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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

December 21, 2006

Colonel John D. Posner
Commander 27th Fighter Wing
100 D.L. Ingram Boulevard, Ste 100
Cannon Air Force Base, New Mexico 88103

RE: NOTICE OF DEFICIENCY (NOD)
CORRECTIVE MEASURES STUDY AT SWMUS 31, 48A, 77 AND 127,
CANNON AIR FORCE BASE, NEW MEXICO
EPA ID NO. NM7572124454
CAFB-06-004

Dear Colonel Posner:

The New Mexico Environment Department (NMED) has reviewed the Cannon Air Force Base (the Permittee) *Corrective Measures Study at SWMUs 31, 48A, 77, and 127* (Report), dated June 2000. NMED has also reviewed the documents *Final Corrective Measure Implementation Work Plan for SWMU 31 (AGE Maintenance Pad) and SWMU 77 (Civil Engineering Container Storage Area)* dated January 1999, and *Work Plans: SWMUs 31, 48A, 77, and 127* dated November 1998. NMED has determined that the Report is technically deficient. While NMED does not require resubmission of the entire Report, the Permittee must respond to the comments provided in this LETTER and supply the requested additional information within 90 days of the receipt of this letter. NMED will reevaluate the report once the requested information is provided.

Comment 1
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. NMED uses a target risk level of 1E-05. Therefore, the screening levels should be adjusted accordingly. Given that an added factor of conservancy was incorporated into the screenings, the evaluation of contaminants of potential concern (COCs) may be overestimated. The Permittee must either revise the screenings to be reflective of the NMED target risk level of 1E-05 or address this issue in the uncertainties discussion.

Comment 2
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 Tier 1 RBSLs are exceeded, a Tier 2 analysis is conducted where site-specific target levels (SSTLs) are developed for those compounds exceeding Tier 1 levels. If Tier 2 SSTLs are exceeded, then several alternatives are available that include instituting an interim remedial action, conducting a 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 contained 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. If so, this step needs to be clearly described in Section 2.5. It is also 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 in Appendix C then states that a BRA was conducted; 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, even though the BRA evaluated over 20 chemicals. The Permittee must update the report to clearly explain the tiered human health evaluation approach used for these sites, and present this information in a logical progression.

Comment 3 **Section 2.5.1**
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". CAFB must correct the cross reference to the section that discussed the MSSLs in detail.

Comment 4 **Section 2.5.1**
Under the fifth bullet on page 2-5 it is noted that if a residential screening level was not available, a screening level was calculated with the exposure component 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 - an unacceptable approach. A Tier 1 screening is intended to be conservative; all screening levels must therefore be based on residential exposure assumptions. The Permittee must clarify whether both residential and industrial screening levels were used in the Tier 1 screening. If so, CAFB must revise all calculated screening levels for the Tier 1 screen to be reflective of residential exposure parameters.

Comment 5 **Section 2.5.1**
The description of the Tier 1 and Tier 2 process does not specifically indicate what land use scenarios are used for these two steps. The Permittee must 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.

Comment 6 **Section 3.7**
The Permittee indicated in the last paragraph of Section 3.7 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 therefore overestimate or underestimate site levels. The only acceptable data that may be used in screening out metals is site-specific NMED-approved background data. In reviewing the background comparisons, NMED is concerned that in some cases, the site concentration exceeded the Cannon background concentration, but was nevertheless eliminated as a COC because the concentration was less than a regional level. The Permittee must 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, the Permittee must revise the COC lists and risk assessments accordingly.

Comment 7 **Section 4.2**
Section 4.2 is a partial paragraph starting with "with JP-4, oils, and diesel fuel, flows off the pad to the southeast". The Permittee must make connections to complete this paragraph.

Comment 8 **Section 4.4**
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].

The last paragraph of Section 4.4 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 since 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 from NMED's guidance, "The New Mexico Environment Department TPH Screening Guidelines (November 2005)", which is based on 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 developed screening levels for different hydrocarbon fractions of TPH based on percent composition and the weighted sum of the toxicity of each hydrocarbon fraction. Use of the current screening datum will not change the conclusion of the report because the maximum detected TRPH concentrations exceeds the NMED TPH screening action level. However, the Permittee must 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).

Comment 9 **Section 4.5.3**
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].

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. When comparing the site data to screening levels developed using similar methodology (e.g., Region 9 Preliminary Remediation Goal equations), 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.

Comment 10 **Section 4.5.5**
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].

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, a more conservative Tier 2 screening level would likely result. The Permittee must both 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.

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

Chemical	SSTL (from CMS) (mg/kg)	2005 MSSL, industrial indoor worker (mg/kg)	Maximum Site Concentration (mg/kg)	Retain as Chemical of Concern based on MSSL?
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(1,2,3-cd)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 MSSLs, 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 that is likely to be present at the site. The Permittee must conduct a thorough review of the more current toxicity data and MSSLs and revise accordingly.

Comment 11 Table 4.7

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

When 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 1. 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)fluoranthene, 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 therefore overestimate the risks. 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, the Permittee must 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.

Comment 12 **Section 5.5.1**
The rationale provided for the exclusion of groundwater exposures is that the depth to groundwater is approximately 250 feet. However, migration of COCs to groundwater is not based upon depth, but rather the volume of the contaminant source, geology, hydrology, and chemical properties of the contaminants. 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. The Permittee must provide additional lines of evidence justifying the exclusion of the groundwater pathway.

Comment 13 **Section 5.5.1**
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. The Permittee must revise the assessment to address exposure via this pathway. In addition, it is noted that the MSSLs do not incorporate risks via inhalation from vapor intrusion. A separate evaluation of this pathway must therefore be evaluated. The Permittee must revise the CMS accordingly.

Comment 14 **Table 5.5**
When looking at the MSSLs based upon more recent toxicity data (2005 MSSLs), it is agreed that none of the COPCs detected at the site have maximum detected concentrations above the MSSLs.

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 1. It is noted that the following constituents had maximum concentrations greater than the screening level DAF of 1: 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, a review of the site characteristics and the source area leads one to conclude that the potential for migration to groundwater is most likely minimal. However, the Permittee must 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.

Comment 15 Section 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. The Permittee must revise the assessment to address exposure via this pathway. In addition, it is noted that the MSSLs do not incorporate risks via inhalation from vapor intrusion. Thus a separate evaluation of this pathway must be evaluated. The Permittee must revise the CMS accordingly.

Comment 16 Section 6.7.4
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 MSSLs for an indoor, industrial worker. While differences between the screening levels and the 2005 MSSLs were noted, the site maximum concentrations were below the 2005 MSSLs for an indoor industrial worker.

Comment 17 Table 6.9
Considering more recent toxicity data (2005 MSSLs), NMED agrees that the list of COPCs detected at the site have maximum detected concentrations above the MSSLs.

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 1. The following two constituents had maximum concentrations greater than the screening level DAF of 1: 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, a review of the site characteristics and the source area leads one to conclude that the potential for migration to groundwater is most likely minimal. However, the Permittee must 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.

Comment 18 Section 7.5.1
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, this is potentially a complete exposure route. The Permittee must revise the assessment to address exposure via this pathway. In addition, it is noted that the MSSLs do not

incorporate risks via inhalation from vapor intrusion. Thus a separate evaluation of this pathway must be evaluated. The Permittee must revise the CMS accordingly.

Comment 19 **Section 7.5.5**

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 MSSLs for an indoor, industrial worker. It is noted that there were differences between the screening levels and the 2005 MSSLs and also with the identified COCs that exceeded their MSSLs, as noted in the below table

Chemical	SSTL (from CMS) (mg/kg)	2005 MSSL, industrial indoor worker (mg/kg)	Maximum Site Concentration (mg/kg)	Retain as Chemical of Concern based on MSSL?
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 MSSLs based upon more recent toxicity data, all of the chemicals with the exception of dibenzo(a,h)anthracene are above the MSSL. The Permittee must revise these accordingly.

Comment 20 **Table 7.6**

The maximum detected concentration for indeno(1,2,3) pyrene is listed as 5.1 mg/kg. When compared to the residential soil MSSL (0.56 mg/kg) listed in the table, the concentration for indeno(1,2,3)pyrene exceeded the MSSL. However, the table lists indeno(1,2,3)pyrene as not exceeding the MSSL. The Permittee must revise the table accordingly.

Comment 21 **Table 7.6**

In light of more recent toxicity data (2005 MSSLs), NMED agrees that the list of COPCs detected at the site have maximum detected concentrations above the MSSLs (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 1. The following constituents had maximum concentrations greater than the screening level DAF of 1: 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, that groundwater could not be affected. This combined with a review of the site characteristics and the source area, raises the possibility of a potential for migration to groundwater. The Permittee must 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.

Comment 22
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, the maximum detected lead concentration at all of the sites was below 100 mg/kg. 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. The Permittee must revise the industrial screening level for lead in the report to reflect the current standard screening level.

General Comments:

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 to each of the risks assessments.

1. The discussions in Appendix C often indicate that something is "explained in Appendix C". 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 referenced as being explained in Appendix C. However, this information could not be located in Appendix C. The Permittee must clarify what explanation in Appendix C is being referenced.

2. The specific method of determining the 95% UCL was not provided, although it appears that a one-tailed test based on a normal distribution was used. This is not an appropriate test. It is unusual for environmental data to be normally distributed. CAFB must discuss the type of testing 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 muat be calculated based upon individual data set distributions. The Permittee must 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.

3. Concentrations of volatile organic compounds (VOCs) released from the soil were estimated using 1991 EPA methodologies. While this approach applied is acceptable (it was the current methodology applied at the time), the more recent 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).

4. The use of non-detects is referenced as being 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. The Permittee must clarify this.

5. Toxicity data for total petroleum hydrocarbons (TPH) are provided. Currently, TPH date 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). The Permittee must revise the toxicity data to be consistent with current toxicity data.

6. 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 are detected infrequently may be eliminated from additional consideration. The guidance also 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. The Permittee must discuss whether any of the chemicals eliminated as a COC may be present due to site history. Where this is true, the risk assessment must be revised to include these chemicals.

Please contact Swarna Latha Vonteddu at (505) 476-6057 should you have any questions.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

JPB: sv

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