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COMMENTS:		
Steve,		
Enclosed are the comments from EPA's risk assessment review and my draft letter suspending the RFI for the sewer system. We plan to conduct our site visit on June 20-21. Talk to you later.		
Lowell		
Copies to:		



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

1445 ROSS AVENUE, SUITE 1200

DALLAS TEXAS 75202 2733

June 1, 1995

MEMORANDUM**SUBJECT:** Holloman Air Force Base, New Mexico Risk Assessment**FROM:** Steven Ehlers *SEE*
RCRA Risk Assessment Team (6H-PA)**TO:** David Neliegh, Chief
New Mexico/Federal Facilities Section (6H-PN)**THRU:** Arnold Ondarza, Chief *AO*
Administrative and Technical Section (6H-PA)

In accordance with the memo dated May 19, 1995 from Lowell Seaton, the Risk Assessment Team has prepared our draft comments on major deficiencies and incompleteness for the Holloman AFB, New Mexico Risk Assessment. The appropriate documents for Holloman AFB have been reviewed and the following comments are being presented for your consideration.

We are prepared to participate in a conference call during the week of June 5-9 to discuss these comments with the Base and their contractors. Also we are anticipating a site visit consisting of the Facility Manager and the appropriate Risk Assessment Team members during the week of June 12-16.

COMMENTS ON VOLUMES I AND II OF THE PHASE I RCRA FACILITY INVESTIGATION REPORT (December 1993)

The following comments address issues concerning risk assessment for the 45 SWMUs covered in the above documents.

GENERAL COMMENTS**Selection of Chemicals of Potential Concern/Action Levels**

- 1) The decision tree presented in Figure C1-1 in Volume II; Attachment C1 presents a method for selecting chemicals of

concern based on residential risk to humans. A similar tree for selection of chemicals of concern based on ecological risk was not found. It is not appropriate to use the list screened for human risk when assessing the effects on the environment.

- 2) Table B-1 in Volume 11, page B-2 presents two different upper tolerance limits (UTL's) for Antimony and Thallium. This suggests confidence intervals may have been calculated without using non-detects, thereby artificially increasing the UTL for the background analyte. One-half of the detection limit should be substituted for each non-detect in calculation of the UTL. If this method was used it is important to note that the detection limit of the analytical method used can have a significant effect on the final background UTL. The higher the detection limit, the greater the chance for an artificially high background UTL. It is therefore important to utilize analytical methods which provide the lowest practical detection limit. As an example, arsenic could be analyzed to a much lower detection limit than that provided by SW6010 (i.e. by atomic absorption). This is important in that the arsenic UTL in Table B-1 is above what would be considered a human risk-based action level and may be overestimated. Also, the calculations of UTL's as a reasonable level for remediation seems appropriate, however, the UTL's should not be used to screen out chemicals of potential concern (COPC).
- 3) Many of the action levels which are missing in Table A-1 can be found in EPA Soil Screening Guidance (EPA/540/R-94/101). An oral cancer slope factor of 1.8 mg/kg/day can be used for arsenic.
- 4) All the action levels listed in Table A-1 are human health based. These levels may or may not be reasonable estimates of levels in media at or below which corrective action is likely to be necessary when ecological risk concerns are factored in.
- 5) Many of the chemicals of concern are reported at values below the detection limit. The detection limit should be less than the action level for all chemicals of concern. On page C1-21 it is stated that uncensored measurements are better than proxy concentrations. This may be true; but the goal of the risk assessment, at this point, should be to produce a conservative estimate; and, therefore, a proxy concentration can be used.
- 6) In attachment C5 of Volume 11 page C5-1 it is stated that Region III risk numbers will be used to screen out chemicals of potential concern. The action levels listed in this section by which chemicals of potential concern were selected are all off by a factor of ten. They appear to have been

calculated based on a hazard index of 1 instead of the hazard index referenced which is 0.1. It is not appropriate to use a hazard index of 1 to screen out chemicals of potential concern. A new list of chemicals of potential concern for human health risk should be generated using a hazard index of 0.1.

Ecological Risk

- 7) The overall procedure presented for conducting ecological risk assessments is too narrow for some SWMU's. Black-tailed jackrabbits are the only ecological pathway evaluated. This would be appropriate if herbivores were the only ecological pathway; however, in several instances, you have carnivores (e.g. wolves, cougars), birds (e.g. falcons, eagles), and fish (e.g. pupfish). These pathways need to be addressed. Chemicals can have toxicities that differ in orders of magnitude between species, especially between trophic levels. Examples of this can be seen in metal toxicity differences between fish and mammals or chlorinated pesticide toxicity differences between birds and other species. It is not, however, reasonable to develop a separate risk analysis for every species present. It is important to address all species groups for each site where those pathways are relevant. It is therefore recommended that, at a minimum, the species groups listed above (i.e. birds, carnivores, and fish) be added to the evaluation in each risk assessment where the path exists. This situation is most appropriate at sites which have surface water as part of their exposure pathway.
- 8) It is not appropriate to ignore surface water ingestion as an exposure pathway to organisms. If only a small portion of an organisms diet is composed of water ingestion then cite this and adjust the exposure appropriately. A small amount of poison can kill as quickly as a large amount depending on the chemicals present and the duration of the exposure.
- (9) When evaluating the risk to the pupfish, surface water samples were collected. There is no information on when they were collected and whether the river was in a dry or wet stage. To be conservative surface water samples should be collected when water levels are lowest to give a worst case scenario. Also, fish accumulate toxicants through ways other than direct passage of water over the gills (i.e. through ingestion, uptake from sediment). These pathways do not appear to be addressed.
- (10) It states in the 1992 Radian risk document that acute water quality criteria will be used in development of ecological quotients when chronic water quality criteria were not

available. When developing ecological quotients it is not appropriate to use acute data unless it is corrected using an acute to chronic ratio or other similar process.

Other Areas of Concern

- (11) It sounds like Lake Lucero could be a sink for much of the contamination located on the base, has anyone evaluated this?
- (12) It is not clear what fish, amphibians, benthic invertebrates or other organisms live in the arroyos. These could all be potential pathways for accumulation up the food chain. By definition, arroyos should not support any fish life given that they dry up every year; however, since the endangered pupfish was listed to exist in one of these bodies of water it can be assumed that it is not an arroyo. It is also unclear if groundwater leaches into the surface water and if so which of the arroyos receive a water supply from the ground water.
- (13) On page C1-34 of Volume 11 it states an alpha level of 0.20 is used for comparison of background to site sample data. There is nothing in the guidance document that they cited (USEPA's RCRA Groundwater Monitoring Guidance) which indicates an alpha of 0.20 is appropriate. It appears an alpha of 0.05 should be used for this comparison.
- 14) All risk-based trigger criteria in Table 3-1 are a factor of ten high for use in screening of chemicals of potential concern.
- 15) In other EPA regions TRPH trigger criteria are usually between 50 and 100 mg/kg in soil, much lower than the proposed New Mexico standard of 1000 mg/kg. The lower remediation levels are based on risk which is primarily determined by benzene concentrations. For SWMU's in which benzene is found above risk-based trigger criteria (e.g. SWMU 123), it is recommended that TRPH should be remediated down to 100 mg/kg levels.

Comments for Individual SWMU's

The following comments are based on data provided and do not take into account chemicals of potential concern which may have been inappropriately screened out by the misuse of Region III's risk-based numbers (See comment 6 above).

- 16) SWMU's 119 and 2 should not pose risk to human health or the environment based on sample results. The only concern could be whether the sampling scheme would have detected a leak from the pipe between the waste oil tank and the oil/water separator.

- 17) SWMU 15 should not pose a risk to human health or the environment based on sample results. However, it is not clear why no soil samples were collected between 4 and 6 feet bgl which would seem to be the most likely to be contaminated given the depth of the oil/water separator.
- 18) At SWMU 17 lead concentrations are above the risk-based trigger criteria, however, given the results of the other inorganic analyses, the additive hazard index for the site should be less than 1, indicating no further action is necessary. It is not clear at this site why soil samples were not collected nearer to the oil/water separator.
- 19) SWMU's 21 and 22 should not pose a risk to human health or the environment based on sample results. SWMU 123 exceeds risk-based trigger criteria for benzene and 1,1-dichloroethene. Given the toxicity of benzene, it is recommended that TRPH be remediated down to 100 mg/kg at this SWMU. Also note that the carcinogenic risks estimated for the future risk for the near site worker scenario exceeds the 1E-06 acceptable risk level for A and B carcinogens described in Subpart S guidance.
- 20) SWMU's 125 and 32 should not pose a risk to human health or the environment based on sample results. Analytical results for the sludge sample collected in SWMU 125 were not provided in the report and, therefore, could not be evaluated.
- 21) SWMU 126 should not pose a risk to human health or the environment based on sample results. Extent of TRPH contamination should be determined and remediated for SWMU 36.
- 22) SWMU's 39, 127, and 135 will require further investigation to quantify risks. Benzene levels are above risk based trigger criteria in several of the samples and, therefore, remediation of TRPH to 100 mg/kg should be considered. It is stated that groundwater is not expected to reach Lake Holloman or the Sewage Lagoons. Has a fate and transport model been used to substantiate this conclusion?
- 23) SWMU's 40 and 128 should not pose a risk to human health or the environment based on sample results. Extent of TRPH contamination should be determined and remediated for SWMU 138.
- 24) At SWMU's 54 and 55 the risks associated with the future near site worker scenario are greater than the 1E-06 levels for Class A and B carcinogens described in Subpart S Guidance. Also, it should be confirmed that TRPH contamination has been cleaned up at SWMU 54.

- 25) SWMU 56 should not pose a risk to human health or the environment based on sample results.
- 26) SWMU 63 should not pose a risk to human health or the environment based on sample results. Conclusions for this site state that TRPH levels were not exceeded; however, they were not measured. It should be confirmed that there is no reason to measure TRPH's at this site.
- 27) Arsenic concentrations at the surface in SWMU 71 exceed risk-based trigger criteria. Due to low risk associated with other inorganics at the site, overall risk to humans should be in the acceptable range. Risk-based trigger criteria for metals and aquatic receptor in Lost River due to surface runoff should be evaluated at this SWMU.
- 28) SWMU's 78 and 91 should not pose a risk to human health or the environment based on sample results.
- 29) At SWMU 124 there does not appear to be a risk to human health or the environment; however, the sampling was only to a depth of 4 inches. Given that high levels of volatile organics were found in the sludge sample, it may be more appropriate to analyze a subsurface sample to assess the release history.
- 30) Extent of TRPH contamination should be determined and remediated at SWMU 136.
- 31) In SWMU 155 ecological risk was not adequately addressed. Exposure pathways should be determined along with risk-based trigger values for possible ecological receptors. Some of the organophosphorus and organochlorine pesticides listed are toxic to aquatic life and birds at levels below the detection limits of the analytical methods used.
- 32) In SWMU 156 ecological risk was not adequately addressed. Ecological risk-based trigger numbers should be developed and compared with contamination levels. Additive risk should also be addressed.
- 33) SWMU 164 is defined as a pond. It is not clear why only jackrabbits were evaluated if water exists in this pond, or why ingestion of water by jackrabbits was not considered. The importance of this pond to ecological receptors other than the jackrabbit should be evaluated along with how often and how long the pond holds water.
- 34) At AOC-U it seems water must exist year-round or the white sands pupfish could not survive. If this is the case, both the water and sediment samples should have been analyzed. If

it is not the case, a soil sample should have been collected at the lowest point in the basin (i.e. the last place to hold water in the season); was it? Also, risk-based trigger levels for ecological receptors have not been established; therefore, it is not possible to assess ecological risk. What is the possibility of groundwater leaching into the surface water at this site?

- 35) Results from the Phase II investigation at SWMU's 118, 132, and AOC-A recommend that only TRPII be remediated. Both PCB's and heptachlor epoxide were detected at concentrations exceeding risk-based trigger levels. Assumptions of risk-based calculations for this area should be defined so the risk due to these two chemicals can be evaluated. Also, it appears QA/QC at this site is questionable. Over 20 chemicals were found and not confirmed and several blanks were highly contaminated. Ecological risks for future land use were not adequately addressed. Many of the contaminants present are extremely toxic to bird life.
- 36) The Phase II investigation at SWMU's 129 and 178 do not address risk to horses. Given that this location is now a horse stable and horses would have the greatest exposure time to contaminants, this pathway should be assessed. Also, because drains tend to clog and water, suitable for ingestion, may accumulate around them, drain replacement with non-lead drains should be considered.
- 37) In the phase II investigation at SWMU's 165, 177, 179, and 181 elevated levels of TCE were found in the groundwater. The ground water appears to be only 2 to 3 feet bgl in this area and flows toward the Lost River Basin. It should be described why TCE contamination will not reach or leach into the Lost River Basin. It is also unclear whether the ecological assessment was adequately addressed. Questions or concerns include: 1) what time of year were surface water samples collected (i.e. under wet or dry conditions); 2) sediment samples should have been collected to assess metal contamination; 3) bird and carnivore pathways were not addressed; and 4) TCE and its degradation products do not appear to have been considered as pathways to Lost River Basin ecological receptors.

COMMENTS ON HOLLOWAN RISK ASSESSMENTS: SEWAGE LAGOONS AND LAKES INVESTIGATION (December 1993)

The USEPA has reviewed the above referenced document along with the several appendices associated with the risk assessment for the Ditch and Lakes Holloman and Stinky. It appears these risk assessments are not complete, as there are several references to in-progress studies. Comments listed below should be considered when determining tasks necessary for project completion. Review of risk assessments for Ponds A through G and sewage lagoons will be reviewed when final assessments have been completed. EPA would be happy to review any workplan compiled to complete the risk assessment of the above water bodies.

GENERAL COMMENTS**EXECUTIVE SUMMARY**

- 1) The USEPA proposed Subpart S corrective action rule (55 Federal Register 30826, 27 July 1990) does allow for a cancer risk between 10^{-4} and 10^{-6} . This is to take into consideration a) cumulative effects and b) present and future land use of the site. However, it does not provide for a blanket dismissal of a review of the chemicals of concern that produce these values.
 - a) The Ditch has a cancer risk of 7×10^{-6} due almost entirely from Heptachlor epoxide.
 - b) Lakes Holloman and Stinky both have cancer risks of 1×10^{-5} . The chemicals of concern are arsenic, Heptachlor and two PCBs (HxCB and PnCB). Each of the chemicals has a risk above 10^{-6} . Special concern must be given to the PCBs detected at these sites.
- 2) The whole question of the organic lead found in Lake Holloman needs further study. Where did it come from? There is no lead in the Ponds or the Ditch. Regardless of its origin, the levels are of concern (highest noncarcinogenic hazard quotient = 287).

RISK ASSESSMENT FOR THE DITCH

- 3) Section 9.2 Identification of Chemicals of Potential Concern - Were the Action Levels calculated for an HI = 1 or HI = 0.1? When using the risk-based screening methodology suggested by Region III, the HI should be set at less than 0.1 so that accumulation of several chemicals will not add up to greater than unity.

- 4) Figure 9-4. Reasonable maximum Carcinogenic Risk - Current Recreational Scenario. There appears to be a wedge of the pie which is not labeled that has an apparent value of 2.46%. What is missing? Of more concern is the fact that 72.8% of the Total Risk is due to PCBs. Even though the Total Risk is only 7×10^{-6} , the occurrence of the PCBs does warrant further investigation.
- 5) Section 9.7 Ecological Assessment - ^{Were} ~~Where~~ the same chemicals used in the Eco-risk as in the Human risk? Many chemicals have different toxicities for wildlife than for humans. Birds are much more susceptible to certain pesticides than man. Heptachlor epoxide is such a pesticide. A separate COPC list should be determined for eco-risk.
- 6) Figure 9-5. Ecological Conceptualization Model for the Ditch. - There is a raptor in the model. However, there is no discussion as to how they fit into the system or how they will be protected. What does the raptor eat? Only ducks? What about the jackrabbit? There is no mention of this animal here; however, it is the only animal in the SWMU ecological risk assessment. Do the rabbits not come down to the Ditch?

RISK ASSESSMENT FOR LAKE HOLLOMAN

- 7) Section 10.2 Identification of Chemicals of Potential Concern - Were the Action Levels calculated for an HI = 1 or HI = 0.1? See comment 3) above.
- 8) Table 10-3 Exposure Point Concentrations for Lake Holloman - There are several new chemicals, mostly pesticides found in the Lakes but not in the Ponds or the Ditch, e.g., Kepone. Where did they come from? Since the source does not appear to be the Base wastewater treatment system, is the source terminated or are they still being used?
- 9) Section 10.6.4 Current Off-Site Recreational Scenario - Adult Chronic Exposure - The chemicals of concern for carcinogenic risk are arsenic, Heptachlor and two PCBs (HxCB and PnCB). Each of the chemicals has a risk above 10^{-6} . Special concern must be given to the PCBs detected at the site.
- 10) Section 10.6.4 Current Agricultural Chronic Adult and Child Risk - There is great concern about the organic lead levels (HI-123 and 287, respectively). What is the source? There does not appear to be any lead, much less organic lead, in the Ponds. What is proposed to remove or reduce it?
- 11) Section 10.7 Ecological Assessment - See 5) above about chemicals of concern for eco-risk.

- 12) Figure 10.9 Ecological Conceptualization Model for Lake Holloman - See 6) above about raptors. Also there is a concern about the sludge on the bottom of the lake, especially near the Ditch. What is the chemical composition? What is being proposed for the clean-up of this material?
- 13) There appears to be a discrepancy between Table 9-6 and Table 10-6. In the Ditch there is a .32 to .10 ratio between the EQ of Mergansers and fish; however, in Lake Holloman, the ratio is .29 to 3.1. What is causing the increase in fish risk or decrease in Merganser risk? This is especially perplexing in relation to the marked increase in risk for the herbivorous Mallards.

RISK ASSESSMENT FOR LAKE STINKY

- 14) Section 11.2 Identification of Chemicals of Potential Concern - Were the Action Levels calculated for an HI = 1 or HI = 0.1? See 3) above.
- 15) Table 11.2 Potentially Complete Current/Future Exposure Pathways: Lake Holloman AFB, New Mexico - The table appears to be giving pathways selected for evaluation for Lake Stinky; however, Ingestion of soil is not to be evaluated. Lake Stinky is dry for half of the year and this would allow more than enough opportunity for wind to be entrained and comprise a significant exposure pathway. This pathway should be evaluated.
- 16) Section 11.1.3 Evaluation of Exposure Points/Routes - What is "hydraulically downgradient" of Lake Stinky? Is there runoff from the Lake?
- 17) Table 11-3 Exposure Point Concentrations for Lake Stinky - There are several new chemicals, mostly pesticides found in the lakes but not in the Ponds or the Ditch, e.g., Kepone. See 8) above.
- 18) Section 11.7 Ecological Assessment - See 5) above about chemicals of concern for eco risk.
- 19) Section 11.7.1 Background - In the last paragraph there is mention of snowy plovers, avocets, black-necked stilts and killdeer nesting on the lake. With the high pesticides, especially PCBs, were there any studies on the effects of these chemicals on nesting? Are these chemicals causing egg shell problems? Death or deformity of the young? Reproductive problems in the next generations?

- 20 Figure 11-5. Ecological Conceptualization Model for Lake Stinky. There is a raptor in the model. See 6) above.

CONCLUSIONS

- 21) Section 13.2.2 Uncertainties Associated with the Ecological Assessment - If the bioaccumulation factors in birds is not used, substitute actual data. Otherwise, use the literature data and explain the uncertainties. Several places in this document a duck tissue analysis study is referenced. Has the study been completed? Is the data available? When can EPA expect the study data?

Should you have any questions, please contact Steven Ehlers at 665-8312.

CC: Lowell Scaton
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