TechLaw
Quality & Integrity
Twenty Years 2003

560 Golden Ridge Road, Suite 130
Golden, CO 80401
(303) 763-7188
(303) 763-8889 FAX
www.techlawinc.com

ENTERED

RECEIVED
SEP 2006
NMED Hazardous Waste Bureau

August 28, 2006

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; State of New Mexico Environment Department, Santa Fe, New Mexico; Risk Assessment for Other Facilities; Review of the Risk Assessment for the Corrective Measures Study at SWMUs 31, 48A, 77, and 127, Cannon Air Force Base, New Mexico, Task 2 Deliverable.

Dear Mr. Cobrain:

Attached please find a deliverable for the above-referenced work assignment. The deliverable provides risk assessment review comments on the "Corrective Measures Study at SWMUs [Solid Waste Management Units] 31, 48A, 77, and 127," (the CMS) Cannon Air Force Base, New Mexico and dated June 2000.

Per discussion with Ms. Vonteddu, the report should be reviewed against the methodology current at the time drafting of the CMS. The risk-based corrective action (RBCA) was based upon a 1996 American Society of Testing and Material document (ASTM E1739-95). It is noted that the ASTM guide was revised and re-approved in 2002. Even though the CMS was dated 2000, before the release of the revised ASTM guide, differences between the methodology applied in the CMS and current guidance/methodologies were noted in the attached deliverable.

The risk-based screening data applied in the CMS are dated 1997. As requested by Ms. Vonteddu, all risk-based data and toxicological data should be reviewed against the most current (present-day) data. Any discrepancies noted between these data in the CMS and present-day data are addressed in the attached deliverable.

The second paragraph on page 2-4 of Section 2.4, Approach for Evaluating Background Concentrations indicates that the maximum detected concentration in soil was compared to the 95% upper tolerance limit (UTL) of the background concentration. Typically a site attribution analysis is conducted to compare background data to site data. However, the methodology applied in the CMS is consistent with methodology used in 2000 and was appropriately applied. The UTL is an estimate of the maximum detected concentration in background and is appropriately compared to a maximum detected concentration. While slightly less conservative than comparing actual data set distributions, the use of a site attribution analysis over this methodology would most likely not change the results of the risk assessment. Therefore, no comments were drafted concerning this issue.

Metals concentrations in soil were compared to background soil concentrations addressed in the document "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico" dated September 1997. It was noted that during a review of this document (refer to TechLaw deliverable dated October 14, 2006), one of the purposes of the document was to establish a natural background level for pesticides. This was counter-intuitive, as pesticides do not occur naturally in background. It is typically assumed that detections of pesticides are due to site activities. It was not clear whether the history of farming and agricultural activities in the area has lead to elevated levels of pesticides in general. Given that only one pesticide (4,4-DDT) was detected in one surface soil sample in background samples, it appeared that establishment of a background pesticide level for 4,4-DDT was not appropriate and that adequate demonstration that 4,4-DDT was an area-wide contaminate had not been provided. It was recommended that no background levels for pesticides be established. In reviewing the data for this CMS, pesticides were detected at some of the SWMUs. However, background screening for the pesticides was not conducted; background screening was only done for inorganics. Therefore, no comments were drafted concerning this issue. However, as noted in the 2005 TechLaw deliverable on the background document, there were several deficiency comments. These comments should be resolved to ensure background concentrations have been adequately developed and are applied correctly at sites.

This deliverable was emailed to you on August 18, 2006 at Dave.Cobrain@state.nm.us to Ms. Swarna Vonteddu at Swarna.Vonteddu@state.nm.us. A formalized hard (paper) copy of this letter deliverable will be sent via mail. If you have any questions, please call me at (303) 464-6525 or Ms. Paige Walton at (801) 451-2978.

Sincerely,

June K Dreith

June K. Dreith
Program Manager

Enclosure
cc: Swarna Vonteddu, NMED
Ms. Paige Walton, TechLaw
Dallas/TechLaw Files

TASK 2 DELIVERABLE

RISK ASSESSMENT REVIEW COMMENTS ON THE CORRECTIVE MEASURES STUDY AT SWMUS 31, 48A, 77, AND 127 CANNON AIR FORCE BASE, NEW MEXICO

Risk Assessment of Other Facilities

Submitted by:

TechLaw, Inc.
3920 W. 98th Place
Westminster, CO 80030

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

August 18, 2006

RISK ASSESSMENT REVIEW COMMENTS ON THE CORRECTIVE MEASURES STUDY AT SWMUS 31, 48A, 77, AND 127 CANNON AIR FORCE BASE, NEW MEXICO

GENERAL COMMENTS

1. The review of this document included review against (1) the methodology as presented and considered current at the time the document was drafted, and (2) the most current toxicological data and risk-based screening levels. There have been many changes to risk levels since 1997, when the data used in the report were evaluated. As such, the evaluation of which chemicals do not pass the Tier 1 and Tier 2 evaluations have changed. The concern is that because the constituents of concern (COCs) identified in this process are no longer identical as those identified in 2000, the corrective measures necessary to address the site may require modification. It is suggested that once the identification of COCs has been finalized, the corrective actions be re-evaluated to ensure source areas are being addressed.

2. The soil screening levels applied in the Corrective Measure Study (CMS) are taken from the Region VI media specific screening level (MSSL) tables. It should be noted that the screening levels are based upon a target risk of 1E-06. The New Mexico Environment Department (NMED) enforces a target risk level of 1E-05. Therefore, the screening levels should have been adjusted accordingly. Given that an added factor of conservancy was incorporated into the screenings, the evaluation of COCs may be overestimated. It is suggested that either the screenings be revised to be reflective of the NMED target risk level of 1E-05 or that this be addressed in the uncertainties.

3. As noted in Appendix C, Human Health Evaluation Backup Data, an industrial screening level for lead of 2,000 mg/kg was applied. Currently, the standard default screening level for lead (refer to Region 6 Medium-specific Screening Levels and Region 9 Preliminary Remediation Goals) is 800 mg/kg. However, it is noted that the maximum detected lead concentration at all of the sites was below 100 mg/kg. Therefore, while there is concern with the proposed industrial screening level for lead, none of the site concentrations were significantly elevated and all concentrations were below the residential screening level of 400 mg/kg.

4. The Human Health Risk Evaluation Methodology described in Section 2.5 of the report is not consistent with the methods and results presented in Sections 4 through 7 for the four solid waste management units (SWMUs). According to Section 2.5, a two-tiered approach was used to evaluate potential human health risks. Tier 1 compares the maximum site concentrations to generic human health risk-based screening levels (RBSLs). If the Tier 1 RBSLs are exceeded, a Tier 2 analysis is conducted where site-specific target levels (SSTLs) are developed for those compound exceeding Tier 1 levels. If Tier 2 SSTLs are exceeded then several alternatives are available to include instituting an interim remedial action, conduct further tier evaluation (i.e., Tier 3 evaluation), or

remediate to Tier 2 SSTLs. Upon reviewing the risk evaluation results presented in Sections 4 through 7, it appears that only SWMU 31 and SWMU 127 indicated exceedances of the Tier 2 SSTLs; for these sites a baseline risk assessment (BRA) was also conducted (refer to Appendix C).

It is unclear if the BRA process corresponds to the Tier 3 step of the human health evaluation process, and if so, this step needs to be clearly described in Section 2.5. In addition, it is unclear how the results of the Tier 1 and 2 processes were used to determine that a BRA was needed at these two sites. For example, for SWMU 31, the Tier 2 analysis indicated that only two compounds, benzo(a)pyrene and benzo(b)fluoranthene, exceeded the SSTLs. The text then states that a BRA was performed in Appendix C and the conclusions indicate that human health risk was within USEPA acceptable levels without stating the risk results and the USEPA acceptable risk levels. In reviewing the BRA results for SWMU 31, there is no mention of the Tier 1 and 2 analysis and the BRA evaluated over 20 chemicals. The report requires significant updates to clearly explain the tiered human health evaluation approach used for these sites and should also present this information in a logical progression.

5. There are some general comments concerning the methodology used in the risk assessments provided in Appendix C. Instead of listing the comments for each assessment, the concerns have been outlined below. Please note that these comments apply for each of the risks assessments.

6. The discussions in Appendix C often indicate that something is "explained in Appendix C". This is very confusing. For example, under the discussion of exposure point concentrations (example see Section 4.3.5, page 4-6, Appendix C-1), the methodology for determining the upper confidence level is addressed in Appendix C. However, this information could not be located in Appendix C.

7. For determining the 95% upper confidence level (UCL), the specific method was not provided, but it appears that a one-tailed test based on a normal distribution was used. This does not appear to be good science. It is unusual for environmental data to be normally distributed. Discuss what testing was done to determine that all of the data set distributions were normal and provide the results of these tests. If no data set distribution testing was conducted, then the data must be re-evaluated and the 95% UCL calculated based upon individual data set distributions. Also discuss the uncertainty in using censored data with normal distribution testing. It is likely that data sets will have different distributions and different tests may need to be applied. It is suggested that the following guidance be consulted and the software ProUCL (available free on-line) be used: *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*, OSWER 9285.6-10, December 2002.

8. Concentrations of volatile organic compounds (VOCs) released from the soil were estimated using 1991 EPA methodologies. While this approach applied is acceptable, as it was the current methodology applied at the time, today, the Johnson and Ettinger model is used to evaluate the vapor intrusion pathway (USEPA, 2004;

http://www.epa.gov/oswer/riskassessment/airmodel/pdf/2004_0222_3phase_users_guide.pdf).

9. The use of non-detects is indicated to be addressed in Appendix C. However, it is not clear where this is addressed or how non-detects/censored data were addressed and applied in the risk assessment. Please clarify this.

10. Toxicity data for total petroleum hydrocarbons (TPH) are provided. Currently, TPH are evaluated based upon carbon chain length and associated toxicity. Please refer to NMED's guidance, *The New Mexico Environment Department TPH Screening Guidelines (November 2005).* The NMED TPH guidance is based on the Massachusetts Department of Environmental Protection (MADEP) Final Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH methodology (incorporating April 2005 erratum) (2003). It is recommended that the toxicity data be revised to be consistent with current toxicity data.

11. Some constituents were eliminated as a COC due to low detection frequency (less than five-percent). As stated in the "Risk Assessment for Superfund Guidance, Volume I Human Health Evaluation Manual" (EPA 1989), chemicals that detected infrequently may be eliminated from additional consideration. However the guidance also specifically states that if there is reason to suspect the presence of the chemical at the site based upon site history, the chemical may not be eliminated based on frequency of detection. Please discuss whether any of the chemicals eliminated as a COC may be present due to site history, and where this is true, the risk assessment must be revised to include these chemicals.

SPECIFIC COMMENTS

1. **Section 2.5.1, RBCA Process, Page 2-5.** The first bullet on page 2-5 indicates that the MSSLs are discussed in detail in Section 4.6.2, however, Section 4.6.2 does not exist. It is possible that this bullet is referring to section 2.5.2 Derivation of USEPA Region VI MSSLs. Please correct the cross reference to the section that discussed in the MSSLs in detail. In addition, the description of the Tier 1 and Tier 2 process does not specifically indicate what land use scenarios are used for these two steps. Please state that the Tier I risk-based screening levels (RBSLs) are based on residential exposure and that the Tier 2 site-specific target levels (SSTLs) are based on commercial and construction worker exposures.

2. **Section 2.5.1, RBCA Process, Page 2-5.** Under bullet point five (5), it is noted that if a residential screening level was not available, a screening level was calculated but the exposure component was modified to account for industrial exposures. It is unclear why an industrial value would be calculated in the absence of a residential value. This implies that the Tier 1 screen used a combination of residential-based and industrial-based screening levels which is an unacceptable approach. A Tier 1 screening is intended to be conservative, therefore all screening levels must be based on residential exposure assumptions. Please clarify whether both residential and industrial screening levels were

used in the Tier 1 screening. If so, please revise all calculated screening levels for the Tier 1 screen to be reflective of residential exposure parameters.

3. **<u>Section 3.7, Background Metals Concentrations in Soil and Water Quality, Page 3-6.</u>** The last paragraph indicates that other sources for background data were used in determining whether detected metals were within background concentrations. It is noted that in Appendix C, levels representative of southwestern soil and United States soils were used as part of the background screening. This is not an acceptable approach. Regional levels incorporate various geologies, which may not be appropriate for Cannon Air Force Base. Regional levels may over estimate or under estimate site levels. The only acceptable data that may be used in screening out metals is site-specific background data. In reviewing the background comparisons, there is a concern that in some cases, the site concentration exceeded the Cannon background concentration but was eliminated as a COC as the concentration was less than a regional level. Please revise the background screening assessment to be based solely on site-specific data; chemicals for which site-specific background are unavailable should be included in the screening level human and ecological evaluations. In addition, revise the COC lists and risk assessments accordingly.

4. **<u>Section 4.2, Site History, Page 4-1.</u>** This paragraph is only a partial paragraph. Please provide the missing text discussing the site history.

5. **<u>Section 4.4, Previous Investigation, Page 4-3.</u>** The last paragraph indicates that the total recoverable petroleum hydrocarbon (TRPH) maximum concentrations exceeded NMED's action level of 1,000 mg/kg. Given the history of the site, which indicates that jet fuel and diesel fuels were used, and, the site overlies a drinking water aquifer, the more conservative TPH residential screening level for diesel range fraction of TPH , 520 mg/kg, should have been used. This TPH screening level is derived based on NMED's guidance, *The New Mexico Environment Department TPH Screening Guidelines (November 2005)*, which adopted the Massachusetts Department of Environmental Protection (MADEP) Volatile Petroleum Hydrocarbons/Extractable Petroleum Hydrocarbons (VPH/EPH) approach for evaluating individual hydrocarbon fractions of TPH. The MADEP approach develops screening levels for different hydrocarbon fractions of TPH based on percent composition and the weighted sum of the toxicity of each hydrocarbon fraction. In using the current screening datum, the conclusion of the report does not change, in that the maximum detected TRPH concentrations exceed the NMED TPH screening action level. However, please refer to the above NMED document for future evaluations of site data to TPH action levels.

   In addition, the same paragraph indicates that the NMED action level for benzene, toluene, ethylbenzene, and xylenes (BTEX) of 500 mg/kg and the action level of 10 mg/kg for benzene were not exceeded. Again, the "New Mexico Environment Department TPH Screening Guidelines" should be used for both evaluation of soil concentration for direct exposure and for the potential for the contaminants to migrate to groundwater (refer to Table 3 of the guidance).

Please note that this comment applies to each SMWU evaluated in the CMS [SWMU 48A (page 5-2), SWMU 77 (page 6-3), and SWMU 127 (page 7-3].

6. **Section 4.5.3, Background Comparison, Page 4-7.** For the essential nutrients, the maximum detected concentrations were compared to recommended daily allowances (RDAs). However, the RDAs or upper intake levels (ULs) should be evaluated as toxicological data. These RDAs/ULs should be used in conjunction with the soil media-specific screening levels (MSSLs) for developing a specific screening level. Comparing the site data to screening levels developed using similar methodology (e.g., Region 9 Preliminary Remediation Goal equations) to the MMSLs, it is found that the maximum detected concentrations for all of the essential nutrients are less than the resulting screening level. In the future, when evaluating essential nutrients, the RDAs/ULs should not be used directly for comparison but rather should be used to derive a screening level.

   Please note that this comment applies to each SMWU evaluated in the CMS [SWMU 48A (pages 5-5 & 5-6), SWMU 77 (pages 6-8 & 6-9), and SWMU 127 (pages 7-6 & 7-7].

7. **Tier 2 Evaluation, Pages 4-8 and 4-9.** Tier 2 screening levels were developed using the Risk-Based Corrective Action (RBCA) Tool Kit for Chemical Releases. Based upon the magnitude of the screening level provided for chromium (3100 mg/kg), it appears that the chromium was either trivalent chrome (CrIII) or total chrome. However, for the Tier 1 screening purposes, data for hexavalent chrome (CrVI) should be used. If CrVI were expected at the site, it would seem that a more conservative Tier 2 screening level would result. Please clarify and justify what form of chromium is present at the site, and modify the evaluations of chromium in the Tier 1 and Tier 2 evaluation for consistency. (This comment applies for all SWMUs addressed under this CMS.)

   In addition, the resulting screening levels, for a commercial worker scenario, were compared against the 2005 MMSLs for an indoor, industrial worker. Significant differences were noted, as summarized in the below table.

Chemical	SSTL (from CMS) (mg/kg)	2005 MMSL, industrial indoor worker (mg/kg)	Maximum Site Concentration (mg/kg)	Retain as Chemical of Concern based on MMSL?
Benzo(a)anthracene	4.3	7.8	2.4	No
Benzo(a)pyrene	0.43	0.78	2.7	Yes
Benzo(b)fluoranthene	1.3	7.8	5.6	No
Dibenzo(a,h)anthracene	3.7	0.78	0.63	No
Indeno(1,2,30cd)pyrene	4.3	7.8	2.3	No

Arsenic	16	3.8	4.6	Yes
Chromium – total	3100	210	130	No
Chromium - hexavalent	3100	64	130	Yes

Based on the more current MMSLs arsenic is a COPC and benzo(a)pyrene is still retained as a COPC, while benzo(b)fluoranthene is below its screening level. Chromium may or may not be retained as a COPC depending on the type of chrome that is likely to be present at the site. Please conduct a thorough review of the more current toxicity data and MMSLs and revise accordingly.

8. **Table 4-7, Comparison of SWMU 31 Maximum Soil Concentrations to MMSLs.** The residential soil MMSLs in Table 4-7 were compared to the December 2005 version of the MMSLs (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screenvalues.pdf). Although the MMSLs have been revised for almost all of the chemicals listed in Table 4-7, no new chemical was identified as having maximum concentration exceeding the MMSL. Therefore, while the magnitude of exceedance may be different, the list of chemicals failing the Tier 1 screening evaluation remains the same.

   While not addressed in the report, in addition, to comparing the maximum detections to the residential soil levels, the data were evaluated against the soil-to-groundwater migration levels, based upon a dilution attenuation factor (DAF) of one as part of this review. It is noted that the following constituents had maximum concentrations greater than the screening level DAF of one: methylene chloride, tetrachloroethene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthnen, carbazole, dibenzo(a,h)anthracene, indeno(1,2,3)pyrene, arsenic, barium, cadmium, and chromium (chromium VI). The polynuclear aromatic hydrocarbons (PAHs) and metals have concentrations significantly above the screening levels, suggesting a potential for migration to groundwater. However, given the site conditions and hydrology, a DAF of 1 may not be appropriate for the site and may overestimate the risks. Therefore, while this analysis does not support the conclusion of the fate and transport modeling, based upon a review of the site characteristics and the source area, the potential for migration to groundwater is most likely minimal. However, please address the use of the soil-to-groundwater screening levels and how this screening relates to the fate and transport evaluation conducted for the site.

9. **Section 5.5.1, Site Conceptual Model, Page 5-4.** The rationale provided for the exclusion of groundwater exposures is that the depth to groundwater is 250 feet. However, migration of COCs to groundwater is not based upon depth, but rather the amount of source, geology, hydrology, and chemical properties. Given that this site overlies an aquifer that is used as an off-site drinking water source, stronger evidence and justification for excluding this pathway is required. Please provide additional lines of evidence justifying the exclusion of the groundwater pathway.

10. **Section 5.5.1, Site Conceptual Model, Page 5-4.** The site conceptual model does not address inhalation of volatile organic compounds (VOC) from the vapor intrusion

pathway. Given that several VOCs were detected in site soil, this is potentially a complete exposure route. Please revise the assessment to address exposure via this pathway. In addition, it is noted that the MMSLs do not incorporate risks via inhalation from vapor intrusion. Thus a separate evaluation of this pathway must be evaluated. Please revise the CMS accordingly.

11. **Table 5-5, Comparison of SWMU 48A Maximum Soil Concentrations to MMSLs.** When looking at the MMSLs based upon more recent toxicity data (2005 MMSLs), it is agreed that none of the COPCs detected at the site have maximum detected concentrations above the MMSLs.

    In addition, to comparing the maximum detections to the residential soil levels, the data were also evaluated against the soil-to-groundwater migration levels, based upon a DAF of one. It is noted that the following constituents had maximum concentrations greater than the screening level DAF of one: ethylbenzene, methylene chloride, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylnaphthalene, and 4-chloroaniline. Several of these constituents had maximum concentrations significantly above the screening levels, suggesting a potential for migration to groundwater. However, given the site conditions and hydrology, a DAF may not be appropriate for the site and may overestimate the risks. Therefore, while this analysis does not support the conclusion of the fate and transport modeling, based upon a review of the site characteristics and the source area, the potential for migration to groundwater is most likely minimal. However, please address the use of the soil-to-groundwater screening levels and how this screening relates to the fate and transport evaluation conducted for the site.

12. **Section 6.7, Site Conceptual Model, Pages 6-6 and 6-7.** The site conceptual model does not address inhalation of VOCs from the vapor intrusion pathway. Given that several VOCs were detected in site soil, this is potentially a complete exposure route. Please revise the assessment to address exposure via this pathway. In addition, it is noted that the MMSLs do not incorporate risks via inhalation from vapor intrusion. Thus a separate evaluation of this pathway must be evaluated. Please revise the CMS accordingly.

13. **Section 6.7.4, Tier 1 Evaluation (Tier 2 Evaluation), Pages 6-11 and 6-12.** Tier 2 screening levels are provided on the table on page 6-12. The site maximum detections listed in the table were compared against the 2005 MMSLs for an indoor, industrial worker. It is noted that while differences between the screening levels and the 2005 MMSLs were noted, the site maximum concentrations were below the 2005 MMSLs for an indoor industrial worker.

14. **Table 6-9, Comparison of SWMU 77A Maximum Soil Concentrations to MMSLs.** When looking at the MMSLs based upon more recent toxicity data (2005 MMSLs), it is agreed with the list of COPCs detected at the site have with maximum detected concentrations above the MMSLs.

In addition, to comparing the maximum detections to the residential soil levels, the data were also evaluated against the soil-to-groundwater migration levels, based upon a DAF of one. It is noted that the following two constituents had maximum concentrations greater than the screening level DAF of one: pentacholorophenol and endrin ketone. The maximum concentrations were not significantly above the screening levels, suggesting a minor potential for migration to groundwater. Given the site conditions and hydrology, a DAF may not be appropriate for the site and may overestimate the risks. Therefore, while this analysis does not support the conclusion of the fate and transport modeling, based upon a review of the site characteristics and the source area, the potential for migration to groundwater is most likely minimal. However, please address the use of the soil-to-groundwater screening levels and how this screening relates to the fate and transport evaluation conducted for the site.

15. **Section 7.5.1, Site Conceptual Exposure Model, Pages 7-3 through 7-5.** The site conceptual model does not address inhalation of VOCs from the vapor intrusion pathway. Given that several VOCs were detected in site soil, with some detected above the screening level. Thus, this is potentially a complete exposure route. Please revise the assessment to address exposure via this pathway. In addition, it is noted that the MMSLs do not incorporate risks via inhalation from vapor intrusion. Thus a separate evaluation of this pathway must be evaluated. Please revise the CMS accordingly.

16. **Section 7.5.5, Tier 2 Evaluation, Pages 7-9 and 7-10.** Tier 2 screening levels are provided on the table on page 7-10. The site maximum detections listed in the table were compared against the 2005 MMSLs for an indoor, industrial worker. It is noted that there were differences between the screening levels and the 2005 MMSLs and also with the identified COCs that exceeded their MMSLs, as noted in the below table

Chemical	SSTL (from CMS) (mg/kg)	2005 MMSL, industrial indoor worker (mg/kg)	Maximum Site Concentration (mg/kg)	Retain as Chemical of Concern based on MMSL?
Benzo(a)anthracene	4.3	7.8	8	Yes
Benzo(a)pyrene	0.43	0.78	8.6	Yes
Benzo(b)fluoranthene	1.3	7.8	17	Yes
Dibenzo(a,h)anthracene	3.7	0.78	0.28	No
Benzene	4.6	1.5	3.8	Yes
Xylenes	23,000	210	260	Yes

When looking at the MMSLs based upon more recent toxicity data, all of the chemicals with the exception of dibenzo(a,h)anthracene are above the MMSL. Please revise accordingly.

17. Table 7-6, Comparison of SWMU 127 Maximum Soil Concentrations to MMSLs. The maximum detected concentration for indeno(1,2,3) pyrene is listed as 5.1 mg/kg. When compared to the residential soil MMSL (0.56 mg/kg), listed in the table, the concentration for indeno(1,2,3)pyrene exceeded the MMSL. However, the table lists indeno(1,2,3)pyrene as not exceeding the MMSL. Please revise accordingly.

When looking at the MMSLs based upon more recent toxicity data (2005 MMSLs), it is agreed with the list of COPCs detected at the site have with maximum detected concentrations above the MMSLs (with the exception of indeno(1,2,3)pyrene, which should be added as noted above).

In addition, to comparing the maximum detections to the residential soil levels, the data were also evaluated against the soil-to-groundwater migration levels, based upon a DAF of one. It is noted that the following constituents had maximum concentrations greater than the screening level DAF of one: toluene, xylenes, 2-methylnaphthalene, benzo(a)pyrene, benzo(s)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, carbazole, chrysene, dibenzo(a,h)anthracene, phenanthrene, antimony, barium, cadmium, chromium (CrVI and total), and silver. In some cases, the maximum concentrations were significantly above the screening levels, suggesting a potential for migration to groundwater. Given the site conditions and hydrology, a DAF may not be appropriate for the site and may overestimate the risks. This analysis does not support the conclusion of the fate and transport modeling, that groundwater could not be affected, and based upon a review of the site characteristics and the source area, the potential for migration to groundwater is unclear. Please address the use of the soil-to-groundwater screening levels and how this screening relates to the fate and transport evaluation conducted for the site.