A DAF of 1 is being used for discussion purposes, assuming that there is little or no dilution or attenuation of soil leachate at the site (due to the shallow water table and the large source size).
- b. The NDEP’s December 17, 1998 letter to KM required comparison of sample results to actual Nevada cleanup standards and background values.
- c. Soil samples also appear to indicate that there are elevated pH levels in a number of the locations and depths. Background levels for pH should be delineated in accordance with USEPA guidance (see also comment #11.f).
- d. The data presented do not delineate the valences of the chromium present in soil. KM states “*elevated pH values tend to retard the mobility of chromium, especially trivalent chromium Cr(III) (Allen 1993). This implies that the mobility of chromium in soil beneath Old P-2 and P-3 Ponds is retarded, thus limiting or eliminating the ponds as an existing or future source of chromium to groundwater.*” The NDEP does not agree with this assessment. There are very high concentrations of chromium in groundwater in the vicinity of the P-2 and P-3 ponds. Data presented by KM indicates that a majority of this chromium may be hexavalent. Please provide further justification for the above statement.
17. **Section 3.2.1, page 3-11**
- a. The detection limits presented in Table 3-2 and discussed in this section appear to be elevated. Potential screening levels for benzene, toluene and ethylbenzene in soil are at least an order of magnitude lower than the detection limits presented in table 3-2. For example, the USEPA SSL DAF 1 for benzene is 0.002 mg/kg, for toluene is 0.6 mg/kg, and for ethylbenzene is 0.7 mg/kg. KM needs to derive appropriate action levels and re-evaluate the need for additional sampling in this area.
- b. For soil samples SB5-4 and SB5-5, the highest concentrations of “TEPH” are at the greatest depth. The NDEP believes that the depth and volume of soil contamination has not been appropriately evaluated. Additional deeper samples should be proposed in the next workplan.
- c. It is suggested that future groundwater samples be analyzed for BTEX. Revised sampling procedures may need to be investigated due to the reported low flow conditions.

18. **Section 3.2.2, page 3-11**

- a. The NDEP does not concur with the assessment that no further investigation is recommended or warranted for the former diesel fuel tank storage area.

LEO DROZDOFF, *Administrator*

(775) 687-4670

Administration  
*Facsimile 687-5856*

Water Quality Planning  
Water Pollution Control  
*Facsimile 687-4684*

Mining Regulations and Reclamation  
*Facsimile 684-5259*

STATE OF NEVADA  
KENNY C. GUINN  
Governor



ALLEN BIAGGI, *Director*

Air Pollution Control  
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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL PROTECTION

Las Vegas Office

1771 East Flamingo Road, Suite 121-A

Las Vegas, Nevada 89119-0837

May 6, 2005

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Kerr-McGee Chemical Corporation LLC (KM)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Background Investigation Work Plan* dated March 29, 2005

Dear Ms. Crowley,

The NDEP has received and reviewed KM's correspondence identified above and provides comments in Attachment A. The NDEP requests that KM address the issues outlined herein no later than **June 22, 2005**.

If there is anything further or if there are any questions please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Rakvica".

Brian A. Rakvica, P.E.  
Staff Engineer III  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

Ms. Susan Crowley

5/6/2005

Page 2

CC: Jim Najima, NDEP, BCA, Carson City  
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75 Hawthorne Street, San Francisco, CA 94105-3901  
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Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
Mr. George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Mr. Lee Erickson, Stauffer Management Company, 1800 Concord Pike, Hanby 1, Wilmington,  
DE 19850-5437  
Mr. Chris Sylvia, Pioneer Americas LLC, 8000 Lake Mead Parkway, Henderson, Nevada 89015  
Mr. Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California  
95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380,  
Bainbridge Island, WA 98110

## ATTACHMENT A

1. General comment, CEM Jurat, the jurat should clarify who is the responsible CEM for this project. There are three signatures on the page and one of the signatures is by a non-CEM. Please revise.
2. General comment, this report does not discuss the statistical methods that will be used to evaluate the background data once it is collected. It is suggested that KM describe the statistical methods that will be used to evaluate the background data in the revised version of this report.
3. General comment, KM should discuss how the proposed background data set will be evaluated versus background data sets collected by others (i.e., the City of Henderson, TIMET and BRC). It may be necessary for KM to consider these other background data sets in the development of the KM background data set. If the background data collected by KM differs from the data collected by others in the same geologic formation KM may need to discuss and justify the differences.
4. General comment, KM should discuss what types of background are proposed to be evaluated. For example, surface soil, sub-surface soil, sub-surface alluvium, sub-surface Muddy Creek formation (and different intervals?), ground water in the water table aquifer, ground water in deeper aquifers, etc.
5. Section 1.0, page 1-1, KM references a meeting that was held on April 1, 2005. This meeting did not occur. Please revise.
6. Section 1.2, page 1-4, KM states "In February 2004, the NDEP provided a response to the Kerr-McGee Supplemental Phase II ECA. NDEP indicated that yet additional work would be required including..." The NDEP believes that the tone of this statement is inappropriate and has not been presented with data to not require "additional work". If KM believes that the scope of work that the NDEP is requiring is too onerous, then KM should develop an opinion paper and submit this document to the NDEP prior to the development of any additional reports.
7. Section 2.5, page 2-3, KM describes the water within the Muddy Creek formation as being of "generally good quality" and describes the water from the deeper coarse grained Muddy Creek Formation as containing "55 mg/l calcium, 180 mg/l chloride, 180 mg/l sodium and 250 mg/l sulfate". It would be helpful if this data was compared to site data that is impacted and off-site data that is not impacted. This data has limited meaning when it is not compared to other data sets. KM should substantiate statements in reports with data or references.
8. Section 3.0, page 3-1, it is requested that KM provide additional explanation on how the data that is collected for VOCs and TPH will be used. Ideally, background locations would be selected that are not impacted by anthropogenic activities. Also, please explain how KM will differentiate between site-related impacts from VOCs and TPH given the following:
  - a. KM has documented releases of TPH on-site and elevated levels of TPH on-site and in the Western Area Power Administration (WAPA) easement.
  - b. KM has a number of VOCs that are site-related chemicals.
  - c. KM has collected limited groundwater data to determine the breadth and depth of contamination with regards to TPH and VOCs.
9. Section 3.2, pages 3-1 and 3-2, the NDEP has the following comments:

- a. General comment, it may not be necessary to complete DQOs in order to develop a background data set. If KM chooses to develop a set of DQOs it is necessary to complete these DQOs in accordance with USEPA guidance. The NDEP believes that it is necessary to complete as many steps of the DQOs as possible in order to make sound decisions about site issues. KM has chosen to present an abbreviated implementation of the DQOs and the NDEP believes that this has limited value. Specific comments and examples are provided below.
- b. Step 1, State the Problem, the NDEP has the following comments:
  - i. The NDEP believes that the word "alluvium" in this sentence is extraneous. If KM disagrees, please explain how samples will be collected in the "alluvium" that are different than the soil and groundwater samples that are proposed. This comment applies to other steps in the DQOs as well.
  - ii. KM has not identified the planning team and decision makers.
  - iii. KM has not identified available resources, constraints and deadlines.
  - iv. The NDEP believes that a reference to the CSM should be included in this step.
- c. Step 2, Identify the Decision, the NDEP has the following comment:
  - i. KM has not identified the principal study question, the alternative actions, or organized multiple decisions (if necessary).
- d. Step 3, Identify Inputs to the Decision, the NDEP has the following comment:
  - i. The NDEP believes that additional inputs may include: results of field screening of soil and groundwater; results of geological data collected; and the results of physical data of the soil. An additional input that should be discussed are the parameters that KM will compare the background data set to in order to determine if the data set is representative of background conditions.
- e. Step 4, Study Area Boundaries, the NDEP has the following comments:
  - i. KM should also state the depth-related boundary, and the time-related boundary for this study. In addition, it would be helpful if the areal boundaries were correlated to a figure.
  - ii. Populations of interest should be defined. Including but not limited to the following examples: surface soil, subsurface soil (and possibly the different geologic formations), and groundwater (and possibly groundwater derived from different geologic formations).
  - iii. The scale of decision making and practical constraints have not been discussed.
- f. Step 5, Develop a Decision Rule, the NDEP has the following comments:
  - i. KM has not specified the statistical parameter(s) that will characterize the population(s) of interest; or the action level that will be the basis for the decision; or combined the statistical parameter, the scale of decision making and the action level into a decision statement.
  - ii. The decision statement should be presented in an if-then format to comply with the USEPA guidance.



- g. Step 6, Specify Limits on Decision Error, and Step 7, Optimize the Design, the NDEP has the following comments:
- i. KM has not specified the limits on decision errors for step 6. KM should also discuss the project goals for power and significance. In addition, the null hypothesis has not been stated.
  - ii. Step 7 has not been completed in accordance with the USEPA guidance.
  - iii. It may not be necessary to complete Steps 6 and 7 of the DQOs. KM is asked to review the USEPA guidance and contemplate if it is necessary to complete Step 6 and 7 of the DQOs.
10. Section 4.1, pages 4-1 and 4-2, KM discusses the analytical data for perchlorate associated with existing well M-10, however, the analytical data for other analytes and other existing locations is not discussed. It is suggested that KM review and discuss the existing data for wells and soil borings in the vicinity of the proposed background locations. Please see additional comments below regarding the proposed background locations.
11. Section 4.1, pages 4-1 and 4-2, KM has proposed to sample soil and groundwater in a number of different geologic formations, however, KM does not discuss how this data will be applied in the future. KM should clarify the purpose of the work plan and identify if this background data set is intended to be applied to soils in the alluvium and the Muddy Creek Formation. In addition, a reference to the applicable tables would be helpful.
12. Section 4.3.1, page 4-3, please explain the methodology by which KM will obtain PID readings. Sonic drilling tends to produce heat which in turn accelerates volatilization. PID readings on the outer surface of a soil boring may not be representative of sub-surface conditions.
13. Section 4.3.5, page 4-5, KM indicated that water generated from well development activities will be containerized and temporarily stored on site. Please explain what the final means of disposition and characterization will be for this material.
14. Section 4.3.6.2, pages 4-6 and 4-7, the NDEP has the following comments:
- a. Please include a discussion on well equilibration.
  - b. Per USEPA guidance (*Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, April 1996), please limit the variance for electrical conductivity to 3%.
  - c. Please clarify the criteria for low-flow purging versus traditional purging methodologies. It is likely that low-flow purging may produce variances in analytical results. KM should consider the implementation of either low-flow purging or traditional methodologies and implement this method uniformly.
  - d. KM should consider implementing low-flow purging for wells that are located in low yield formations. Please note that TIMET has successfully implemented a low-flow purging and sampling program with some wells yielding as little as 40 mL/minute.
15. Section 4.3.6.3, pages 4-7 and 4-8, please note that USEPA guidance recommends against the use of a bailer for sample collection (*Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, May 2002).

16. Section 5.2, page 5-1, this section does not indicate that the analytical results will be statistically evaluated; see also general comment above on statistical methods. KM should describe how the background data will be evaluated if statistics are not proposed to be used.
17. Section 6.0, page 6-1, please note that the NDEP project manager for this case is Brian Rakvica not "Brian Ratvecka". Mr. Rakvica has been the project manager for this case for nearly two years and this type of error speaks to the lingering quality problems that KM continues to have.
18. Section 6.0, page 6-2, the Project Management Plan does not identify any personnel that perform QA/QC verification of documents prior to and after production. Based on the quality issues that KM has had in the past and continues to have, it is suggested that KM consider a more rigorous internal QA/QC program.
19. Section 7.0, pages 7-1 and 7-2, it would be helpful if KM listed the specific USEPA guidance that this document was prepared to be in compliance with.
20. Table 1, the NDEP has the following comments:
  - a. Wells H-11, TR-8, TR-9, TR-10, and M-103 all appear to be impacted by site operations due to elevated concentrations of perchlorate. These elevated levels of this site-related chemical would disqualify these locations as viable background sample locations. The concentrations of perchlorate in these wells range from 47 – 1,000 ppb. If KM believes that these perchlorate concentrations are representative of background conditions the NDEP will require additional documentation to support this opinion.
  - b. The NDEP requests that KM include a summary of the historic data from all of the existing wells that are proposed to be used for background. This data summary should include relevant data from the Montrose, Pioneer and Stauffer Corporations.
  - c. KM states that there is an upward hydraulic gradient from the Muddy Creek formation to the alluvial aquifer, however, well TR-9 contains 55 ppb perchlorate at 250' bgs. Please explain the mechanism by which perchlorate impacted this well at this depth.
  - d. Well H-11 is located south of the Montrose site and downgradient of an impacted site (the Fiesta Casino and adjacent properties). The properties upgradient of well H-11 that are impacted were historically used to stage ore materials and were also used as a historic dump by the BMI Companies. The NDEP explained this to KM in our meeting on March 16, 2005. It is suggested that KM review and present the historic data associated with well H-11. In addition, KM should present additional information to substantiate any opinion that the upgradient properties do not impact well H-11.
  - e. Screened intervals, the NDEP has the following comments:
    - i. Existing wells H-11, TR-7, TR-8, TR-9, and TR-10 are all screened well below the water table elevation as depicted on Figures 3, 4, and 5. Some wells are at greater than 200' below the existing water table elevation and are screened in a different geologic formation. KM should use existing wells or install new wells that are installed in the geologic formation that is closest to the alluvial aquifer and represents the "same water" that is found in the alluvial aquifer. It is not obvious

that the water located in the second coarse grained facies of the Muddy Creek Formation (MCF) is analogous to the water located in the alluvial aquifer.

- ii. It is not clear why new wells are being proposed to be screened nearly 100' below the water table elevation and in a different geologic formation. It is suggested that the wells be screened in the geologic formation that contains the water table aquifer. For example, proposed well M-118 is proposed to be screened from 120-140' bgs in the second fine grained facies of the MCF, however, the water table elevation is at approximately 50-60' bgs in the first coarse grained facies of the MCF. The NDEP does not understand the justification for such a proposal. Another example is proposed well M-117 is proposed to be screened from 120-140' bgs in the second fine grained facies of the MCF, however, the water table is at approximately 70' bgs in the first coarse grained facies of the MCF.

21. Table 2, the NDEP has the following comments:

- a. KM has proposed varying sample depths on a location by location basis. This will provide a limited data set for soils below 50' bgs. KM should discuss if two soil samples from depths of 60-120' bgs will be sufficient to evaluate background. Also, it is not clear that the number of samples proposed for the 0-50' bgs depth increment is sufficient. It is the belief of the NDEP that KM will likely need more soil samples from the various depth intervals to appropriately assess background conditions.
- b. Please discuss how the sampling program was developed. All analytes are not proposed to be analyzed at all depths. Further justification for the analyses in the selected depth intervals is required.
- c. Please discuss how the metals and radionuclides proposed for analysis relate to the site-related chemicals list and why some chemicals have been excluded. The following metals appear to be omitted: calcium, magnesium, platinum, phosphorous, potassium, sodium, strontium, and tin. The following radionuclides appear to be omitted: actinium 228, bismuth 212, polonium 210, radon 222, and isotopic uranium. The NDEP does not require that all site-related metals and radionuclides be included, however, justification should be provided for their exclusion.
- d. KM should list which VOCs are proposed for analysis.

22. Table 3, the NDEP has the following comments:

- a. Please note that the NDEP does not warrant the appropriateness of the methods selected by KM. It is the responsibility of KM to insure that the methods selected will provide data that is usable for the intended purposes and that KM will be in compliance with the NDEP Lab Certification Program. The comments provided below are for informational purposes.
- b. The method listed for perchlorate is EPA 350.1. This is the method for ammonia analysis. Please revise.
- c. It would be helpful if all of the VOCs and fuel alcohols intended for analysis be listed.

- d. The method listed for total uranium is EML ASTM D5174. This appears to be the method for uranium analysis in water. Please clarify and revise if necessary.
  - e. KM states that radon-222 is not proposed for analysis because there is "no test - too volatile". The NDEP requests that this statement be clarified. There are analytical methods available to detect radon in soil. It appears that method DOE A-01-R (HASL 300) could be used for this purpose.
  - f. KM references "EML HASL 300" as the method for a majority of the radionuclides. EML HASL 300 refers to the procedures of the Environmental Measurements laboratory and can be applied to a number of different analyses (<http://www.eml.doe.gov/publications/procman/>) including: inorganics, organics, radiochemistry, atmospheric testing and a number of other procedures. Please identify the specific methods that are intended to be used. For example, method EML GA-01-R MOD is applicable to Lead-210, Lead-212, Lead-214, Bismuth-212, Bismuth-214, Actinium-228, Potassium-40, and Thallium-208.
23. Table 4, the NDEP has the following comments:
- a. Please discuss how the metals and radionuclides proposed for analysis relate to the site-related chemicals list and why some chemicals have been excluded. The following metals appear to be omitted: platinum, phosphorous, strontium and tin. In addition, hexavalent chromium is not specifically identified. The following radionuclides appear to be omitted: actinium 228, bismuth 212, polonium 210, and radon 222. The NDEP does not require that all site-related metals and radionuclides be included, however, justification should be provided for their exclusion.
24. Table 5, the NDEP has the following comments:
- a. Please note that the NDEP does not warrant the appropriateness of the methods selected by KM. It is the responsibility of KM to insure that the methods selected will provide data that is usable for the intended purposes and that KM will be in compliance with the NDEP Lab Certification Program. The comments provided below are for informational purposes.
  - b. Two methods are listed for cyanide. One method measures total cyanide and the other measures cyanide available to chlorination. Please discuss if KM plans to analyze by both methods or one of the methods. If KM is choosing to analyze using one of the indicated methods please delete the extraneous reference and explain why that method was chosen. The NDEP suggests that the analysis for total cyanide be used if KM is going to use one of the methods.
  - c. Perchlorate is listed twice. Please remove the duplicate reference.
  - d. As stated previously, it would be helpful if all of the VOCs and fuel alcohols intended for analysis be listed.
  - e. Similar to the comment for cyanide, please specify what is intended for phosphate, sulfate, and radon analysis.
  - f. KM references "EML HASL 300" as the method for uranium and thorium. EML HASL 300 refers to the procedures of the Environmental Measurements laboratory and can be applied to a number of different analyses (<http://www.eml.doe.gov/publications/procman/>) including: inorganics,

Ms. Susan Crowley

5/6/2005

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organics, radiochemistry, atmospheric testing and a number of other procedures. Please identify the specific methods that are intended to be used.

25. Figures 3, 4, and 5, it is suggested that these cross-sections be extended to present the data that shows that the water located in the MCF surfaces into the alluvial aquifer.



Susan Crowley  
Staff Environmental Specialist

(702) 651-2234  
Fax (405) 228-6882  
scrowley@kmg.com

July 20, 2005

Mr. Brian Rakvica, P.E.  
Nevada Division of Environmental Protection  
1771 East Flamingo, Suite 121-A  
Las Vegas, NV 89119-0837

Subject: NDEP Facility ID H-000539 – Kerr-McGee ECA – *Background Study Work Plan – Groundwater and Soils* - Kerr-McGee Response to NDEP May 6, 2005 Comments

Dear Mr. Rakvica:

Kerr-McGee Chemical LLC (Kerr-McGee) has undertaken an Environmental Conditions Assessment (ECA) as directed by Nevada Division of Environmental Protection (NDEP). Integral to that investigation is understanding background conditions associated with the site. In late March 2005, Kerr-McGee submitted a *Background Study Work Plan – Groundwater and Soils* (Work Plan), which once executed is intended to provide information associated with background site conditions. NDEP provided comments regarding the Work Plan on May 6, 2005 and this correspondence provides responses to those comments. Our Work Plan has been revised to reflect the responses provided here but after discussion with your office we will hold on re-submittal of the revised Work Plan until you have reviewed the Attachment A enclosed.

Feel free to call me at (702) 651-2234 if you have any questions regarding this correspondence. Thank you.

Sincerely,

A handwritten signature in cursive script that reads 'Susan Crowley'.

Susan Crowley  
Staff Environmental Specialist, CEM 1428

Overnight Mail

Cc: Public Repository  
Jeff Johnson, NDEP  
Jennifer Carr, NDEP  
Todd Croft, NDEP  
Mitch Kaplan, EPA Region IX  
Val King, NDEP  
Jim Najima, NDEP  
Jon Palm, NDEP

Brian Rakvica  
July 20, 2005  
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Brenda Pohlmann, COH  
Barry Conaty, COH  
Ron Sahu, BMI  
Carrie Stowers, CCCP  
Paul Sunberg, Montrose  
Al Tinney, NDEP  
Craig Wilkinson, TIMET  
Keith Bailey, Kerr-McGee  
Sally Bilodeau, ENSR  
Pat Corbett, Kerr-McGee  
John Dixon, Kerr-McGee  
Dave Gerry, ENSR  
Ed Krish, ENSR  
Tom Reed, Kerr-McGee  
Don Shandy, Kerr-McGee  
Rick Stater, Kerr-McGee

Attachment

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**Attachment A**  
**Kerr-McGee response to NDEP**  
**Comments on the Background Investigation Work Plan**  
**dated March 29, 2005 – Letter Dated May 6, 2005**  
**Henderson, Nevada**

**NDEP Comment 1:**

1. General comment, CEM Jurat, the jurat should clarify who is the responsible CEM for this project. There are three signatures on the page and one of the signatures is by a non-CEM. Please revise.

***Response:***

*The signature page has been revised.*

**NDEP Comment 2:**

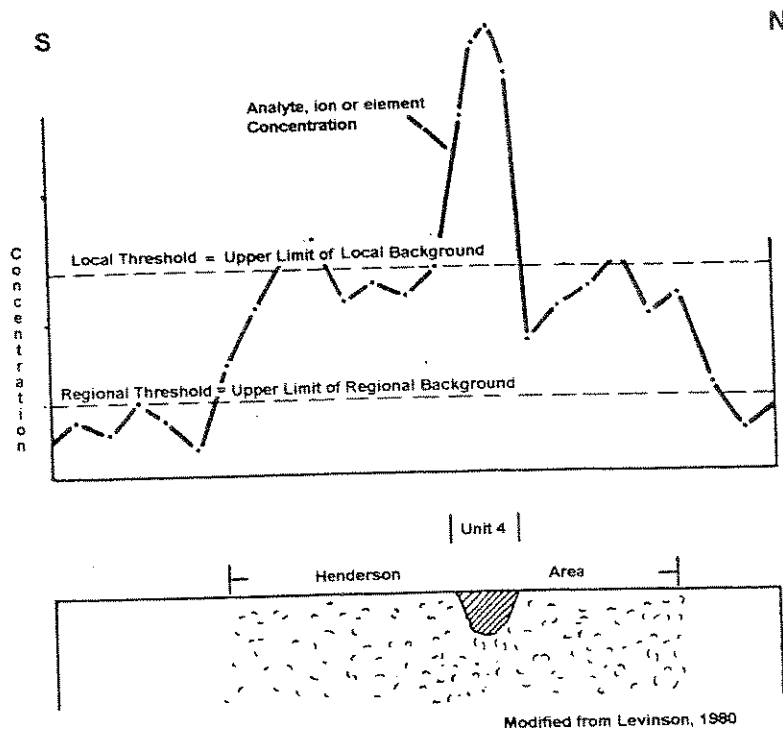
2. General comment, this report does not discuss the statistical methods that will be used to evaluate the background data once it is collected. It is suggested that KM describe the statistical methods that will be used to evaluate the background data in the revised version of this report.

***Response:***

*In interpreting the various chemical trends in the area of the Site, it is important to understand the concept of regional versus local background and threshold. As defined in the literature (Levinson, 1980), background is the normal range of concentrations, centered around some most likely value (the median), for an analyte, ion or element in an area. It is essential to understand that background is a range, and that normal backgrounds are established in unimpacted areas. The upper limit of background value, above which samples are considered anomalous, is defined as the threshold. The threshold is the highest background concentration.*

*Threshold concentrations, like median background concentrations, will vary for each analyte, ion or element, in each formation type and in each area. Concentrations higher than the threshold are considered anomalous and worthy of further evaluation. Statistical analyses of the sampled data allow a threshold to be defined. In most impacted areas there are usually two background values and two threshold values. These are called regional threshold, which is based on the normal (regional) background and the local threshold, based on a local (upgradient) background. The local (upgradient) background gives higher values and is generally in the vicinity of an impacted area. This concept is illustrated in the figure below, modified from Levinson (1980).*





Modified from Levinson, 1980

From this figure it can be seen that the regional upper limit of background (the regional threshold) can be considered a "plain" whereas the local upper limit of background (the local threshold) can be considered a "plateau" and the anomalies are represented as peaks. The definition of local backgrounds and thresholds, and the distinction between local and regional backgrounds and thresholds, are of great importance in the interpretation of chemical data.

By way of example, the bottom of the figure shows a theoretical cross section from the Black Mtns. on the south, through the Henderson and the BMI Complex areas, to Frenchman's Mtn on the north. This clearly illustrates the relationship of the higher local Henderson area background to the lower background of the surrounding region and the higher anomalous background in the Unit 4 area to the lower relative background of the Henderson area.

Without the benefit of a detailed geochemical orientation survey, the best way to determine regional and local background and threshold values is by using statistical methods. The conventional method, of taking the threshold as the mean plus two standard deviations, presents problems when dealing with geochemical data. Firstly, this method is designed for single population samples distributed symmetrically (either normal or lognormal). In geochemical surveys, sampling usually includes many individual populations related to bedrock type, environmental phenomena and contamination and therefore precludes the gathering of the requisite single population. Thus this situation really fits a case where the "statistical distribution is irregular" as defined by Hawkes and Webb (1962). Secondly, in areas containing contamination, the

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*inclusion of erratic high values renders the population asymmetrically distributed and biases the statistics toward the high end. For these kinds of "irregular" distributions the threshold can only be considered an "inspection level" and no true threshold can be determined (Garrett, 1989).*

*The preferred method used for determining the median background and upper limit of background (regional and local threshold) is described by Hawkes and Webb (1962). In this method the geochemical data are ordered (ranked) from lowest to highest, as one would do in preparing a cumulative frequency plot, and any erratic high values are set aside and some top percentage of the data are selected for further evaluation. According to these authors, when the statistical distribution is irregular, as it probably is in the Henderson area, "probably the best approximation is to estimate threshold (upper limit of background) as that value which is exceeded by no more than 2.5 percent of the total number of observations, excluding markedly high erratic values". Erratic values are defined as those lacking regularity. They are valid data, collected using approved industry methods and analyzed by reputable geochemical laboratories using approved analytical techniques. The only difference is that the erratic values have a markedly higher analyte content due to the sampling of scattered local anomalous phenomenon.*

**References:**

Garrett, R. G. 1989. *A Cry from the Heart*. in *Explore*, Association of Exploration Geochemists Newsletter, Number 66, June 1989, Pg. 18-19.

Hawkes, H.E. and Webb, J.S. 1962. *Geochemistry in Mineral Exploration*, First edition: Harper and Row, New York, 415p.

Levinson, A.A. 1980. *Introduction to Exploration Geochemistry*. Second Edition: Applied Publishing, Calgary, 924p.

**NDEP Comment 3:**

3. General comment, KM should discuss how the proposed background data set will be evaluated versus background data sets collected by others (i.e., the City of Henderson, TIMET and BRC). It may be necessary for KM to consider these other background data sets in the development of the KM background data set. If the background data collected by KM differs from the data collected by others in the same geologic formation KM may need to discuss and justify the differences.

**Response:**

*Kerr-McGee will compare this data set with data sets collected by others as appropriate for data sets collected from different physical locations and different geologic units. Background soil sampling by the City of Henderson, TIMET and BRC will probably suffice to establish the regional background and threshold. Also see the response for NDEP Comment 2.*

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**NDEP Comment 4:**

4. General comment, KM should discuss what types of background are proposed to be evaluated. For example, surface soil, sub-surface soil, sub-surface alluvium, sub-surface Muddy Creek formation (and different intervals?), ground water in the water table aquifer, ground water in deeper aquifers, etc.

***Response:***

*Soil samples will be collected from 0.5 feet below ground surface (bgs), subsurface soil/alluvium samples will be collected from depths of 5, 10, 20, 30, 40 feet bgs (i.e. at 10 foot intervals until the Muddy Creek Formation is reached) and Muddy Creek formation samples will be collected at 10 foot intervals to the total depth of each borehole (currently estimated to be 140 feet in M-117 and M-118). Groundwater samples will be collected from the Muddy Creek coarse grained facies 1 and 2 (MCfg 1 and 2) and the Muddy Creek fine grained facies 2. These sample intervals are summarized in Tables 1 and 2 of the Workplan.*

**NDEP Comment 5:**

5. Section 1.0, page 1-1, KM references a meeting that was held on April 1, 2005. This meeting did not occur. Please revise.

***Response:***

*The meeting date has been changed to March 16, 2005.*

**NDEP Comment 6:**

6. Section 1.2, page 1-4, KM states "In February 2004, the NDEP provided a response to the Kerr-McGee Supplemental Phase II ECA. NDEP indicated that yet additional work would be required including..." The NDEP believes that the tone of this statement is inappropriate and has not been presented with data to not require "additional work". If KM believes that the scope of work that the NDEP is requiring is too onerous, then KM should develop an opinion paper and submit this document to the NDEP prior to the development of any additional reports.

***Response:***

*Kerr-McGee did not intend to offend the NDEP and has removed the "yet" from the sentence.*

**NDEP Comment 7:**

7. Section 2.5, page 2-3, KM describes the water within the Muddy Creek formation as being of "generally good quality" and describes the water from the deeper coarse grained Muddy Creek Formation as containing "55 mg/l calcium, 180 mg/l chloride, 180

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mg/l sodium and 250 mg/l sulfate". It would be helpful if this data was compared to site data that is impacted and off-site data that is not impacted. This data has limited meaning when it is not compared to other data sets. KM should substantiate statements in reports with data or references.

**Response:**

*The sentence discussing the data has been removed.*

**NDEP Comment 8**

8. Section 3.0, page 3-1, it is requested that KM provide additional explanation on how the data that is collected for VOCs and TPH will be used. Ideally, background locations would be selected that are not impacted by anthropogenic activities. Also, please explain how KM will differentiate between site-related impacts from VOCs and TPH given the following:
- a. KM has documented releases of TPH on-site and elevated levels of TPH on-site and in the Western Area Power Administration (WAPA) easement.
  - b. KM has a number of VOCs that are site-related chemicals.
  - c. KM has collected limited groundwater data to determine the breadth and depth of contamination with regards to TPH and VOCs.

**Response:**

*It is acknowledged that if TPH or VOC impacts are detected, additional analysis may be required to determine the extent and/or source of impact. Such analysis could include but not necessarily be limited to fuel fingerprinting.*

**NDEP Comment 9:**

9. Section 3.2, pages 3-1 and 3-2, the NDEP has the following comments:
- a. General comment, it may not be necessary to complete DQOs in order to develop a background data set. If KM chooses to develop a set of DQOs it is necessary to complete these DQOs in accordance with USEPA guidance. The NDEP believes that it is necessary to complete as many steps of the DQOs as possible in order to make sound decisions about site issues. KM has chosen to present an abbreviated implementation of the DQOs and the NDEP believes that this has limited value. Specific comments and examples are provided below.
  - b. Step 1, State the Problem, the NDEP has the following comments:
    - i. The NDEP believes that the word "alluvium" in this sentence is extraneous. If KM disagrees, please explain how samples will be collected in the "alluvium" that are different than the soil and groundwater samples that are proposed. This comment applies to other steps in the DQOs as well.
    - ii. KM has not identified the planning team and decision makers.
    - iii. KM has not identified available resources, constraints and deadlines.
    - iv. The NDEP believes that a reference to the CSM should be included in this step.

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locations. Please see additional comments below regarding the proposed background locations.

**Response:**

*A table will be added to section 4.1 that will list all of the available recent chemistry for the other existing upgradient wells in the vicinity of the proposed background locations. The contents of the table will be discussed in the text.*

**NDEP Comment 11:**

11. Section 4.1, pages 4-1 and 4-2, KM has proposed to sample soil and groundwater in a number of different geologic formations, however, KM does not discuss how this data will be applied in the future. KM should clarify the purpose of the work plan and identify if this background data set is intended to be applied to soils in the alluvium and the Muddy Creek Formation. In addition, a reference to the applicable tables would be helpful.

**Response:**

*The purpose of this work plan is to characterize the local background geochemistry of the sediments in the different upgradient formations as well as to characterize the local background chemistry of the groundwater that moves through them. It is anticipated that background soil sampling by the City of Henderson, TIMET and BRC will be sufficient to establish the regional background and threshold.*

*Chemical data generated in the sampling of soil from the different geologic formations will be used to establish a local baseline case showing the present chemical character of these formations at the upgradient edge of the Site. Chemical data generated in the sampling of groundwater from the different geologic formations will also be used to establish a local baseline case showing the present chemical character of these formation waters at the upgradient edge of the Site. These wells will be monitored annually for changes to this baseline. Refer also to the response to comment 2.*

**NDEP Comment 12:**

12. Section 4.3.1, page 4-3, please explain the methodology by which KM will obtain PID readings. Sonic drilling tends to produce heat which in turn accelerates volatilization. PID readings on the outer surface of a soil boring may not be representative of sub-surface conditions.

**Response:**

*The following has been added to the workplan. "Approximately 200 grams of soil will be removed from the sampling tube and placed in a zip lock plastic bag. In general soil from the middle sleeve of the sampling tube is used for the PID analysis. Once sealed in the bag the soil will be broken apart and allowed to equilibrate for about 20 minutes. The probe tip of the PID will be inserted into the plastic bag and a reading obtained.*

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- c. Step 2, Identify the Decision, the NDEP has the following comment:
    - i. KM has not identified the principal study question, the alternative actions, or organized multiple decisions (if necessary).
  - d. Step 3, Identify Inputs to the Decision, the NDEP has the following comment:
    - i. The NDEP believes that additional inputs may include: results of field screening of soil and groundwater; results of geological data collected; and the results of physical data of the soil. An additional input that should be discussed are the parameters that KM will compare the background data set to in order to determine if the data set is representative of background conditions.
  - e. Step 4, Study Area Boundaries, the NDEP has the following comments:
    - i. KM should also state the depth-related boundary, and the time-related boundary for this study. In addition, it would be helpful if the areal boundaries were correlated to a figure.
    - ii. Populations of interest should be defined. Including but not limited to the following examples: surface soil, subsurface soil (and possibly the different geologic formations), and groundwater (and possibly groundwater derived from different geologic formations).
    - iii. The scale of decision making and practical constraints have not been discussed.
  - f. Step 5, Develop a Decision Rule, the NDEP has the following comments:
    - i. KM has not specified the statistical parameter(s) that will characterize the population(s) of interest; or the action level that will be the basis for the decision; or combined the statistical parameter, the scale of decision making and the action level into a decision statement.
    - ii. The decision statement should be presented in an if-then format to comply with the USEPA guidance.
  - g. Step 6, Specify Limits on Decision Error, and Step 7, Optimize the Design, the NDEP has the following comments:
    - i. KM has not specified the limits on decision errors for step 6. KM should also discuss the project goals for power and significance. In addition, the null hypothesis has not been stated.
    - ii. Step 7 has not been completed in accordance with the USEPA guidance.
    - iii. It may not be necessary to complete Steps 6 and 7 of the DQOs. KM is asked to review the USEPA guidance and contemplate if it is necessary to complete Step 6 and 7 of the DQOs.

**Response:**

*The DQOs have been removed.*

**NDEP Comment 10:**

10. Section 4.1, pages 4-1 and 4-2, KM discusses the analytical data for perchlorate associated with existing well M-10, however, the analytical data for other analytes and other existing locations is not discussed. It is suggested that KM review and discuss the existing data for wells and soil borings in the vicinity of the proposed background

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*These organic vapor readings will be recorded on boring logs prepared by the field geologist during drilling activities. The PID will be calibrated to 100 ppm isobutylene each day prior to its use."*

*In response to the heat from sonic drilling, please note that the drill string is removed from the borehole and the split spoon sampler is advanced into "undisturbed" soil, so heat transference from the sonic drill bit to the portion of the soil column that is sampled will be minimal.*

**NDEP Comment 13:**

13. Section 4.3.5, page 4-5, KM indicated that will be containerized and temporarily stored on site. Please explain what the end characterization will be for this material.

**Response:**

*The water generated from well development activities will stored in the GW-11 pond and treated on site.*

**NDEP Comment 14:**

14. Section 4.3.6.2, pages 4-6 and 4-7, the NDEP has the following comments:
- a. Please include a discussion on well equilibration.
  - b. Per USEPA guidance (*Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, April 1996), please limit the variance for electrical conductivity to 3%.
  - c. Please clarify the criteria for low-flow purging versus traditional purging methodologies. It is likely that low-flow purging may produce variances in analytical results. KM should consider the implementation of either low-flow purging or traditional methodologies and implement this method uniformly.
  - d. KM should consider implementing low-flow purging for wells that are located in low yield formations. Please note that TIMET has successfully implemented a low -flow purging and sampling program with some wells yielding as little as 40 mL/minute.

**Response:**

- a. *The text has been revised to state, "The well casing will have a vent hole so equilibration of the water level prior to purging and sampling should be achieved. Water levels will be monitored during purging and sampling and, if possible, drawdown will be limited to less than 10 percent of the distance between the initial water level and pump intake."*
- b. *Historical data indicate that electrical conductivity varies 5% due to the chemistry of the local aquifer so that site specific value will be applied.*
- c. *Kerr-McGee is still in the process of evaluating the purge and sampling methods to apply to the site. It is anticipated that some comparative tests may be proposed to resolve this issue. Kerr-McGee will work closely with NDEP to identify and implement sampling methods that are acceptable to both parties.*

- 
- d. *Kerr-McGee is still in the process of evaluating the purge and sampling methods to apply to the site. It is anticipated that some comparative tests may be proposed to resolve this issue. Kerr-McGee will work closely with NDEP to identify and implement sampling methods that are acceptable to both parties.*

**NDEP Comment 15:**

15. Section 4.3.6.3, pages 4-7 and 4-8, please note that USEPA guidance recommends against the use of a bailer for sample collection (*Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, May 2002*).

***Response:***

*Comment noted. See response to 14 c and d above.*

**NDEP Comment 16:**

16. Section 5.2, page 5-1, this section does not indicate that the analytical results will be statistically evaluated; see also general comment above on statistical methods. KM should describe how the background data will be evaluated if statistics are not proposed to be used.

***Response:***

*As described in the response for NDEP Comment 2, Kerr-McGee plans to identify a local threshold (upper limit of background) as that value that is not exceeded by 2.5 percent of the total number of observations, excluding markedly high erratic values.*

**NDEP Comment 17:**

17. Section 6.0, page 6-1, please note that the NDEP project manager for this case is Brian Rakvica not "Brian Ratvecka". Mr. Rakvica has been the project manager for this case for nearly two years and this type of error speaks to the lingering quality problems that KM continues to have.

***Response:***

*Comment noted.*

**NDEP Comment 18:**

18. Section 6.0, page 6-2, the Project Management Plan does not identify any personnel that perform QA/QC verification of documents prior to and after production. Based on the quality issues that KM has had in the past and continues to have, it is suggested that KM consider a more rigorous internal QA/QC program.

***Response:***

*A QA/QC verification of documents team has been designated.*



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**NDEP Comment 19:**

19. Section 7.0, pages 7-1 and 7-2, it would be helpful if KM listed the specific USEPA guidance that this document was prepared to be in compliance with.

***Response:***

*The references section has been expanded to include USEPA guidance documents.*

**NDEP Comment 20:**

20. Table 1, the NDEP has the following comments:

- a. Wells H-11, TR-8, TR-9, TR-10, and M-103 all appear to be impacted by site operations due to elevated concentrations of perchlorate. These elevated levels of this site-related chemical would disqualify these locations as viable background sample locations. The concentrations of perchlorate in these wells range from 47 – 1,000 ppb. If KM believes that these perchlorate concentrations are representative of background conditions the NDEP will require additional documentation to support this opinion.
- b. The NDEP requests that KM include a summary of the historic data from all of the existing wells that are proposed to be used for background. This data summary should include relevant data from the Montrose, Pioneer and Stauffer Corporations.
- c. KM states that there is an upward hydraulic gradient from the Muddy Creek formation to the alluvial aquifer; however, well TR-9 contains 55 ppb perchlorate at 250' bgs. Please explain the mechanism by which perchlorate impacted this well at this depth.
- d. Well H-11 is located south of the Montrose site and downgradient of an impacted site (the Fiesta Casino and adjacent properties). The properties upgradient of well H-11 that are impacted were historically used to stage ore materials and were also used as a historic dump by the BMI Companies. The NDEP explained this to KM in our meeting on March 16, 2005. It is suggested that KM review and present the historic data associated with well H-11. In addition, KM should present additional information to substantiate any opinion that the upgradient properties do not impact well H-11.
- e. Screened intervals, the NDEP has the following comments:
  - i. Existing wells H-11, TR-7, TR-8, TR-9, and TR-10 are all screened well below the water table elevation as depicted on Figures 3, 4, and 5. Some wells are at greater than 200' below the existing water table elevation and are screened in a different geologic formation. KM should use existing wells or install new wells that are installed in the geologic formation that is closest to the alluvial aquifer and represents the "same water" that is found in the alluvial aquifer. It is not obvious that the water located in the second coarse grained facies of the Muddy Creek Formation (MCF) is analogous to the water located in the alluvial aquifer.
  - ii. It is not clear why new wells are being proposed to be screened nearly 100' below the water table elevation and in a different geologic formation.

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It is suggested that the wells be screened in the geologic formation that contains the water table aquifer. For example, proposed well M-118 is proposed to be screened from 120-140' bgs in the second fine grained facies of the MCF, however, the water table elevation is at approximately 50-60' bgs in the first coarse grained facies of the MCF. The NDEP does not understand the justification for such a proposal. Another example is proposed well M-117 is proposed to be screened from 120-140' bgs in the second fine grained facies of the MCF, however, the water table is at approximately 70' bgs in the first coarse grained facies of the MCF.

**Response:**

- a. *In the response to NDEP Comment 2, the concept of regional versus local background and threshold was described and illustrated in a figure. It was stressed that background is a range of values centered around a median concentration and that the threshold is the upper limit of background above which concentrations are anomalous. This concept requires that there will be two backgrounds and two thresholds – a lower regional one and a higher local one. Henderson, by its very nature as a residential/commercial/industrial city, appears to have made its background and threshold the higher local variety. In essence, Henderson, in its 70+ years of existence, has impacted some soil and groundwater. Chemical impacts upgradient of the Kerr-McGee Site contribute to the higher local background and threshold conditions which, in turn, directly impact the Kerr-McGee Site.*

*The NDEP observation of 1000 ug/l perchlorate in well TR-10 has been noted. However the recently discovered 510 and 390 ug/l perchlorate concentrations in groundwater along Lake Mead Parkway, south of TIMET and downgradient of downtown Henderson, appears to indicate other upgradient off-site impacts*

*In response to NDEP's concerns, Kerr-McGee has relocated wells M-117 and M-118 to the extreme south end of the property approximately 50 feet north of Lake Mead Parkway. In addition two wells will be constructed in the same area to monitor the first encountered water bearing zone.*

- b. *A summary table of historic chemical data, of known data quality, will be provided for the existing wells that are proposed to be used for background.*
- c. *Potential mechanisms will be discussed.*
- d. *The historic data from well H-11, of known data quality, will be presented and the difference between regional background and local (upgradient) background and threshold will be discussed.*
- e.i *The TR-series wells were installed in 1999 to specifically look for the deep AMPAC perchlorate plume in the first and second coarse-grained facies of the Muddy Creek formation beneath the Kerr-McGee Site. At that time the eastern most expression of this plume was in the Thatcher well, 3000 feet to the west and possibly in H-11 located 300 feet west of the Kerr-McGee property boundary.*

- 
- Kerr-McGee has sought to monitor and understand what upgradient off-Site chemical constituents are flowing toward the Site. The rationale for completing proposed wells M-117 and M-118 in the MCfg2 unit is because there are not wells completed in that unit. As mentioned above, the locations for the two new wells have been relocated to the south and two additional wells to monitor the first encountered water bearing zone will also be constructed. Comment noted.*
- e.ii *In order to be further away and upgradient from historic industrial land uses, Kerr-McGee has relocated wells M-117 and M-118 to the extreme south end of the property just north of the drainage ditch that parallels Lake Mead Parkway. In addition two wells will be constructed in the same area to monitor the first encountered water bearing zone. The map and cross sections will be updated to reflect this change. Comment noted.*

**NDEP Comment 21:**

21. Table 2, the NDEP has the following comments:

- a. KM has proposed varying sample depths on a location by location basis. This will provide a limited data set for soils below 50' bgs. KM should discuss if two soil samples from depths of 60-120' bgs will be sufficient to evaluate background. Also, it is not clear that the number of samples proposed for the 0-50' bgs depth increment is sufficient. It is the belief of the NDEP that KM will likely need more soil samples from the various depth intervals to appropriately assess background conditions.
- b. Please discuss how the sampling program was developed. All analytes are not proposed to be analyzed at all depths. Further justification for the analyses in the selected depth intervals is required.
- c. Please discuss how the metals and radionuclides proposed for analysis relate to the site-related chemicals list and why some chemicals have been excluded. The following metals appear to be omitted: calcium, magnesium, platinum, phosphorous, potassium, sodium, strontium, and tin. The following radionuclides appear to be omitted: actinium 228, bismuth 212, polonium 210, radon 222, and isotopic uranium. The NDEP does not require that all site-related metals and radionuclides be included, however, justification should be provided for their exclusion.
- d. KM should list which VOCs are proposed for analysis.

**Response:**

- a. *Kerr-McGee will discuss the need for additional background samples following analysis of the samples proposed.*
- b. *Justification for the analysis selected for the depth intervals has been included.*
- c. *Justification for the selected metals and radionuclides has been included.*
- d. *The VOCs proposed for analyses are listed at the end of this document and at the bottom of Table 3.*

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### NDEP Comment 22:

22. Table 3, the NDEP has the following comments:

- a. Please note that the NDEP does not warrant the appropriateness of the methods selected by KM. It is the responsibility of KM to insure that the methods selected will provide data that is usable for the intended purposes and that KM will be in compliance with the NDEP Lab Certification Program. The comments provided below are for informational purposes.
- b. The method listed for perchlorate is EPA 350.1. This is the method for ammonia analysis. Please revise.
- c. It would be helpful if all of the VOCs and fuel alcohols intended for analysis be listed.
- d. The method listed for total uranium is EML ASTM D5174. This appears to be the method for uranium analysis in water. Please clarify and revise if necessary.
- e. KM states that radon-222 is not proposed for analysis because there is "no test – too volatile". The NDEP requests that this statement be clarified. There are analytical methods available to detect radon in soil. It appears that method DOE A-01-R (HASL 300) could be used for this purpose.
- f. KM references "EML HASL 300" as the method for a majority of the radionuclides. EML HASL 300 refers to the procedures of the Environmental Measurements laboratory and can be applied to a number of different analyses (<http://www.eml.doe.gov/publications/procman/>) including: inorganics, organics, radiochemistry, atmospheric testing and a number of other procedures. Please identify the specific methods that are intended to be used. For example, method EML GA-01-R MOD is applicable to Lead-210, Lead-212, Lead-214, Bismuth-212, Bismuth-214, Actinium-228, Potassium-40, and Thallium-208.

### **Response:**

- a. *Comment noted.*
- b. *Comment noted. The method for Perchlorate in soil to be used is EPA 314.0 using preparation method 1:10 DI-leach.*
- c. *The VOCs proposed for analyses are listed at the end of this document and on Table 3.*
- d. *The method to be used for analysis of total Uranium is DOE U-02 using Alpha Spectroscopy.*
- e. *According to the contracted Nevada Certified lab for radionuclide analyses (both soil and water) Radon-222 analyses are not performed on soil, in groundwater the analyses is by Liquid Scintillation SM 7500-RN-B. However, Nevada does not certify a method for Radon-222 in either water or soil.*
- f. *Table 3 has been revised with specific methods.*

### NDEP Comment 23:

23. Table 4, the NDEP has the following comments:

- a. Please discuss how the metals and radionuclides proposed for analysis relate to the site-related chemicals list and why some chemicals have been excluded.

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The following metals appear to be omitted: platinum, phosphorous, strontium and tin. In addition, hexavalent chromium is not specifically identified. The following radionuclides appear to be omitted: actinium 228, bismuth 212, polonium 210, and radon 222. The NDEP does not require that all site-related metals and radionuclides be included, however, justification should be provided for their exclusion.

**Response:**

*Justification for the selected metals and radionuclides has been included.*

**NDEP Comment 24:**

24. Table 5, the NDEP has the following comments:

- a. Please note that the NDEP does not warrant the appropriateness of the methods selected by KM. It is the responsibility of KM to insure that the methods selected will provide data that is usable for the intended purposes and that KM will be in compliance with the NDEP Lab Certification Program. The comments provided below are for informational purposes.
- b. Two methods are listed for cyanide. One method measures total cyanide and the other measures cyanide available to chlorination. Please discuss if KM plans to analyze by both methods or one of the methods. If KM is choosing to analyze using one of the indicated methods please delete the extraneous reference and explain why that method was chosen. The NDEP suggests that the analysis for total cyanide be used if KM is going to use one of the methods.
- c. Perchlorate is listed twice. Please remove the duplicate reference.
- d. As stated previously, it would be helpful if all of the VOCs and fuel alcohols intended for analysis be listed.
- e. Similar to the comment for cyanide, please specify what is intended for phosphate, sulfate, and radon analysis.
- f. KM references "EML HASL 300" as the method for uranium and thorium. EML HASL 300 refers to the procedures of the Environmental Measurements laboratory and can be applied to a number of different analyses (<http://www.eml.doe.gov/publications/procman/>) including: inorganics, organics, radiochemistry, atmospheric testing and a number of other procedures. Please identify the specific methods that are intended to be used.

**Response:**

- a. *Comment noted.*
- b. *The analysis for Total Cyanide will be used (EPA Method 335.2) as it is a better measure of occurrence that will detect free Cyanide and metal associated Cyanides.*
- c. *Comment noted, the duplicate reference has been removed.*
- d. *The list of VOCs to be analyzed is attached in Kerr-McGee's response to comment 25. No fuel alcohols will be analyzed due to the difficulty in analyzing for ethanol and methanol, also methanol is the solvent for the internal standard used in the laboratory making analysis for this analyte virtually impossible.*

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- e. The analysis for phosphate will be the colorimetric method EPA 365.1, which is more sensitive than EPA 300.0. The analysis for sulfate will be EPA 300, which is more precise than EPA 375.4. The analysis for radon will be Standard Methods 7500-RN-B, which is the method proposed by EPA for the Radon Rule and is more precise than EPA 913.0.
- f. Total Uranium will be analyzed by DOE U-02 (Alpha Spectroscopy). Isotopic Thorium will be analyzed by ACW-03 (Alpha Spectroscopy), however Nevada does not certified any analysis for Thorium.

**NDEP Comment 25:**

25. Figures 3, 4, and 5, it is suggested that these cross-sections be extended to present the data that shows that the water located in the MCF surfaces into the alluvial aquifer.

**Response:**

A north-south cross section (PLATE 4d) that shows the water located in the Muddy Creek formation surfaces into the alluvial aquifer is part of the Conceptual Site Model document dated February 28, 2005. Readers will be referred to that cross section.

24d. List of VOCs to be analyzed in Groundwater and Soil. In groundwater no fuel alcohols will be analyzed due to difficulty in analyzing for ethanol and methanol is the solvent for the internal standard used in the laboratory.

1,1,1,2-Tetrachloroethane	Bromoform
1,1,1-Trichloroethane	Carbon disulfide
1,1,2,2-Tetrachloroethane	Carbon Tetrachloride
1,1,2-Trichloroethane (1,1,2-T	Chlorobenzene
1,1-Dichloroethane	Chloroethane
1,1-Dichloroethylene (1,1DCE)	Chloroform (Trichloromethane)
1,2,3-Trichlorobenzene	cis-1,2-Dichloroethene
1,2,3-Trichloropropane	cis-1,3-Dichloropropene
1,2,4-Trichlorobenzene	Dibromochloromethane
1,2,4-Trimethylbenzene	Dibromomethane
1,2-Dichloroethane	Dichlorobromomethane
1,2-Dichloropropane	Dichlorodifluoromethane
1,3,5-Trimethylbenzene	Ethyl benzene
1,3-Dichloropropane	Freon 113
2,2-Dichloropropane	Hexachlorobutadiene
2-Butanone (MEK)	Iodomethane
2-Chloroethylvinyl ether	Isopropylbenzene
2-Hexanone	m-Dichlorobenzene (1,3-DCB)
4-Methyl-2-Pentanone (MIBK)	Methyl Bromide
Acetone	Methyl Chloride
Acrylonitrile	methyl isobutyl ketone*
Benzene	methyl tert-butyl ether
Bromobenzene	Methylene Chloride
Bromochloromethane	Naphthalene

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AUG - 1 2005

July 28, 2005

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Kerr-McGee Chemical Corporation LLC (KM)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Background Study Workplan – Groundwater and Soils – Kerr-McGee Response*  
*to NDEP May 6, 2005 Comments dated July 20, 2005*

Dear Ms. Crowley,

The NDEP has received and reviewed KM's correspondence identified above and provides comments in Attachment A. Please address these comments in the revised workplan, if there are questions it is suggested that these issue be discussed in our next monthly meeting.

If there is anything further or if there are any questions please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "BR" followed by a long horizontal line.

Brian A. Rakvica, P.E.  
Staff Engineer III  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

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*n*-Butylbenzene  
*n*-Propylbenzene  
*o*-Chlorotoluene  
*o*-Dichlorobenzene (1,2-DCB)  
*p*-Chlorotoluene  
*p*-Dichlorobenzene (1,4-DCB)  
*p*-Isopropyltoluene  
*sec*-Butylbenzene  
Styrene  
*tert*-Butylbenzene

Tetrachloroethylene (PCE)  
Toluene  
Total Trihalomethanes  
Total Xylenes  
*trans*-1,2-Dichloroethene  
*trans*-1,3-Dichloropropene  
Trichloroethylene (TCE)  
Trichlorofluoromethane  
Vinyl Acetate  
Vinyl Chloride (VC)



Ms. Susan Crowley

7/27/2005

Page 2

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Jeff Johnson, NDEP, BCA, Carson City  
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75 Hawthorne Street, San Francisco, CA 94105-3901  
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1741  
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DE 19850-5437  
Mr. Chris Sylvia, Pioneer Americas LLC, PO Box 86, Henderson, Nevada 89009  
Mr. Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California  
95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380,  
Bainbridge Island, WA 98110

Attachment A

1. General comment, in a number of instances KM notes that the response is provided in the revised workplan. The NDEP will review the appropriateness of these revisions once the revised workplan is received.
2. Response #2, the NDEP has the following comments:
  - a. The NDEP recommends the use of the following statistical tests: Gehan Modification of the Wilcoxon Rank Sum Test; Quantile Test; Slippage Test; and side-by-side plots. The NDEP can provide additional information on these tests and a reference to a website that may assist Kerr-McGee with completing these tests. The derivation of background is an issue that requires rigorous analysis by KM and concurrence by the NDEP.
  - b. KM should reference the applicable USEPA guidance on the calculation of the range of background concentrations. Geochemistry textbooks are not an appropriate reference. Please review the applicable USEPA guidance and the KM response.
  - c. The NDEP understands and appreciates the importance of establishing upgradient conditions and requests that the terminology of upgradient be used in place of "local background".
  - d. KM should note that the range of background concentrations will not necessarily be centered around the median.
3. Response #3, KM should note that the BRC/TIMET evaluation of background includes the evaluation of alluvial soils derived from the River Mountains and McCullough range. This evaluation will also determine if the soils from these two ranges are geologically and chemically similar. KM is located on soils derived from the McCullough Range. Please describe what "different geologic unit" is being referenced by KM in their response. It appears that KM may be referring to soils derived from the Muddy Creek Formation. Please clarify.
4. Response #8, KM should note that the nature and extent of contamination associated with the southern drainage ditch has not been determined and that it is likely that this ditch is a source of perchlorate, TPH, and other contaminants.
5. Response #14a, depending on the methodology used, the drawdown discussed by KM may not be appropriate. If low-flow sampling is performed the drawdown should be limited to less than 0.3 feet at the maximum purge rate. Additionally, it is recommended (for low-flow sampling) that the well equilibration be verified. The well should be opened and a depth to water measurement should be taken. This depth to water measurement should be taken periodically until two consecutive readings within 0.01 feet of each other are recorded. It is recommended that KM discuss the appropriate sampling techniques with a qualified vendor or TIMET personnel.
6. Response #14b, please note that the historical data is not based upon low-flow sampling. Low-flow sampling may allow KM to achieve the less than 3% variance that is requested. The remaining parameters should stabilize prior to sampling of the well. Once KM has selected a sampling method, NDEP will work with KM to determine an appropriate operating procedure. Also, please note that the revised

Ms. Susan Crowley

7/27/2005

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workplan cannot be approved until a sampling procedure is decided upon and discussed with the NDEP.

7. Response #16, please see NDEP comment above regarding Response #2.
8. Response #20a, KM should note that it is likely that the drainage ditch along the southern property boundary is a likely source of contamination. See also comment #3 above. KM should note that it is possible that the proposed wells may serve as a good indication of upgradient conditions but may not be appropriate for the evaluation of background conditions. As NDEP has discussed with KM previously, it is preferable to locate background locations off-site and upgradient of impacts from the site.
9. Response #24d, it is expected that the revised workplan will provide a discussion on how the VOCs in this list were selected and how they compare to the site-related chemical list.

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October 6, 2005

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Kerr-McGee Chemical Corporation LLC (KM)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Upgradient Investigation Work Plan*  
dated September 29, 2005

Dear Ms. Crowley,

The NDEP has received and reviewed KM's letter identified above and provides comments in Attachment A. The remaining issues outlined below should be addressed through a conference call and/or errata sheet prior to the initiation of field work.

If there is anything further or if there are any questions please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Rakvica".

Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

Ms. Susan Crowley

10/6/2005

Page 2

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1741  
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Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
Mr. George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Mr. Lee Erickson, Stauffer Management Company, 1800 Concord Pike, Hanby 1, Wilmington,  
DE 19850-5437  
Mr. Chris Sylvia, Pioneer Americas LLC, PO Box 86, Henderson, Nevada 89009  
Mr. Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California  
95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380,  
Bainbridge Island, WA 98110

Attachment A

1. Section 3.2, page 3-2, after the completion of field activities, in the investigation report, and please include a discussion regarding the relationship between the various lithologies. For example, how does the groundwater encountered in the alluvial aquifer in the central portions of site relate to the MCfg1 and MCcg1 formations on the southern portion of the site? Also, are any chemical differences in groundwater attributable to the difference in lithology?
2. Section 3.3, pages 3-3 and 3-4, please consider including the following chemicals in the soil and groundwater analyses: cyanide – reportedly was historically associated with State Industries operations; chlorate – historically associated with Site operations; platinum – historically associated with Site operations and potentially useful for delineating upgradient versus Site-related. The presence of platinum is unclear at this time based on the limited amount of historic data on platinum.
- 3.) Section 3.3, page 3-3, it is suggested that perchlorate analysis be completed in the same intervals as the remaining metals and ions. Also, this section does not address the NDEP comment 9 in the July 28, 2005 letter to KM regarding VOCs. Please provide a discussion or table that addresses this issue.
4. Section 4.2.6.2, page 4-6, in the errata submitted on September 5, 2005 KM changed the variance to 3% for electrical conductivity, turbidity and dissolved oxygen. The NDEP's requested change was for electrical conductivity only. Please note the appropriate correction in the field sampling protocol.
5. Table 2, the NDEP has the following comments:
  - a. The proposed sampling frequency for metals does not coincide with the text on page 3-3. The text on page 3-3 indicates that samples will be collected every 10' to the bottom of the boring. Table 2 skips the collection of samples in select intervals. Please correct the text or table.
  - b. The proposed sampling frequency for location M-121 for hexavalent chromium does not appear to be consistent with the remainder of the locations or with the text. Please delete the 5' depth interval for consistency.
  - c. The proposed sampling frequency for location M-121 for radionuclides is not consistent with the remainder of the locations. Please include a sample at the 5' depth interval and hold the samples in the 10' depth interval for consistency.
- 6.) Figure 2, KM should consider soil sampling in the storm water ditch (and vicinity) to delineate the depth and extents of contamination associated with this ditch
7. Please note that the NDEP's review of this document does not include a comprehensive review of detection limits in Appendix D; appropriateness of containers or holding times for laboratory analyses; or QA/QC procedures relating to field procedures or laboratory analyses. These issues are the responsibility of KM to insure that data collected is of sufficient quality to support future decision making. The NDEP will review these issues in an exhaustive manner as part of future data validation; risk assessments; and risk-based decisions. The NDEP has performed "spot checks" of this information and has included comments as necessary. Also, the

# TRONOX

Susan Crowley  
Staff Environmental Specialist

(702) 651-2234  
Fax (405) 228-6882  
scrowley@kmg.com

February 20, 2006

Brian Rakvica, P.E.  
Nevada Division of Environmental Protection  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119

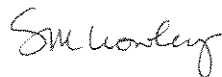
Subject: NDEP Facility ID H-000539 – Tronox ECA – *Upgradient Investigation Workplan* – Tronox response to NDEP October 6, 2005 comments

Dear Mr. Rakvica:

Tronox LLC (Tronox), formerly Kerr-McGee Chemical LLC (Kerr-McGee), has undertaken an Environmental Conditions Assessment (ECA) as directed by the Nevada Division of Environmental Protection (NDEP). Integral to that investigation is understanding upgradient / background conditions associated with the site. In late March 2005, Tronox submitted a *Background Study Workplan*. NDEP provided comments May 6, 2005 and Tronox provided a response to NDEP's comments July 20, 2005. NDEP provided further comment on July 28, 2005 and Tronox submitted the *Upgradient Investigation Workplan* September 29, 2005. October 6, 2005 the NDEP provided additional comments and October 14, 2005 errata sheets and a revised CD were provided by Tronox. The enclosed *Attachement A* has been prepared to document Tronox responses to the NDEP October 6, 2005 comments.

Please feel free to contact me at (702) 651-2234, if you have any questions related to this information. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

Overnight Mail

cc: Public Repository  
Jeff Johnson, NDEP  
Keith Bailey Tronox  
Tom Reed, Tronox  
Ed Krish, ENSR  
Sally Bilodeau, ENSR

Tronox LLC

8000 West Lake Mead Parkway, Henderson, Nevada 89015 • P.O. Box 55, Henderson, Nevada 89009

Brian Rakvica  
February 20, 2006  
Page 2

Todd Croft, NDEP  
Val King, NDEP  
Jim Najima, NDEP  
Jon Palm, NDEP  
Brenda Pohlmann, COH  
Barry Conaty, COH  
Rob Mrowka, CCCP  
Mitch Kaplan, EPA Region IX  
Ron Sahu, BMI  
Paul Sundberg, Montrose  
Al Tinney, NDEP  
Craig Wilkinson, TIMET  
Dave Gerry, ENSR  
Pat Corbett, Tronox  
Dana Elmer, Tronox  
John Hatmaker, Tronox  
Don Shandy, Tronox  
Rick Stater, Tronox  
Brad Dougherty, AIG  
Tim Wolf, Malcom Pirne  
Tracy Hemmerling

#### Attachment



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04020 - KerrMcGee\0



**Attachment A**  
**Tronox response to**  
**October 6, 2005 NDEP comments on the**  
**Upgradient Investigation Workplan**  
**dated September 29, 2005**

**NDEP Comment 1**

1. Section 3.2, page 3-2, after the completion of field activities, in the investigation report, and please include a discussion regarding the relationship between the various lithologies. For example, how does the groundwater encountered in the alluvial aquifer in the central portions of site relate to the MCfg1 and MCcg1 formations on the southern portion of the site? Also, are any chemical differences in groundwater attributable to the difference in lithology?

***Response:*** *The data will be evaluated to see if differences in groundwater chemistry may be attributable to differences in lithology.*

**NDEP Comment 2**

2. Section 3.3, pages 3-3 and 3-4, please consider including the following chemicals in the soil and groundwater analyses: cyanide – reportedly was historically associated with State Industries operations; chlorate – historically associated with Site operations; platinum – historically associated with Site operations and potentially useful for delineating upgradient versus Site-related. The presence of platinum is unclear at this time based on the limited amount of historic data on platinum.

***Response:*** *Cyanide, platinum and chlorate have been added to the soil and groundwater analyte lists.*

**NDEP Comment 3**

3. Section 3.3, page 3-3, it is suggested that perchlorate analysis be completed in the same intervals as the remaining metals and ions. Also, this section does not address the NDEP comment 9 in the July 28, 2005 letter to KM regarding VOCs. Please provide a discussion or table that addresses this issue.

***Response:*** *Table 2 has been modified to indicate that Perchlorate will be analyzed at the same intervals as metals and ions. The suite of VOCs that will be included in the soil and water analysis is shown on Table 8. The VOCs proposed for analysis include those that the selected lab routinely performs through this analyses. This is a broader suite of VOCs than those specifically identified on the Site Related Chemicals List (SRC). The broader suite of VOCs was selected because it is available at no additional cost and the additional information may identify chemicals that are present but that are not currently on the SRC list.*

**NDEP Comment 4**

4. Section 4.2.6.2, page 4-6, in the errata submitted on September 5, 2005 KM changed the variance to 3% for electrical conductivity, turbidity and dissolved

oxygen. The NDEP's requested change was for electrical conductivity only. Please note the appropriate correction in the field sampling protocol.

**Response:** *The text has been modified to state, "Stabilization of water quality parameters is indicated when the following criteria are met in the final three consecutive readings: the pH is within 0.1 unit, temperature is within 1 degree Celsius, electrical conductivity is within 3 percent and the dissolved oxygen and turbidity are within 5 percent."*

#### **NDEP Comment 5**

5. Table 2, the NDEP has the following comments:
  - a. The proposed sampling frequency for metals does not coincide with the text on page 3-3. The text on page 3-3 indicates that samples will be collected every 10' to the bottom of the boring. Table 2 skips the collection of samples in select intervals. Please correct the text or table.
  - b. The proposed sampling frequency for location M-121 for hexavalent chromium does not appear to be consistent with the remainder of the locations or with the text. Please delete the 5' depth interval for consistency.
  - c. The proposed sampling frequency for location M-121 for radionuclides is not consistent with the remainder of the locations. Please include a sample at the 5' depth interval and hold the samples in the 10' depth interval for consistency.

**Response:** *The tables and text have been corrected.*

#### **NDEP Comment 6**

6. Figure 2, KM should consider soil sampling in the storm water ditch (and vicinity) to delineate the depth and extents of contamination associated with this ditch.

**Response:** *Tronox is not proposing to sample the storm water ditch at this time but will evaluate sampling following evaluation of the soil and groundwater data generated by the upgradient investigation.*

#### **NDEP Comment 7**

7. Please note that the NDEP's review of this document does not include a comprehensive review of detection limits in Appendix D; appropriateness of containers or holding times for laboratory analyses; or QA/QC procedures relating to field procedures or laboratory analyses. These issues are the responsibility of KM to insure that data collected is of sufficient quality to support future decision making. The NDEP will review these issues in an exhaustive manner as part of future data validation; risk assessments; and risk-based decisions. The NDEP has performed "spot checks" of this information and has included comments as necessary. Also, the NDEP does not have the regulatory authority to review or approve Health and Safety plans but appreciates the inclusion of these documents as part of the work plan.

**Response:** *Comment noted.*

February 23, 2006

Ms. Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (Trx)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Upgradient Investigation Work Plan*  
dated February 2006

Dear Ms. Crowley,

The NDEP has received and reviewed Trx's letter identified above and provides comments below.

1. Table 2, it is suggested that hexavalent chromium be analyzed from the same depth increments as the remaining metals.
2. Table 8, please include xylenes in the VOC analysis.

These comments should be addressed as part of the work plan implementation. If there is anything further or if there are any questions please do not hesitate to contact me.

Sincerely,

Brian A. Rakvica, P.E.  
Supervisor, Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

Ms. Susan Crowley

9/21/2006

Page 2

CC: Jim Najima, NDEP, BCA, Carson City  
Jeff Johnson, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, Las Vegas  
Todd Croft, NDEP, Las Vegas  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5,  
75 Hawthorne Street, San Francisco, CA 94105-3901  
Rob Mrowka, Clark County Comprehensive Planning, PO Box 551741, Las Vegas, NV, 89155-  
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Keith Bailey, Tronox, PO Box 268859, Oklahoma City, Oklahoma 73126-8859  
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Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
Mr. George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Mr. Lee Erickson, Stauffer Management Company, 1800 Concord Pike, Hanby 1, Wilmington,  
DE 19850-5437  
Mr. Chris Sylvia, Pioneer Americas LLC, PO Box 86, Henderson, Nevada 89009  
Mr. Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California  
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# TRONOX

Susan Crowley  
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July 20, 2006

Mr. Brian Rakvica, P.E.  
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1771 East Flamingo, Suite 121-A  
Las Vegas, NV 89119-0837

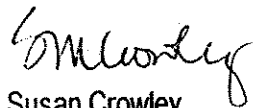
Subject: NDEP Facility ID H-000539 – Tronox ECA – *Upgradient Study Report*

Dear Mr. Rakvica:

Tronox LLC (Tronox) has undertaken an Environmental Conditions Assessment (ECA) as directed by Nevada Division of Environmental Protection (NDEP). An element of this ECA is the development of an understanding of upgradient soil and groundwater conditions. This information can in turn assist in understanding the background conditions for the site, within which the studied facility sits. A work plan was prepared and approved by NDEP for upgradient soil and groundwater sampling which anticipated a report preparation time of 120 following field sampling. The field sampling was completed earlier this year; however the long delivery time for the analytical results has delayed several key elements for the report preparation, data validation being the first. The validation is underway and moving with all speed. Even with this, the report will not be available for issue until October 31, 2006.

Feel free to call me at (702) 651-2234 if you have any questions regarding this correspondence. Thank you.

Sincerely,



Susan Crowley  
Staff Environmental Specialist, CEM 1428 exp 3-8-07

Overnight

CC: Please see attached distribution list

smc/trx to NDEP - Delivery of Source Area Phase A Work Plan - 10-21-05.doc

Tronox LLC

8000 West Lake Mead Parkway, Henderson, Nevada 89015 • P.O. Box 55, Henderson, Nevada 89009

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Lambeth	Jeff	Veolia			
Smart	Gerald	Veolia			
Cheung	Mary	Veolia			
Guerriero	Joe	AIG		X	
Wolf	Tim	Malcolm Pimie		X	
Hemmerling	Tracy	Malcolm Pimie		X	
Stowers	Kirk	Broadbent			
Quillian	Jill	ERM			
Sahu	Rahnijit	BMI		X	
Crouse	George	Syngenta		X	
Erickson	Lee	Stauffer		X	
Kelly	Joe	Montrose			
Sundberg	Paul	Montrose		X	
Gibson	Jeff	AmPac			
Sylvia	Chris	Pioneer		X	
Wilkinson	Craig	Timet		X	
Mack	Joel	Montrose Counsel			