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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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April 15, 1996

Mr. Paul Pak
N Area Project Manager
U.S. Department of Energy
P.O. Box 550
Richland, WA 99352

Dear Mr. Pak:

Re: N Springs Expedited Response Action Performance Evaluation Report
(DOE/RL-95-110, Draft A)

The Washington State Department of Ecology has completed its review of the above referenced document. Enclosed are the comments from that review.

Should you or your staff have questions please do not hesitate to contact me at (509) 736-3029.

Sincerely,

A handwritten signature in cursive script that reads "Phillip R. Staats".

Phillip R. Staats
N Area Project Manager
Nuclear Waste Program

PS:mf

cc: David Olson, USDOE
Pam Innis, EPA
Administrative Record (N Springs ERA)



**N Springs Expedited Response Action Performance Evaluation Report
Washington State Department of Ecology Comments**

Executive Summary, Page ES-2, first paragraph

Deficiency: The text states the existing system can be modified to increase the Sr-90 flux reduction to 94% by operating at 189 L/min. This must be a typo as the current flow rate of the system is 189 L/min. Modification of the system would boost the flow rate to 227 L/min.

Recommendation: Ensure the flow rate indicated is consistent with the recommendation.

Section 1-2, Page 1-2, third paragraph

Deficiency: A reference is made to the Hanford Site Wide Groundwater Remediation Strategy as providing the basis for the amount of Sr-90 available in the unconfined aquifer and that which may be dissolved in the groundwater. There is no reference to the data gathered from the crib characterization boreholes.

Has the Hanford Site Wide Groundwater Remediation Strategy been agreed to by the three parties? Does the data from the crib characterization boreholes confirm the location and distribution of Sr-90 referenced in the text?

Recommendation: Include the data generated from the crib characterization boreholes and provide text which describes the distribution of contaminants found. Please remove the reference to the Hanford Site Wide Groundwater Remediation Strategy from the document.

Figure 1-1, Page 1-7

Deficiency: The map shows contours for Sr-90 concentrations in the upper part of the aquifer. However, wells N-103 and N-105 are not included, according to the legend. It is thus assumed these wells do not represent the upper part of the aquifer. However, they are extraction wells and are critical to the pump-and-treat, under present conditions and for future purposes. We need to determine the construction and rationale behind locating the structures at the lower part of the aquifer (if that is the case) and what can be done in interpretation of data from these wells, as well as determining how to proceed using the wells for future pump-and-treat efforts.

Recommendation: Please provide the boring logs and analytical data gathered from the installation of all of the wells being used in the pump and system. Expand the text to include a discussion of the effects of the well screen interval, Sr-90 concentration, and areal effects of the wells.

Section 3.1.2, Page 3-2, second paragraph

Deficiency: The text indicates wells N-104 and N-29 are each capable of receiving 209 L/min; however, the recommended flowrate of the document is 227 L/min. Will an upgrade to the effluent receiving well be necessary should the system flowrate be increased above 209 L/min?

Recommendation: Please bound the receiving capacity of the existing effluent receiving wells.

Section 3.3.4, Page 3-5, second paragraph

Deficiency: The indication that 53.0 pCi/L flagged as "u" data being a value which is below minimum detectable activity is inconsistent with section 3.2.1, which states the minimum detectable values for the on-site and off-site laboratories is 1 pCi/L and 11 pCi/L, respectively.

Recommendation: Please revise the text to be consistent.

Figure 3-2, Page 3-8

Deficiency: This figure is probably not representative of all the extraction wells and should be modified to reflect the additional screen (if that is the case) for wells N-103 and N-105. Although there are no numbers in this figure to illustrate the length of screen, that is an important consideration in data interpretation and planning for future uses of these extraction wells.

Recommendation: See comment Figure 1-1, page 1-7.

Table 3-1, Page 3-17

Deficiency: Quanterra sample numbers BOGRS1 and BOGYX1 are listed as not being below the minimum detectable level for this laboratory. This is inconsistent with Section 3.2.1.

Recommendation: Please revise the document appropriately.

Section 4.1.3, Page 4-4, second paragraph

Deficiency: Is well N-105 screened in the bottom part of the aquifer? What effect will this have on generating the velocity field and creating a capture zone for Sr-90? If the well would be more effective by plugging the bottom of the screen and only pumping the upper few meters, then perhaps that should be considered.

Recommendation: As previously requested, the inclusion of the boring logs and data from the pump and treat wells would be of benefit to the reader. Please expand the text to include a discussion on the effects of the screen location and, therefore, the groundwater available for capture, and possible scenarios which might improve the efficiency of the wells.

Section 4.2.1, Page 4-6, first full paragraph

Deficiency: Again, this paragraph discusses the estimated inventory of Sr-90 in the vadose zone and unconfined aquifer. Is this consistent with what we know about the 1301/1325 cribs from data collected in the characterization effort? The text states that sufficient analytical results have not been received concerning well N-106A to delineate the vertical extent of contamination. Well N-106A was completed August 1995.

Recommendation: Please revise the text to include the data gathered from the crib characterization boreholes and from the installation of the pump and treat wells.

Section, 4.2.2, Page 4-7

Deficiency: What about well N-105A? It had the second highest discharge rate and second lowest drawdown of all the traction wells and showed little decrease in Sr-90 concentrations. It would appear this particular well should have an important role and be discussed within the context of this section. Why is it left out of this discussion?

Recommendation: Please revise the text to include a discussion of well N-105A.

Section 4.2.2, Page 4-7, second paragraph

Deficiency: The value given for well N-106A is ambiguous. The text should be revised to indicate an average concentration (i.e., 3700 pCi/L).

Recommendation: Please revise the text.

Figure 4-17, Page 4-37

Deficiency: This figure is mislabeled. These are all extraction wells and do not include monitoring wells. Again, it is critical in determining at what depths wells N-103 and N-105 are located in the aquifer and where the pumps are placed. This graph may not represent an accurate comparison of the activities vs. time if different portions of the aquifer are represented by N-103/105 and N-75/106. However, it does show the drop-off of concentrations in N-103.

Recommendation: Please revise the title of the figure and include the previously requested data on the pump and treat wells.

Section 6.2.2, Page 6-10, second paragraph

Deficiency: The text states no additional capital costs will be incurred for cases 2 and 3, while Section 6.2.1, Page 6-9, first paragraph includes an assumption that well N-103 may not produce the desired flowrate and thus require the installation of a replacement well. Costs for this probability should be included in Case 3.

Recommendation: Please revise the text and cost tables to reflect the new well.

Figures 6-9 and 6-10, Pages 6-20 and 6-21

Deficiency: The totals and cost per gallon figures on these two pages do not match the totals and cost per gallon represented on Table 6-3, page 6-24.

Recommendation: Please revise the tables and figures to represent consistent costs.

Section 7.0, Page 7-2

Deficiency: The section titled "Provide data necessary to set demonstrable Sr-90 groundwater cleanup standards" is not supported by the text which follows. Isn't there sufficient data available from the treatment system to state the proposed MCL, if not the existing MCL, for Sr-90 is achievable at a reasonable cost?

Recommendation: Please revise the text in support of this heading to address the requirement stated by the heading.

Section 8.0, Page 8-1, third paragraph

Deficiency: The text recommends the existing extraction well network be modified to principally operate wells N-75A, N-103A, and N-106A, (N105A as backup) at a total pumping rate of 227 L/min. There are no isoplath maps with x/y coordinate charts or cost data to support this modification of Case 3. Information in support of this alternative needs to be provided.

Recommendation: Expand the document to include an isoplath map with x/y coordinate chart to indicate the predicted results of implementing this new alternative, along with associated cost information.

Appendix A, Page A-7, first complete paragraph

Deficiency: It is stated in the first part of the paragraph that the total quantity of Sr-90, “disposed to the LWDFs cannot be accounted for, which indicates that a fraction of the Sr-90 inventory must be distributed deeper and farther away from the facilities” Later in the paragraph, from Serne and LeGore (1996), it is mentioned that 1866 Ci of Sr-90 is thought to remain in the vadose zone. Is this consistent? There may be a discrepancy based on the new information from the crib characterization effort. This needs to be verified. Did Serne and Legore (1996) have the crib characterization data available?

Recommendation: Data from the crib characterization effort needs to be considered in this report as it represents real time contaminant distribution data relevant to the on-going pump and treat system.

Appendix A, Section A2.3.1 Region 1, Page A-8

Deficiency: The Region 1 inventory is not based on the crib characterization (apparently). It could be that there is much less Sr-90 tied up in the vadose zone beneath the cribs than has been estimated. This would have future impacts on remediation of the cribs if it should prove only necessary to excavate down to just the depths to remediate only the less mobile radionuclides (and nonrad) such as ^{60}Co , ^{137}Cs , and plutonium. It is stated in the last paragraph of that section that movement of Sr-90 from Region 1 to Region 3 is no longer significant. It may not necessarily be true that the crib characterization will “provide additional evidence to support this conclusion,” that the Sr-90 is stabilized within the vadose zone. However, it may be true that it is no longer significant because most of the inventory is already in Region 3 (or at least Region 2).

Recommendation: Again, inclusion of the crib characterization data is requested.

Appendix A, Section A2.3.3 Region 3, Page A-9, first paragraph

Deficiency: Sr-90 concentrations in the groundwater are estimated to range from 5,500 pCi/L to a low of 26 pCi/L. Recent data indicates the high to be above 11,000 pCi/L due to high water levels in the area.

Recommendation: Revise the text to reflect current levels of Sr-90 concentrations in the groundwater.

Appendix A, Section A2.4.2, Page A-11, third paragraph

Deficiency: Section 7.0 is referred to as containing the groundwater modeling and transport calculations for the yearly flux of Sr-90. This is a typo, Section 7.0 is conclusions portion of the document.

Recommendation: Revise the text appropriately.

Appendix A, Section A2.4.2, Page A-11, last paragraph

Deficiency: Groundwater modeling probably is not accurate enough to estimate flux to the significant figures stated (i.e., 0.085 Ci/yr).

Recommendation: Provide a figure which can reasonably be ascertained considering the accuracy of the model.

Appendix A, Section A4.1, Page A-17

Deficiency: This section discusses other contaminant plumes in the area of the pump and treat, yet does not indicate their affect on the pump and treat.

Recommendation: Expand the text to address the actual or potential affect to the other contaminants of concern on the treatment system.

Appendix A, Figures A-8, A-9 and A-10, Pages A28-A30

Deficiency: Screen intervals and water levels indications are not provided for all wells depicted and the information which is provided is not consistent with Figures A4 and A5.

Recommendation: Please provide the screen intervals for all wells depicted on the figures and ensure the information depicted is consistent with Figures A4 and A5.

Appendix A, Table A-2, Page A-37

Deficiency: It is noted in this table that 20,600 pounds of corrosive material was disposed per year and more significantly, 10,000 pounds of sodium dichromate per year. Would the sodium be able to disassociate and mobilize Sr-90 in the vadose zone? Would it have provided a means of driving this radionuclide into the unconfined aquifer where it may now reside contributing continuous influx to the groundwater?

Recommendation: Providing the crib characterization borehole data would enable the reader to determine the relative location of the contaminants of concern. Expand the text to include consideration of competing contaminants within zones beneath the cribs and their affect on the pump and treat.