CHRISTINE O. GREGOIRE
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

November 30, 1989

8905097

Mr. Roger Freeberg
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550
Richland, Washington 99352

Dear Mr. Freeberg:

Re: Notice of Deficiency for the 2101-M Pond Closure Plan

This letter transmits Ecology's comments on the 2101-M Pond Interim Status Closure Plan. The permit application was reviewed for compliance with final facility status standards in the state Dangerous Waste Regulations (chapter 173-303 WAC).

In general, the plan was well conceived. However, there are four major deficiencies as described below:

1. Under the Hanford Federal Facility Agreement and Consent Order (FFACO), the site should be closed under final status, not interim status. The applicable regulation for compliance is WAC 173-303-610; this regulation requires clean-up of contaminants to background levels. It should be noted that while Ecology agreed to review clean-up standards based on the health and environmental risks of contaminants, the discussions presented in the plan do not sufficiently demonstrate that these risk-based standards are appropriate. Furthermore, the analyses performed to date indicate that clean-up to background levels is not only preferable but attainable at this site. Note also that for a final status closure, a postclosure plan must be included if any residual contamination remains at the site. Consequently, the enclosed Notice of Deficiency stresses cleanup to background levels rather than health and environmental risk-based standards.

2. The scope of the sampling was inadequate. The major problems were that the top two feet of the pond soil were composited, no samples of the pond water were taken, and the examination of the vadose zone was generally inadequate due to poor quality control and insufficient sampling. Additionally, the groundwater sampling does not provide enough information to draw any conclusions about the direction of flow or the background contaminant levels near the 2101-M Pond site.

3. Quality control/quality assurance information has not been presented in sufficient detail. More specifically, although the plan states generally whether analyses were in compliance or not, the data substantiating these assertions has not been presented within the plan.

4. The statistical evaluation of contamination at the site was deficient. The primary difficulty was in the approach used; that is, contaminants were not examined by individual site locations (they were composited over the site as a whole for comparison to background or into layers or columns for location effects). This approach, in conjunction with the sampling methods employed (see #2, above), led to obscuring the patterns and extent of contamination at the site.

Should you have questions or concerns regarding the technical aspects of this notice, please contact Megan Lerchen at (206) 438-3089.

Sincerely,

Roger Stanley
Hanford Project Manager

Enclosures

cc: Paul Day - EPA
Jack Waite - WHC

DEPARTMENT OF ECOLOGY
NOTICE OF DEFICIENCY FOR THE
2101-M POND CLOSURE PLAN
November 30, 1989

8905097

The following comments reference sections from the September 1989 draft of the 2101-M Pond Interim Status Closure Plan.

Title Page. "2101-M Pond Interim Status Closure Plan."

1. Comment: The plan is entitled 2101-M Pond Interim Status Closure Plan. Note that the Hanford Federal Facility Agreement Consent Order (FFACO), "All TSD units that undergo closure, irrespective of permit status, shall be closed ... in accordance with 173-303-610 WAC." The 2101-M Pond should close under final closure status (in accordance with WAC 173-303-610 and references therein), not interim status.

Table of Contents

2. Recommendation: The Table of Contents should have the appropriate column headed with "page."

Section I. Acronyms and Abbreviations

3. Requirement: Change the abbreviation p/b to ppb (throughout the plan).

4. Requirement: Change the abbreviation p/m to ppm (throughout the plan).

Section I. General Closure Requirements

5. Comment: The subsections in this section are not numbered consistently with the rest of the plan.
Recommendation: Give each subsection a number, for example, I-1 for Location and General Description, I-2 for 2101-M Pond Location and General Description.

Section I. General Closure Requirements, Introduction

6. Comment: The stated closure strategy is to, "[c]lean close the 2101-M Pond in its current condition." Clean close is defined in this plan to mean that no waste or waste contaminated soils, structures, or equipment remain on site that pose a substantial threat to human health or the environment. The plan discusses health and environmental based risks in Section B-5g.
Deficiency: The health and environmental standards for clean closure have not been shown to be appropriate at this site, therefore the current clean closure strategy is unacceptable.
Recommendation: The clean closure strategy should be amended to be in compliance with the requirements of WAC 173-303-610 as stipulated in the FFACO. Clean closure under WAC 173-303-650(6) (as referenced in the closure requirements of WAC 173-303-610), all extremely hazardous waste must be removed and all dangerous waste (as designated under WAC 173-303-040) must be reduced to background levels for clean closure.

Section I. 2101-M Pond Location and General Description

7. Deficiency: The 2101-M Pond is described in general terms and illustrated in minimal detail by Figure I-4. Additionally, the standing water in the 2101-M Pond is described in general terms with no

quantitative values on the amounts, locations, or sources. Further, the plan states that the 2101-M Pond does not backflow into the adjacent run-off ditch without adequate justification.
Recommendation: These descriptions do not adequately describe the site or the surrounding areas. Unambiguous descriptions may be achieved by providing the following information:

1. A detailed illustration with elevations of the 2101-M Pond should be provided; a topographical map of the surrounding area with a scale of 1":200' would be appropriate.
2. Data on the maximum, minimum, and average amounts of water standing in the pond along with information on depths and location should be provided. A surface effluent map would be useful for describing effluent sources outside of the 2101-M Building.
3. The assumption that there is no backflow from the pond to the ditch is used as justification for exclusion of the ditch from the closure plan. Documentation that water from the 2101-M Pond does not percolate through the connecting earthen barrier or otherwise flow between the two structures should be submitted.

Section I. 2101-M Building General Description and Process Information

8. Comment: Current usage of the 2101-M Building includes an insulators shop.
Recommendation: The plan should state whether any asbestos products (particularly friable) are or were handled there.

9. Comment: Current usage of the 2101-M Building includes a substation maintenance shop.
Recommendation: The plan should state whether any PCB, pentachlorophenol, or creosote products are or were handled there.

10. Comment: There is a vague discussion of possible future uses of 2101-M Building space. It is also asserted that, "some of the drains have been removed" and that the only additional drains plumbed into the HVAC drainage system belonged to the BWIP laboratories.
Deficiency: These descriptions do not provide adequate information about current and future effluent sources to the 2101-M Pond.
Requirement: The plan should include copies of the current building plans that indicate which drains are plumbed to flow into the 2101-M Pond.
Refer To: Number 27, below.

Section A. Closure Performance Standards

11. Recommendation: The word "hazardous" should be replaced with the word "dangerous" in the statement labelled (b) to be consistent with the usage in WAC 173-303.

12. Comment: The plan states that the 2101-M Pond will be closed in compliance with the specific closure requirements of WAC 173-303-650.
Requirement: This statement should not be construed as limiting closure requirements to those stipulated in WAC 173-303-650. According to the Hanford Federal Facility Agreement and Consent Order, "All TSD units that undergo closure, irrespective of permit status, shall be closed pursuant

to the authorized State Dangerous Waste Program in accordance with 173-303-610 WAC." Therefore, closure should be in compliance with WAC 173-303-610.

13. Comment: The plan states that, "[t]here are no contaminated containment system components, associated structures and equipment, or dangerous waste inventory and waste residues that pose a substantial present or potential threat to human health or the environment; or that require removal, decontamination, or treatment."
Deficiency: These assertions are not demonstrated by the analytical data presented within the plan.
Recommendation: The above statement should be deleted from the plan or appropriate supporting data supplied.
Refer to: Number 6, above.

14. Deficiency: The pond water has not been analyzed for contamination.
Requirement: The pond water should be analyzed using the appropriate standards and the resulting data and conclusions should be presented in the plan. Analysis of the 2101-M Building effluent is not sufficient to demonstrate that the pond water is clean.

Section A-2. Protection of Human Health and the Environment

15. Comment: Proposed action levels are introduced as standards for clean closure of the facility. These action levels are presented in further detail in Section B-5g.
Deficiency: Comparisons with proposed action levels is not sufficient for compliance with the closure requirements stipulated in the FFACO.
Refer to: Number 6, above.

16. Comment: Only two quarters of groundwater data are examined, yet four quarters are currently available.
Requirement: All available data should be analyzed and submitted within the plan.

Section A-3. Land Restoration

17. Comment: The plan states, "[r]eturning the land to the appearance and use of surrounding land areas would be impractical, as the 2101-M Pond is still needed to receive condensate liquid from the 2101-M Building heating, ventilation, and air conditioning system."
Deficiency: Declining to perform a required part of the closure procedure under WAC 173-303-610 because it is "impractical" is not adequate.

Section A-4. Specific Closure Requirements of WAC 173-303-650

18. Comment: This section discusses only the requirements under WAC 173-303-650, while under the Hanford Federal Facility Agreement and Consent Order, all TSD units should be closed under WAC 173-303-610.
Refer to: Numbers 6 and 12, above.

19. Comment: The plan states there, "... is no waste to remove from the 2101-M Pond or pond soil ...."

Deficiency: It has not been demonstrated that there is no contamination of the 2101-M pond or pond soil under WAC 173-303-610.
Refer to: Number 6, above.

20. Comment: It is stated that no postclosure requirements for a landfill are anticipated.
Deficiency: The requirements for clean closure have not yet been met.
Requirement: A postclosure plan should be provided.
Refer to: Number 6, above.

Section B-1. Description of Final Closure

21. Comment: The plan states, "[t]here are no contaminated containment system components, associated structures and equipment, or dangerous waste inventory and waste residues that pose a substantial present or potential threat to human health or the environment, or that require removal, decontamination, or treatment."
Deficiency: It has not been demonstrated that there is no contamination of the 2101-M pond or pond soil under WAC 173-303-610.
Recommendation: The above statement may be deleted.
Refer to: Numbers 6 and 13, above.

22. Comment: Analytes with all concentration values below detection limits were not evaluated.
Deficiency: Only contaminants with concentration values below the limits stipulated under WAC 173-303-610(2) may be eliminated from consideration.
Requirement: Ensure and document within the plan that all analyses are in compliance with WAC 173-303-610.

23. Comment: It is asserted that, "[t]he concentration of constituents in the pond soil ... does not pose a substantial present or potential threat to human health or the environment. Therefore, soil removal is not required ...."
Deficiency: The standard for clean closure is removal of all dangerous wastes to background levels under WAC 173-303-610.
Recommendation: The sentences containing the above statements may be deleted.
Refer to: Number 6, above.

24. Comment: A groundwater monitoring program under 40 CFR Part 265 Subpart F (EPA 1988b) has been implemented.
Requirement: Groundwater monitoring should be implemented under the Dangerous Waste Regulations, WAC 173-303-645.

25. Comment: The plan states that initial groundwater monitoring will establish background concentrations near the 2101-M Pond site.
Deficiency: Equating initial concentrations of contaminants with background levels at a potentially contaminated site is scientifically unsound.
Requirement: Groundwater monitoring should be in compliance with WAC 173-303-645. Background should be established at a site not affected by past or current practices at the 2101-M Pond or other off-site locations, such as U.S. Ecology.

26. Comment: The plan discusses closure under an interim status closure plan.
Requirement: The 2101-M Pond should be closed under final closure in compliance with The FFACO and WAC 173-303-610.
Refer to: Number 6, above.

Section B-2. Maximum Extent of Operation

27. Comment: The plan states, "[t]he 2101-M Pond is no longer receiving dangerous wastes and is currently undergoing closure."
Deficiency: Although there are administrative controls on the materials that may be routinely disposed of in the 2101-M Pond drains, there are no protective measures in case of accidental addition of dangerous wastes to the effluent stream.
Requirement: The possibility for dangerous wastes to enter the 2101-M Building effluent should be prevented by physical safeguards. Several possible ways to accomplish this are as follows:

1. Isolate and collect effluent in a holding tank with regular monitoring. Alternate disposal methods for contaminated waste water should be in place.
2. Permanently close or remove all drains not related to the HVAC system.
3. Plumb non-HVAC drains into a treated waste system.

The chosen method should be documented entirely in the plan and implemented as soon as possible.
Refer to: Number 10, above.

Section B-3a(1). Inventory of Types of Wastes That May Have Been Discharged to the 2101-M Pond from the BWIP Laboratory

28. Comment: The plan states that, "... small quantities of laboratory chemical waste water" have been generated.
Requirement: Quantify small with an amount and document the types of chemical waste.

29. Comment: The plan states, "... there is no written evidence that ... dangerous waste or waste constituents from the BWIP Laboratory were discharged down the drains. ... [I]f any chemicals were discharged down the laboratory drains to the 2101-M Pond, the chemicals would have been used or spent materials."
Deficiency: The above statements infer that used or spent chemicals are not dangerous waste. This may not be true; used or spent chemicals may in themselves constitute dangerous waste.
Requirement: Clarify the paragraph containing these statements in language that is not misleading regarding the nature of materials disposed of from the BWIP laboratories or document conclusively that no dangerous waste was disposed of from the BWIP laboratories into the 2101-M Pond.

30. Comment: In 1985, formal written disposal procedures were instituted. The plan states that, "[t]he evidence to date indicates that the BWIP followed these written procedures."

Requirement: This evidence should be documented within the plan.

31. Comment: The plan states, "small quantities of ... chemicals ... could have been discharged to the 2101-M Pond."
Deficiency: Small does not quantify the amount discharged.
Requirement: "Small" should be replaced with an amount.

Section B-3a(1.2). Acids

32. Comment: The plan states, "... there is no evidence that these [wastes] were disposed of via laboratory drains."
Deficiency: Unless there is evidence that wastes were not disposed of via laboratory drains they should be assumed to have been disposed of in this manner.
Recommendation: The above statement should be deleted from the plan.

Section B-3a(1.3). Other Wastes That May Have Been Discharged to the 2101-M Pond From the BWIP Laboratory

33. Deficiency: In subsection B-3a(1.1), the estimated amount of barium containing dangerous waste discharged is 10,250 pounds from 1982 to July 1984. In subsection B-3a(1.3), the same amount of barium containing waste (10,250 pounds) is estimated to have been discharged over the longer time period of 1981 to July 1985.
Requirement: This discrepancy should be explained or corrected.

34. Comment: The estimated amount of waste water given in the Part A permit application is referred to.
Requirement: The values from the Part A permit application should be stated within the plan.

Section B-3a(3.2). Heating/Cooling Waste Waters

35. Comment: Table B-1 shows that the amount of HVAC condensate water discharged to the 2101-M Pond ranged from 0.87 to 2.44 million gallons per year for 1982 to 1988. However, the amount reported by DOE-RL for 1977 is 5.03 million gallons. The plan states that, "... the HVAC system was scheduled to be modified ..." in a 1978 DOE-RL document. Additionally, it is stated that, "... the assumption is made that the HVAC system was modified in 1979 ...."
Deficiency: Changes to the 2101-M Building should not be assumed.
Requirement: Information reported in the plan should be substantiated by documentation.

36. Comment: Effluent volumes are reported to the tenth of a gallon.
Deficiency: The data does not support this degree of accuracy.
Requirement: Amounts should be reported to reflect the proper degree of uncertainty. Please correct this here and elsewhere in the plan.

Section B-3a(4). Analyses of the 2101-M Building Effluent Discharges to the 2101-M Pond

37. Comment: The waste water effluent is designated as not dangerous waste.
Deficiency: The justifications for this designation are not in

compliance with the requirements of WAC 173-303-075.
Requirement: In order to designate the waste water correctly, the criteria listed in WAC 173-303-075 should be met.

38. Comment: The presence of low levels of acetone in the effluent is discussed with regard to its concentration or proximity to the detection level. Note also that acetone was found in the soil and may well be discharged on an infrequent basis through the laboratory drains (a possibility not entertained in this discussion). The presence of this acetone may be sufficient to determine the waste water as dangerous waste.
Requirement: Sufficient quality control should be performed while testing and documented within the plan in order to eliminate outside sources of contamination from consideration.
Refer to: Number 56, below.

39. Comment: Table B-2 is titled, "The 2101-M Pond Waste Water Analytical Data."
Deficiency: The water analyzed is the 2101-M Building effluent, not the 2101-M Pond water.
Recommendation: Change the title of this table to reflect what was actually analyzed.
Refer to: Number 14, above.

40. Deficiency: The raw data from which Table B-2 is compiled is not presented in the plan.
Requirement: All raw data should be reported within the plan.

Section B-3a(5). Analyses of Soil in the 2101-M Pond

41. Comment: The plan states, "[a]nalytes with all values below detection limits were eliminated from further consideration. Analytes with concentrations above detection limits were evaluated statistically where possible and compared to background concentrations and/or threshold values ...."
Deficiency: There are several difficulties with the above approach:
    1. The detection limits should be within the constraints stipulated in WAC 173-303-610.
    2. Analytes for a certain site that are above detection limits should also be considered separately; the values for several sites should not be simply consolidated and analyzed statistically.
    3. Threshold values based on health-based standards are not applicable under WAC 173-303-610.

Requirement: Analytes should be evaluated to determine if their values exceed the concentration limits as stipulated by WAC 173-303-610. In addition, each sample from the contaminated site should also be compared individually against the background; they should not be merely lumped together.
Refer to: Number 6, above, and numbers 76 and 113, below.

Section B-3a(5.1). Designation of the 2101-M Pond Soil

42. Comment: The presence of the organic chemicals (acetone, methylene chloride, and toluene) in the 2101-M Pond soil are discussed in terms of

health-based standards and present or potential threat to human health or the environment.
Refer to: Number 6, above.

43. Comment: The plan states that acetone, methylene chloride, and toluene were detected in five, three, and one samples respectively out of a total of 23 samples.
Deficiency: These chemicals were analyzed for in 13 out of the 23 samples collected. The above statements are misleading as to the known extent of contamination of the 2101-M Pond site by these species.
Requirement: Both the number of samples actually analyzed and the number of samples taken should be clearly stated to avoid misleading statements.

44. Comment: Both methylene chloride and toluene are attributed to introduction during sampling or analysis.
Deficiency: Unless there is evidence that these chemicals (or any others detected) were introduced during the analysis, they will be assumed to be sample constituents.
Requirement: Adequate quality control measures during analysis should be performed and documented within the plan to eliminate this type of conjecturing.
Refer to: Number 56, below.

45. Comment: Analytes with significant variability were evaluated statistically and compared with background.
Requirement: Each sample should also be compared individually to the background levels.

46. Comment: The plan states, "[i]norganic carcinogens are not known to be present in the 2101-M Pond soil."
Requirement: The contaminants detected at the 2101-M Pond site should be designated under WAC 173-303-103 and the results stated conclusively within the plan.

47. Comment: The plan states, "... the pond soil does not warrant handling as dangerous waste."
Refer to: Number 6, above.

Section B-3a(5.2). Organic Constituents.

48. Comment: Health-based standards for clean-up are again referred to.
Refer to: Number 6, above.

Section B-3a(5.3). Barium.

49. Comment: Barium levels were compared statistically with background levels.
Refer to: Number 41, above.

Section B-3a(5.5). Inorganic Constituents.

50. Comment: Typographical error, "pond soil.that."

51. Comment: The summation of data refers to, "substantial present or

potential threat to human health or the environment."
Refer to: Number 6, above.

52. Comment: Conclusion (2) states that the, "... maximum inventory of dangerous wastes and dangerous waste constituents present in the 2101-M Pond is limited to extremely low concentrations of a few residual organic and inorganic constituents that do not justify handling of the soil as dangerous waste."
Deficiency: There are several problems with the above conclusion. First, the 2101-M Pond water has not been evaluated. Second, the sample sites have not been compared individually with the background levels. And third, designation should be in compliance with WAC 173-303-070.
Refer to: Numbers 6, 14, and 41, above.

Section B-3b. Detailed Description of the Removal of Dangerous Waste Inventory.

53. Comment: The plan states, "... dangerous wastes ... are no longer present at levels that cause the pond soils to warrant handling as dangerous waste." It further contends that, "[t]he concentrations of constituents in the soil do not pose a substantial present or potential threat to human health or the environment. Therefore, no dangerous waste inventory remains at the 2101-M Pond ...."
Refer to: Numbers 6 and 14, above.

Section B-3c. Detailed Identification and Type of Offsite Dangerous Waste Management Units.

54. Comment: The plan states that this section is not applicable due to the lack of dangerous waste at the 2101-M Pond.
Requirement: This section should be provided.
Refer to: Numbers 6 and 14, above.

Section B-4. Description of Decontamination and Removal of Dangerous Waste Residues.

55. Comment: The criteria of human health and the environment are again used to substantiate the cleanliness of the site. The plan states that, "... criteria for determining the extent of decontamination ... are not necessary."
Deficiency: The information required by WAC 173-303-610(3)(a)(v) should be provided.
Refer to: Numbers 6, 14, and 41, above.

Section B-5. Soil Sampling and Analysis Plan for the 2101-M Pond

56. Comment: The plan states that the analytical results, "... were judged for reliability ...."
Requirement: Give a detailed description of how the data was determined to be reliable. At a minimum, this should include information regarding the accuracy and precision of the analyses and how these values were obtained. Note that the information provided in Appendix C-4 is not sufficient as it generally consists of statements with no supporting data or, if there is data, it is not explained nor is the source described.

Section B-5a(1.1). Sampling Locations.

57. Comment: This section discusses the selection of soil sampling locations and states, "... [t]he stratification enabled the use of a random sampling approach without raising the possibility of clustering the four sample locations in one area of the pond as might occur using a simple random design. Within each sample area, the specific sample location was determined using a random-numbers generator to identify a unique point along the centerline of the pond proper ...."
Recommendation: Please provide a detailed explanation concerning how the random-numbers generator identified and determined the sampling points. Also justify how soil samples obtained at specific depths may be termed "random."

58. Comment: The plan states that background samples, "were collected ... from a locale near the 2101-M Pond, but sufficiently distant (approximately 1,000 ft) to be unaffected by past operations (Fig. B-3)."
Deficiency: Because past disposal practices from different operations impacted such large areas on the Hanford site, the Department of Energy should demonstrate that onsite "background" sample results (e.g., 2101-M Pond background values) are comparable to background conditions offsite of the Hanford site.
Recommendation: Conduct an investigation offsite in an area that is documented to not be affected by any past practice to determine true background soil conditions. If the background sites already examined fulfill this requirement, this information should be documented within the plan. Following this investigation the value obtained for soil constituents can then be applied to the background cleanup standards for the 2101-M Pond closure.

Section B-5a(1.2). Site Modifications.

59. Comment: The plan states that an access ramp was excavated at each sampling site in the 2101-M Pond and fill was added at three (sites 2, 3, and 4).
Requirement: Clarify what the source of the fill material was and state what was done with the excavated and fill material after the samples were collected.

Section B-5a(1.3). Soil Sampling Depths

60. Comment: The plan states that a soil sampling depth of 12 feet was chosen based on the following:
    1. cost effectiveness,
    2. ability to detect significant changes in chemical concentration with depth and extrapolate this information to greater depths,
    3. deeper samples in the vadose zone could be obtained during well-drilling, and
    4. soluble compounds would likely be detected in the groundwater.

Deficiency: The cost effectiveness of an analysis should not be a primary driving force in determining the scope of an investigation. Note that the depth to groundwater in this vicinity is roughly 300 feet; 12

feet is only 4% of the vadose zone.
Requirement: To adequately understand the soil profile the entire vadose zone should be investigated. In lieu of this, provide a detailed explanation of how an investigation of the top 12 feet of the vadose zone and opportunistic samples obtained during well drilling is an adequate substitute for a complete soil characterization of the vadose zone. Include substantiation for percolation of all soluble materials to the ground water; i.e., a model or documentation giving expected depths to which the waste water will travel must also be provided.

61. Comment: The plan states that the chemical constituents from the waste nitric and hydrochloric acids were not expected to leach or move to significant depths.
Deficiency: Both nitrate and chloride salts are generally soluble in water.
Recommendation: Reassess this expectation using known solubilities of nitrate and chloride salts and the fact that the HVAC system discharges approximately one to two million gallons of waste water per year to the 2101-M Pond.

Section B-5a(3). Sampling Equipment and Samples Collection

62. Comment: This section states that a B-24 mobile power auger rig was employed in conjunction with the continuous flight hollow-stem auger sampling method modified from the American Society for Testing and Materials (ASTM) standard D1452-80 (ASTM 1985).
Recommendation: State whether this method provides an undisturbed sample. That is, does the sample represent an in-situ core of the soil at the sample location?

Section B-5a(3.1). Vadose Zone Sampling

63. Comment: The vadose zone analyses of the samples obtained during well drilling using the ICP method did not follow the protocols required.
Deficiency: The testing methods must be in compliance with the applicable regulations (in this case WAC 173-303-110).
Requirement: All analyses used in characterizing the site must be within the specifications designated; analyses that are not within the specifications should not be relied on for final decisions.
Refer to: Number 60, above.

Section B-5a(3.2). Precharacterization Soil Sampling

64. Comment: The soil samples from the run-off ditch were acquired at the same time as the precharacterization samples. However, the precharacterization samples were not analyzed by the analytical laboratory for as long as 44 days after sampling.
Deficiency: It is not clear that the run-off ditch samples were analyzed within the time constraints specified in WAC 173-303.
Requirement: State if these samples were analyzed in compliance with holding times or resample the run-off ditch.

Section B-5b. Analytical Parameters and Procedures

65. Comment: The plan states, "[t]o facilitate a more cost-effective sampling program ... [soil samples were] collected at depths of 0.0 to 2.0 ft ...."
Deficiency: Because insoluble contaminants are expected to collect in the top layer of sediments near the effluent source in the 2101-M Pond, analysis of a composite of the upper two feet of soil rather than smaller segments could lead to erroneous conclusions.
Requirement: Resample the upper soil layers with narrower stratification (Ecology typically accepts 2" strata for homogenization) in order to provide a more accurate portrayal of the pattern (or lack thereof) of contamination of the site by insoluble materials.

Section B-5c. Data Evaluation Criteria.

66. Comment: In (2) of the data analysis approach, the plan states that groups of chemical constituents are analyzed.
Recommendation: Clarify the referred to chemical groups.
Refer to: Number 41, above.

67. Comment: Location and depth effects are going to be examined by the analysis of variance procedure.
Requirement: Each sample from the 2101-M Pond site should be examined individually against background. The range of error for the samples should be attributable to sampling and instrument error, not a range determined by a composite of data from several sites. The method for determination of the errors should be clearly stated. Any patterns of contamination for a species over a number of locations should be described completely. Note that a number of the contaminants at the 2101-M Pond site that exceed the background mean are located in sample M159 (the top sample of site #3, the 2101-M Building outflow site).
Refer to: Number 41, above.

68. Comment: Contaminants that had a significant difference in mean concentration from background samples or insufficient data for statistical analysis were compared to, "accepted regulatory standards on a constituent by constituent basis."
Requirement: The applicable regulatory standard for comparison is background under WAC 173-303-650(6).
Refer to: Number 41, above.

69. Comment: Assessments of contaminants for health and/or environmental concern were made.
Requirement: The applicable standard is background.
Refer to: Number 6, above.

Section B-5d(1). Inorganic Chemical Analyses.

70. Comment: The plan states, "[l]aboratory duplicates were within ... QC limits for inorganic analytes with the exception of copper, barium, and manganese. Significant percent differences outside QC limits ... occur in samples M132 and M143."
Recommendation: Clarify what the QC limits are. Quantify what is meant by a significant percent difference.

71. Comment: The plan states, "[p]roblems with percent recoveries and percent differences are most likely caused by matrix interference and the inhomogeneous [*sic*] nature of the soil."
Recommendation: Clarify the types of difficulties that could arise from the heterogeneous nature of the soil. Does this mean that the analytical tests were inadequate? If separate phases were observed, these should be tested individually.

Section B-5d(2). Organic Chemical Analyses.

72. Comment: The plan states that spike sample recovery for analysis M146 is not acceptable because it is outside QC limits. The next comment contradicts this by stating that, "... [all] spike recoveries were ... found to meet EPA QC established limits." Neither of these assertions is evident from the raw data presented in Appendix C-1.
Recommendation: The discrepancy between these two statements should be corrected. The assertions should be clarified and discussed in terms of the applicable regulations (WAC 173-303) and the data.

Section B-5e. Soil and Sediment Chemical Analyses.

73. Comment: The plan states that all data packages for all analyses are provided in Appendix C-1.
Deficiency: This comment is not true; for example, the data for the analyses of the 2101-M Building effluent is not reported in this appendix.
Recommendation: All data should be reported in one section of the plan. Review the other sections of the plan to ensure that this has been done. Note that data for quality control evaluations should also be provided.

Section B-5f(1). Statistical Evaluation of Location Effect.

74. Comment: Typographical error: "... vanadium and zine are ...."

Section B-5f(2). Statistical Evaluation of Depth Effect

75. Comment: Chemicals exhibiting a statistically significant depth effect generally show elevated contaminant concentrations in the uppermost sampling layer. Note that each of these were composites of the top two feet of soil at each sampling site of the 2101-M Pond.
Deficiency: The analyses do not provide enough data on the stratification of contaminants in the top layers of the 2101-M Pond soil.
Requirement: More analyses should be performed in order to provide better data on the stratification of the upper soil layer of the site.

Section B-5f(3). Statistical Comparison of Pond and Background Soil Data

76. Comment: The plan states, "... the 2101-M Pond as one entity was compared to the background as another entity."
Deficiency: This is an inadequate analysis of the data; more sampling to greater depths below the pond would probably show results even closer to background using this approach.
Requirement: Each sample should also be individually compared to

background for each contaminant present above the detection limit.

Section B-5g. Risk to Human Health and the Environment

77. Comment: This section is based on the results presented in Section B-5f(3), Statistical Comparison of Pond and Background Soil Data. It also presumes that whether or not the contaminants pose a risk to human health or the environment is sufficient as a standard for the site.
Deficiency: The statistical analyses this section is based on are inadequate. Additionally, under the FFACO the cleanup must be conducted in compliance with WAC 173-303-610, i.e., standards based on risk to human health or the environment are not applicable.
Refer to: Numbers 1, 6, and 41.

Section B-5g(1.1). Apparent Effects Threshold

78. Comment: The plan states, "... the AET approach does not apply directly to the ... 2101-M Pond ...." The plan includes AET's for ecosystems that are very different from that associated with the 2101-M Pond. For example, the 2101-M Pond and associated ecosystem is a high desert system and is vastly different from the referenced marine (estuarine) system.
Deficiency: Although the AET is a viable means for determining environmental health standards, it is inappropriate to utilize an AET which was developed for a marine (estuarine) sediment ecosystem and use it as justification for environmental health standards at the 2101-M Pond.
Requirement: Should DOE wish to pursue development of AET's further, they would need to be developed on a site-specific basis. That is, Ecology would expect DOE to fully justify and document a health and environmental based clean-closure on the most sensitive organism(s) or ecosystem which may be exposed at the 2101-M Pond site.
Refer to: Number 6, above.

Section B-5g(1.4). Equivalent Concentration

79. Comment: A composite of the 2101-M Pond soil was designated under WAC 173-303-084(5)(b) for equivalent concentration.
Requirement: This designation should also be done individually for each sampling site for all listed contaminants.

Section B-5g(1.5). Reference Dose

80. Deficiency: The explanation for examination of chemical constituents for estimates of the reference dose is not clear.

Section B-5g(2.3.4). Methylene Chloride

81. Comment: Methylene chloride is attributed to laboratory contamination.
Deficiency: Sufficient QC during analysis should show whether or not this compound was introduced during sampling.

Section B-5g(2.3.6). Toluene

82. Comment: Toluene is attributed to laboratory contamination.

Deficiency: Sufficient QC during analysis should show whether or not this compound was introduced during sampling.

Section B-5g(2.5). Biological Pathways

83. Comment: This section mentions that known biological pathways in the Puget Sound benthic and epibenthic ecosystems are different than those of the 2101-M Pond. The biological pathways for the 2101-M Pond ecosystem are not presented, but it is stated that observations over the past 10 years lead to the conclusion that, "... the contaminants in the pond soil do not pose a significant present or future threat to human health or the environment."
Deficiency: As stated in the plan, the biological pathways associated with this site are relatively unknown.
Requirement: If DOE chooses to pursue standards based on health and environmental risks, a detailed evaluation concentrating on the most sensitive organism(s) or ecosystem which may be exposed must be presented in support of any conclusions. Note that these standards should not be based solely on human health impacts; these evaluations must be based on the most sensitive biological pathway regardless of its identity.
Refer to: Number 6, above.

Section B-6. Groundwater Monitoring

84. Comment: The plan states, "[i]nstallation of groundwater monitoring wells is required for compliance with interim status regulations (40 CFR 265, Subpart F) (EPA 1988b)."
Deficiency: Under the FFACO, the site must close in compliance with final status closure regulations (WAC 173-303-610).
Requirement: The well monitoring program should be in compliance with WAC 173-303-645 as required by WAC 173-303-610.

Section B-6b(1.2). Stratigraphy Beneath the 2101-M Pond

85. Comment: Typographical error: "... following the discussion ...."

Section B-6f. Quality Assurance/Quality Control

86. Comment: This section describes the QA/QC controls in place during the groundwater monitoring. Note, however, that the QA/QC measures used in the soils analyses are presented in Appendix C-4.
Recommendation: Organization of the text should be consistent throughout the plan.

Section B-6b(2.1). Groundwater Hydrology of the 200 Areas

87. Comment: Table B-19, Ranges of Hydraulic Properties in the 200 Areas indicates ranges for hydraulic conductivity but not storativity or porosity.
Requirement: Supplement Table B-19 (from Graham et al. (1981)) by including more recent range estimates for hydraulic conductivity, storativity, and porosity.

Section B-6b(3.2). Water Levels

88. Comment: The water-level data for wells near the 2101-M Pond are provided in Table B-21. The table indicates that four measurements have been corrected for borehole deviation (i.e., by use of inclinometer). The other measurements reported do not appear to have undergone correction (e.g., barometric efficiency, earth tides). Note that in Sec. B-6b(3) it is stated that, "... the hydraulic gradient (in the vicinity of the 2101-M Pond) is so small that measurement error could be responsible for incorrectly determining the water levels and thus the direction of groundwater flow beneath the pond."
Deficiency: Clarify what corrections have been made; if any that could help in alleviating errors in the water levels, and therefor the gradient in this area, have not been done, these should be applied.

Section B-6b(4.1). Justification for Locations

89. Comment: The Department of Energy has recently defined background water quality as, "the solute content of natural groundwater in the upper geohydrologic [*sic*] systems on the Hanford Site, where groundwater is unaffected by Hanford Site waste disposal operations." See DOE/RL 88-36 p. WP-43. The plan asserts that, "[g]roundwater flow in the southwest corner of the 200 East Area is estimated to be to the northeast." Well 299-E18-1, located 280 feet southwest of the southwest corner of the 2101-M Pond is stated to be, "unaffected by discharges to the pond."
Deficiency: It is not clear whether any place in the area surrounding the 2101-M Pond has groundwater which is unaffected by past practices at the 2101-M Pond or any other site. Furthermore, the groundwater flow in this area is not fully understood. Designation of the well 299-E18-1 as the "background well" is premature.
Requirement: A study should be conducted to determine actual background groundwater quality. If it is necessary for this study to be performed offsite and upgradient of the Hanford Site in order to ensure no effect from past practices, then this should be done.

Section B-6b(5.2) Borehole Logging

90. Comment: This section states that each well will be geophysically logged with natural gamma, density, and neutron probes.
Recommendation: Please state what calibration standards will be used before and after logging each borehole.

Section B-6b(6.2). Establishing background

91. Comment: The plan states that background levels are being established from samples obtained from well 299-E18-1.
Deficiency: It is not established that this well is upgradient of contamination sources and unaffected by past practices.
Refer to: Number 89, above.

Section B-6d(2). Water Quality Analyses

92. Comment: The plan states, "... these are very close to or below DWS or SMCLs ...."
Deficiency: Very close is an ambiguous amount.

Requirement: Quantify "very close" with specific amounts.

Section B-6d(2.3). Discussion of Preliminary Analyses

93. Comment: The plan states, "[t]hus from analyses completed to date the 2101-M Pond and the facilities that discharge to 2101-M Pond may not have contributed regulated wastes to groundwater."
Deficiency: This comment is premature; there is insufficient information to preclude past contamination based on well sampling. More to the point, if groundwater contaminated by past practices at the 2101-M Pond site has moved beyond the regions sampled by these wells, it will never be possible to state that there was no contamination due to discharges to the 2101-M Pond based on data obtained from the 2101-M Pond RCRA monitoring wells, particularly since administrative controls on discharges were established in 1985.
Requirement: Delete or amend the above sentence (and any similar statements based on insufficient information) so that inferences are supported by the data available.

94. Comment: In the plan for future groundwater monitoring it is not clear which well(s) will be used for obtaining data on groundwater background levels.
Requirement: Any well(s) used for obtaining samples for establishing background levels must be upgradient and offsite of the area in question. Because many of the past practices at the Hanford site impacted large areas, it is possible that background samples may have to be obtained offsite and upgradient of the entire Hanford site. In any case, any well chosen for setting the background standards must be unambiguously documented within this plan as not impacted by any past or present practice at the 2101-M Pond site.
Refer to: Number 89, above.

Section B-6f(2). Quality Assurance Review of Organic Analyses

95. Comment: Typographical error: "1,1-dichloreothylene."

Section B-10. Wastes Treated, Removed, or Disposed of Within 90 Days

96. Comment: The plan asserts there are no wastes present at the 2101-M Pond site which require treatment, removal, or disposal prior to closure.
Deficiency: The validity of this assertion has not been demonstrated.
Refer to: Number 6, above.

Section C. Certification of Closure

97. Requirement: For your information, Ecology is interpreting "independent" to be defined as avoiding a "conflict of interest or the appearance of a conflict of interest," as described in OSWER Directive 9483.00-3 (excerpt attached).
Refer to: Enclosure.

Section III. References

98. Deficiency: There are typographical errors in the list of references.

Appendix B-1. Laboratory Inventory

99. Deficiency: There are numerous typographical errors in the list of chemicals.

Appendix C-1. Data Package for Analysis of 2101-M Pond Soil Samples and Background Samples

100. Comment: Some of the analyses had low percent recoveries for the spike analytes (see, for example, sample M132, procedure 733).
Deficiency: This is not addressed sufficiently within the plan.
Recommendation: Acceptance of these analyses should be justified.
Refer to: Number 56, above.

101. Comment: One section is entitled, "Results of the Vadose Sediment Analyses by the X-Ray Fluorescence Method" while another covering analyses of the same samples is called, "Results of Borehole Sediment Analysis Using ICP Method."
Recommendation: Related sections of the plan should be labelled consistently.

102. Recommendation: A key to the U.S. Testing sampling methods should be provided in this section to facilitate data interpretation.

Appendix C-2. Graphic Representation of Soil Sample Results

103. Comment: The total organic carbon graph is upside down.

Appendix C-4. Quality Assurance/Quality Control of analyses

104. Comment: The plan states, "[h]olding times were acceptable for ... cyanide analyses. Cyanide holding times are outside EPA quality control limits of 14 days for samples M131 through M154."
Recommendation: Amend these two statements so that they are consistent with each other.

105. Comment: The plan states that, "[b]lank results were within QC limits."
Recommendation: The quality control limits should be stated.
Refer to: Number 56, above.

106. Comment: Typographical error: "Cu, BA, and ...."

107. Comment: The elements Cu, Ba, Mn, As, Cd, Pb, and Se have percent differences outside quality control limits for samples M132, M142 and M143. The percent and QC limits (%) columns are reported differently for the metals than the main group elements.
Recommendation: State how these were determined and if the other analytes and samples were treated similarly. Additionally, information should be reported consistently throughout the plan.
Refer to: Number 56, above.

108. Comment: The plan states, "[p]roblems with percent recoveries and percent differences most likely are caused by matrix interference and inhomogeneous nature of the soil."
Recommendation: Inadequacies in the analytical data should be managed by quality control measures. If it is necessary to resample a site due to problems with an original sample, this should be done.

109. Comment: The plan states, "[t]he percent spike recovery is outside laboratory-establish QC limits ..." for sample M146 TOX. (Note typographical error: establish should be established.)
Refer to: Number 56, above.

110. Comment: Acetone, methylene chloride, and toluene were detected in a number of samples.
Refer to: Number 44, above.

Appendix C-5. 1.0 Input Data

111. Comment: The plan states, "[b]ackground depth intervals were the same as the pond samples."
Deficiency: This statement appears to be inaccurate; samples M136, M137, M138, M144, M145, and M146 were taken from different soil depths than the pond soil samples.
Recommendation: Clarify which samples were used to determine background.

Appendix C-5. 2.1 Assumptions

112. Comment: It is assumed that metals are log-normally distributed since they are naturally occurring in the soil. Other contaminants are assumed to have normal distributions.
Recommendation: These assumptions should be tested statistically to the extent possible given the available data. The results of this should be presented within the plan.

Appendix C-5. 2.5 Comparison With Background Samples

113. Comment: The data from the 2101-M Pond were pooled and compared to a composite of the background data. This approach was based on the assumption that the pond data were a simple random sample.
Deficiency: Note that the pond samples were not taken randomly; the depths were predetermined before sampling. Additionally, pooling the data for comparison to background distorts any location or depth effects that may other wise be noted.
Refer to: Numbers 57, 60, 65, 67, and 78, above.

ATTACHMENT

Other than non-enterable underground tanks, and all ancillary equipment, may be tested by using either a leak test or an internal inspection. With respect to interim status tank systems, leak tests or inspections of other than non-enterable underground tank systems must be conducted at least annually. With respect to permitted tank systems, the frequency of the leak test or internal inspection for other than non-enterable underground permitted tank systems must be sufficient to detect the potential for serious releases before they occur. The frequency is specified in the permit and should be based on the material of construction of the tank and its ancillary equipment, the age of the system, the type of corrosion or erosion protection used, the rate of corrosion or erosion observed in previous inspections, and the characteristics of the waste being stored or treated.

Internal inspections must be conducted by an independent, qualified, registered, professional engineer, and the schedule and procedure for the inspection must be adequate to detect obvious cracks, leaks and corrosion, or erosion that may lead to cracks and leaks.

EPA does not specify the techniques that must be used when conducting leak tests because the Agency recognizes that many factors influence the choice of an appropriate test method. These factors may include temperature, barometric and hydrostatic pressure variations, tank size and design, physical characteristics of the waste, variations in structural support provided by soil or fill material, and leak detector characteristics. EPA believes that the level of accuracy attainable by leak testing methods must be reviewed periodically as the technology improves. Consequently, EPA expects owners and operators to use the most reliable methods available to assess the integrity of their hazardous waste tank systems. Current methods should be capable of detecting leaks of 0.1 gallons per hour.

If a tank system is found to be leaking or unfit-for-use following an integrity assessment, the owner or operator must comply with the requirements for responding to leaks or spills (see 40 CFR 264.193(i)(5) and 265.193(i)(4); also, see question V.3.)

5. Who may perform and certify the initial tank system integrity assessment and subsequent annual assessments?

It is the owner or operator's responsibility to determine that his tank system is not leaking or unfit for use. When conducting the initial assessment of the integrity of tank systems without appropriate secondary containment, an independent, qualified, registered, professional engineer (IQPRE) must review and certify the owner or operator's written assessment of the tank system's integrity.[10] (The assessment can be written by any qualified person, whether or not a registered, professional engineer, but it must be reviewed and certified by an IQPRE.) The Agency believes that this initial integrity assessment must be certified by a person who does not have a conflict of interest or the appearance of a conflict of interest. Hence, employees of the owner or operator (e.g., those who receive their primary source of income from the o/o) are not judged to be "independent" and cannot, therefore, certify the initial integrity assessment.

---

10. 40 CFR 264.191(a) and 265.191(a)

DISTRIBUTION COVERSHEET

Author
R. F. Stanley, Ecology
cc: J. L. Waite

Addressee
R. D. Freeberg, DOE-RL

Correspondence No.
Incoming # 8905097

Subject NOTICE OF DEFICIENCY FOR THE 2101-M POND CLOSURE PLAN

12/06/89JLW:dh

Internal Distribution

Approval	Date	Name	Location	w/att
		Correspondence Control	A3-01	X
		L. C. Brown	H4-51	X
		C. DeFigh-Price	B2-20	X
		B. R. Dickey	R1-48	X
		C. J. Geier	H4-57	X
		K. L. Hoewing	B3-06	X
		R. E. Lerch (Assignee)	B2-35	X
		D. E. Mahagin	H4-21	X
		H. E. McGuire	B2-35	X
		R. C. Nichols	B3-02	X
		J. E. Nolan	B3-01	
		L. L. Powers	B2-35	X
		S. M. Price	H4-57	X
		F. A. Ruck, III	H4-57	X
		D. E. Simpson	B3-51	X
		J. E. Thrasher	H4-21	X
		J. L. Waite	B2-35	X
		S. A. Wiegman	B2-19	X
		R. D. Wojtasek	B2-15	X
		TPA Integr. & Control	B2-35	X
		EDMC	H4-51	X