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START

Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

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CORRESPONDENCE CONTROL

Mr. Roger F. Stanley, Program Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 99504

Dear Mr. Stanley:

RESPONSE TO NOTICE OF DEFICIENCY FOR 2727-S NONRADIOACTIVE DANGEROUS WASTE STORAGE FACILITY (S-2-3) INTERIM STATUS CLOSURE PLAN

The U.S. Department of Energy-Richland Operations Office (DOE-RL) and Westinghouse Hanford Company (WHC) have reviewed the comments provided in your Notice of Deficiency (NOD) for the 2727-S Nonradioactive Dangerous Waste Storage Facility (NRDWSF) Interim Status Closure Plan. Our responses to your comments are provided in the enclosed table. In addition, a revised Chapter 4.0, "Closure Activities," is attached to the NOD Response Table. Upon receipt of concurrence to these responses and the revised Chapter 4.0, DOE-RL and WHC will proceed with revising the closure plan.

Any questions you may have regarding the comment responses may be directed to Mr. D. L. Duncan of DOE-RL on (509) 376-9333 or Mr. C. J. Geier of WHC on (509) 376-2237.

Sincerely,

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R. D. Izatt, Director
Environmental Restoration Division
Richland Operations Office

R. E. Lerch, Manager
Environmental Division
Westinghouse Hanford Company

Enclosure:
2727-S NRDWSF NOD Response Table

cc: P. T. Day, EPA, w/o encl.
R. E. Lerch, WHC, w/encl.

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No.	Comment/Response	Ecology Concurrence
1.	Page 1. The "locational information" provided here fails to list and describe the 600 and 700 areas. Please include this information. Response: Agree, this information will be included in the revised closure plan.	
2.	Page 2. Figure 1 does not illustrate the locations of the operational areas nor the Wye and Yakima Barricades discussed in the text. Figure 1-1 in your 300 Area Solvent Evaporator Closure Plan (February 1989) provides this information. It is suggested that the Figure 1-1 map be used in this and future plans and permit applications. Note that Figure 1-1 of the 300 Area Solvent Evaporator Closure Plan needs to be amended to include the 3000 Area. Response: Agree, Figure 1 will be consistent in all future closure plans.	
3.	Page 7. Typo. "mo" should be "month" or added to this plan's list of acronyms and abbreviations. Response: Agree. Typo will be corrected.	
4.	Page 11. Typo. "DOE-R1" should be "DOE-RL". Response: Agree. Typo will be corrected.	
5.	Page 13-27. The sampling plan is difficult to follow. Comment #8 from our September 15, 1988 NOD has not been adequately addressed. We have provided a sampling plan flowchart (Attachment 2) to aid in the refinement of this and future sampling plans. Each element of this flow chart must be addressed. The reader should be able to choose any one sample from your plan and follow through each step of the flowchart. The technical adequacy of your sampling plan cannot be fully addressed until it is put into a readable format. Response: Agree, Chapter 4 (pages 13-27) will be revised to reflect each element of the sampling plan flowchart which is attached to this NOD table. In addition, as discussed during the Unit Managers Meeting on July 17, 1989, insulation, wall board, and electrical wiring will be removed without prior sampling, placed in 55 gal drums and designated for disposal.	

6. Page 13. Typo. Third para. "any" should be "if". Fourth para. "an" should be "and".
Response: Agree. Typo will be corrected.

7. Page 13. Your plan currently suggests combining four 40-foot wall samples to make one composite and two 20-foot wall samples to make one composite. This produces a 4-way dilution factor for the 40-foot wall and a 2-way dilution factor for the 20-foot wall. To provide a more comparative analysis, each of the 40-foot walls must be divided into two 20-foot sections for random number generation and compositing. This will produce the same number of samples for the same size wall area and identical quantities for compositing. (173-303-610(3)(a)(v))
Response: Wall sampling is no longer being proposed (see Chapter 4.0).

8. Page 16. Comment #7 is also applicable to metal wipe sampling. Each 40-foot wall should be treated as two 20-foot sections and sampled in the same manner as the 20-foot walls. Each sample must be analyzed individually. (173-303-610(3)(a)(v))
Response: Agree, text will be modified to produce consistency in sampling.

9. Page 16. It is possible that the pooled rainwater on the pad within the building leached contaminants from drums and other parts of the pad prior to pooling. The areas of pooling also indicate where spilled liquids would accumulate. These areas must therefore be considered a contamination pathway and biased sampling conducted within the building at points of rainwater accumulation. In addition, the entry of rainwater into the building must be established, i.e. leaks in roof, runoff from drums, etc. (173-303-610(3)(a)(v))
Response: Agree, the sampling plan for the floor will included bias sampling where liquid accumulation will occur.

10. Page 16. Typo. "Appendix A" should be "Appendix H".
Response: Agree. Typo will be corrected.

11. Page 16. Your plan utilizes two different methods for selecting random sampling locations. The building sampling plan assigns each potential sampling section with an alpha-numeric character and random "sections" are chosen. On the other hand, the soil and concrete sampling plans utilize a coordinate system to choose random "points" at grid intersections. The use of two different systems is unnecessary. Choose one method and employ it throughout the plan.
Response: Disagree, the most appropriate method of determining random sample locations will be used throughout the sampling plan, depending on the sampling media. However, consistent sampling methods have been employed for each medium.

12. Page 16. The random number generation method described in Appendix H identifies a point, not a section. Therefore, the word "sections" in the last paragraph of this page should be changed to "point".
Response: Agree, the text will be modified to used the appropriate nomenclature of the selected random sampling method.

13. Page 20. It is not clear what is meant by "...will cut the core... from the intersection of each selected section and at each sampling point". It may be better stated as "...will cut the core ... at each randomly chosen intersection and at each biased sampling point". Please clarify this statement.
Response: Agree, the text will be modified to state the core will be taken from each random chosen location and from each bias sample location.

14. Page 20. It is not stated whether the laboratory will analyze the top 1/2 inch or the remainder of the concrete core or both? Please clarify.
Response: Agree, the text will be modified to state how concrete samples will be analyzed, however, chips from the concrete core are now being taken. Chip sampling is described in the text.

15. Page 21. The text indicates that six samples will be drawn from each area but figure 11 only shows five sampling points in area 2. Please correct.
Response: Agree, the corrections will be made in the appropriate locations in the text and figures to insure consistency.

16. Page 21. The word "can" should be replaced with the word "will" in the sentence "If contamination is found in any of these areas...".
Response: Agree, the correction will be made.

17. Page 21. "The depth to which soil removal is necessary will be indicated by" the results of discreet, verification sampling and not compositing data. After removing the area designated as contaminated, further sampling must be conducted to verify non-contamination. Details of verification sampling must be provided in the plan. (173-303-610(3)(a)(v))
Response: Agree, the details of verification of contamination removal will be included throughout the closure plan (see response to Comment No. 5). All verification sampling will be discrete (See Table 2, Chapter 4).

18. Page 21. Typo. "loca-tion" should be "location".
Response: Agree, typo will be corrected.

19. Page 21. Typo. "beforeremediation" should be "before remediation".
Response: Agree, typo will be corrected.

20. Page 21. The sampling plan suggests that soil samples withdrawn from the same depth throughout each area be composited. Due to the fact that contamination, if any, originated from random spills and the tendency of spilled contamination to move down through the soil, it is more likely to find contamination one to three feet below a spill than ten or more feet laterally away from a spill. Therefore, compositing by depth, as your plan suggests, would only serve to dilute a positive analysis. Compositing, in this instance, will only be approved for samples withdrawn from the same location.
Response: Agree, compositing of samples will only be done for samples withdrawn from the same location and the text will modified accordingly (See response to Comment No. 17).

21. Page 21. Will these background samples only be analyzed for "priority pollutants" or will they be analyzed for all the constituents in Appendix G? See comment #44.
Response: The samples will be analyzed for the known hazardous chemicals that may have been stored in the facility, ie. all constituents listed in Appendix G.

22. Page 25. The text inadequately supports the sampling plan. The effectiveness of this plan is integral in meeting closure performance standards and should therefore be properly defended. This facility was exposed to random spills (spatial fluctuations) and not homogeneous contamination. Therefore, the discussion in the second paragraph suggests your plan is "less effective". The third paragraph then "alleviates" this inherent problem by requiring some biased sampling. In order to defend this plan, the discussion here should include the fact that the only random sampling being conducted, per se, is that associated with the collection of background samples. The remaining sampling is either totally biased or a cross between random and biased sampling referred to as stratified sampling. The addition of this systematic factor is necessary because contamination can not always be located by "visual disturbances" and because homogeneous contamination is not present. Amend this section to properly defend the adequacy of the plan.
Response: Agree, the text will be revised to reflect the need to adequately address why the sampling plan was developed.

23. Page 25. What is referred to as being "true" in the statement "This is true because..."? Please clarify.
Response: This sentence has been deleted.

24. Page 25. What does the term "entire wall" constitute? Does this include insulation, wallboard and metal siding? If contamination is found only in the wallboard, will only the wallboard be stripped or will the insulation be stripped as well? What about the other walls? Please elaborate. (173-303-610(3)(a)(v))
Response: The wall board and all associated material, including insulation and electrical components, will be stripped from the entire wall and disposed of according to the plan, as stated in the response to Comment No. 5.

25. Page 26. The statement "The associated electrical component, ceiling..." is unclear. Does this mean that all these materials will be stripped if only one wall sample shows contamination? Please clarify. (173-303-610(3)(a)(v))
Response: As stated in response to Comment No. 5, all wallboard, insulation, and electrical components will be disposed of as hazardous waste, if so designated.

26. Page 26. The extent of steam cleaning will be determined by verification sampling of adjacent materials. If an entire wall is designated as contaminated and steam cleaned, then the adjacent walls must be verified as clean near the point of contact with the contaminated wall.
Response: Agree, the text will be modified to address verification sampling of adjacent wall for contamination.

27. Page 27. If you choose to remove the entire 1/2-inch of the pad based upon one sample, then the collected concrete material must be designated by the concentration of the original designating sample, not upon the composite of the entire material after being stripped.
Response: Agree, concrete removal will be done all at once, not by 1/2 inches, and disposed of per the results of the designating chip sample.

28. Page 27. Wipe sampling may be conducted similar to that outlined in Section 4.2.1 but analysis of the verification samples must be discrete.
Response: Agree, the text will be modified to address discreet verification sampling and analyses of those samples as stated in the response to Comment No. 5.

29. Page 27. If contamination is found in a soil sample, a discrete 100 square foot sampling grid is not identifiable. Samples are being taken from an intersection of four ten-by-ten foot areas, not within one 10 foot by 10 foot grid. Since the sample is taken from an intersection, it is not appropriate to choose only one of the four adjacent sections. One option is to define the contaminated area as a new grid with its corners defined by the center of the four adjacent sections. The plan must specify whatever designation process will be used.
Response: Agree, the text will be modified to reflect how to designate which adjacent section would be sampled to determine the extent of contamination.

30. Page 27. Compositing is not acceptable for verification sampling. The five (or other number) of soil verification samples must be individually analyzed.
Response: Agree, the text will be modified throughout the plan to state that analyses of any verification sample will be individual.

31. Page 28. The certifications must be "submitted", not "completed", within 60 days of completion of closure. Please correct. (173-303-610(6))
Response: Agree, the text will be modified accordingly.

32. Page 28. Typo. "Appendix H" should be "Appendix I".
Response: Agree, the typo will be corrected.

33. Page 28. The term "responsible government official" should be amended to read "responsible USDOE official".
Response: Agree, the correction will be made.

34. Page 29. State Dangerous Waste Regulations require: 1) closure of any TSD facility must begin within thirty days after receipt of the final volume of dangerous waste, 2) all dangerous wastes must be treated, removed or disposed within 90 days of receipt of the final volume of dangerous waste, and 3) closure must be completed within 180 days after receipt of the final volume of dangerous waste. In order to evaluate your compliance with these regulations, you must provide the date on which the last volume of dangerous waste was received at this facility. If any of these regulatory deadlines cannot be met, a letter requesting an extension must be submitted separate from the closure plan. (173-303-610(3)(c)(ii))
Response: Disagree, during the August 1989 Hanford Federal Facility Agreement and Consent Order Project Managers Meeting, it was agreed that compliance with 173-303-610(3)(c)(ii) is not required.

35. Page 32. There is no tabbed cover page for Section 6. Please provide this page.
Response: Agree, a tabbed cover page for Section 6 will be provided.

36. Page 32. Washington State Dangerous Waste Regulations were revised in January 1989. Your references to WAC (1987) should be evaluated to ensure compliance with the 1989 version. Any regulatory changes after this version may be addressed through the amendatory process.
Response: The closure plan will be submitted using the latest WAC 173-303.

37. App E. Each appendix has a blank second page. Please delete these pages or provide a justification for their presence.
Response: The closure plan will be paginated correctly.

38. App. B. The pages of this Appendix are not numbered. Please number these pages.
Response: The closure plan will be numbered correctly.

39. App. E. Manifest information is only provided for the time period 03-06-86 to 12-23-86. Explain the absence of manifests from the first two years of this facility's operation.
Response: This is the only time period in which these manifest are available.

40. Page E-65. What is the information listed here, e.g. totals for the year, month, shipment, etc?
Response: This page contained a list for 1986 of the total shipment of D001 designated waste.

41. Page F-3. Typo. "Analysis" should be "Analytical".
Response: Agree, typo will be corrected.

42. Page G-3. The reference to WAC (1987) is incorrect. There is no "Appendix VIII Dangerous Waste Constituents list". The WAC 173-303-9905 Dangerous Waste Constituent List is not the same as the Appendix VIII Hazardous Waste Constituent List. The proper list to use is WAC 173-303-9905. If you need to reference Appendix VIII then you must properly reference it as 40 CFR 261. Appendix VIII. Please correct.
Response: Agree, the text and references to hazardous waste lists will be revised.

43. Page G-3. It is stated that the "majority" of the wastes presented in the inventory will be encompassed with this analytical plan. A list of the inventoried wastes not encompassed by your analytical plan must be provided. The justification for these exclusions must also be presented. (173-303-610(3)(a)(v))
Response: Agree, the text will be revised to state that all wastes stored at the 2727-S NRDWS Facility will be encompassed within the analytical plan.

44. Page G-3. Will every sample (building, concrete and soil) be analyzed for all the constituents listed in Appendix G? Either a statement to this fact should be made or a delineation of the parameters to be considered should be presented for each sample. This presentation must include the justification for not analyzing the remaining constituents. (173-303-610(3)(a)(v))
Response: Agree, all samples will be analyzed for the constituents in Appendix G. The text will be modified accordingly.

45. Page G-4. This is not a comprehensive list of Appendix VIII or WAC 173-303-9905. Explain how this list was compiled. See comment #42.
Response: This list represent hazardous chemicals contained in either Appendix VIII or WAC 173-303-9905 that were stored in 2727-S NRDWS Facility.

46. Page H-3. The text here indicates the origin to be the lower, left vertex of each area. Figures 9 and 11 show their vertices in the upper, left corner. Figure 12 shows no origin at all. Please correct.
Response: Agree, the text and figures will be revised to insure consistency on the appropriate location of the origin for the sampling grids.

47. App. H. Tables H-2 through H-5 erroneously list random numbers for areas 1,2,4 and 5. Correct these tables to accurately address areas 1,2,3 and 4.
Response: Agree, the corrections will be made.

The following comment/responses relate to the SEPA checklist:

48. Page 1. Our office received two copies of the closure plan and SEPA checklist. One copy was missing page 16 of the checklist but contained page 17 which was identical to page 4 except it lists Mr. Izatt as the USDOE contact and was revised on January 23, 1989. The other copy contained page 16 but not page 17. Page 1 of this copy lists Ms. Bracken as the USDOE contact and a preparation date of February 24, 1988. Please correct this error.
Response: The correct dates and contacts will be provided on the SEPA checklist.

49. Page 2. Item 10. Delete the words "the Hazardous and Solid Waste Amendments of 1984 (42 United States Code 6901-6987)" and "-400". Our authority does not include the HSWA amendments nor is it limited to section 400 of our Dangerous Waste Regulations. It should be noted in the checklist that EPA has regulatory authority over the HSWA amendments although our review encompasses compliance with these amendments.
Response: Agree, the text will be revised accordingly.

50. Page 8. Item 4a. This item should reflect the presence of the sagebrush/cheatgrass-Sandberg's bluegrass which is mentioned in Item in Item 4b.
Response: Agree, the text will be revised accordingly.

51. Page 9. Item 5a. List the animals observed or known to be near the site. This would include animals recognized in the 200 West Area.
Response: Agree, the appropriate animals will be included in the text.

52. Page 15. Item 14a. Reference should be made to a site map showing vehicle access to this facility.
Response: Agree, the appropriate map in the closure plan will be referenced.

4.0 CLOSURE ACTIVITIES

The 2727-S NRDWS facility will not require partial closure before final closure of the entire facility. At present, the facility has interim status and is not operating. Once notification of closure plan approval is received from Ecology, closure activities at the facility will begin.

The waste inventory in Appendix E indicates that this facility held both characteristic and listed waste. The standard of background environmental levels or nondetectable levels has been chosen as the appropriate cleanup level.

4.1 HOW THE FACILITY WILL BE CLOSED

The 2727-S NRDWS facility will be closed so that no wastes will remain at the facility. The closure operations will consist of the following steps as necessary:

1. Determine what chemical wastes, if any, are currently contaminating the building, the concrete pad, and surrounding soils
2. Decontaminate the building
3. Perform verification sampling of the building to determine the effectiveness of decontamination procedures
4. Demolish the building and dispose of it, if decontamination procedures did not meet background cleanup levels
5. Dispose of the concrete pad offsite, if determined to be contaminated
6. Excavate and dispose of any contaminated soils
7. Perform verification sampling of the remaining soils to determine the completeness of excavation procedures
8. Perform repeated excavation and verification sampling until remaining contaminated soils have been removed
9. Decontaminate any equipment used in performing closure activities
10. Dispose of any waste generated during closure
11. Restore the area after closure activities are complete
12. Certify that closure activities were completed in accordance with the approved closure plan.

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The closure activities will be completed in accordance with this closure plan and after approval of this plan by Ecology and EPA. The closure activities are explained in the following sections.

4.2 FACILITY SAMPLING PLAN

The chemical wastes, if any, currently contaminating the building, the concrete pad, and the surrounding soils, will be assessed through the sampling procedures and analytical plan described in this Subsection and in Appendices F and G. All samples taken from the building, concrete, and soil will be analyzed for the constituents listed in Appendix G. The building consists only of walls and a ceiling; the floor of the building is a concrete pad. The sampling of the building and concrete pad are addressed separately.

4.2.1 Building Sampling

The accumulation of drums adjacent to the building exterior only occurred when incompatible waste was received, or the building capacity was exceeded. During the facility operational period, storage of containers outside the building was infrequent, which would limit the amount of exposure time of the exterior walls to contamination. In addition, if any contamination did exist on the exterior walls, this contamination would likely have been eliminated by the scouring and washing actions of the wind and precipitation. Therefore, the exterior of the building will not be sampled.

Each wall inside the building will be divided into 5-ft by 5-ft sections as illustrated on Figure 6. Each section will be identified with a letter, "U" for upper and "L" for lower, and a numeral, starting from left to right, looking from inside the building. The wallboard and insulation will not be sampled. The ceiling, electrical components, and any other interior building materials not mentioned previously will also not be sampled. These interior building materials will be removed and disposed of based on the results of the designation sampling as described in Section 4.3.

Although wallboard and insulation were installed at the time the facility began operation, it cannot be assumed that the metal siding was protected by these materials and is uncontaminated. As such, the metal siding will be sampled. Each interior wall will be wipe sampled. Four sections will be randomly selected from any 20-ft wall, two from the upper level and two from the lower level. Eight sections will be randomly selected from any 40-ft wall, four from the upper level and four from the lower level. Random selection will be made with the use of a random number table. A 1-ft^2 disposable template will be placed in the center of each randomly selected section (Fig. 6). One gauze pad will be used to wipe down the wall surface within the template. The entire 1-ft^2 area will be carefully covered, utilizing vertical strokes, starting at one end and progressing to the other (Fig. 6). Care will be taken to wipe the surface only once throughout the sampling effort. After the sample is collected, the gauze will be immediately

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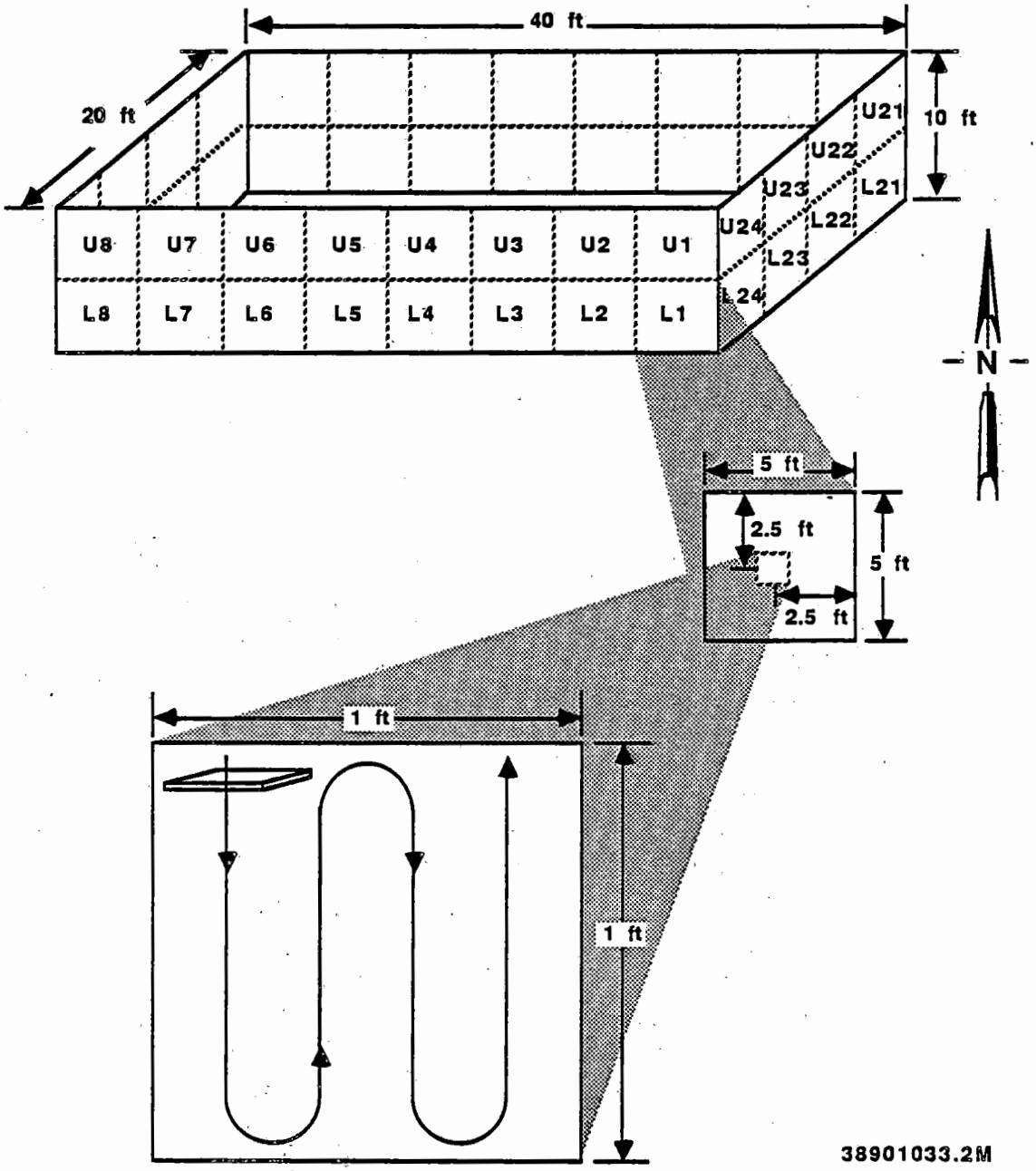

Figure 6. Wipe Sampling Plan for Building.

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placed in the sample container to prevent any volatile contaminants from escaping. Each gauze pad will be placed in a 40-mL glass screw-cap volatile organics analysis (VOA) vial with a Teflon*-faced silicone septum. See Appendix F for additional sampling procedures.

Half of the gauze pads will be laboratory prepared with hexane. These pads will be analyzed for the organic constituents listed in Appendix G. The remaining pads will be laboratory-prepared in a dilute (1:100) nitric acid solution. These pads will be analyzed for the inorganic constituents and metals listed in Appendix G. For the first section selected per half of a 20-ft wall, one pad will be used for organic constituents. For the second section selected in a half of a 20-ft wall, one pad will be used for inorganic constituents. For a 40-ft wall, the first and second sections will be wiped for organics and the third and fourth for inorganics. For details regarding the analytical program refer to Appendix G.

4.2.2 Concrete Pad Sampling

The concrete pad will be sampled both inside and outside the building. The pad inside the building, will be randomly sampled at four locations as shown in Figure 7. These locations were selected using a random number generator (Appendix H). The sample locations will be supplemented by samples taken at low points, cracks, or stained areas. The cores will be cut, removed, processed for use, and packaged as described in the following section.

Six randomly identified points outside the building will be sampled. These locations were selected using a random number generator (Appendix H). The sections will be located from the northwest corner of the pad progressing in 10-ft intervals 80-ft south and 110-ft east (Fig. 9). Additionally, seven core samples will be collected as described below in the areas marked on Figure 8. These locations have been chosen because of physical considerations such as staining, depressions, and cracks in the pad.

Surface sampling (wipe sampling) of the concrete pad will not occur, based on the fact that if spillage occurred it is assumed that the porous nature of the concrete would have allowed the penetration of the contaminant into the concrete matrix. Therefore, a concrete coring device will cut the core at each randomly selected intersection and biased sampling points. The coring device employs a 6-in.-outer-diameter (OD) saw that uses water as a cutting lubricant. No organic-based lubricant will be used. An industrial-size shop vacuum will be used to remove excess water from around the core. This is done to minimize any surface contamination flowing into the underlying soil. The wastewater from within the shop vacuum will be emptied into a new 17-E closed-head 55-gal drum. The shop vacuum will be triple rinsed with distilled water, and this rinseate will be containerized with the wastewater. The rinseate and wastewater will be managed as described in Appendix F.

*Teflon is a trademark of E. I. duPont de Nemours & Company.

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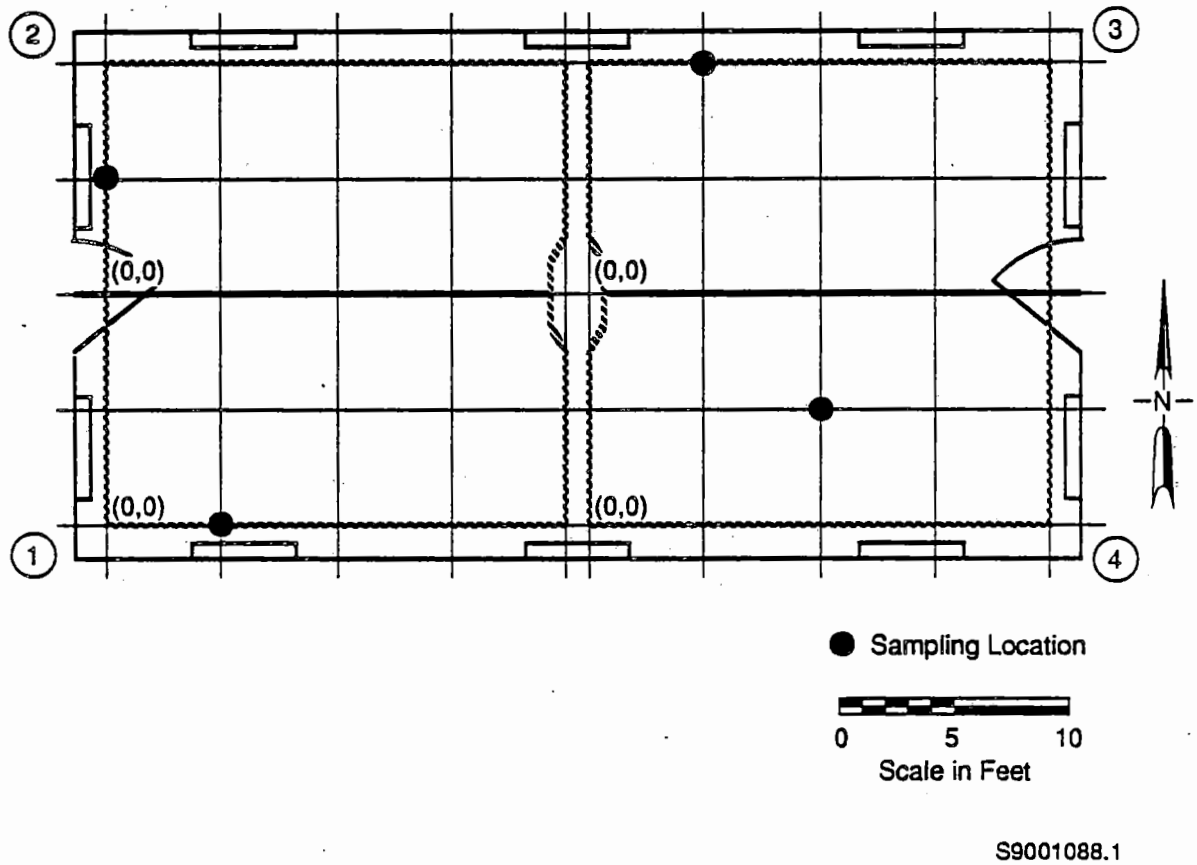

Figure 7. Sampling Locations Within Building.

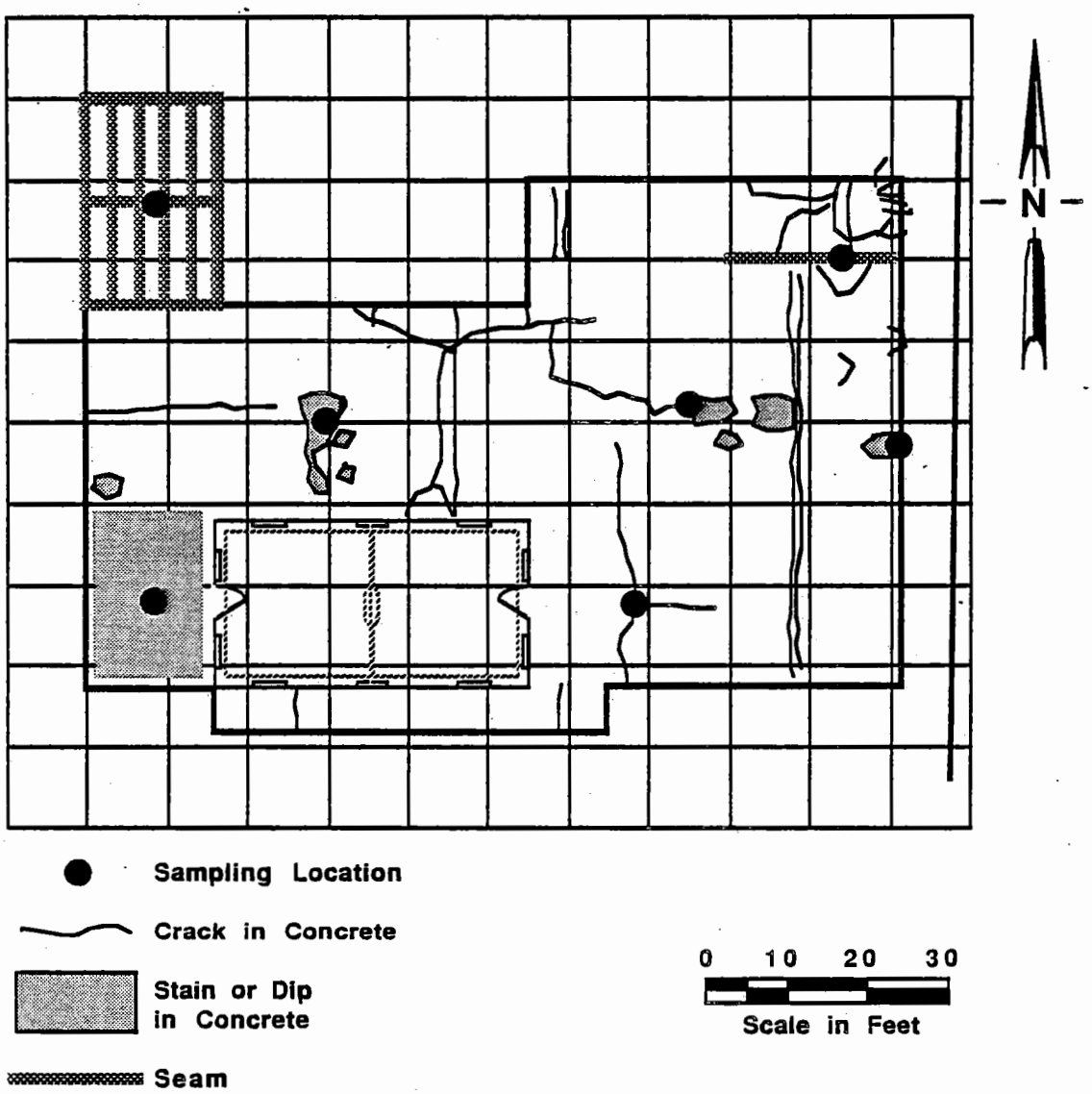

Figure 8. Specific Sampling Site Plan, Concrete Pad.

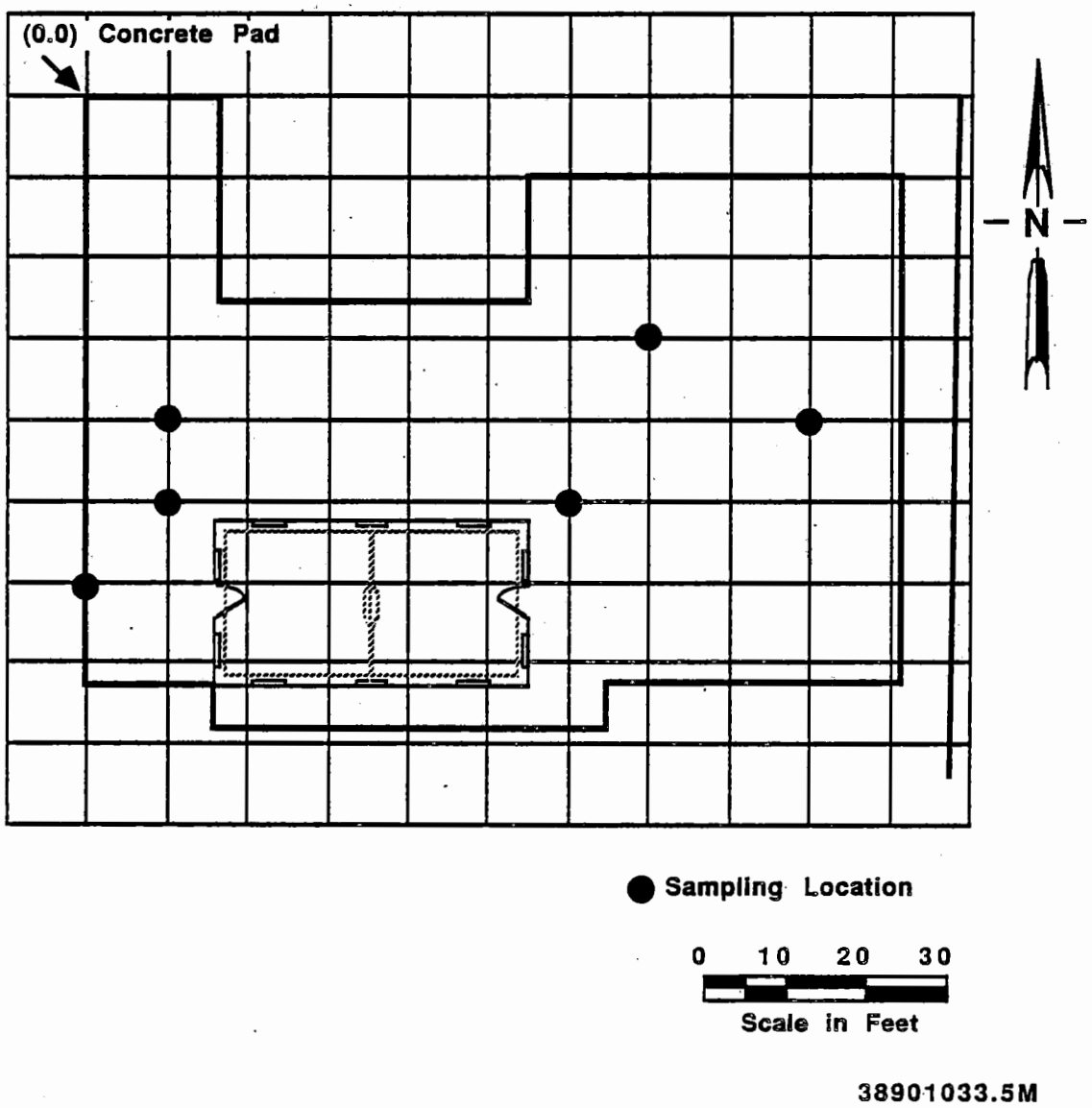

Figure 9. Random Sampling Grid, Concrete Pad.

A chip will be taken from the top of the core and used for analysis. The chips will be placed in a sample bottle appropriate for the analyses and transported to the laboratory. In two locations, to be selected at the time of sampling, an additional chip sample will also be taken at the base of the core. If contaminants are present, the contaminant gradient will be assessed based on the data from the top and bottom chips. Gradients will be used to better assess the concentrations of any contaminants present throughout the entire concrete slab for designation and disposal purposes. No decontamination is proposed for the concrete slab. See Appendix F for additional sampling procedures. The laboratory will pulverize each sample for analysis, and put the sample through two-phase crushing. First the sample is put into a jaw crusher to reduce it to -0.5 in., and then it is put into a disc pulverizer to reduce it to -80 mesh. See Appendix G for details of the analytical plan.

Each core hole will be filled with grout after soil sampling is completed. The locations to be cored will proceed from the least to the greatest potentially contaminated, which in this case is from the outside of the building to the inside of the building. This will minimize the chance of cross contaminating samples.

4.2.3 Soil Sampling

The purpose of this sampling effort is to delimit the areal and vertical extent of near-surface soil contamination resulting from the operation of the facility. The fine sandy soil immediately surrounding and beneath the concrete slab will be sampled. Additionally, samples will be collected within the areal extent of the property within the facility boundaries.

The facility property soil sampling was divided into the four soil sampling areas listed below:

- Beneath the concrete pad immediately under the building
- Beneath the concrete pad surrounding the building
- The 20-ft-wide perimeter surrounding the concrete pad
- The remaining facility property.

Soil sampling beneath the building will be performed at the four locations identified in Section 4.2.2 and shown on Figure 7. At each location a soil boring will be advanced to a 3-ft depth. A soil sample will be collected at the surface, at 1 ft, and at 3 ft in the soil profile. Samples from the same location will be composited after collection.

Soil beneath the concrete pad surrounding the building will be sampled at the specific sampling locations (not the randomly selected locations) identified in Section 4.2.2 and shown on Figure 8. These samples will be taken by advancing the concrete core through to the soil. Samples will be

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collected from three depths in each boring: The surface, at 1 ft, and at 3 ft. Samples from the same location will be composited after collection.

The historical use of the site indicates that drums were stored off the pad but only in the immediate vicinity of the north side of the pad. Site conditions around the pad are such that the ground is essentially flat. If any spills occurred at the edge of the pad or onto surrounding soils, liquids would migrate down into the soil column and would be held in the upper soil profile since there would be little driving force. The absorptive capacity of the soils has been determined to be high. Therefore, an intensive soil sampling effort will be conducted in the 20-ft perimeter around the pad.

The 20-ft-wide perimeter surrounding the concrete pad was subdivided into four areas corresponding to the sides of the building (Fig. 10). For each area, six sampling locations were randomly identified using a random number generator (Appendix H). At each of these locations samples will be collected from the surface, at 1 ft, and at 3 ft. Samples from the same location will be composited in the laboratory after collection.

The 20-ft-wide perimeter was subdivided into four smaller areas to provide information on the areal extent of contamination. If contamination is found in any of these four areas the soil will be removed from 100-ft^2 surrounding the contaminated sample site to a depth of 3 ft.

The remaining facility property will be sampled at ten locations. Locations will be chosen at least 50 ft away from the facility. The locations were chosen using a random number generator and a 25-ft grid system and are shown on Figure 11. Appendix H contains details of the random number generation and sample location process. At each location, a boring will be advanced to 3 ft and sampled at the surface, at 1 ft, and 3 ft. The three samples from each boring will be composited in the laboratory. These soils are intended as background samples, but will also serve as verification samples to ensure that the storage activities were contained within the other sampling zones.

A random selection procedure was chosen for identifying the sampling locations discussed previously, because it is statistically defensible. If soil staining or historic information indicate that contamination was localized to specific areas, these sampling strategies need to be supplemented with biased sampling within the suspect areas. Biased sampling is planned on the concrete pad in addition to random sampling, because cracks and stains are suspect for contamination. Elsewhere on the facility property there is no reason to locate samples in a biased manner, because the soil materials are not stained and appear natural.

The decision to collect background samples within the same property parcel as the 2727-S structure was based on 1) the similarity of soil type to that immediately surrounding the structure and 2) confidence that no other hazardous waste activity has occurred on the parcel. Background levels will be established for metals and radioactive constituents. Detection limits will be used as background for organic constituents.

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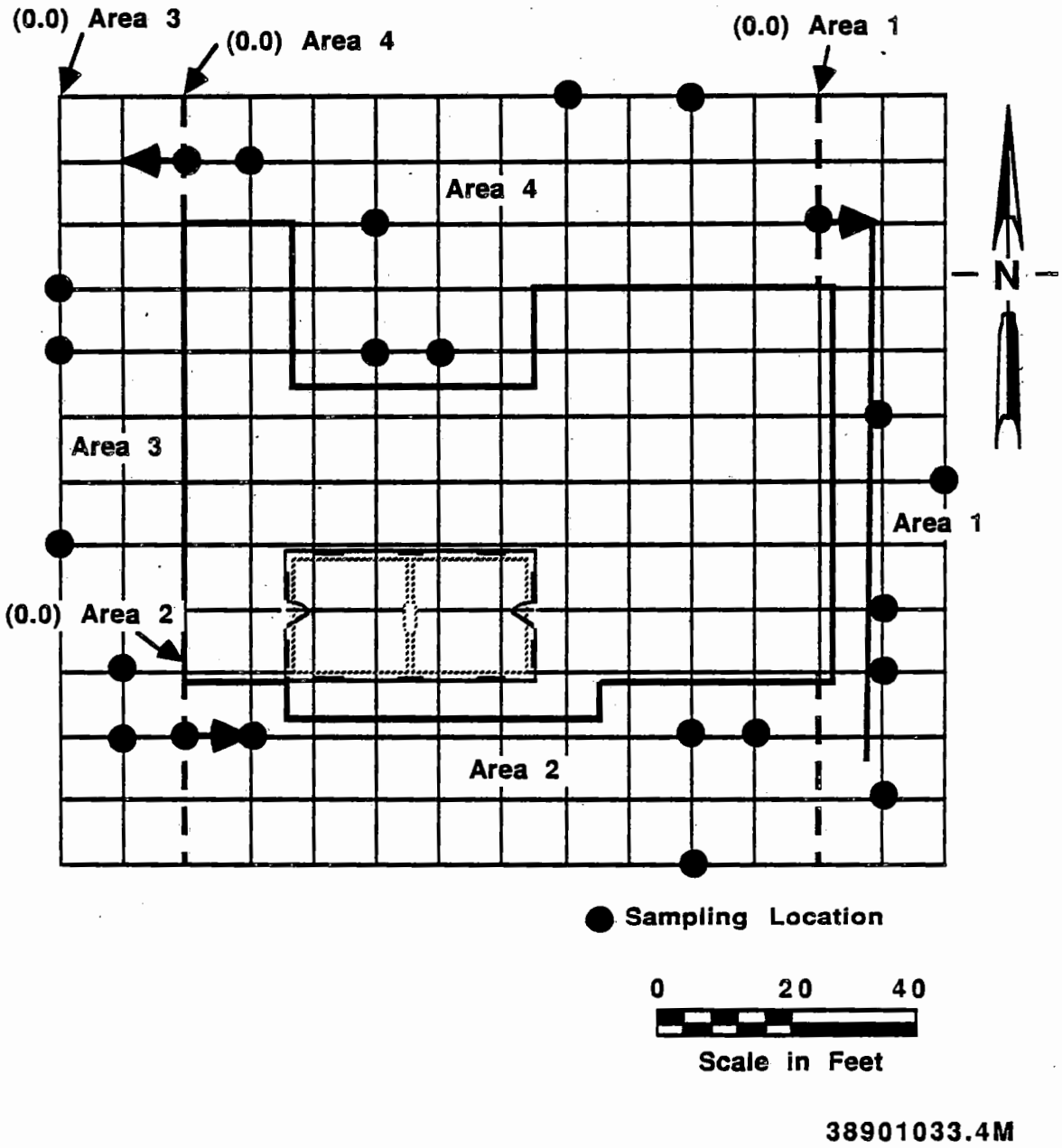

Figure 10. Random Sampling Grid, Soil.

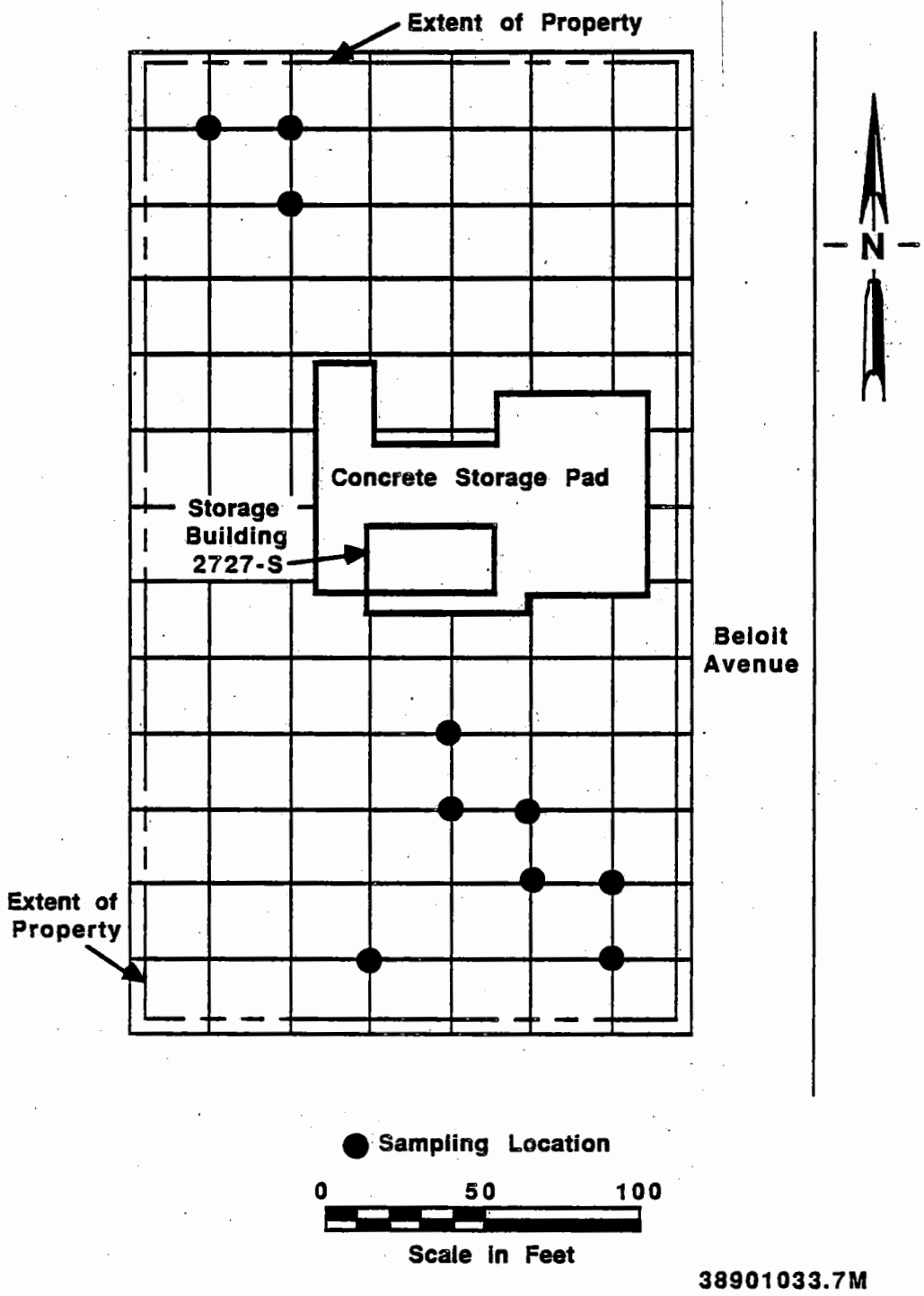

Figure 11. Areal Soil Sampling Plan.

At each soil sampling location, both on and off the concrete pad, a surface soil sample will be taken. A precleaned 4-in.-OD hand-operated soil auger will then be carefully placed in each hole, and soil will be removed to a depth of 1 ft. At the 1-ft depth, a soil sample will be carefully removed with a clean stainless steel sampling spoon as described above. Extreme care will be exercised to avoid knocking soil along the side of the boring and at the surface into the bottom of the borehole, which might contaminate the sample. Once sampling is complete, the soil auger will be decontaminated and reintroduced in the hole. Soil removal will proceed down to 3 ft from the surface. A final sample will be removed at this depth as previously described. See Appendices F and G for details of the sampling procedures and analytical plan.

The soil that is removed by the auger from each hole will be containerized in preconditioned 17-H open-headed 55-gal container(s) pending analysis. The container(s) will be stored at the 2727-S NRDWS facility until analyses are returned and evaluated.

4.2.4 Sampling Plan Quality

The depth to which a sampling plan elucidates the statistical properties of environmental variables must be dependent on the purpose, or objective, of the investigation.

The purpose, or objective, of this sampling plan is to identify the absence or presence of contamination in several media, namely the building materials and concrete pad of the 2727-S NRDWS facility. A classification of 'contamination absence' is indicated by undetectable concentrations, whereas 'contamination presence' is indicated by concentrations greater than detection limits. (Background levels for soil are discussed in Section 4.2.3.) Thus, it is not necessary, in light of the proposed decontamination procedures (see Sections 4.3, 4.4, and 4.5), to reveal statistical properties of the contaminants that may be present in these materials. For example, mean values, dispersion parameters, and covariance structures do not provide pertinent information for this type of an investigation. Moreover, statistically rigorous comparisons with background populations are not necessary since background concentration levels are assumed to be below detection limits. Statistical rigor is required, however, in determining the laboratory quality assurance/quality control. The probability for false positives or false negatives is mostly dependent on the quality of the data produced by the laboratory.

A summary of the sampling effort included in the present plan is given in Table 2 (see Sections 4.2.1 through 4.2.3).

This sampling is designed to define the nature and extent of nonhomogeneous spill contamination. This definition is accomplished by employing a random sampling scheme supplemented by biased samples located in areas of greatest suspected contamination.

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Table 2. Summary of Sampling Effort.

Media	Number of samples collected	Number of samples analyzed	Comments
Interior metal	24	24	All wipe
Concrete pad	17	17	4 inside, 13 outside
Soils			
Beneath building	12	4	4 locations, 3 depths composited
Beneath pad	21	7	7 biased, 3 depths composited
Perimeter soil	72	24	4 locations, 3 depths composited
Areal soil	30	10	10 locations, 3 depths composited,
Total	176	86	

Plus any verification or additional biased samples as needed.

4.3 BUILDING DECONTAMINATION

The decontamination of the building will be based on the results of the building sampling discussed in Section 4.2.1. As stated previously in Section 4.2.1, all interior building materials, i.e., wallboard insulation, electrical wires, will be removed, placed in new 17-H open-head 55-gallon drums, sampled individually, designated and shipped to the 616 NRDWS facility for storage. The materials will then be shipped to Northwest EnviroService, Inc. (NWES) for disposal assuming that the contaminants are regulated waste. The approximate volume of material to be removed is 16 yd^3. The materials will be screened for radioactivity, if radioactivity levels are above those stipulated in WHC-CM-7-5, Part K, then the material will be disposed of onsite as hazardous mixed waste.

If the wipe sampling shows the metal interior of the building to be contaminated, then the building will be decontaminated. Any contaminated building walls will be marked and steam cleaned. Only those walls having contamination and walls adjacent to the point of contact with the contaminated walls will be steam cleaned. The steam cleaning will be performed three times. Preparation of the area to be cleaned includes lining the area with durable plastic, either 8-mil (e.g., Visqueen*) or 12-mil (e.g., Hypalon**) thick. The rinseate will be collected and pumped to containers using a portable diaphragm pump with flexible hoses and will be managed as described in Appendix F and Section 4.6. The steam-cleaned building sections will be wipe sampled as outlined in Subsection 4.2.1. These wipe samples will be analyzed for the chemical constituents revealed in the initial wipe sampling to verify that steam cleaning was effective.

*Visqueen is a trademark of the Ethyl Corporation.
**Hypalon is a trademark of E. I. duPont de Nemours and Company.

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If the steam cleaning was determined to be ineffective by verification wipe sampling of the wall and adjacent section, then the still-contaminated building sections will be designated as a regulated waste per the wipe sample analysis results. Any contamination found during wipe sampling above detection will be assumed present at levels of concern for designation purposes. This designation will be in accordance with WAC 173-303-070 (Ecology 1989) and will be based on the results of the verification wipe sampling. The still-contaminated building sections will be shipped to NWES assuming that the contaminants are regulated waste. The estimated maximum volume of waste is 26 yd^3. If the steam cleaning is effective as determined by wipe sampling, then the metal exterior will be considered clean and the building can be reused on the Hanford Site. The clean metal exterior will be removed from the 2727-S site to allow sampling of the underlying concrete pad.

4.4 CONCRETE PAD DECONTAMINATION

If the initial sampling program indicates that contaminants have been absorbed by the concrete at any sampling location the entire concrete pad will be removed. The collected material will be designated in accordance with WAC 173-303-070 (Ecology 1989) per the designating concrete chip sample(s). Assuming that the resulting designation determines the material to be a regulated waste, the material will be shipped to NWES. The estimated maximum volume of waste is 88 yd^3.

4.5 SOIL EXCAVATION

The soils represent the third and final area where 'decontamination' may be necessary. If soils are contaminated above background, all contaminated soils within 100-ft^2 of sampling point will be removed and disposed of at NWES. A backhoe and front-end loader will be used to collect and place contaminated soils in 17-H open-head 55 gallon drums.

Once the soil is removed, verification samples will be collected from the excavation to determine the effectiveness of the removal program. The number of samples collected will be dependent on the areal extent of contamination encountered, but will be no less than one sample from the area previously determined to be contaminated. Based on the analytical results, additional soil may be removed at 1 ft-intervals until background levels are achieved followed by verification sampling as described above.

4.6 EQUIPMENT DECONTAMINATION

The equipment used during the closure activities will be cleaned three times with a steam cleaner. The cleaning of the equipment will be performed over a solid sheet of durable plastic. The plastic will be either 8-mil (e.g., Visqueen) or 12-mil (e.g., Hypalon) thick, depending on the equipment and the amount of potential abrasion resulting from cleaning activities. The sides of the plastic will be elevated to prevent the escape of rinseate.

9 0 1 1 7 8 4 0 8 3 2

The rinseate from steam cleaning will be collected and pumped to 55-gal steel drums that will be sampled as specified in Appendix F. The pump will then be flushed three times with water that will be managed as rinseate.

The rinseate will be designated, if necessary, in accordance with WAC 173-303-070 (Ecology 1989). If it is determined to be regulated waste, it will be shipped to NWES for treatment and/or disposal. The NWES accepts hazardous liquids for treatment; no prior solidification is necessary. The plastic liner will be removed and disposed of at NWES. All materials packaged for shipment to NWES will be in DOT-approved containers that are compatible with waste contents (e.g., 55-gal drums). All containers will be labeled and shipped under manifest.

4.7 RESTORATION

Upon removal of waste residues and contaminated structures or soil, including waste generated during closure, the site may require some degree of reclamation. This may be justified to control dust, erosion, and surface water runoff and to promote postclosure usage. Site restoration will include backfilling disturbed soil areas with noncontaminated native soils, compaction, grading, and revegetation.

4.8 CERTIFICATION

Within 60 days of completion of closure of the 2727-S NRDWS facility, certifications will be completed. Suggested certification statements are contained in Appendix H. The independent registered professional engineer who will be monitoring closure will visit the site at least at the commencement and end of each activity described in the closure plan (e.g., wipe sampling, concrete pad sampling, soil excavation, etc.). The frequency of these inspections is noted in the closure plan schedule (Section 5.0). The professional engineer will review all records, notes, analyses, files, manifests, etc. relating to the closure activities. After the final professional engineer closure certification has been executed and the appropriate local zoning authority has received a copy of the survey plan indicating the location of the facility, a responsible government official will certify that the facility has been closed in accordance with the closure plan. The responsible government official(s) is identified in Appendix I.

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APPENDIX F

SAMPLING PROCEDURES

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APPENDIX F

SAMPLING PROCEDURES

The following sampling procedures were designed in conjunction with the Analytical Plan presented in Appendix G. All sample bottles for the sampling and analysis plan will be provided by the receiving laboratory (including the addition of preservatives).

Detailed notes of all sampling activities will be taken as the sampling occurs. Notations will be made for the following:

- Location of sampling point
- Type of sample (e.g., wipe, liquid, soil)
- Number and volume of samples taken
- Analyses to be performed on samples
- Description of sampling point and sampling methodology
- Date and time of collection
- Sample identification number(s)
- References such as maps or photographs of the sampling site
- Field observations
- Signatures of personnel responsible for sampling and observations.

All notations will be recorded in a bound log book with consecutively numbered pages. Notation will be made in ink. The log book will be kept at the 2750-E Building in the 200 E Area of the Hanford Site.

The extent of information recorded for each sample collected will be sufficient so that the activity could be reconstructed without reliance on the sampler's memory.

The sampler will wear latex gloves and exercise extreme care to prevent cross contamination by using a new pair of gloves for each sample collected. Gloves will be collected, containerized, and disposed of at NWES. Soil sampling will be performed according to guidelines in WHC-CM-7-7 (WHC 1989), Environment Investigation Site Characterizations Manual, (EII) 5.2, Soil and Sediment Sampling. Details of soil, concrete and wipe sampling methodology are provided in the text.

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All samples will be placed in laboratory-prepared jars with Teflon*-lined lids. The samples will be placed on ice in an ice chest and maintained at 4 °C while being transported to the Analytical Laboratory under chain-of-custody procedures. The samples will be maintained at this temperature until the analyses are performed. Samples will be delivered to the Analytical Laboratory within 24 h of their collection.

All sampling equipment will be cleaned between samples, utilizing a detergent wash with distilled water rinse, followed by a hexane rinse, and finally three distilled water rinses. All rinseates will be collected and containerized in drums for analysis and disposal as discussed below.

RINSEATE SAMPLING

The contents of each rinseate drum will be sampled by immersing a 4-ft, 14-mm-ID glass sampling thief into the liquid to the bottom of the drum. A column of the contents will be withdrawn and placed in a precleaned 8-oz-capacity glass sampling jar. Additional samples will be collected as necessary to obtain at least 5 oz. The drum(s) are to be stored at the 2727-S NRDWS facility until the analyses are returned and evaluated. Rinseate management is described in Section 4.6 of the closure plan.

SAMPLING AND ANALYTICAL QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance (QA)/Quality Control (QC) for the project will be established to ensure that high-quality data are generated from the sampling activity. There are three basic elements to the QA/QC strategy: accountability, controllability, and traceability.

Accountability will be achieved through detailed sampling and analysis plans.

Controllability will be accomplished in that all phases of sampling will meet field QA/QC requirements as specified in the Data Quality Objectives for Remedial Response Activities - Development Process (EPA, 1987) (DQO Guidance Document). The field sampling methodology and documentation requirements were described previously. In addition, the following QC samples will be taken.

Duplicate: Duplicates are two separate samples taken from the same sampling point in the field. The samples are placed in separate containers and analyzed separately to provide a measure of total error (sampling and analytical). Duplicate samples will be analyzed according to the same sampling scheme as the original sample.

*Teflon is a trademark of E.I. duPont de Nemours & Company.

Equipment Blank: Equipment blanks are a solution or clean sand that is as free of analyte as possible and is transported to the site, opened in the field and poured over or through the sample collection device, collected in a sample container, and returned to the laboratory. It serves as a check of sampling device cleanliness.

Trip Blank: Trip blanks are an organic or aqueous solution that is as free of analyte as possible and is transported to the sampling site and returned to the laboratory without opening. This serves as a check on sample contamination originating from sample transport, shipping, and site condition.

The QC samples will be taken once a day or every twenty samples, whichever is greater.

Samples taken from 2727-S will be analyzed per SW-846 protocol (EPA 1986). Analytical services for hazardous waste constituents in environmental media and other laboratory work aspects are covered by procedures specific to the laboratory and by quality assurance and quality control manuals. Laboratory procedures will follow EPA approved methods. QA/QC procedures and precision and accuracy (bias) values relevant to the data set will be provided and reviewed for adequacy by WHC. For the initial phase of sampling, precision and accuracy ranges will be used as target levels. The target levels will become more defined as more information becomes available.

Traceability involves the documentation necessary to reconstruct the completed sampling program through an independent review of project records.

Field documentation requirements for 2727-S sampling will be fulfilled by the completion of a field logbook, sample labels, chain-of-custody forms, and sample analysis request forms. The Field Team Leader/Cognizant Engineer will maintain an official logbook during the characterization effort, per EII 1.5, "Field Logbooks" (WHC 1989a). The book should be bound, with consecutively numbered pages. All information pertinent to the sampling must be recorded in the logbook in a legible fashion, with indelible ink.

Sample labels should be attached to each sample to prevent misidentification. They may be stick-on paper labels or tags and should be affixed to the proper sample containers prior to, or at the time of, collection. All information should be filled out at the time of collection. Nonsmearable ink should be used. Each label should contain the following information:

- Site contractor
- Collector's name
- Date and time of collection
- Sample number

Chain-of-custody documentation traces possession and handling. All samples obtained during the course of this investigation shall be controlled from the point of origin through the analytical process in compliance with EII 5.1, "Chain of Custody" (WHC 1989a). Custody includes situations where the sample is:

- In persons physical possession
- In view of person
- Secured by individual so tampering is impossible
- Placed in an area restricted to authorized personnel only.

Standard chain-of-custody procedures will be followed keyed to the standard label information that will be on each sample jar.

The sample analysis request form accompanies the samples to the laboratory and designates the analyses to be performed on each sample. It also provides a check to ensure that all samples have been received and that correlation between sample analysis and sample number is finalized and complete. A reminder will be provided with sample analysis requests to assure that the analytical laboratory recognizes critical holding time deadlines. An example of the sample analysis request form is provided in WHC-CM-7-7 (WHC 1989).

In addition, all modifications to the sampling procedures will be done in accordance with EII 1.4, "Deviation from Environmental Investigation Instruction" (WHC 1989).

These QA records and files will be kept at the 2750-E Building in the 200 E Area of the Hanford Site.

A QA/QC coordinator will review all data generated during closure of the 2727-S NRDWS facility. This coordinator will be familiar with the closure plan and its implementation. All the documentation will be maintained by the coordinator. The documentation will include closure plan approval, sampling records, chain-of-custody forms, laboratory analyses, contractor records, manifests, certification reports and statements, meeting notes, etc. The coordinator will ensure that all information associated with closure of the facility has been completed and submitted.

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APPENDIX G

ANALYTICAL PLAN

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APPENDIX G

ANALYTICAL PLAN

The analytical plan presents the analytical parameters, methods, minimum detection limits, and specific analytical procedures. The analysis plan is based on knowledge of the contents of the 2727-S NRDWS facility. Appendix E provides that inventory.

The plan was developed to determine the presence of constituents residing on the list of 129 priority pollutants and the WAC 173-303-9905, Dangerous Waste Constituent List (Ecology 1989). These constituents represent a potential threat to human health or the environment nationally. Whenever they are identified they are added to a growing data base of knowledge regarding their hazards.

As evidenced in Appendix E, a variety of wastes are listed that would be difficult or impossible to analyze. The list of constituents presented in this plan in Tables G-1 and G-2 are, however, readily identifiable and quantifiable by an experienced laboratory. They also encompass the wastes presented in the inventory. All samples, building, concrete and soil, will be analyzed for the constituents listed.

Methods of analysis are presented in Table G-3. Detection limits will be those specified by each method. The detection limits presented are goals, while the final limits will be presented in the analytical certification reports.

Table G-1. Appendix VIII Dangerous Waste Constituents.

Acetophenone
Coal tar
Crotonaldehyde
2,4 - dichlorophenoxyacetic acid
Dioxane
Formaldehyde
Formic acid
Hydrazine
Hydrofluoric acid
Lead acetate
Methyl ethyl ketone
Nitrobenzene
Phenylmercury acetate
Potassium cyanide
Selenium oxide
Thiourea

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Table G-2. Priority Pollutants.

Metals	Base/neutral extractibles	Acid extractibles
Antimony		
Arsenic	Acenaphthene	2,4,6-Trichlorophenol
Beryllium	Benzidine	P-Chloro-M-Cresol
Cadmium	1,2,4-Trichlorobenzene	2-Chlorophenol
Chromium	Hexachlorobenzene	2,4-Dichlorophenol
Copper	Hexachloroethane	2,4-Dimethylphenol
Lead	Bis (2-Chloroethyl) Ether	2-Nitrophenol
Mercury	2-Chloronaphthalene	4-Nitrophenol
Nickel	1,2-Dichlorobenzene	2,4-Dinitrophenol
Selenium	1,3-Dichlorobenzene	4,6-Dinitro-o-cresol
Silver	1,4-Dichlorobenzene	Pentachlorophenol
Thallium	3,3-Dichlorobenzidine	Phenol
Zinc	2,4-Dinitrotoluene	
	2,6-Dinitrotoluene	**Volatile organics**
Miscellaneous	1,2-Diphenylhydrazine	
	Fluoranthene	Acrolein
Cyanide	4-Chlorophenyl Phenyl Ether	Acrylonitrile
Phenol (total)	4-Bromophenyl Phenyl Ether	Benzene
	Bis (2-Chloroisopropyl) Ether	Carbon tetrachloride
Pesticides	Bis (2-Chloroethoxy) Methane	Chlorobenzene
	Hexachlorobutadiene	1,2-Dichloroethane
Aldrin	Hexachlorocyclopentadiene	1,1,1-Trichloroethane
Chlordane (alpha and	Isophorone	1,1-Dichloroethane
Dieldrin gamma)	Naphthalene	1,1,2-Trichloroethane
4,4'DDT	Nitrobenzene	1,1,2,2-Tetrachloroethane
4,4'DDE	N-Nitrosodimethylamine	Chloroethane
4,4'DDD	N-Nitrosodi-N-Propylamine	Chloroform
Alpha Endosulfan	N-Nitrosodiphenylamine	1,1-Dichloroethylene
Beta Endolsulfan	Bis (2-Ethylhexyl) Phthalate	1,2-trans-Dichloroethylene
Endosulfan Sulfate	N-Butyl Benzyl Phthalate	1,2-Dichloropropane
Endrin	Di-N-Butyl Phthalate	Cis-1,3-Dichloropropene
Endrin Ketone	Di-N-Octyl Phthalate	Trans-1,3-Dichloropropene
Heptachlor	Diethyl Phthalate	Ethylbenzene
Heptachlor Epoxide	Dimethyl Phthalate	Methylene Chloride
Alpha BHC	Benzo (A) Anthracene	Methyl Chloride
Beta BHC	Benzo (B) Fluoranthene	Methyl Bromide
Gamma BHC (Lindane)	Benzo (K) Fluoranthene	Bromoform
Delta BHC	Chrysene	Bromodichloromethane
Toxaphene	Acenaphthylene	Dibromochloromethane
PCB 1016	Anthracene	Tetrachloroethylene
PCB 1221	Benzo (GHI) Perylene	Toluene
PCB 1232	Fluorene	Trichloroethylene
PCB 1242	Phenanthrene	Vinyl Chloride
PCB 1248	1,2,5,6-Dibenzanthracene	Bis (Chloromethyl) Ether
PCB 1254	Indeno (1,2,3-CO) Pypene	2-Chloroethyl Vinyl Ether
PCB 1260	Pyrene	
Methoxychlor	TCDD	

Source: Clean Water Act of 1977 (PL 95-217)

Table G-3. Methods of Analysis.

Parameter	Method	Reference[a]
SOLID SAMPLES		
Acid digestion procedure	3010/3020	2
Antimony	6010	2
Arsenic	7061	2
Beryllium	6010	2
Cadmium	6010	2
Chromium	6010	2
Copper	6010	2
Lead	7421	2
Mercury	7471	2
Nickel	6010	2
Selenium	7741	2
Silver	6010	2
Thallium	7841	2
Zinc	6010	2
Cyanide	335.2	1
Volatile organic compounds	8240	2
Extractable organic compounds	8270	2
LIQUID SAMPLES		
Trace metals	See above	--
Cyanide	335.2	1
Volatile organic compounds	624	3
Extractible organic compounds	625	3
Pesticides	608	3

[a]References

1. Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, Washington, D.C., 1979.

2. Test Methods for Evaluating Solid Waste, SW-846, U.S. Environmental Protection Agency, Washington, D.C., 1982, Revised 1985, 1986.

3. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, U.S. Environmental Protection Agency, Washington, D.C., 1982.

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APPENDIX H

GENERATION OF RANDOM SAMPLING LOCATIONS

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APPENDIX H

GENERATION OF RANDOM SAMPLING LOCATIONS

Random sampling locations were selected for several areas at the 2727-S facility. A Hart Crowser, Inc. program was used to generate the sampling locations using a uniform (0,1) probability distribution function.

To determine the random sampling locations, a cartesian coordinate system was fit to each sampling area. The X-coordinate ran across the page left to right and the Y-coordinate ran vertically up the page. The origin locations for these grids are shown on Figures 7, 9, 10, and 11.

Because it was possible to generate duplicate locations or locations beyond the sampling area boundaries, criteria were set to select the locations from the program output. These criteria are the following.

- Select the random sampling locations sequentially down the list from the first selection.
- Discard duplicate sampling locations and sampling locations that fall outside the sampling area.
- Stop selecting locations when the desired number of samples are obtained.

Computer output for the random sampling locations are provided on Tables H-1 through H-7.

9 0 1 1 7 8 4 0 8 4 9

Table H-1. Random Grid Coordinates for the Concrete Floor (Figure 7).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (0, 3)
(YMIN, YMAX) = (0, 2)

Quadrant #	X-Coordinate	Y-Coordinate
1	6	0
2	4	1
3	5	1
4	6	5

In this case, Lotus was used to develop the random numbers instead of the Hart Crowser, Inc. program. Description of the coordinate system and sample point selection criteria are the same as for the Hart Crowser program.

*Lotus is a trademark of Lotus Development Corporation.

Table H-2. Random Grid Coordinates for the Concrete Pad (Figure 9).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 8.00)
(YMIN, YMAX) = (.00, 10.00)
The initial random seed value = 2,157.00
The total number of points generated = 30

Selection	X-Coordinate	Y-Coordinate
1	6	0
2	4	1
3	5	1
4	6	5
5	4	1
6	7	3
7	3	7
8	8	6
9	6	9
10	5	1
11	8	9
12	5	5
13	1	0
14	6	8
15	2	9
16	4	4
17	6	6
18	1	8
19	1	2
20	5	8
21	3	2
22	6	4
23	4	2
24	6	10
25	7	1
26	1	1
27	1	1
28	6	4
29	1	6
30	4	2

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Table H-3. Random Grid Coordinates for Area 1 (Figure 10).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 12.00)
(YMIN, YMAX) = (.00, 2.00)
The initial random seed value = 12,490.00
The total number of points generated = 20

Selection	X-Coordinate	Y-Coordinate
1	9	0
2	11	1
3	2	0
4	2	0
5	5	1
6	6	2
7	9	1
8	11	1
9	8	1
10	7	2
11	12	2
12	11	0
13	9	1
14	7	1
15	4	2
16	6	1
17	2	2
18	10	2
19	2	1
20	0	1

9 0 1 1 7 8 4 0 8 5 2

Table H-4. Random Grid Coordinates for Area 2 (Figure 10).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 3.00)
(YMIN, YMAX) = (.00, 10.00)
The initial random seed value = 245.00
The total number of points generated = 20

Selection	X-Coordinate	Y-Coordinate
1	1	0
2	1	9
3	2	3
4	1	1
5	3	8
6	0	6
7	1	8
8	3	1
9	1	6
10	0	9
11	2	9
12	2	1
13	3	6
14	3	2
15	1	10
16	0	2
17	0	4
18	2	0
19	0	5
20	1	10

Table H-5. Random Grid Coordinates for Area 3 (Figure 10).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 5.00)
(YMIN, YMAX) = (.00, 10.00)
The initial random seed value = 21,679.00
The total number of points generated = 20

Selection	X-Coordinate	Y-Coordinate
1	2	3
2	4	4
3	0	6
4	4	3
5	1	1
6	4	7
7	0	8
8	1	1
9	3	10
10	0	5
11	1	3
12	1	1
13	5	4
14	1	3
15	3	4
16	3	8
17	2	6
18	2	4
19	5	5
20	1	4

9 0 1 1 7 8 4 0 8 5 4

Table H-6. Random Grid Coordinates for Area 4. (Figure 10).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 12.00)
(YMIN, YMAX) = (.00, 2.00)
The initial random seed value = 5,491.00
The total number of points generated = 20

Selection	X-Coordinate	Y-Coordinate
1	4	0
2	7	0
3	9	1
4	3	0
5	1	2
6	10	1
7	3	2
8	3	1
9	0	1
10	6	0
11	9	2
12	1	1
13	10	0
14	7	2
15	2	1
16	9	2
17	7	2
18	9	0
19	5	0
20	1	1

Table H-7. Random Grid Coordinates for the Buffer Area (Figure 11).

Random X and Y pairs were generated using a random number generator that follows a uniform (0,1) distribution.

The grid coordinates are as follows:
(XMIN, XMAX) = (.00, 7.00)
(YMIN, YMAX) = (.00, 13.00)
The initial random seed value = 12,360.00
The total number of points generated = 30

Selection	X-Coordinate	Y-Coordinate
1	6	2
2	6	13
3	1	0
4	6	8
5	2	11
6	3	1
7	7	5
8	5	6
9	4	8
10	6	9
11	0	10
12	4	3
13	5	4
14	4	8
15	6	1
16	7	10
17	2	12
18	7	9
19	5	2
20	1	12
21	4	4
22	1	12
23	1	13
24	3	8
25	0	3
26	6	1
27	2	4
28	1	9
29	7	9
30	1	1

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9 0 1 1 7 8 4 0 8 5 7

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Subject

RESPONSE NOD FOR 2727-S NRDWSF (S-2-3) INTERIM STATUS CLOSURE PLAN

Internal Distribution

Approval	Date	Name	Location	w/att
		Correspondence Control		X
		M. R. Adams	H4-55	
		J. D. Bauer	B3-15	X
		R. J. Bliss	B3-04	
		L. C. Brown	H4-51	
		H. F. Daugherty	R2-53	
		W. T. Dixon	B2-35	
		C. J. Geier	H4-57	
		K. L. Hoewing	B3-06	
		W. L. Johnson	H4-55	
		R. E. Lerch (Assignee)	B2-35	
		J. E. Nolan	B3-01	
		F. A. Ruck III	H4-57	X
		D. E. Simpson	B3-51	
		D. R. Speer	R2-77	
		R. R. Thompson	R1-10	
		K. A. Woodworth	H4-55	
		EDMC	H4-22	X
		FAR/LB	H4-57	X

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