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JAN 27 1998

Mr. E. R. Skinnarland
 200 Area Section Manager
 Nuclear Waste Program
 State of Washington
 Department of Ecology
 1315 West 4th Avenue
 Kennewick, Washington 99336-6018



Dear Mr. Skinnarland:

REVISED RESPONSES TO COMMENTS ON EVALUATION OF THE SOIL-GAS SURVEY AT THE
 NONRADIOACTIVE DANGEROUS WASTE LANDFILL (NRDWL), BHI-01115, REV. 0 48170

Attached is a copy of the U.S. Department of Energy (DOE), Richland Operations Office (RL), revised responses to State of Washington Department of Ecology (Ecology) comments received on the report "Evaluation of the Soil-Gas Survey at the Non-Radioactive Dangerous Waste Landfill" BHI-01115 Rev. 0."

The responses were revised based on a comment disposition meeting held with Ecology on December, 10, 1997. The focus of the meeting was to clarify responses to the following items:

- volatile organic compound (VOC) is not widespread laterally, but carbon tetrachloride and chloroform were found to be vertically deep directly beneath the chemical trenches.
- the soil gas data do not currently justify a change to NRDWL's priority, however mechanisms are in place to change priorities, if warranted.

Furthermore, Environmental Restoration believes that given the limited characterization data available in the 200 Areas, the data at NRDWL is more extensive than at most other waste sites and DOE considers the collection of data at other waste sites, including other treatment, storage, and disposal, to be of higher priority than collecting additional data at NRDWL.

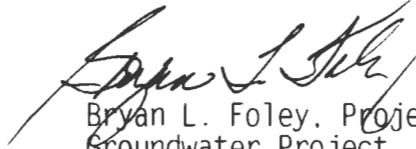
Mr. E. R. Skinnarland

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DOE considers that the revised responses document the clarification requested by Ecology, and that a revision to the soil gas report is not needed. If you have any questions, please feel free to contact me at 376-7087.

Sincerely,



Bryan L. Foley, Project Manager
Groundwater Project

GWP:BLF

Attachment

cc w/o attach:

V. R. Dronen, BHI

G. B. Mitchem, BHI

S. Mohan, Ecology

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Response to Comments on
Evaluation of the Soil-Gas Survey
at the Nonradioactive Dangerous Waste Landfill (NRDWL)
BHI-01115, Rev. 0

Comment:

General Comments:

The objective of the soil gas survey was to collect enough data to both, assess vertical and lateral distribution of Volatile Organic Compound (VOC) contamination and potential impacts to groundwater and determine if contaminants are moving. The small amount of data collected however limits the conclusions that can be drawn from this survey. Ecology does conclude that carbon tetrachloride and chloroform, at certain locations, are increasing in concentration with depth, indicating that migration is vertically downward through the vadose zone.

No attempt has been made to convert soil gas data into soil or groundwater concentrations. Other than verifying earlier soil gas results, this survey has not provided the data to define contaminant conditions at NRDWL.

The viability of this approach rested on the collection of soil gas at more vertical and lateral locations. The inability of the Geoprobe to sample any of the 36.6 m target depths and two of the 27.4 meter target depths has compromised the results of this survey. Additional data must be collected before statements regarding the potential risk from this site can be made.

This entire document does not contain recommendations and does not answer if the purpose stated in Section 1.2. Conclusions arrived at does not meet concurrence of Ecology.

Response:

Even though there may be gaps in the data at NRDWL (specifically the desired soil-gas results at 120 feet below ground surface) it was felt that two conclusions could be drawn based on available data: (1) a laterally widespread contaminant migration problem does not exist at NRDWL (this assumes that all values less than 1 ppmv do not pose a threat to groundwater), and (2) carbon tetrachloride (and its breakdown product chloroform) are the only constituents of concern based on the sampling results. DOE concurs that there is only limited data available and is basing these conclusions on the available data. With regards to the carbon tetrachloride at depth, the concentrations do indicate that migration has historically occurred (i.e., concentrations higher than background do exist).

Page ES-1

The Executive Summary should indicate the number of sampling locations planned according to the DQO in addition to the locations actually sampled. Last sentence of the Executive Summary implies that 200 Area Strategy has been approved and the priorities of the sites can not be changed. According to the 200 Area Strategy, the priorities of the sites can be modified based on threat to contamination of groundwater and the risks. Modify the text.

Detecting Carbon Tetrachloride and Chloroform is significant since the other chemicals (TCA, TCE, DCA) are probably break down products of these compounds. The last statement indicates that the potential risk at NRDWL is low. The information is only indicative with the available data and the risk conclusions cannot be made unless the four basic concepts of a risk assessment have been established: (1) complete hazard identification, (2) dose response evaluation, (3) exposure assessment, (4) risk characterization/uncertainty analysis.

Until these concepts have been established only then can a comparison with other 200 Area waste sites be made. The sentence "Evaluation of the 1997... current priorities for the closure." should be deleted and the text should be modified appropriately.

Response: (In reference to Page ES-1, paragraph 1) Text is considered adequate given the purpose of the document, which is to provide DOE an additional, more current, evaluation of the soil- gas data collected at NRDWL. DOE agrees that site priorities established in the 200 Area Strategy can be changed. The text just indicates that the soil gas data does not justify a change to NRDWL's priority at this time. No changes to the document are required.

(In reference to Page ES-1, paragraph 2) DOE agrees that a quantitative conclusion on risk requires all four basic concepts. DOE is making a qualitative conclusion based on available data. DOE is concerned that if even relative determinations of risk are withheld pending complete hazard identification for all 200 Area soil waste sites, then there will be no way to prioritize work in the 200 Areas. At the current state of available characterization data in the 200 Areas, the data at NRDWL is more extensive than at most other waste sites and DOE considers the collection of data at other waste sites, including other treatment, storage, and disposal, to be of higher priority than collecting additional data at NRDWL. The text is considered adequate given the purpose of the document, which is to provide DOE an additional, more current, evaluation of the soil-gas data collected at NRDWL. No changes to the document are required.

(In reference to Page ES-1, paragraph 3) This last sentence is only attempting to state the DOE position described above in a brief and concise manner. The text is considered adequate given

the purpose of the document, which is to provide DOE an additional, more current, evaluation of the soil-gas data collected at NRDWL. No changes to the document are required.

Comment: **Page 1, Section 1.1**
The 200 Area Soil Remediation strategy is still in the process of approval, thus referring to the strategy is not appropriate in this document. The complete paragraph should be modified to reflect the factual position.

Response: The Soil Remediation Strategy has been issued Rev. 0 and has included reviews and approved resolution of all comments made by the EPA and Ecology. Issuance of the document was made with consensus of all team members which included EPA and Ecology. In that sense DOE feels this represents an approved document by all of the Tri-Parties. DOE also feels that the document will continue to be revised to consider stakeholder interface discussions, incorporating new information and other changes that will result in continuous improvement of the document.

Comment: **Page 1, Section 1.2, Line 5**
Change "vertical extent" to "vertical and lateral extent".

Response: The context of where this language was used was focusing on the depth of sampling, which covers the vertical extent of contaminant migration. DOE agrees that both the vertical and lateral extent of contamination was assessed by the study. No changes to the document are required.

Comment: **Page 3, Paragraph 1, Line 1**
Remove "cost effective" and replace with "within the limited USDOE allocated budget for the FY1997".

Response: Limited allocated budget was a consideration but the effort, regardless of the allocated budget, was to collect data in a cost effective manner.

Comment: **Page 3, Last Sentence**
The sentence is confusing. According to this paragraph only one attempt was made to drive the probe to a target depth at each location. The first sentence of the next paragraph on page 4 indicates that at eight locations where refusal was initially encountered, probes were successfully installed during later attempts. Therefore, more than one attempt was made at some locations. Please explain.

According to the Sampling and Analysis Plan (SAP) only one attempt was required to be made to reach the desired depth at each location; however, there was an option to adjust the horizontal position of the pre-selected sampling location. Explain why horizontal position was not adjusted. The sentence "As described in the Sampling...depths at that location." should be deleted or modified to reflect the correct intent of the SAP.

Response: (In reference to Page 3, Last Sentence, paragraph 1) The problems with successful installation of seven of the eight locations related to factors other than refusal (tip release problems, screen placement problems, and rod failure problems) and the one where refusal was of concern occurred when refusal was encountered at 3.7 m. In all these cases additional attempts were made at these locations because the "failure" was not due to a problem with subsurface conditions prohibiting deep installation at the particular location.

(In reference to Page 3, Last Sentence, paragraph 2) The horizontal position adjustment was utilized prior to sample tube installation in order to increase the likelihood of success by avoiding buried waste in the trenches. Once sample probes were starting to be installed at the sample location no additional horizontal adjustments were made to "try again" to get to the deeper depths if refusal was encountered at depth.

Comment: **Page 4, Paragraph 3**
See comments on page 13, Table 3, and modify this accordingly.

Response: ~~DOE recognizes that a decision rule in the DQO (Section 5.5) is for DOE and Ecology to mutually develop "guidelines" to tie to groundwater protection. However, DOE feels that in trying to develop these guidelines the effectiveness and technical accuracy of converting soil-gas results to soil or liquid concentrations using ideal theories is suspect. DOE feels the approach is highly variable and will not provide the degree of quantification that can be used to establish regulatory action limits.~~

Comment: **Page 6, Paragraphs 1 and 2**
These two paragraphs describe comparison of 1993 and 1997 data in the shallow wells, and refers to Table 5. The title of the table indicates the data of 1993. If the table includes data of 1993 and 1997, the title should be appropriately corrected and the two sections should show the year of the data.

Response: Table 5 shows the 1993 data that was collected and analyzed by two different techniques in 1993.

Comment: **Page 6, Paragraph 3 and Figure 11**
The last sentence refers to Figure 11 as the data of 1993. Please label the figure appropriately in the title to reflect the year 1993.

Response: The text is considered adequate given the purpose of the document, which is to provide DOE an additional, more current, evaluation of the soil-gas data collected at NRDWL. No changes to the document are required.

Comment: **Page 6, Paragraph 4**
The comparative interpretation of Table 6 should be correctly described. The description should say: "In the shallow probes TCA, DCA, PCE, and TCE have decreased in 1997 as compared to 1993."

however. Carbon Tetrachloride and Chloroform have increased. In the deep probes all the chemicals have increased in 1997 compared to 1993."

Response: It cannot be stated that the chemicals in the deep probe have increased as compared to 1993 since there is no deep data available for 1993. The 1993 "deep" probes were 9 to 15 ft deep, and therefore relatively shallow. The deep probes for the 1997 study were those probes installed to 30 feet or more.

Comment: **Page 6, Last Paragraph**
Comparison of shallow soil gas data and deeper soil gas data indicates that contaminants have migrated significantly. The movement has been downward, not laterally. The statement that contaminants have not migrated significantly is true only for lateral migration, not vertical. This paragraph should reflect that vertical migration is apparently taking place.

Ecology does not agree with the conclusion as stated in third sentence of the paragraph, starting "However, limited comparison...not migrated significantly." The survey results are merely indicative of how it can be interpreted that the contaminants have not moved significantly. Remove this sentence.

Response: (In reference to Page 6, Last Paragraph, paragraph 1) See discussion above under response to general comment and page 6, paragraph 4, as to the timing of when this migration has occurred and whether there is presently any movement of contaminants taking place. The text states that "...vertical migration of carbon tetrachloride was directly beneath the chemical trenches.... The term "are very localized" (first paragraph page 7) was intended to mean that higher concentrations of carbon tetrachloride and chloroform were limited to directly beneath the chemical trenches, not that the contamination was not deep.

(In reference to Page 6, Last Paragraph, paragraph 2) DOE has agreed to initiate this assessment and has provided in this report the DOE qualitative opinion based on the data collected as part of this effort.

Comment: **Page 7, Last Paragraph**
The conclusion that the potential risk from NRDWL compared to potential risks from other waste sites in the 200 Areas is low, is premature. Additional data must be collected before such a conclusion can be reached.

Ecology objects to the sentence "This potential risk is low...Waste Site Grouping report (DOE-RL 1997)". Prove this paragraph by showing a specific study according to which the risk comparison has been made and what data has been used. This sentence should be removed from the paragraph. See previous comments on page ES-1.

Response: See prior comment response to ES-1 comment.

Comment: **Page 13, Table 3**
Probe number S-4 and its replicate show a 41 ppmv value for Carbon Tetrachloride with good precision and above the instrument calibration range. Assuming this is a defensible data value and the gas is acting "ideally" then if you take this 41 ppmv value and convert it to the groundwater value using the 0.0151 vapor concentration value the groundwater value would be 271 ppb. This value is significantly above the MCL of 5 ppb. Then if this number is converted by the MTCA 100 times rule to 27.1 mg/kg this value is significantly above the MTCA B method value of .034 mg/kg for soil.

If similar logic is used to look at the chloroform values at the same probe the 22 ppmv value will convert to 956ug/l and to 95.6mg/kg which is again significantly above the MTCA method B value of 0.72mg/kg.

The other values reported at the deeper D-3 probe site (which are even higher for chloroform) if converted as above, would fall above the MCL and MTCA method B value. Ecology's conclusion is that the data indicates a possible migration of the contaminants Carbon Tetrachloride and Chloroform from a depth of 1.8 m to 23.2 m through the vadose beneath the chemical trenches 33 and 34.

Response: See prior comment responses to "general comments" and "page 4, paragraph 3."

Comment: **Figure 1**
The figure shows many sampling locations, which include locations of 1993 survey as also of the 1997 survey. Clearly demarcate the locations of 1993 and 1997 probe locations.

Response: The text is considered adequate given the purpose of the document, which is to provide DOE an additional, more current, evaluation of the soil-gas data collected at NRDWL. No changes to the document are required.

Comment: **Figure 2**
See comments on Figure 1 and modify.

Response: See prior comment response to Figure 1.

Comment: **Figure 3**
Turn by 90 degrees to see the figure upright.

Response: See prior comment response to Figure 1.

Comment: **Figures 5 through 9**
Draw shades of levels of chemicals in various graphs, where possible.

Response: See prior comment response to Figure 1.