

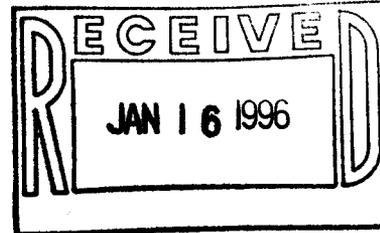


DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 27th FIGHTER WING (ACC)
CANNON AIR FORCE BASE, NEW MEXICO



Gale W. Larson, Colonel, USAF
Vice Commander
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Mr. David Neleigh, Chief
New Mexico/Federal Facilities Section
Multimedia Planning and Permitting Division
US Environmental Protection Agency Region VI
1445 Ross Avenue
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Dallas TX 75202-2733

Dear Mr. Neleigh

The Cannon AFB responses to EPA Region VI Notice of Deficiencies (NODs) for the Appendix II and Appendix III Phase II Draft RCRA Facilities Investigation (RFI) Reports are attached for your review and approval. These responses answer the EPA Region VI NOD received at Cannon AFB on 11 Nov 95.

If you have questions concerning these responses, please contact Mr. John S. Pike, of my environmental flight, at (505) 784-4348.

Sincerely

GALE W. LARSON, Colonel, USAF
Vice Commander

Attachment:
Response to EPA Region VI NODs (7 Nov 95)

cc:
NMED (B. Hoditschek)
NMED (J. Jacobs) w/o Attachment
HQ ACC CES/ESVW (M. Calvert) w/o Attachment

4/19/1995

**RESPONSE TO EPA COMMENTS
RFI DRAFT REPORT
APPENDIX II AND APPENDIX III SWMUs PHASE II
CANNON AIR FORCE BASE, NEW MEXICO
EPA I.D. NO. MM7572124451**

GENERAL COMMENTS

Comment 1. At several SWMUs, a chemical-specific cancer risk between 1E-04 and 1E-06 was calculated and a conclusion was drawn that the risk represented was within EPA's target risk range, and therefore, no unacceptable risk was expected. When risk falls within this range, it is a risk management decision as to whether or not it is acceptable.

Response: Comment noted. Language regarding EPA's risk range is taken from several EPA guidance documents (as referenced). The risk range is used as a benchmark by which readers of the risk assessment can evaluate the relative risks posed by the site. The risk range is not used in the text as a risk management tool; it is only used to place site risks in context with EPA's evaluation thresholds.

Comment 2. The levels of total recoverable petroleum hydrocarbons (TRPH) in soil at several SWMUs is above the New Mexico limit of 100 mg/kg. This issue should be resolved with the state.

Response: This issue, as discussed below, will be reviewed with the state. New Mexico has two regulations that address the levels of TPH in soils. These regulations set limits at which remediation is deemed adequate or complete. The UST regulation (Section 1209) specifies that 100 mg/kg TPH is the level at which soils that are "highly contaminated" (defined as "saturated") with petroleum will be deemed to be adequately remediated; however, that regulation also states that contaminated soils may be left in place (i.e., for in situ remediation) if factors such as transport to groundwater and volatile emissions do not pose unacceptable conditions. The regulation for "Petroleum Contaminated Soils" (Section 708) is similar to the UST regulation except that the contaminated soils are considered to be adequately remediated when the TPH level is at 1,000 mg/kg. In addition to TPH, the regulations also specify maximum total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations of 50 and 500 mg/kg in Sections 1209 and 708, respectively. Only one sample in the entire Appendix II and Appendix III investigation significantly exceeded the 50 mg/kg BTEX level, and no sample exceeded the 500 mg/kg BTEX level. Sample CAN127-2710-000 had a total BTEX concentration of 399.8 mg/kg, and sample CAN127-2709-0000 had a total BTEX concentration of 50.9 mg/kg, which is considered equal to the 50 mg/kg level. Both of these are beneath pavement where exposure is not likely.

Potential risks due to the TPH constituents that are likely to pose significant risks (i.e., that have toxicity factors) have been evaluated. Therefore, in effect, the potential risk due to TPH has been evaluated. This approach is more comprehensive than the approach set out in the regulations because it accounts for all of the potentially toxic TPH constituents while the regulations only assess TPH and BTEX. In addition, since the purpose of the risk assessment is to evaluate potential health and environmental risks rather than to evaluate regulatory cleanup criteria, it is appropriate to state the results of the risk assessment and to make recommendations based on those results.

Comment 3. Procedures for calculating risk were not presented in the documents presented for review. It is unclear what default assumptions were made and how these compared to Region III's Risk-Based Concentration (RBC) assumptions. Also, fate and transport models were not referenced.

Response: A formal risk assessment was not done on the Phase II data. The Phase II data were compared to the Phase I data and to Region III RBCs. Section 3.5 of each volume discusses the approach and methodology used to evaluate the data. The RBCs along with their derivation methodology are presented in Appendix D. Section X.7 for each SWMU discusses the risk evaluation done at each SWMU. The risk number generated in the comparison table for each SWMU is simply based on the ratio of the detected SWMU concentration to the RBC (a footnote will be added to the tables to describe this). Also, no fate and transport models were used in this evaluation. Any fate and transport issues were addressed in Section 3.2 of the Phase I and Phase II reports.

SPECIFIC COMMENTS APPENDIX II SWMUS

Comment 1. SWMU No. 3 Oil/Water Separator Site 108. The TRPH issue (See General Comment No. 2) should be addressed prior to recommending no further action.

Response: See response to General Comment #2.

Comment 2. SWMU No. 5 Oil/Water Separator No. 121: The Final Work Plan Addendum (W-C 1994) required borings to 25 feet bgs. The borings were completed at 20 feet bgs. The TRPH concentrations were increasing with depth and the borings confirmed contamination at 20 feet bgs. Since the vertical extent of contamination has not been completely defined, additional sampling should be completed and sampled to background.

The TRPH issue (see General Comment 2) should be addressed prior to recommending no further action.

Response: Of the three borings completed during this investigation, two had no detectable levels at 20 feet. A boring was recently completed to 35 feet bgs at the

location where contaminants were previously detected at 20 feet bgs. Two samples were taken, one at twenty-eight and one at thirty-three feet. Bis(2-ethylhexyl)phthalate was the only organic compound detected (CAN005-0504-0028) in these two samples (Table 1). The detected concentration (400 $\mu\text{g}/\text{kg}$) only slightly exceeded the reporting limit (380 $\mu\text{g}/\text{kg}$). Additionally, the detected concentration is well below the residential RBC 46,000 $\mu\text{g}/\text{kg}$. (Phthalates are also common laboratory contaminants.) The sample taken at 33 feet bgs was nondetect for bis(2-ethylhexyl)phthalate.

The concentrations of metals detected in these two additional samples were all lower than previously sampled concentrations.

TPH was not detected in these two samples.

The results of these two additional samples do not change the conclusions and recommendations made in the Phase II RFI. In fact, they verify that contaminants are not being transported to the groundwater.

These results will be included in the final submittal.

The TRPH issue (see General Comment 2) should be addressed prior to recommending no further action.

Response: Comment noted. See General Comment #2.

Comment 3. SWMU No. 16 Oil/Water Separator No. 680: Sampling was not conducted at this site during the Phase II investigation. Reference the document (Date and Title), that notified EPA that the planned sampling was not feasible. A review of results from the Phase I investigation will need to be conducted to determine if significant contamination exists to warrant additional sampling since the original recommendation of the Phase I investigation was to conduct a screening-level risk evaluation and to characterize the vertical extent of contamination.

Response: John Constantine, Cannon AFB Project Manager, verbally informed Bill Hurlburt, EPA Project Manager, when it was determined that the site was inaccessible and the proposed soil borings could not be completed. This oil water separator was removed in 1991. It has been effectively capped with construction of the concrete slab and building and there are no exposure pathways; therefore, it is reasonable to conclude that there is no unacceptable risk. Furthermore, all risk evaluations to date of oil water separators at Cannon AFB have concluded with recommendations for no further action.

Comment 4. SWMU No. 48A Underground Storage Tank: State standards that specifically address petroleum contamination from USTs are set forth in New Mexico UST regulations

Section 1209.D Part 3 (a). These regulations specify cleanup levels for contaminated soils associated with USTs. TRPH clean up levels are set at 100 mg/kg for highly petroleum contaminated soils. TRPH was detected at a concentration of 17,300 mg/kg and reporting limits for several potentially toxic constituents were above Risk Based Concentrations (RBCs). Therefore, further action is warranted at this SWMU.

Response: TRPH Regulations: See General Comment #2.

Reporting Limits: The following will be inserted into Section 9.7.2:

The contract lab that analyzed the samples reported concentrations (J-qualified) at one-fifth the reporting limit. The highest reporting limit for SVOCs (i.e., PAHs) was 3.7 mg/kg (3,700 µg/kg). One-fifth of the level is 0.74 mg/kg. This concentration exceeds the residential RBCs for only the PAHs benzo(a)pyrene (0.088 mg/kg) and dibenzo(a,h)anthracene (0.088 mg/kg) and is below industrial RBCs for all PAHs. All of the PAHs (including benzo(a)pyrene and dibenz(a,h)anthracene) would have been reported at estimated (J-qualified) concentrations had they been present in the samples at concentrations above 0.74 mg/kg (below industrial RBCs). Since this is below RBCs, the data show that the chemicals are not present at concentrations of concern. Further, only samples (from one boring) between 5 feet and 25 feet had elevated reporting limits. Only two samples had significant hits of TRPH (>100 mg/kg), so the potentially impacted area is quite limited in size. Since no contamination was detected in the 30-foot sample, there is no evidence of vertical transport to groundwater (at approximately 280 feet). Since no contamination was detected at the surface, no significant occupational or residential exposures are expected. Therefore, it can be concluded that the human health risk is minimal.

As stated in the RFI, the underground tank has been removed, and the entire area covered with an asphalt parking lot. Therefore, the only potential exposures are to construction workers who would contact soil during construction activities. However, most construction activities are of short duration (8 weeks), involve a small area (i.e., basements, trenching), and occur in the upper 10 feet of soil. Additionally, modern earth-moving equipment limits direct worker contact with soil. Therefore, exposures to potential contaminants at concentrations of concern is very unlikely.

Comment 5. SWMU No. 48B Aboveground Storage Tank: The TRPH issue (see General Comment No. 2) should be addressed prior to recommending no further action.

Response: See General Comment #2.

Comment 6. SWMU No. 83 Oil/Water Separator Site 120: The TRPH issue (see General Comment No. 2) should be addressed prior to recommending no further action.

Response: See General Comment #2.

Comment 7. SWMU No. 108 EOD Training Area: A hazard index greater than 1 for one non-cancer constituent (barium) was calculated at this SWMU. Additive risk, grouped by target organ affects, for non-cancer Contaminants of Concern (COCs) should be calculated. Risk due to background should be calculated using one-half the reporting limit, or analyses should be conducted at a lower reporting limit.

Response: The risk assessment done for SWMU 108 was not a quantitative risk assessment, but rather a screening-level risk assessment as indicated in the work plan that was reviewed and approved by EPA. In this screening-level risk assessment, hazard quotients/hazard indices were not calculated using all available site data, rather, they were estimated using a ratio of the maximum site concentrations to the Region III residential RBCs. This is a very conservative approach because the SWMU is located in an industrial area of the Base and is likely to remain an industrial area; therefore, residential exposure scenarios likely significantly overestimate potential hazards at the site. Additionally, the screening-level risk assessment used maximum detected concentrations not average and 95 percent UTLs as would have been done in an actual risk assessment, making the screening risk assessment more conservative. Long-term exposure to the highest concentrations at a site would be unlikely due to the size of the site and the types of activities at the site (i.e., Base workers do not spend hours/days at a time in contact with the soils at this site). The following paragraph will be added to Section 12.7.2:

The only compounds that contribute significantly to the HI (i.e., that are within an order of magnitude of the residential RBC) are antimony, barium, and manganese. These chemicals do not have the same target organs, so their potential toxic effects are not additive. Antimony and manganese have HQs of less than 1.0. Therefore, barium is the only compound at this site which could potentially pose an unacceptable human health risk. Additionally, the HQs were determined using residential RBCs instead of industrial RBCs, which is a more likely exposure scenario for this site. Since none of the detected concentrations exceeded industrial RBCs (or even approach the industrial RBCs), the additive potential HQ will not exceed 1.0, and no unacceptable human health effects are expected at the site.

Comparisons of potentially site-related chemicals to background levels were made in accordance with EPA guidance. Also, in accordance with EPA guidance, risks due to background levels were not calculated. Rather, if the chemical exceeded background levels, it was considered to be site-related, and the potential risk was

calculated based on the concentration present. This approach was presented in the work plan that was reviewed and approved by EPA.

It is not clear what the reviewer means regarding the reporting limits.

SPECIFIC COMMENTS APPENDIX III SWMUs:

Comment 1. [A] SWMU No. 31 AGE Maintenance Shop Pad: The Previous Investigations Section states that near boring 03103 located off the slab west of the wash rack that small piles of stained soils were observed at this location suggesting that oily soils have been deposited here. Have any plans been proposed to remove these piles of oily soils?

Response: [A] No evidence of piles of soil or stained soil is present. It appears that the soils were removed and disposed of during routine facility maintenance activities.

[B] Additive risk was not addressed. Several Polycyclic Aromatic Hydrocarbons (PAHs) exceeded Region III RBC levels. Risk from all carcinogens at a site are additive, and it is not appropriate to address them on a separate basis. Risk is also additive across all pathways.

Response: [B] The risk assessment done for SWMU 31 in the Phase II RFI report was a screening-level risk assessment as indicated in the work plan that was reviewed and approved by EPA. Hazard quotients/hazard indices were not calculated using all available data, rather, they were estimated using a ratio of the maximum site concentration to the Region III residential RBCs. This is a very conservative approach because the SWMU is located in an industrial area of the Base and is likely to remain an industrial area. Therefore, residential exposure scenarios likely significantly overestimate potential risks at the site. Additionally, the screening-level risk assessment used maximum detected concentrations not average and 95 percent UTLs as would have been done in an actual risk assessment. Thus, the screening risk assessment used more conservative concentrations.

Potential exposure to contaminated soils at SWMU 31 are unlikely. The site is covered by asphalt with only very small patches of grass (i.e., 1 foot by 7 feet) available for direct contact. Construction workers would be the only potentially exposed population. Most construction activities are of short duration (i.e., 8 weeks) and modern earth-moving equipment limits direct contact with soils. Therefore, there are no significant exposures to contaminated soils at this SWMU.

A discussion of potential cumulative (additive) risks will be added to the text. Potential cumulative risks will be evaluated by adding Phase I risks to the potential risks due to chemicals whose Phase II concentrations exceeded the maximum Phase I concentrations. The potential Phase II risks will be based on a comparison of the maximum Phase II concentration to the RBC. Chemicals for which the maximum

Phase II concentration did not exceed the Phase I concentration will not be included because higher concentrations were already evaluated in the Phase I risk assessment.

[C] The Region III RBCs were not derived to address dermal exposure, and therefore, may be less conservative than what is likely to occur at the SWMU.

Response: [C] The dermal contact pathway was evaluated in the Phase I risk assessment. As discussed in the text, the Phase II evaluation consisted of evaluating whether the Phase II results could significantly impact the results of the Phase I risk assessment. Since dermal contact was evaluated in the Phase I risk assessment, it is unlikely that the incremental risk due to the dermal pathway for the few chemicals that had higher concentrations in Phase II would significantly affect the results of the risk evaluation. In addition, the method used for evaluating cumulative risk accounts for the concentrations of the risk drivers twice. That is, the Phase I concentrations were evaluated for ingestion, inhalation, and dermal contact, and the Phase II concentrations (of the same chemicals) were again evaluated for ingestion (via comparison to RBCs). Accounting for ingestion twice will compensate for any incremental risk due to the dermal pathway not evaluated in Phase II.

[D] The reporting limit (RL) for analytical results is greater than the RBC for several chemicals (e.g., RL in soil for benzo(a)pyrene ranges from 0.38 to 3.7 mg/kg whereas the residential soil RBC is 0.088 mg/kg). In these cases risk should be calculated using one-half the reporting limit or analyses should be conducted at a lower reporting limit.

Response: [D] The following text will be added to Section 6.7.2:

The reporting limits were normal for all samples except for the surface soil sample in boring 3107 (CAN031-3107-0000), which had elevated reporting limits of 3.7 mg/kg for semivolatile chemicals. The contract lab that analyzed the samples reported concentrations (J-qualified) at one-fifth the reporting limit. One-fifth of 3.7 mg/kg is 0.74 mg/kg. This concentration exceeds the residential RBCs for only the PAHs benzo(a)pyrene (0.088 mg/kg) and dibenzo(a,h)anthracene (0.088 mg/kg), but it is below industrial RBCs for all PAHs. All of the PAHs (including benzo(a)pyrene and dibenz(a,h)anthracene) would have been reported at estimated (J-qualified) concentrations had they been present in the samples at concentrations above 0.74 mg/kg (below industrial RBCs). Since this is below RBCs, the data show that the compounds are not present at concentrations of concern. Further, only samples from one boring (and only at the surface) had elevated reporting limits, so the potentially impacted area is quite limited in size. Since no significant contamination was detected in the 5-foot sample, there is no evidence of vertical transport to groundwater (at approximately 280 feet).

[E] Risk due to background concentrations should be calculated. This does not imply that COCs below background will need to be cleaned up. However, this information will be used in the risk management decision for setting clean up levels for other COCs (i.e., where in the range of 1E-04 to 1E-06 clean up level should be set).

Response: [E] Comparisons of potentially site-related chemicals to background levels were made in accordance with EPA guidance. Also, in accordance with EPA guidance, risks due to background levels were not calculated. Rather, if the chemical exceeded background levels, it was considered to be site-related, and the potential risk was calculated based on the concentration present. This approach was presented in the work plan that was reviewed and approved by EPA.

Comment 2. SWMU No. 93 Oil/Water Separator No. 5121: The TRPH issue (see General Comment No. 2) should be addressed prior to recommending no further action.

Response: See General Comment #2.

Comment 3. SWMU No. 127 Oil/Water Separator No. 4095: General Comments 1 through 3 apply. Specific comments for SWMU No. 31 apply.

Response: [A] General Comments 1-3: See responses to General Comments 1-3.

[B] Additive risk: See response to Specific Comment #1 [B], Appendix III SWMUs.

[C] Dermal pathway: See response to Specific Comment #1 [C], Appendix III SWMUs.

[D] Reporting limits: As stated in the text, the reporting limits for two samples (12709-000 and 12710-000) had elevated reporting limits that preclude evaluation of risk due to some target compounds (e.g., PAHs) in those samples. However, as discussed in the text, these samples are covered by pavement, which prevents exposures to any contaminants that could potentially be present. In addition, the potentially impacted area is very small, limited to the area around the drain and limited to the depths between 0 and 5 feet. Therefore, because exposure would be very limited, no significant risk would be expected even if the pavement were removed in the future. Finally, as discussed in the text, the potential for impacts to groundwater have been shown to be insignificant based on the lack of contamination in the sample taken at a depth of 5 feet. (The discussion regarding the limited extent of potential contamination will be added to Section 8.7.2).

[E] Background risk: See response to Specific Comment #1 [E], Appendix III SWMUs.

Comment 4. SWMU No. 55 Lead/Acid Battery Area: General Comments 1 through 3 apply. Specific comments for SWMU No. 31 apply.

Response: [A] General Comments 1-3: See responses to General Comments 1-3.

[B] Additive risk: The Lead/Acid Battery Area is located next to a vehicle maintenance shop in an industrial area of the Base. While the specific battery storage area is no longer in use, the surrounding area remains active and will likely remain an industrial area in the future. Future construction workers would be the only likely exposed population. However, construction activities are generally of short duration (i.e., 8 weeks) and modern earth-moving equipment limit direct contact with contaminated soils. Therefore, the use of residential RBCs for estimating potential site risks is highly conservative and overestimates potential risks.

See response to Specific Comment #1 [B], Appendix III SWMUs.

[C] Dermal pathway: See response to Specific Comment #1 [C], Appendix III SWMUs.

[D] Reporting limits: The following will be added to Section 9.7.2:

The reporting limits for 2 samples (5505-000 and 5506-000) were elevated to 3.7 mg/kg and 3.6 mg/kg, respectively, for semivolatile compounds. The contract lab that analyzed the samples reported concentrations (J-qualified) at one-fifth the reporting limit. One-fifth of 3.7 mg/kg is 0.74 mg/kg. This concentration exceeds the residential RBCs for only the PAHs benzo(a)pyrene (0.088 mg/kg) and dibenzo(a,h)anthracene (0.088 mg/kg), but it is below industrial RBCs for all PAHs. All of the PAHs (including benzo(a)pyrene and dibenz(a,h)anthracene) would have been reported at estimated (J-qualified) concentrations had they been present in the samples at concentrations above 0.74 mg/kg (below industrial RBCs). Since this is below RBCs, the data show that the compounds are not present at concentrations of concern. Further, only samples from one boring (and only at the surface) had elevated reporting limits, so the potentially impacted area is quite limited in size. Since no significant contamination was detected in the 5-foot sample, there is no evidence of vertical transport to groundwater (at approximately 280 feet).

[E] Background risk: See response to Comment #1 [E], Appendix III SWMUs.

Comment 5. SWMU No. 77 CE Container Storage Area: Sample 7707-0000 was analyzed with too high of a detection limit for pesticides/PCBs. Sample results were omitted from risk calculations using the justification that PCBs were not characteristic of other samples collected at the SWMU. However, only one organic chemical (Arochlor-1260) was detected at this site above RBCs and it is a PCB. Also, if an industrial exposure scenario is used to imply the

conclusion of no significant risk, then a deed restriction for industrial use only should be imposed.

Response: Reporting limits: The following will be added to Section 10.7.2:

The contract lab that analyzed the samples reported concentrations (J-qualified) at one-fifth the reporting limit. The elevated reporting limits occurred only for one sample, 7707-0000. The highest reporting limit for PCBs (including Aroclor 1260) was 1.7 mg/kg (1,700 µg/kg). One-fifth of the level is 0.34 mg/kg. This concentration exceeds the residential RBC for PCBs (0.083 mg/kg); however, it is below the industrial RBC for PCBs (0.37 mg/kg). One sample (7710-0000) had a detection of PCBs (0.14 mg/kg), which is below the industrial RBC. All other samples were nondetect for PCBs at normal reporting limits. Since PCBs (if present) would have been reported at estimated concentrations below RBCs, and because PCBs were detected in only one of 26 samples (<4% detection frequency), PCB contamination appears to be limited to the area near boring 7710 and at concentrations below the industrial RBC. Samples 7707-000 and 7710-0000 are located across the SWMU from each other (approximately 410 feet apart). There are no other detections of PCBs across the entire SWMU even at normal detection limits. Therefore, there is no reason to expect PCBs to be present at boring 7707.

The EPA suggests a 5 percent detection frequency as a guideline for determining whether or not chemicals detected in only a few samples are representative of the contamination at a site. At SWMU 77, PCBs were detected in one of twenty-six samples. This is a less than 5 percent detection frequency (<4 percent actually). Therefore, according to the EPA guidance, PCBs are not representative of the types of contaminants found at SWMU 77. Additionally, since PCBs were detected in only one sample which was located in an area where no direct work is done, actual exposures to the detected PCB concentration is unlikely. As stated in the text, 7707-0000 was collected just below the newly paved asphalt surface and contained asphalt fragments. Since asphalt contains PAHs, and high concentrations of PAHs were found only in this sample, it is believed the PAH concentrations are due to the asphalt pavement and not related to SWMU activities. The elevated reporting limits are likely due to the asphalt constituents. Deeper samples (i.e., 5 feet and deeper) collected from boring 7707 are essentially nondetect for target organic compounds. This indicates that PAH contamination is limited to the surface sample and is likely due to the asphalt. Therefore, they should not be (and were not) evaluated in the RBC comparison.

Additionally, because the site is covered by asphalt, no direct exposures to contaminated soils by Base workers or trespasser is likely to occur. The only significant potential exposures would occur to future construction workers who might excavate beneath the asphalt. The data indicates that concentrations of interest were

limited to soils directly beneath the asphalt; therefore, the area of contamination is small. The short duration of most construction activities and modern earth-moving equipment would further reduce any potential exposure to the PAHs in soils found at this site.

Deed restriction for industrial future use: In accordance with EPA guidance, risk assessments are to be conducted assuming the most likely future use of the land. SWMU 77 is located in an industrial area of the Base, and this area is likely to remain industrial. Therefore, it is reasonable to use an industrial exposure scenario to evaluate potential risks at this SWMU. The guidance does not stipulate deed restriction for sites that were evaluated for the likely future use.

Comment 5 (cont'd). A hazard index greater than 1 for one non-cancer constituent (manganese) was calculated at this SWMU. Additive non-cancer risk should be calculated for this SWMU Across all COCs (i.e., including individual COCs which have a calculated hazard index less than 1). Non-cancer risk should be added based on effects to the same target organ (e.g., liver, kidney). Risk due to background should be calculated using one-half the reporting limit or analyses should be conducted at a lower reporting limit. General Comment 2 also applies to this SWMU.

Response: The risk assessment done for SWMU 77 was not a quantitative risk assessment, but rather a screening-level risk assessment as indicated in the work plan that was reviewed and approved by EPA. In this screening-level risk assessment, hazard quotients/hazard indices were not calculated using all available site data, rather, they were estimated using a ratio of the maximum site concentrations to the Region III residential RBCs. This is a very conservative approach because the SWMU is located in an industrial area of the Base and is likely to remain an industrial area; therefore, residential exposure scenarios likely significantly overestimate potential hazards at the site. Additionally, the screening-level risk assessment used maximum detected concentrations not average and 95 percent UTLs as would have been done in an actual risk assessment. Thus, the screening risk assessment used more conservative concentrations. Long-term exposure to the highest concentrations at a site would be unlikely due to the size of the site and the types of activities at the site (i.e., Base workers do not spend hours/days at a time in contact with the soils at this site.

Additive risk: See response to Specific Comment #1 [B], Appendix III SWMUs.

Background risks: See response to Specific Comment #1 [E], Appendix III SWMUs.

Comment 6. SWMU NO. 103 Wastewater Playa Lake: In the evaluation of the Ground Water Pathways Section, borings 60 feet below the bottom of the lake were originally planned, but were not drilled due to technical difficulties. What were those technical difficulties? Since the deepest sediment samples were only 5 feet below the lake, and metals,

pesticides, and VOCs were detected, what criteria determined that the vertical extent of contamination was defined?

Response: It was determined that it was not economically feasible to place a drill rig capable of making the 60-foot borings in the planned locations (i.e., in the middle of the lake). However, from the discussion in the text and the following discussion, it can be concluded that the site has been adequately evaluated with the substituted 5-foot borings.

As stated in the text, the vertical extent of soil contamination may not be completely defined. However, there is sufficient data to conclude that the groundwater pathway will not result in a significant risk. As shown on Table 11-4 and Figure 11-3, only manganese was detected in the sediment (to a depth of 5 feet) at a concentration that exceeded residential RBCs. Aroclor-1248 was detected in an upland soil sample at the surface and 5-foot depth; it was nondetect in the deeper samples.

Because of high K_d and K_{oc} values, the mobility of metals and SVOCs is known to be low (also demonstrated by the lack of vertical transport of the Aroclor-1248), and as stated in the text, it is very unlikely that these chemicals would be transported the 280 feet to groundwater at concentrations of concern. This is especially true since the concentrations are so low even in the sludge where these compounds might be expected to accumulate.

Only very low levels of VOCs (mostly common lab contaminants) were detected in the sediments or underlying soils. This is to be expected since the water in the Playa Lake comes from the sewage treatment lagoons, where VOCs would be expected to volatilize. While VOCs can be mobile in soils, it can be concluded, based on the expected and observed low levels of these compounds at the site, that VOCs are not being transported to groundwater at concentrations of concern.

Comment 6 (cont'd). Ecological risk at this SWMU should be addressed. Fish samples may need to be taken at this site to reduce uncertainties associated with bioaccumulation assumptions. General Comments 1 and 2 apply. Additive risk was not addressed. Risk from all carcinogens at a site are additive, and it is not appropriate to address them on a separate basis. Risk is additive across all pathways. Region III RBCs were not derived to address dermal exposure, and therefore, may be less conservative than what is likely to occur at the SWMU.

Response: Ecological risks: An ecological risk assessment was completed for the Playa Lake during the Phase I investigation. The ecological risk assessment evaluated potential impacts from sediment and surface water, and it evaluated the potential for bioaccumulation and food chain transfers. Although some new chemicals were detected in upland soil samples during the Phase II sampling, the Phase II sediment and surface water concentrations were not significantly higher than the Phase I levels

(evidenced by the lack of Phase II chemicals exceeding residential RBCs) that were evaluated in the risk assessment.

While comparison to human health RBCs (i.e., in the Phase II evaluation) may not specifically address all potential ecological effects; in this case, the fact that only manganese in sediment exceeded conservative residential RBCs shows that this site is not very contaminated, and one would not expect significant ecological risks. In addition, VOCs and metals are not likely to bioaccumulate. Therefore, disregarding common lab contaminants, the only compounds detected in the sediments that have a significant potential to bioaccumulate are five pesticides (DDT, DDE, dieldrin, endrin, and chlordane), and these were detected at levels that are acceptable for residential soils. Based on the low concentrations in the water and sediments, it can be concluded that additional ecological risk assessment is not warranted at this site.

General Comment #1: See response #1, General Comments.

General Comment #2: See response #2, General Comments.

Additive risks: See response to Specific Comment #1 [B], Appendix III SWMUs.

Dermal pathway: The Playa Lake is located in a remote area of the Base. Signs have been posted around the perimeter of the lake indicating that the lake is not to be used for swimming or fishing. Therefore, human exposures are not likely at this SWMU. See response to Specific Comment #1 [C], Appendix III SWMUs.

Comment 7. SWMU No. 97 Landfill 25 Monitoring Well: Additive non-cancer risk should be calculated for this SWMU. The calculated Hazard Index of 1.7 for carbon disulfide requires additional sampling and analysis to further assess ground water contamination.

The Risk Evaluation Section states that Monitor Wells N and O are located approximately 3500 feet downgradient of Monitor Well K, and they are also downgradient of landfills No. 3 and No. 4. Submit a map showing Monitor Wells K, N, and O, and landfills No. 3 and No. 4. The lateral distance (3500 feet) may result in unreliable data.

Response: The risk assessment done for SWMU 97 was not a quantitative risk assessment as indicated in the work plan that was reviewed and approved by EPA. In this screening-level risk assessment, hazard quotients/hazard indices were not calculated using all available site data, rather, they were estimated using a ratio of the maximum site concentrations to the Region III residential RBCs. This is a very conservative approach because the SWMU is located in an industrial area of the Base and is likely to remain an industrial area; therefore, residential exposure scenarios likely significantly overestimate potential hazards at the site. Additionally, the screening-level risk assessment used maximum detected concentrations not average and 95 percent UTLs as would have been done in an actual risk assessment. Thus,

the screening risk assessment used more conservative concentrations. The following paragraph will be added to Section 12.7.1:

There are four chemicals reported in groundwater that could impact the cumulative HI (i.e., that are within an order of magnitude of the RBC). These are carbon disulfide, methylene chloride, barium, and lead. These compounds do not all have the same target organs; therefore, the potential toxic effects are not additive. Carbon disulfide and barium are both fetotoxic. Their combined HI is 1.8. Since carbon disulfide contributes 1.7 of the HI, it is the major constituent of concern at this site. All of the other compounds added together do not have an HI which exceeds (or approaches) 1.0, nor a carcinogenic risk which exceeds 1×10^{-6} . Therefore, they present no significant risk at the site.

Further sampling was recommended in the report to evaluate if the reported carbon disulfide is actually present in the groundwater or if it is a laboratory contaminant. If the carbon disulfide is determined to be present in the groundwater at the reported concentrations (i.e., concentrations that result in an HQ of 1.7), further evaluation of the site may be needed.

A site map will be included that shows the locations of monitor wells K, N, and O, and Landfills 3 and 4.

TABLE 1

SUMMARY OF CHEMICALS DETECTED IN
SOIL SAMPLES COLLECTED AT SWMU 5

LOCATOR	CAN005-0504-0028			CAN005-0504-0033		
LAB SAMPLE NUMBER	0453690010SA			0453690011SA		
COLLECT DATE	10/24/95			10/24/95		
	Result	RL	Qual	Result	RL	Qual
Semivolatile Organics (ug/kg)						
bis(2-Ethylhexyl)phthalate	400	380		<	360	U
Metals (mg/kg)						
Aluminum	4130	22.8		4630	10.9	
Arsenic	0.95	0.57		0.69	0.55	
Barium	84	2.3	J	25.5	1.1	J
Beryllium	<	0.46	U	0.23	0.22	
Calcium	139000	45.6		18600	21.9	
Chromium	8.6	2.3		3.8	1.1	
Cobalt	1.8	2.3	J	1.4	1.1	
Copper	1.5	4.6	J	1.3	2.2	J
Iron	2690	22.8		3860	10.9	
Lead	1.6	0.57		2.2	0.55	
Magnesium	8890	45.6		3770	21.9	
Manganese	24.2	2.3		29.3	1.1	
Nickel	7.4	9.1	J	4.2	4.4	J
Potassium	708	1140	J	1170	546	
Vanadium	10.2	2.3		10.3	1.1	
Zinc	7.2	4.6		6.8	2.2	

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix ____.

J = Estimated value.

R = Rejected value.

U = Nondetected value.

D = Sample was diluted for analysis.

RL = Reporting Limit.