Melrose

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ENTERED

March 7, 2007

DCN 06280.150.ID.004

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

Reference: Work Assignment No. 06280.150.0002; State of New Mexico Environment Department, Santa Fe, New Mexico; Risk Assessments for Other Facilities (Non-LANL); Evaluation of the Response to the Notice of Deficiency, Final RCRA Facility Investigation Report Addendum for Melrose Bombing Range, September 25, 2006, 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 an evaluation of the facility's responses to the Notice of Deficiency issued by the New Mexico Environment Department (NMED) on the Final RCRA Facility Investigation Report Addendum for the Melrose Bombing Range at Cannon Air Force Base (CAFB).

The information submitted for review included:

- A cover letter, submittal letter, and a table presenting NMED's general and specific comments on the Final RCRA Facility Investigation Report Addendum for Melrose Bombing Range and CAFB's responses to those comments;
- A revised map labeled as Figure 2-4 reflecting current conditions at AOC 1 (SWMU 130); and
- A revised map labeled as Figure 2-5 reflecting current conditions at AOC 2 (SWMU 131).

In the cover letter for the response package, CAFB requested an indefinite deferral of the work plans outlined in Specific Comments 1 and 2 of the Notice of Deficiency. While the areas addressed in these comments are part of the active range at the Melrose Bombing Range, TechLaw, Inc. (TechLaw) supports the view that plans for the future investigation and characterization of contamination at area of concern (AOC 1) (SWMU 130) and AOC 2 (SWMU 131) can be made now with the understanding that specific procedures would not be documented and submitted for approval by NMED until the time of work plan implementation. Thus, our evaluations of the CAFB responses to Specific Comments 1 and 2 instruct the facility to prepare and submit the work plans required by the original comments.

In general, the responses from CAFB only partially address the issues raised in the original general and specific comments. Significant issues that are still outstanding are:

- In responding to General Comment 1, CAFB stated that while wells were drilled to a depth of 182 feet (ft) below ground surface (bgs), the Ogallala aquifer was determined not to be present in the area of solid waste management unit (SWMU) 117 and AOC 3 (SWMU 132); thus, all wells were installed in the shallow aquifer at depths ranging from 42 to 50 ft. bgs. The decline in the water level of the regional Ogallala aquifer was attributed to a lack of precipitation over the last decade. However, CAFB provided no data and/or additional discussion in support of this determination. The facility has been instructed to provide supporting lines of evidence to clearly demonstrate that the regional Ogallala aquifer is not present in this area of the Melrose Bombing Range; thus, obviating the need for sampling.

- Specific Comment 1 expressed concern that AOC 1 (SWMU 130) had not been adequately characterized. The CAFB response indicated that Figure 2-5 of the *Final RCRA Facility Investigation Report Addendum for Melrose Bombing Range, Cannon Air Force Base, New Mexico* was "...out of date as a surface cleanup of the site was conducted in early 2002." The response included that a revised map of AOC 1 (SWMU 130) had been provided which indicated no debris within the area boundary, the depression and two mounds noted on the original Figure 2-5 and labeled as "Former Depression", "Former Mound", and "Former Mound", respectively. Furthermore, the requested discussion on the impact of the lack of characterization on the ecological risk assessment and the work plan for further investigation of the area were not provided. CAFB was instructed to provide the information previously requested in Specific Comment 1, specifically a discussion of the impact of the lack of characterization at AOC 1 (SWMU 130) on the ecological risk assessment and a work plan for further investigation and characterization at AOC 1 (SWMU 130). As part of the work plan, a detailed description of the cleanup effort undertaken in early 2002 was requested. The balance of the requested work plan content mirrored that listed in the original Specific Comment 1.

- Specific Comment 2 expressed similar concern over the characterization of AOC 2 (SWMU 131). Areas of sparse and no vegetation and the three tanks shown on Figure 2-6 were listed as examples of locations that might require additional attention. CAFB responded that the vegetation patterns were characteristic of a plant species found across the region and that there were currently no signs of soil contamination or areas of stressed vegetation at AOC 2 (SWMU 131). The tank installation was described as not associated with former activities at AOC 2 and a revised map of the area, reflecting current conditions, was furnished. However, the work plan required by Specific Comment 2 was not provided. CAFB was instructed to submit the work plan as originally requested. As part of the work plan, additional details such as the identity of the plant species and examples of the characteristic sparse growth patterns across the region were requested. To clarify the relationship between the three tanks and AOC 2 (SWMU 131), additional information such as the date of tank installation, the type of fuel stored and dispensed,

and photographs of the area beneath and around the tanks was requested. The facility was instructed that if evidence of a leak was present at the tanks, the stained soil must be sampled as outlined in Specific Comment 2. The balance of the requested work plan content mirrored that listed originally in Specific Comment 2.

- In Specific Comment 3, NMED stated that CAFB must perform a refined ecological risk analysis for the areas, environmental media, and constituents listed in Table 3 of the comment. NMED further stated that the refined analysis was not required for submittal as part of the response to comments. In the response to Specific Comment 3, CAFB did not acknowledge the need for a refined ecological analysis. CAFB was instructed to acknowledge that a refined (i.e., second Tier) ecological risk assessment will be prepared for the areas, environmental media, and constituents listed in Table 3 of Specific Comment 3

- As part of the response to Specific Comment 6, CAFB indicated that the toxicity reference value (TRV) for benzo(a)anthracene was used as a surrogate for phenanthrene, rather than the TRV for benzo(a)pyrene, as phenanthrene was cloaser to benzo(a)anthracene in structure and molecular weight. However, throughout Appendix G, *Toxicity Reference Values (TRVs) from Appendix E* of the *Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment* (EPA 1999b), benzo(a)pyrene is used as a surrogate for polycyclic aromatic hydrocarbons (PAHs) without established values. It seems clear that the TRV of 100 micrograms per milligram per day (µg/mg/day) for benzo(a)pyrene should be employed as a surrogate for phenanthrene in a screening-level risk analysis. CAFB was instructed to revise the ecological screening analysis to use benzo(a)pyrene rather than benzo(a)anthracene as a surrogate for phenanthrene.

The deliverable is formatted in Word. The deliverable was emailed to you on March 7, 2007 at david_cobrain@nmenv.state.nm.us and to Ms. Swarna Vonteddu at swarna.vonteddu@state.nm.us. A formalized hard (paper) copy of this deliverable will be sent via U.S. Mail. If you have any questions, please call me at (770) 752-7585, extension 105 or Michael S. Smith at (678) 765-0815.

Sincerely,

Jasmine Schliesmann-Merkle

Jasmine Schliesmann-Merkle
Program Manager

Enclosure

cc: Ms. Swarna Vonteddu, NMED
Mr. Michael S. Smith, TechLaw

EVALUATION OF THE RESPONSE TO THE NOTICE OF DEFICIENCY FINAL RCRA FACILITY INVESTIGATION REPORT ADDENDUM FOR MELROSE BOMBING RANGE CANNON AIR FORCE BASE, NEW MEXICO EPA ID NO. NM5572124456-1 SEPTEMBER 25, 2006

Submitted by:

TechLaw, Inc.
310 Maxwell Road, Suite 500
Alpharetta, GA 30004

Submitted to:

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

In response to:

Work Assignment No. 06280.150
Risk Assessments, Other Facilities (Non-LANL)
Task 2 Deliverable

March 7, 2007

EVALUATION OF THE RESPONSE TO THE NOTICE OF DEFICIENCY FINAL RCRA FACILITY INVESTIGATION REPORT ADDENDUM FOR MELROSE BOMBING RANGE CANNON AIR FORCE BASE, NEW MEXICO EPA ID NO. NM5572124456-1 SEPTEMBER 25, 2006

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GENERAL COMMENTS

Comment 1. *In the NMED letter dated March 26, 1999 to Cannon Air Force Base (CAFB), CAFB was asked to submit a letter explaining why 182 feet was the maximum drilling depth. NMED's letter also asked if drilling to a greater depth should have been attempted in an effort to reach the underlying regional aquifer. NMED cannot evaluate groundwater contamination without CAFB's response to this crucial issue.*

Facility Response. "Based on hydrologic studies of the region, the depth of the regional Ogallala aquifer during the 1995 RFI field investigation was estimated at 100-125 feet (ft) below ground surface (bgs). Wells were originally to be installed at SWMU 117 and AOC 3 to depths of 125 feet based on the first observance of groundwater. Minor amounts of water were observed in at depths less than 100 ft although the total depth drilled at each site was 182 ft bgs. The Ogallala aquifer was determined not to be present in this area of the installation. Only the localized shallow aquifer used for irrigation was encountered during drilling and wells were installed at these two sites at depths ranging from 42-50 ft bgs. Lack of precipitation in eastern New Mexico during the past 10 years accounts for the decline in water levels of the regional Ogallala and local aquifers.

The minor amounts of contaminants detected at depth in soil at SWMU 117 and AOC 3 are anomalous and show no apparent vertical or lateral trends indication a release at either side."

Evaluation of Response. The facility's response partially addresses the issue presented in General Comment 1.

CAFB indicates that while a total depth of 182 ft bgs was drilled, the Ogallala aquifer was determined not to be present in the area of SWMU 117 and AOC 3 (SWMU 132); thus, all wells at these sites were installed at depths ranging from 42 to 50 ft bgs (i.e., in the localized shallow aquifer). The decline in the water level of the regional Ogallala aquifer was attributed to a lack of precipitation over the last decade. No data and/or additional discussion were offered in support of the determination; however, such information is needed to clearly demonstrate that because the regional aquifer is not present in this area, the need for sampling is obviated. Please provide additional lines of evidence supporting the statement that the regional Ogallala aquifer did not exist in the area of SWMU 117 and AOC 3 (SWMU 132). For example, the boring logs for the wells drilled to 182 ft bgs should include information on the depths at which water was encountered/observed. Further, regional and/or local precipitation data can be correlated to

observed water levels of the regional Ogallala aquifer during the time period cited in CAFB's response to illustrate the relationship between rainfall and the level of the regional aquifer.

Comment 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 Areas of Concern (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. Review of other sources, for phytotoxicity data should have been conducted. When reviewing the other sources, 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:*

TABLE 1: 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*

TABLE 2: 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; however, CAFB must alter their approach in all future ecological risk evaluations.

Facility Response. "Comment Noted. For clarification, toxicity values available in NMED guidance (March 2000) were used to estimate risks to plants. As indicated in Section B2.5 (Description of Risk), there is uncertainty with these toxicity values and elevated ESQs that were observed at background metal concentrations. Consistent with NMED guidance, ESQs for metals were presented based on background concentrations and site concentrations so that the concerns about the TRVs could be illustrated (Section B2.5)."

Evaluation of Response. No response was needed; however, the information provided by CAFB is noted.

Comment 3. *Cobalt was a constituent of concern at several 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.*

Facility Response. "Comment Noted. For clarification, NMED ecological risk assessment guidance (March 2000) was used as was available at the time of report preparation (February 2003). The EPA report on cobalt (August 2003) was not available until after the RFI Report Addendum was submitted to NMED."

Evaluation of Response. No response was needed; however, the information provided by CAFB is noted.

Comment 4. *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 lowest observed adverse effect level (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 no observed adverse effect level (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 avian 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.*

Facility Response. "Comment Noted. For clarification, toxicity values available in NMED guidance (March 2000) were used to prepare the assessment. Toxicity values from Oak Ridge (Sample et al. 1996) were used as a secondary source only in the event that no values were available in the NMED guidance document. Guidance on the identification of appropriate surrogate values was not available from NMED at the time of the preparation of the report (February 2003). Therefore, surrogates were selected only for those few chemicals that have readily apparent surrogates that are technically appropriate and widely used in the industry."

Evaluation of Response. No response was needed; however, the information provided by CAFB is noted.

EVALUATION OF THE RESPONSE TO THE NOTICE OF DEFICIENCY FINAL RCRA FACILITY INVESTIGATION REPORT ADDENDUM FOR MELROSE BOMBING RANGE CANNON AIR FORCE BASE, NEW MEXICO EPA ID NO. NM5572124456-1 SEPTEMBER 25, 2006

SPECIFIC COMMENTS

Comment 1. *NMED is concerned that AOC 1 has 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, mounded areas, depressions, drums, and other obvious remnants of past activities were observed at the site. The sampling did not 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.

Recommendations: *NMED requires submittal of a work plan for further investigation at AOC 1. The work plan shall include soil field screening, visual inspection of debris, and collection of soil samples from the mounds, depression, miscellaneous debris areas, and around the locations of the discarded truck vehicle parts. At a minimum, two samples from the depression, one at each of the truck vehicle parts locations, one sample at the miscellaneous debris area, and four samples in the vicinity of the activities area (as marked in the Figure 2-5 of this letter) shall be collected. Samples collected from the depression shall be analyzed for RCRA metals, volatile organic compounds (VOCs) (SW-846 EPA 8260), diesel range organics (DRO) and explosives. All other samples shall be analyzed for DRO, RCRA metals and explosives. The work plan shall also include descriptions of mounds and depression, including sampling location maps and pictures. Samples from the mounds shall be collected only if the mounds are identified as containing debris. A map of the recommended sampling locations is attached.*

Facility Response. "The map presented in the February 2003 report is currently out of date as a surface cleanup of the site was conducted in early 2002. All debris indicated on the map has been removed and the features on the map reflect conditions during the 1995 RFI field investigation. Invasive sampling could not be conducted in areas of geophysical anomalies based on the potential for unexploded ordnance in this active area of the range.

At this time there are no indications in the data collected to date from AOC 1 and the physical conditions of the site to warrant the collection of additional samples at the site. This site is in the active part of the bombing range and could incur impacts during bombing operations.

The site map for AOC 1 is attached to this document. The revised map reflects current conditions at the site."

Evaluation of Response. The facility's response partially addresses the issues presented in Specific Comment 1.

CAFB states that the map (i.e., Figure 2-5) included in the Final RCRA Facility Investigation Report Addendum for Melrose Bombing Range, Cannon Air Force Base, New Mexico, February 2003 (RFI Report Addendum) was "...out of date as a surface cleanup of the site was conducted in early 2002." No description of the cleanup activities was included with the response. CAFB noted that invasive sampling was not conducted because of the potential for unexploded ordnance in this "...active area of the range." Further, CAFB indicated that the data collected at AOC 1 (SWMU 130) and the physical condition of the site did not warrant the collection of additional samples.

The response includes a revised map of AOC 1 (SWMU 130), labeled as Figure 2-4, which shows no debris within the area boundary and labels the depression and each mound noted on the original Figure 2-5 as "Former Depression", "Former Mound", and "Former Mound", respectively. The requested discussion on the impact of the lack of characterization of AOC 1 (SWMU 130) on the ecological risk assessment and the work plan for further investigation of the area were not provided.

No specific date for the cleanup of AOC 1 (SWMU 130), other than early 2002, was furnished. Original Figure 2-5 showing the locations of debris, two mounds, and a depression containing two drums was dated April 9, 2002; however, there is no explanation of what prompted the cleanup of this area. While details of the cleanup effort were not furnished by CAFB, the new map indicates that all the debris, the two drums, and the concentric (abbreviated CONC. in original Figure 2-5) tower bases were removed from AOC 1 (SWMU 130). Further, a comparison of original Figure 2-5 and new Figure 2-4 implies that the depression and the two mounds were eliminated during the cleanup. Further, it is not known if any characterization of AOC 1 (SWMU 130) and/or the removed debris, mounds, and depression was conducted during the cleanup effort.

As requested in Specific Comment 1, please provide a discussion regarding the impact of the lack of characterization at AOC 1 (SWMU 130) on the ecological risk assessment. As part of the discussion, specifically address whether this lack of characterization resulted in an underestimate or overestimate of the risks to ecological receptors.

Further, NMED requires submittal of a work plan for further investigation and characterization at AOC 1 (SWMU 130). The work plan must include a detailed description of the cleanup effort undertaken in early 2002. Include information on any characterization that was done on AOC 1 (SWMU 130), the removed debris, and the eliminated mounds and depression as part of the effort. Include the results of visual inspections, in-field screenings, and/or sampling events. Describe the methods used and the rationale for eliminating the mounds and depression and how those methods precluded the characterization of removed and disturbed soils. In addition to this discussion, provide for soil field screening and future collection of soil samples from the former

mounds, former depression, and areas where debris was present prior to the cleanup effort within the work plan. This must include the locations of the discarded truck vehicle parts. At a minimum, two samples shall be planned at the former depression, one at each of the discarded truck vehicle parts locations, one sample at the miscellaneous debris area, and four samples in the vicinity of the activities area (these locations are shown on Figure 2.5 provided as Attachment 1 to this document). Samples collected from the depression shall be analyzed for RCRA metals, volatile organic compounds (VOCs) (SW-846 EPA 8260), diesel range organics (DRO) and explosives. All other samples shall be analyzed for DRO, RCRA metals, and explosives. The work plan shall also include descriptions of the former mounds and depression, including future sampling locations at the former mounds if the mounds were identified as containing debris. In addition, include any pictures taken of these areas.

Finally, review new Figure 2-4 provided as part of the facility's response. If this should be included in the RFI Report Addendum as Figure 2-4, please indicate which of the original report figures should be eliminated.

Comment 2. *NMED is concerned that AOC 2 has not been adequately characterized with respect to surface and near-surface soils.*

Only four surface soil and shallow subsurface soil samples were collected and analyzed to characterize site conditions at AOC 2. Upon reviewing Figure 2-6, there are three tanks and several areas of sparse or no vegetation at the site: however, it does not appear that any sampling of soil in and around these areas was conducted. Typically areas of dead or disturbed vegetation are indicative of past activities and potential waste disposal sites. This appears to be a major data gap.

Recommendations: *NMED requires submittal of a work plan for further investigation at AOC 2. The investigation shall include soil field screening and visual inspection of debris. An Investigation report shall identify the type of fuel stored in the three tanks and, if unknown, analysis to identify the fuel types shall be completed and documented. The report must also include photographs of the tanks, including the area beneath and around the tanks and documentation of any leaks/staining. If there is evidence of a leak, the stained soil shall be sampled and analyzed for the compounds consistent with those stored in the tanks. Test pits approximately 6 to 10 feet deep shall be excavated at AOC 2 at the locations of the sparse or absent vegetation to check for waste. Two samples from the east sparse vegetation area, one from each of the other three sparse vegetation areas, two from the area where vegetation is absent, and one sample from the truck loading area near the fuel tanks shall be collected. All soil samples collected from these areas shall be analyzed for RCRA metals, VOCs (EPA 8260), semi volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), dioxins and furans. A map of the recommended sample locations (test pits) is provided in Figure 2-6 of this letter.*

Facility Response. "The pattern of vegetation observed at AOC 2 (SWMU 131) appears to be due to natural conditions as this variety of plant grows in similar patches across the site and in the region. There currently is no sign of soil contamination in the area shown in the photograph.

There are currently no areas of stressed vegetation in AOC 2 (SWMU 131) and vegetation present in the area is naturally sparse. The tanks present at the site are not associated with AOC 2 (SWMU 131), but are used for current fuel storage and dispensing.

At this time there are no indications in the data collected to date from AOC 2 (SWMU 131) and the physical conditions of the site to warrant the collection of additional samples at the site. The sparse and stressed vegetation is a natural condition of the area where there is little precipitation and poor soil.

The site map for AOC 2 (SWMU 131) is attached to this document. The revised map reflects current conditions of the site."

Evaluation of Response. The response partially addresses the issues raised in Specific Comment 2.

The response indicates that the vegetation patterns noted on Figure 2-6 of the February 2003 RFI Report Addendum are characteristic of the plant species and are similar to those existing at other areas of the site. In addition, the response states that there are currently no signs of soil contamination or areas of stressed vegetation at AOC 2 (SWMU 131). Based on these observations and the data collected at AOC 2 (SWMU 131) up to the time of the response (July 2006), it was concluded that the collection of additional samples at AOC 2 (SWMU 131) was not warranted.

Other information furnished in the response included a statement that the fuel tanks shown in Figure 2-6 of the RFI Report Addendum were not part of AOC 2 (SWMU 131) and a revised map of AOC 2 (SWMU 131), labeled Figure 2-5, reflected conditions at AOC 2 (SWMU 131) as of May 1, 2006.

The work plan required by Specific Comment 2 was not provided. The information provided in the facility response is not of sufficient detail to eliminate the need for further investigation and characterization at AOC 2 (SWMU 131).

As stated in Specific Comment 2, NMED requires submittal of a work plan for further investigation and characterization at AOC 2 (SWMU 131). This work plan should include an expanded version of the information contained in the facility's response to Specific Comment 2. The plant species that exhibits patterns of sparse growth across the site should be identified. Photographs of this species illustrating this sparse growth pattern at other SWMUs and AOCs should be provided. If the lack of precipitation and the quality of soil are factors in the observed vegetation patterns, a discussion, supported by precipitation and soil property data, on the relationship among the three factors at AOC 2 (SWMU 131) should be included. Also provide the date that AOC 2 (SWMU 131) was designated as an AOC and the date of installation for the three tanks used in current fuel storage and dispensing operations. Furthermore, identify the type of fuel stored in the three tanks. Include photographs of the area beneath and around the tanks and documentation of any leaks/staining. If there is evidence of a leak, the stained soil shall be sampled and analyzed for the compounds consistent with those stored in the tanks. Also, describe in detail any inspections and analyses performed at AOC 2 (SWMU 131) since the

submittal of the February 2003 RFI Report Addendum supporting the environmental characterization of the area. The descriptions should be supported by available data.

In addition to the above, the work plan shall provide for soil field screening and visual inspection of debris at the site. Unless information is furnished that eliminates the need for additional investigation and characterization in these areas, test pits approximately 6 to 10 ft deep shall be excavated at AOC 2 (SWMU 131) at the locations of the sparse or absent vegetation shown on Figure 2-6 of the February 2003 RFI Report Addendum to check for waste. Two samples from the east sparse vegetation area, one from each of the other three sparse vegetation areas, and two from the area where vegetation is absent shall be collected. All soil samples collected from these areas shall be analyzed for RCRA metals, VOCs (EPA 8260), SVOCs, PCBs, dioxins and furans. A map of the recommended sample locations (labeled as Figure 2-6) is provided as Attachment 2 to this document.

Finally, review new Figure 2-5 provided as part of the facility's response. If this should be included in the February 2003 RFI Report Addendum as Figure 2-5, please indicate which of the original report figures should be eliminated.

Comment 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 discusses many of the uncertainties associated with including 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 ranges between 6.6 and 7.3, aluminum would not be considered bioavailable to ecological receptors. Therefore, aluminum should not have been carried forward into the screening assessment and, 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. When aluminum and iron are dropped 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 inorganics listed in Table 3 are still a concern in the screening assessment:*

TABLE 3

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 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. NMED does not require CAFB to submit a refined analysis at this point; however, these shall be considered in the future reports.

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 Table 3. 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 effects levels (LOAELs). NMED requests that CAFB 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.

Facility Response. "The EPA reference (July 2000) on aluminum came out after the publication of NMED guidance (March 2000). However, the relationship of pH and aluminum toxicity in a number of places in the document is discussed (e.g., B2.3.3, B2.5, B2.6, and B3), and it is emphasized that aluminum is not expected to pose risks because the soil pH at the site is greater than 5.5.

Ecological risk was evaluated using the appropriate guidance available at the time from NMED (March 2000) and this guidance does not specifically address essential nutrients. However, the essentiality of iron and its low bioavailability is discussed in a number of places in the document (e.g., B2.3.3, B2.5, B2.6, and B3), and it is emphasized that these factors reduce the likelihood that iron would result in significant risks at the site."

Evaluation of Response. The facility's response partially addresses the issues raised in Specific Comment 3.

The CAFB response focuses on the issues related to aluminum and iron that were raised in the first paragraph of Specific Comment 3 and CAFB's response adequately addresses these issues.

The response does not acknowledge the need for performing a more refined ecological risk assessment for the parameters listed in Table 3 as expressed in the second and third paragraphs of Specific Comment 3.

NMED does not require CAFB to submit a refined analysis at this point; however, such an analysis is required as part of a future submittal.

The screening assessment performed by CAFB 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, a more refined ecological assessment is warranted for the parameters listed in Table 3 of Specific Comment 3. 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 effects levels (LOAELs). NMED requests that CAFB 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, as detailed in the first paragraph of Specific Comment 3, is acceptable.

Please acknowledge that CAFB will prepare a refined (or second Tier) ecological risk assessment for those SWMUs/AOCs, constituents, and environmental media listed in Table 3 of Specific Comment 3.

Comment 4. *Attachment 1 in Appendix B of the RFI Report 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 by burial 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 in this area. It appears that this may represent a data gap. Please discuss whether any biased sampling in and around the circular patterns was conducted. If sampling was conducted, provide the results of the analysis and/or provide the sample number for cross-reference in the report. If sampling was not conducted, then sampling must be proposed in the required work plan. In addition, a revised AOC 2 description shall be submitted as replacement, which contains a discussion of this area and the potential cause of the patterned vegetation.*

Facility Response. "The pattern of vegetation observed at AOC 2 appears to be due to natural conditions as this variety of plant grows in similar patches across the site and in the region. There currently is no sign of soil contamination in the area shown in the photograph. The vegetation at the site is similar in type and density as in other areas observed at Melrose and within the region. Any lack of vegetation in low-traffic areas at Melrose can be attributed to a lack of precipitation and poor (low-nutrient) soil.

There are currently no areas of stressed vegetation in AOC 2 and vegetation present in the area is naturally sparse. The maps were revised to reflect current conditions and are attached to this document."

Evaluation of Response. The facility's response does not address the issue expressed in Specific Comment 4.

Specific Comment 4 is focused on a circular area of vegetation observed in Photograph 19 of Appendix B of the February 2003 RFI Report Addendum (the area can also be seen in Photograph 20). CAFB's response appears to be a similar to the facility's response to Specific Comment 2 that deals with areas of sparse and no vegetation at AOC 2 (SWMU 131).

Please provide additional information on the investigation and characterization of the circular vegetation pattern shown in Photograph 19, Appendix B, of the February 2003 RFI Report Addendum. If this pattern is indicative of a certain plant species at the site, identify the species and provide photographic evidence of other areas where this circular pattern has been observed. Please discuss whether any biased sampling in and around the circular patterns was conducted. If sampling was conducted, provide the results of the analysis and/or provide the sample number for cross-reference in the RFI Report Addendum. If sampling was not conducted and the need for additional investigation and characterization of this area cannot be eliminated by other lines of evidence, then sampling must be proposed in the work plan for additional investigation and characterization of the circular area of vegetation at AOC 2 (SWMU 131). In addition, a revised AOC 2 (SWMU 131) description shall be submitted as replacement, which contains a discussion of this area and the potential cause of the patterned vegetation.

Comment 5. *Section 5.2.2.1, Comparison to Background Level Concentrations, page 5-6. The text indicates that an 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. The text does not indicate whether the UCL is 95% 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.*

Facility Response. "The text in the RFI Report Addendum (February 2003) indicates that the background values represent upper tolerance limits (UTL) for each metal. As presented in Section 4.1.2 of the RFI Report (October 1996), the 95% UTL was calculated for each metal to represent background values. The background values presented in the 1996 RFI report were used for the evaluation of ecological risk at each site."

Evaluation of Response. The CAFB response partially addresses the issues raised in Specific Comment 5.

The facility's response indicates that a 95% upper tolerance limit (UTL) was used in the comparison of background concentrations. This is in accordance with NMED guidance. However, the response does not identify the distribution assumed for the data and the statistical test used in calculating the 95% UTL. Please provide the distribution test and statistical test information requested in Specific Comment 5.

Comment 6. *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.

Facility Response. "NMED guidance (March 2000) was used as the first source for all TRVs for birds and mammals. In those cases where a TRV was not available in NMED, the Oak Ridge Toxicological Benchmark document by Sample et al. 1996 was used, and the benchmark values for mouse and shrew were selected.

Deer Mouse/Least Shrew
- Acetone – The TRV from the NMED Mammalian TRV table was used, which is from the same study as Sample et al., but the NMED value is more conservative because it applies an uncertainty factor of 0.1.
- Bis(2-ethylhexyl)phthalate – The "Duration" in our table should read "2 years" not "105 days".
- Methyl Ethyl Ketone – No value was available in the NMED table, so the body-scaled TRVs by Cox et al. (1975) and in Sample et al. (1996) for the mouse and shrew were used. The study selected has a duration of more than 1 year, which is considered more appropriate than a study of only 13 weeks.
- Phenanthrene – Phenanthrene has 3 aromatic rings and is a low molecular weight PAH, whereas benzo(a)anthracene has 4 aromatic rings and benzo(a)pyrene has 5 aromatic rings are they are high molecular weight PAHs. High molecular weight PAHs are generally considered more toxic to terrestrial animals than are low molecular weight PAHs. Thus, it was assumed that benzo(a)anthracene was a sufficiently conservative surrogate for phenanthrene.
- Manganese – TRVs for manganese were not in NMED guidance (2000). Values from Laskey et al. (1982), Sample et al. (1996), and selected the body-scaled TRVs for the mouse and shrew were used.

Mourning Dove/Red-tailed Hawk
- Acetone – Values from the Hill and Camardese (1986) study referenced in NMED guidance (2000) included a TRV of 52 mg/kg (52,000 μg/kg)."

Evaluation of Response. The CAFB response partially addresses the issues raised in Specific Comment 6.

In general, except for phenanthrene, the information supplied by CAFB supports the use of the TRVs for acetone (mouse), bis(2-ethylhexyl)phthalate, methyl ethyl ketone, manganese, and

acetone (red tailed hawk) employed by the facility in the screening level ecological risk analysis performed at the Melrose Bombing Range. Some values are more conservative than those mentioned in Specific Comment 6 [e.g., acetone TRV for a mouse and, possibly, bis(2ethylhexyl)phthalate]; some were taken directly from the *Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment* (NMED 2000 guidance) [e.g., both acetone values]; and others were appropriately taken from the wildlife NOAEL column of Table 12 from Sample *et al.* (e.g., methyl ethyl ketone, manganese). Throughout Appendix G, *Toxicity Reference Values (TRVs) from Appendix E EPA 1999b*, of the NMED 2000 guidance, benzo(a)pyrene is used as a surrogate for PAHs without established values. Thus, according to the NMED 2000 guidance, the TRV of 100 µg/mg/day for benzo(a)pyrene should be employed as a surrogate for phenanthrene in this screening-level risk analysis [use of benzo(a)anthracene as a surrogate may be appropriate in a refined analysis of ecological risks]. Please revise the screening level analysis to use benzo(a)pyrene rather than benzo(a)anthracene as a surrogate for phenanthrene.

Furthermore, there appears to be confusion in Table B-52, *Toxicity Study Information and Toxicity Reference Values for Upper Trophic Level Assessment Endpoints*, regarding the units associated with the numerical values listed in the table. The Dose and TRV columns of the table are both labeled as presenting values in units of milligrams per kilogram per day [mg/(kgBW·day)]; however, based on the numerical values presented, some entries appear to be in milligrams per kilogram per day and other appear to be in units of micrograms per kilogram per day [µg/(kgBW·day)]. Please review the numerical values presented in Table B-52 and ensure that the units are correct and consistent with the units specified in the column headings. Submit a revised Table B-52 for inclusion in the February 2003 RFI Report Addendum as a final determination on the suitability of the TRV values used by CAFB cannot be made until the units in the table are reviewed and corrected.

Comment 7. *Section 5.5., SLERA Summary, page 5-11. The report indicates that the elevated screening quotients for chromium may be due to an unrepresentative 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 similar soil type/soil horizons 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. NMED suggests that in future investigation, additional site attribution analyses be conducted in such cases to determine whether the detections at the SWMUs/AOCs are in fact representative of background or attributable to site activities.*

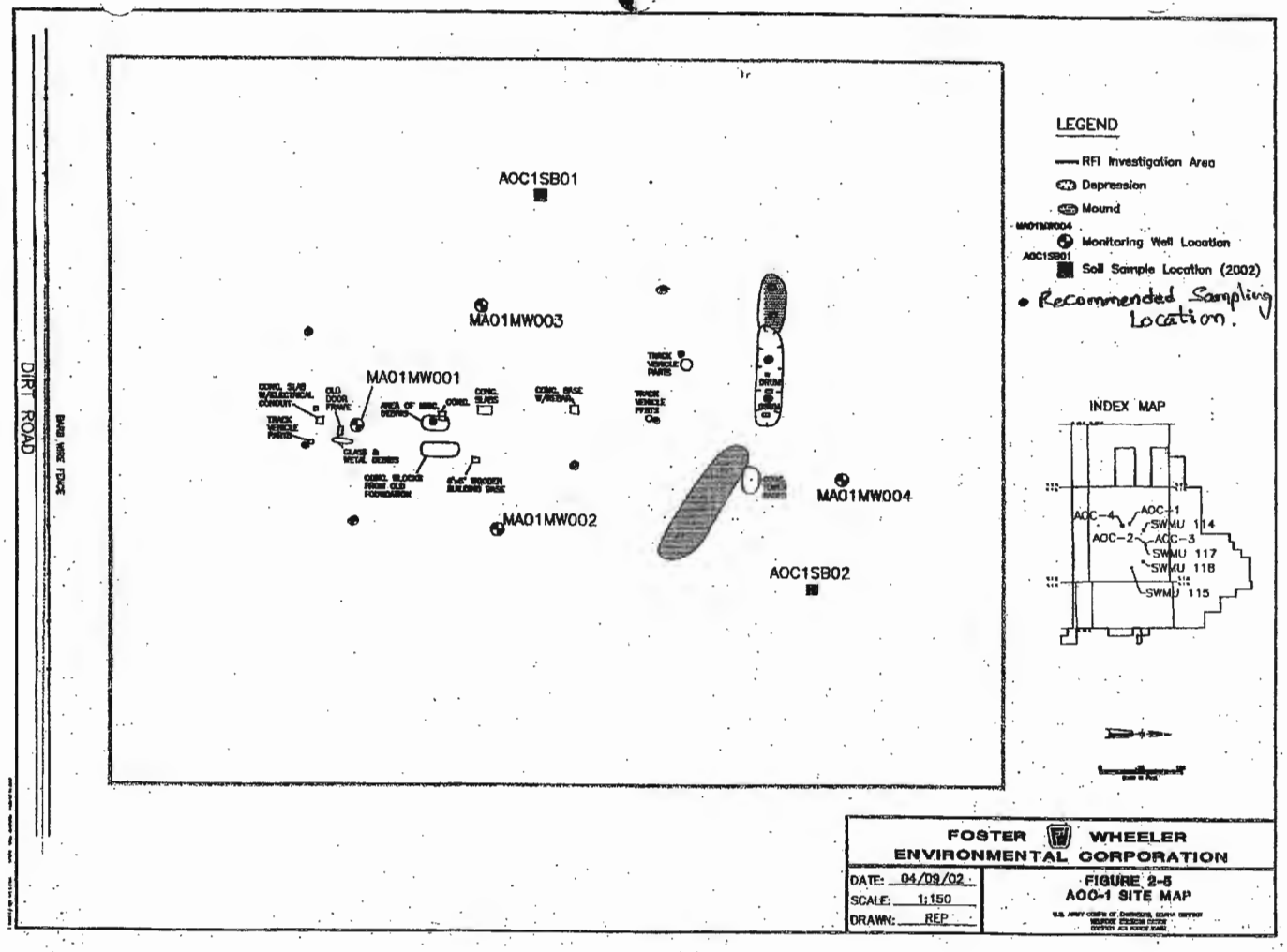
Facility Response. "Comment noted. Recommended evaluations of background and site data will be conducted for future evaluations of sites at Melrose Bombing Range."

Evaluation of Response: The CAFB response adequately addresses the issue raised in Specific Comment 7.

ATTACHMENT 1

Figure 2-5 from the
Notice of Deficiency
Final RCRA Facility Investigation Report Addendum for
Melrose Bombing Range
Cannon Air Force Base, New Mexico
EPA ID No. NM5572124456-1

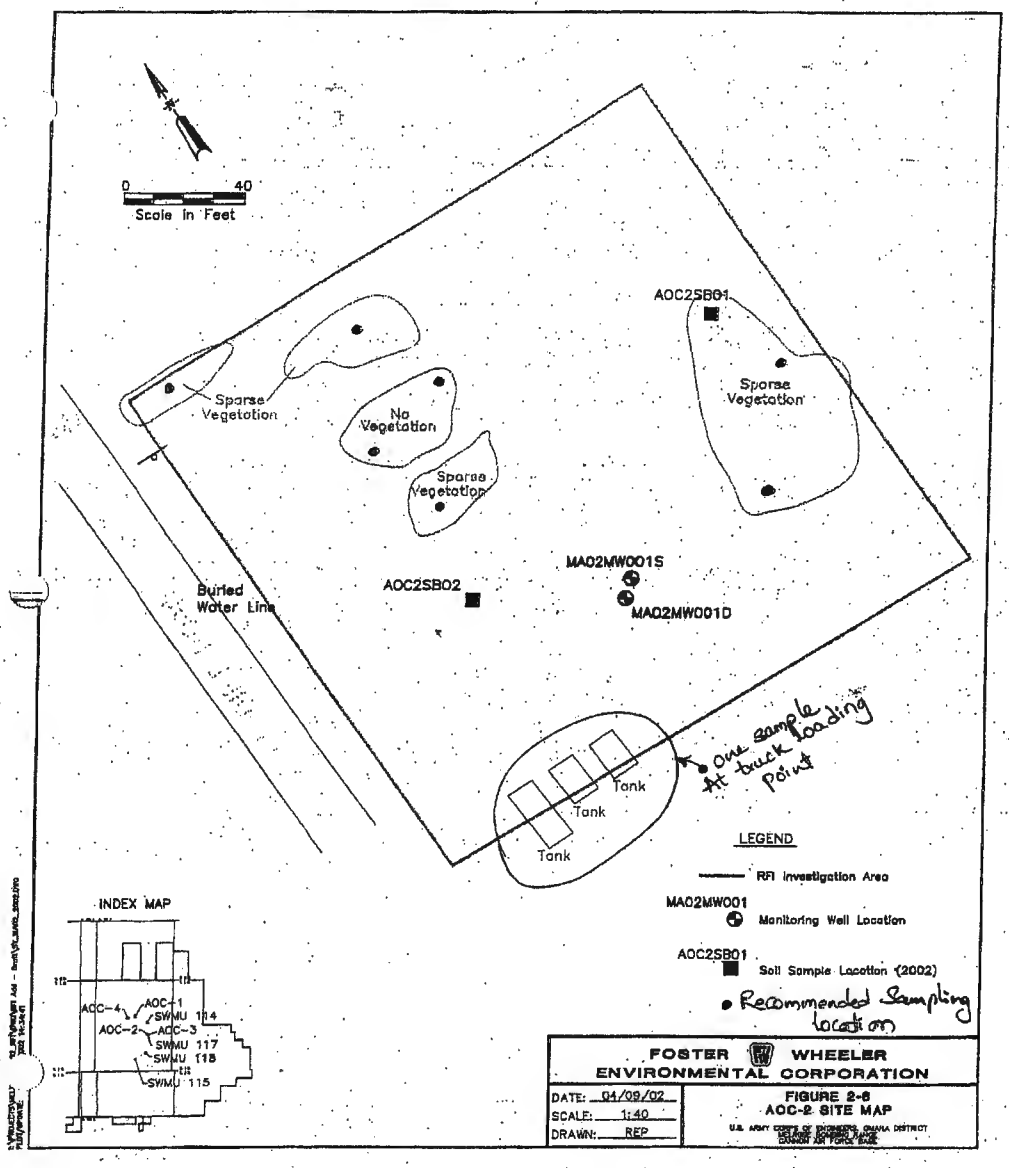
February 1, 2006


AOC1SB01
MA01MW003
MA01MW001
MA01MW002
MA01MW004
AOC1SB02
DIRT ROAD
BARB WIRE FENCE
LEGEND
RFI Investigation Area
Depression
Mound
Monitoring Well Location
Soil Sample Location (2002)
• Recommended Sampling Location.
INDEX MAP
AOC-4
AOC-1
SWMU 114
AOC-2
AOC-3
SWMU 117
SWMU 116
SWMU 115
FOSTER WHEELER
ENVIRONMENTAL CORPORATION
DATE: 04/09/02
SCALE: 1:150
DRAWN: REP
FIGURE 2-5
AOC-1 SITE MAP

ATTACHMENT 2

Figure 2-6 from the
Notice of Deficiency
Final RCRA Facility Investigation Report Addendum for
Melrose Bombing Range
Cannon Air Force Base, New Mexico
EPA ID No. NM5572124456-1

February 1, 2006


0
40
Scale in Feet
AOC2SB01
Sparse Vegetation
No Vegetation
Sparse Vegetation
Sparse Vegetation
MA02MW001S
AOC2SB02
MA02MW001D
Buried Water Line
Tank
Tank
Tank
one sample At truck loading point
LEGEND
RFI Investigation Area
MA02MW001
Monitoring Well Location
AOC2SB01
Soil Sample Location (2002)
Recommended Sampling location
INDEX MAP
AOC-4
AOC-1
SWMU 114
AOC-2
AOC-3
SWMU 117
SWMU 118
SWMU 115
FOSTER WHEELER
ENVIRONMENTAL CORPORATION
DATE: 04/09/02
SCALE: 1:40
DRAWN: REP
FIGURE 2-6
AOC-2 SITE MAP