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August 20, 2004

Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East
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Santa Fe, New Mexico 87505-6303

Reference: Work Assignment No. 06110.290.0002; State of New Mexico Environment Department, Santa Fe, New Mexico; Human Health and Ecological Risk Assessment Support; Review of the RCRA Facility Investigation Report Addendum for Melrose Bombing Range Cannon Air Force Base, New Mexico, Task 2 Deliverable.

Dear Mr. Cobrain:

Enclosed please find the deliverable for the above-referenced work assignment. The deliverable consists of review comments on the "RCRA Facility Investigation Report Addendum for Melrose Bombing Range Cannon Air Force Base, New Mexico" dated February 2003. As requested in the authorization and request for review memo sent by Mr. Glenn von Gonten of the New Mexico Environment Department (NMED), a review of the screening level ecological risk assessment against the most recent NMED guidance was conducted. As noted in previous comments submitted by the NMED (dated March 26, 1999) and contained in Appendix C of the report, the NMED indicated that a short gross or land grazing scenario would be an acceptable approach for the assessment. Therefore, the overall scenario as presented in the report was considered adequate. The report was also revised against the NMED "Guidance for Assessment Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment," dated March 2000.

There is a significant concern that surface soil at the sites have not been adequately characterized, especially Areas of Concern (AOCs) 1 and 2. This concern was expressed to Mr. Van Gonten (NMED) by Ms. Paige Walton (TechLaw). In response to this concern, Mr. Von Gonten faxed over additional sampling information taken from the 1996 RCRA Facility Investigation Report. Based upon the review of the faxed information and the information provide in the report, there appears to be significant data gaps with respect to AOCs 1 and 2. A comment has been drafted concerning this issue. However, NMED may wish to further review this issue to ensure that additional data have not been overlooked and to verify the appropriateness of the comment.

The report focuses quite a bit on groundwater and the comparison of groundwater concentrations to water quality standards. It is not clear why groundwater is included in this addendum, as groundwater is not a viable ecological exposure pathway. However, there is concern about comparing the groundwater concentrations to the New Mexico Water Quality Control Commission (WQCC) standards. The WQCC numbers are similar to maximum contaminant

levels (MCLs) in that they are derived using both toxicological data and equipment specifications, such as detection limits. Since WQCCs and MCLs are not based solely on toxicity, both WQCC and MCLs are not appropriate for use for screening contaminants of concern for a risk assessment. As this review did not include an assessment of the human health risk assessment (HHRA) portion of the site, NMED may wish to review the HHRA to ensure that comparison of groundwater concentrations to the WQCC standards was not conducted to determine which constituents were carried forward in the HHRA. For HHRAs, the screening process must be against risk-based numbers, such as EPA Region 6 or EPA Region 9's Preliminary Remediation Goals (PRGs) for tap water.

For inorganics (i.e., metals) a comparison of site concentrations to background was conducted. The upper confidence limit (UCL) for a background data set taken from Ebasco 1996. This data set was not provided in the report. In addition, the methodology used to determine the UCL was not discussed in the report nor did the text clarify whether the UCL was a 90% or 95% UCL. However, it was assumed that NMED has previously approved this background data set and UCL and determined them to be appropriate for use in the ecological risk assessment. A comment was drafted concerning the clarification of how the UCL was estimated, but no comment was drafted concerning the background data set.

The screening assessment included aluminum as a constituent of concern where aluminum was detected above background. In many instances, the risks associated with exposure to aluminum drove the hazard index above a value of one (1). The report does discuss many of the uncertainties associated with included aluminum in the assessment. As stated in the United States Environmental Protection Agency's (USEPA) Ecological Soil Screening Level Workgroup (July 10, 2000), "Potential ecological risks associated with aluminum in soils are identified based on the measured soil pH. Aluminum is identified as a chemical of concern only for those soils with a soil pH of less than 5.5." Given that the pH at the site range between 6.6 and 7.3, aluminum would not be considered bioavailable to ecological receptors. As such, aluminum should not have been carried forward into the screening assessment. As such, the risks associated with aluminum are not sound and should not be considered when evaluating overall risk. In addition, the rationale concerning iron and the fact that iron is an essential nutrient is also valid. Iron is also typically not evaluated in ecological risk assessments. Dropping aluminum and iron from the assessment, the risks associated with exposure at each solid waste management unit (SWMU) are considerably less, although there are still some concerns with some of the inorganics. In particular, the following inorganics are still a concern in the screening assessment:

SWMU/AOC	Surface Soil	Subsurface Soil
114	None	Arsenic, barium, chromium
115	Lead, copper	Chromium, lead
117	Lead	Barium
AOC 1 (SWMU 130)	Lead	None
AOC 2 (SWMU 131)	None	Chromium
AOC 3 (SWMU 132)	Arsenic, chromium, lead	Lead
AOC 4 (SWMU 133)	Lead	None

When conducting risk assessments, if the results from the screening analysis indicate elevated risks, a more-refined analysis is conducted. Typically, a hazard quotient of greater than ten (10) would trigger the more-refined analysis. Since many of the above-listed constituents drive the risks and have individual hazard quotients greater than 10, a more refined analysis is warranted to ensure that exposure to site contaminants will not pose unacceptable risks to ecological receptors.

A comment has been drafted concerning this issue.

AOC 2 contains a circular area with increased vegetation. This area and denser vegetation appears to be the result of either past waste disposal practices or an underlying tank/septic system. The report did not appear to address this area, and it was also not clear whether any biased sampling from this area was conducted. This may represent a potential data gap. A comment has been drafted concerning this issue.

Appendices C (RFI Comments from NMED), D (Analytical Results), and E (RFI Supplemental Sampling Program Field Data) were briefly reviewed, and no problems were noted with the material; therefore, no comments were drafted.

While there are some broad comments, overall the risk assessment was fairly well done, and few specific comments were noted.

The document is formatted in Word. The deliverable was emailed to you on August 20, 2004 at David_Cobrain@nmenv.state.nm.us. A formalized hard (paper) copy of this deliverable will be sent via mail. If you have any questions, please call me at (303) 763-7188 or Ms. Paige Walton at (801) 451-2978.

Sincerely,

June K. Dreith

June K. Dreith
Program Manager

Enclosure
cc: Glen von Gonten, NMED
Ms. Paige Walton, TechLaw

TASK 2 DELIVERABLE

REVIEW COMMENTS ON THE RCRA FACILITY INVESTIGATION REPORT ADDENDUM FOR MELROSE BOMBING RANGE CANNON AIR FORCE BASE, NEW MEXICO FEBRUARY 2003

Human Health and Ecological Risk Assessment Support

Submitted by:

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Submitted to:

Mr. David Cobrain
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Hazardous Waste Bureau
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Santa Fe, New Mexico 87505

In response to:

Work Assignment No. 06110.290

August 20, 2004

REVIEW COMMENTS ON THE
RCRA FACILITY INVESTIGATION REPORT ADDENDUM FOR
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE, NEW MEXICO
FEBRUARY 2003

General Comments

1. There is concern that Areas of Concern (AOCs) 1 and 2 have not been adequately characterized with respect to surface soil. AOC 1 consists of approximately 23 acres. However, only six surface soil and shallow subsurface soil samples were collected at the site. In addition, it does not appear that any biased sampling was conducted. Based on the review of Figure 2-5, there are some mounded areas, depressions, drums, and other obviously remnants of past activities. The sampling does not seem to address any of these areas. Discuss why sampling in and/or around the mounds, depressions, and drums was not conducted. Also discuss the impact of this lack of characterization on the ecological risk assessment.

   AOC 2 only has four surface soil and shallow subsurface soil samples to represent site conditions. Upon reviewing Figure 2-6, there are three tanks and several areas of sparse or no vegetation on the site; however, it does not appear that any sampling of soil in and around these areas was conducted. Typically areas of disturbed vegetation are indicative of past activities and potential waste disposal activities. This appears to be a major data gap. Discuss why sampling in and/or around the three tanks and several areas of sparse or no vegetation was not conducted. Also discuss the impact of this lack of characterization on the ecological risk assessment.

2. Risks to plant receptors from exposure to inorganic constituents greatly exceeded (up to three orders of magnitude) the target hazard index of one (1) at each site evaluated in the report: Solid Waste Management Units (SWMUs) 114, 115, and 117, and AOCs 1 (SWMU 130), 2 (SWMU 131), 3 (SWMU 132), and 4 (SWMU 133). However, it does not appear that a comparison of the toxicity reference value (TRV) to the background data set was conducted. As quoted in "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision" (R.A. Efroymson, et al.), "If the chemical concentrations reported in field soils that support vigorous and diverse plant communities exceed one or more of the benchmarks presented in the report or if a benchmark is exceeded by background soil concentrations, it is generally safe to assume that the benchmark is a poor measure of risk to the plant community at that site." In reviewing the TRVs against background, the background data exceed all TRVs with the exception of mercury. It appears that while the phytotoxicity TRVs were extrapolated from the NMED guidance, the TRVs are not appropriate for use at Melrose. While many guidance summarize toxicity data, the most recent toxicity data should always be applied, and more than one source for these data should be consulted. Additional review of other sources, such as Los Alamos National Laboratory's (LANL) EcoRisk database, for phytotoxicity data should have been conducted. When reviewing the latest version of EcoRisk (version 2.0), TRVs above background concentrations were available for the following inorganics: arsenic, barium, beryllium, cadmium, cobalt, lead, mercury, and nickel. In lieu of requiring re-calculations of all the phytotoxicity assessments, and in order to assess a more realistic picture of what risks to plants are at the various sites, the TRVs from EcoRisk were applied to the SWMUs and the resulting hazard indices (approximate) were determined as follows:

Risk to Plants via Surface Soil

SWMU	Hazard Index	AOC/SWMU	Hazard Index
114	<1.0	AOC 1/SWMU 130	0.39
115	2.1	AOC 2/SWMU 131	<1.0
117	3.22	AOC 3/SWMU 132	1.81
		AOC 4/SWMU 133	0.07

Risk to Plants via Subsurface Soil

SWMU	Hazard Index	AOC/SWMU	Hazard Index
114	7.2	AOC 1/SWMU 130	<1.0
115	1.82	AOC 2/SWMU 131	1.05
117	12.0	AOC 3/SWMU 132	1.13
		AOC 4/SWMU 133	0.33

Based upon this analysis, the concentrations of chemicals in surface and subsurface soil do not appear to result in unacceptable risks to plants at any of the sites evaluated in the report. No response to this comment is required.

3. The screening assessment included aluminum as a constituent of concern where detected above background. In many instances, the risks associated with exposure to aluminum drove the hazard index above a value of one (1). The report does discuss many of the uncertainties associated with included aluminum in the assessment. As stated in the United States Environmental Protection Agency's (USEPA) Ecological Soil Screening Level Workgroup (July 10, 2000), "Potential ecological risks associated with aluminum in soils are identified based on the measured soil pH. Aluminum is identified as a chemical of concern only for those soils with a soil pH of less than 5.5." Given that the pH at the site range between 6.6 and 7.3, aluminum would not be considered bioavailable to ecological receptors. As such, aluminum should not have been carried forward into the screening assessment. As such, the risks associated with aluminum are not sound and should not be considered when evaluating overall risk. In addition, the rationale concerning iron and the fact that iron is an essential nutrient is also valid. Iron is also typically not evaluated in ecological risk assessments. Dropping aluminum and iron from the assessment, the risks associated with exposure at each SWMU are considerably less, although there are still some concerns with some of the inorganics. In particular, the following inorganics are still a concern in the screening assessment:

SWMU/AOC	Surface Soil	Subsurface Soil
114	None	Arsenic, barium, chromium
115	Lead, copper	Chromium, lead
117	Lead	Barium
AOC 1 (SWMU 130)	Lead	None
AOC 2 (SWMU 131)	None	Chromium
AOC 3 (SWMU 132)	Arsenic, chromium, lead	Lead
AOC 4 (SWMU 133)	Lead	None

When conducting risk assessments, if the results from the screening analysis indicate elevated risks, a more-refined analysis is conducted. Typically, a hazard quotient of greater than ten (10) would trigger the more-refined analysis. Since many of the above-listed constituents drive the risks and have individual hazard quotients greater than 10, a more refined analysis is warranted to ensure that exposure to site contaminants will not pose unacceptable risks to

ecological receptors.

The screening assessment applied conservative assumptions, such as the maximum detected site concentrations, 100% availability of contaminants, and that the receptors only forage on the sites. Given these assumptions, it is not unexpected that risks above the target hazard index of one (1) were calculated. However, as noted above, a more-refined ecological assessment is warranted for the parameters listed in the above table. The more refined analysis should include the use of the upper 95% confidence level (95% UCL), average ingestion/food consumption rates, incorporation of area use factors, and use of less conservative toxicity data, such as lowest observed adverse effect levels (LOAELs). Please provide a more- refined (or second Tier) ecological assessment for those constituents that resulted in hazard quotients above ten (10). Note that the exclusion of aluminum and iron from the assessment is acceptable.

4. Cobalt was a constituent of concern at several of the sites addressed in the report. However, the text indicated that a phytotoxicity value was not available for cobalt. Please note that for future reports, a phytotoxicity datum for cobalt can be obtained from United States Environmental Protection Agency (USEPA), August 2003 August, Ecological Soil Screening Levels for Cobalt, Interim Final. Office of Solid Waste and Emergency Response, Washington, D.C. As the date on the EPA report is after the drafting of the Melrose document, the report does not require modification to incorporate this value. No response to this comment is required.

5. Attachment 1 of Appendix B includes a photograph of a circular vegetation pattern at AOC 2 (photograph No. 19). However, the report does not address this anomaly. Typically these types of vegetation patterns develop when chemicals have been disposed of, either buried waste or waste spilled directly onto the ground. These patterns have also been observed above septic systems and leaking tanks. It is not clear from the maps of AOC 2 and the photographs where the circular pattern is located, nor is it clear if any soil sampling was conducted from this area. It appears that this may represent a data gap. Please discuss whether any biased sampling in and around the circular patterns were conducted. If sampling was conducted, provide the results of the analysis or provide the sample number for cross-reference in the report. In addition, the report should be revised to contain a discussion of this area and the potential cause of the patterned vegetation.

Specific Comments

1. Section 5.2.2.1, Comparison to Background Level Concentrations, page 5-6. The text indicates that an upper confidence limit (UCL) was calculated for background and used in determining whether metals detected in soil at the sites were naturally occurring or attributable to site activities. However, the text does not indicate whether the UCL is a 95% UCL or 90%. Please clarify what type of UCL was used and what methodology (i.e., distribution test and statistical test) was applied in deriving the UCL.

2. Section 5.3.1, Effects Assessment, page 5-7. The report indicates that an avian TRV was not available for 2-methylnaphthalene. However, the paper, "Eisler, R. 1987. *Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: A synoptic review.* U.S. Fish and Wildlife Service Biological Report 85/1.11. Laurel, Maryland," provides a LOAEL of 5.53E+02 mg/kg/day for polycyclic aromatic hydrocarbons (PAHs) that is based upon a seven-month study on mallards. Applying an uncertainty factor of 0.1 (based upon Appendix B, page B-23), the resulting NOAEL would be 55.3 mg/kg/day. SWMU 117 was the only

site where 2-methylnaphthalene was carried forward as a constituent of concern, with a maximum detected concentration of 0.45 mg/kg. If the above NOAEL were applied to the estimation of risk to the mourning dove for SWMU 117 (Table B-69, Appendix B), the resulting hazard quotient for 2-methylnaphthalene would be 1.3E-04, which would have no impact on the overall hazard index. In addition, if an intertaxon uncertainty factor of 0.2 were also applied to the LOAEL, the resulting hazard quotient would still result in insignificant risk. Therefore, the exclusion of 2-methylnaphthalene in the estimation of vain risk at SWMU 117 does not impact the overall conclusion of the report. This assessment has been provided in lieu of requiring a revision to the risk calculations. No response to this comment is required.

3. Section 5.5, SLERA Summary, page 5-11. The report indicates that the elevated screening quotients for chromium may be due to an unrepresentative site background concentration. The report states that while the background concentration for soil at Melrose was 16 mg/kg, regional chromium concentrations near Clovis are 30 mg/kg and for the Western states, 56 mg/kg. First, while the report only provided this information as part of the uncertainties associated with the assessment, comparison against regional background values is not acceptable methodology for screening out a contaminant of concern. It appears that either an inadequate number of background samples were collected or that the samples were not collected from soil of similar type/geology to soil within the SWMUs. However, if the site maximum concentration exceeds background, a site attribution analysis is typically conducted. It is recommended that if sufficient samples are available, a statistical comparison between the site and background data sets be conducted. A nonparametric test (e.g., Wilcoxon Rank Sum Test) is often applied. In addition, box and whisker and/or histograms could be plotted to compare the data distributions. It is suggested that additional site attribution analyses be conducted to determine whether the chromium detections at the SWMUs are in fact representative of background or attributable to site activities.

4. Appendix B, Table B-52 Toxicity Information and Toxicity Reference Values for Upper Trophic Level Endpoints. Typically, the most conservative TRV is used in the screening analysis, unless justification as to inappropriateness of the datum can be supplied. As such, a few comments were noted with the TRVs listed in the table as follows:

   Deer Mouse/Least Shrew:

   - Acetone - discuss why the NOAEL of 100 mg/kg/day based on the 90-day study for the rat from Sample *et al.* 1996 was not applied.
   - Bis(2-ethylhexyl)phthalate - discuss why the NOAEL of 80 mg/kg/day based on the 2-year diet study on rats as cited in EPA 1980 was not applied.
   - Methyl ethyl ketone – discuss why the NOAEL of 1,777 mg/kg/day based on the 13-week gavage test on rats as cited in Sample *et al.* 1996 was not applied.
   - Phenanthrene – discuss why benzo(a)pyrene was not used as a surrogate and discuss why the LOAEL of 40 mg/kg/day based on the oral gavage study on mice as cited in Sample *et al.*1996 was not applied.
   - Manganese - discuss why the NOAEL of 88 mg/kg/day based on the 224-day study for the rat from Sample *et al.* 1996 was not applied.

   Mourning Dove/Red-tailed Hawk:

   - Acetone – discuss why the NOEAL of 5,040 mg/kg/day based on the study for Japanese quail listed in the Hill and Camardese 1986 paper was not applied.