

Hanford Patrol Academy Demolition Sites Closure Plan

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United States
Department of Energy

P.O. Box 550
Richland, Washington 99352

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<u>No.</u>	<u>Page/Line No.</u>	<u>Comment/Response</u>	<u>Concurrence</u>
1.		<p>Deficiency: The level of detail in this closure plan is inadequate.</p> <p>Requirement: Provide additional information regarding the following topics:</p> <p>(1) The determination of the boundary locations.</p> <p>RL/WHC Response 1: Since no written records of the location of Closure Area No. 1 were kept, nor were permanent markers placed at the time of detonations. The location of Closure Area No. 1 was established by personnel that were present during the detonation events, as stated on page 2-2, lines 46-50. Closure Area No. 2 is marked by a depression in the land surface. All treatment activities at this area occurred in the depression. The location of Closure Area No. 2 has not changed position as stated in line 50. Figures F2-4 and F2-5 show the relative locations of the two closure areas. Page 6-1, line 20-22, states that the final closure area boundaries will be confirmed by the results of regulatory acceptable soil sampling and analysis.</p> <p>Ecology Response 1: Concur with the adjustment of unit boundary based on sampling and analysis data for Area No. 2. Because of no hard evidences on the boundary of Area No. 1, and the regradation, initial sampling outside the so-called boundary has to be done for Area No. 1 (see also NOD No. 10 response).</p> <p>Ecology/RL/WHC Resolution: At the February 12, 1994, Data Quality Objectives (DQO) meeting, RL/WHC explained that the location of Closure Area No. 1 was the northwestern most corner of what is called Closure Area no 1. The other three quadrants make up the area where any unreacted residues would have been distributed as a result of grading. Ecology accepted this explanation, therefore</p>	

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		<p>the boundary area was not enlarged. All parties agreed to the preliminary sampling locations and analytical methods for the HPADS sampling and analysis plan (SAP). Ecology approved the final SAP on August 15, 1994.</p>	
		<p>(2) When Comprehensive Environmental Response, Compensation and Recovery Act (CERCLA) cleanup is proposed to comply with Resource Conservation and Recovery Act (RCRA) regulations, explain in detail what will be done so that we may evaluate whether the cleanup will in fact meet RCRA requirements.</p>	
		<p>RL/WHC Response 1: Section 6.3 explains RCRA/CERCLA integration activities during closure.</p>	
		<p><u>Ecology Response 1:</u> Section 6.3 didn't adequately address integration. First, Section 6.3 will be modified (see NOD No. 26 response). Second, Section 6.3, line 22-24, indicated that "If contamination levels for all constituents of concern listed in Chapter 7.0, Table 7-1, are below the action level, the HPADS will be closed." Obviously, Table 7-2 was missed in the text. The problem is that Table 7-1 did not include any contaminants from the detonation events before 1984. The argument was that there were no records kept for those events. If this is true, then, a broader range of contaminants should be sampled and tested to assure potential contaminations are not missed. Modify text to incorporate Appendix IX of 40 CFR Part 264. Finally, to make sure that nothing will be neglected, list explicitly the contaminants regulated under RCRA, and those under CERCLA.</p>	
		<p><u>Ecology/RL/WHC Resolution:</u> Subsequent to the DQO negotiations, it was determined that the HPADS are not within the boundaries of a CERCLA operable unit. Section 6.3 will be revised to explain that</p>	

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if any contaminants not associated with the operation of the TSD unit are detected, the HPADS will be evaluated as a new SWMU and remediated as a RPP activity.

During the DQO process, all parties agreed that no records of the pre-1984 events were kept. RL/WHC explained that while no records exist, the inventory would not have been significantly different from the post-1984 events (e.g., only explosive, shock sensitive, or highly reactive chemical products were treated at the HPADS Closure Area No. 1). All parties agreed to a the analytical test methods, constituents of concern, and sample locations. The finalized SAP was issued on August 15, 1994.

(3) Action levels for constituents of concern.

RL/WHC Response 1: Action levels will be prepared for inclusion in Section 6.0 of Revision 1. Proposed action levels will be health-based values.

Ecology Response 1: Although the term "action levels" is defined within the closure plan as "concentrations of analytes of interest that prompt an action . . .", the term is not defined by WAC 173-303. As the closure plan addresses a RCRA unit and to avoid confusion on this subject, delete the "action level" term. It should be noted that a definition for "cleanup level" is provided by WAC 173-340-200 which may be utilized by reference of proposed WAC 173-330-610 (scheduled to promulgated in December 1993 to amend WAC 173-303-610 to include WAC 173-340-700 through 760 except 745).

Ecology/RL/WHC Resolution: Through the DQO process, all parties agreed that the definition of 'action levels' is levels above the

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		<p>Hanford Site soil background levels identified in <i>Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes DOE/RL-92-24, Rev. 1, U. S. Department of Energy, Richland Operations Office, Richland, Washington and Model Toxic Control Act (MTCA) (WAC 173-303) Method B residential levels.</i></p>	
2.		<p>Deficiency: Throughout the closure plan, there are references to using only a mobile laboratory for sampling and analysis. It is not stated that this is an EPA accredited lab or that any secondary or follow-up analysis will be conducted at an accredited stationary lab. A mobile lab cannot meet SW-846 requirements. A mobile laboratory is a good tool for a first evaluation to determine where contamination is located. For closure, you must follow the sampling and analysis requirements of WAC 173-303-110.</p> <p>Requirement: Revise the plan to require sampling and analysis to meet WAC 173-303-110. See also comments 40, 51, 60, and 61.</p> <p>RL/WHC Response 1: Revised text will propose to perform initial (investigative) sampling with analytical support to be provided by the on-site Environmental Analytical Laboratory (EAL), previously referred to as the "mobile laboratory." The EAL will be providing analytical Level II support, as opposed to Level III capabilities that were planned for the laboratory at the time Revision 0 of the closure plan was prepared. Tables 7-1, 7-2, 7A-1 and 7A-2 identify analytes of interest for initial sampling.</p> <p>A separate round of confirmatory sampling will be proposed in Revision 1 of the plan. Confirmatory samples will be analyzed by an off-site, Ecology-acceptable analytical Level III laboratory. Subsequent to initial sampling and analysis and discussion of the results with Ecology, separate data quality objectives and analyte</p>	

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		<p>tables for confirmatory sampling will be prepared and documented as addenda to the closure plan.</p> <p>Likewise, if soil removal is undertaken and verification sampling is to be carried out in support of soil removal, samples would be analyzed by an off-site analytical Level III laboratory. Separate data quality objectives and analyte tables would be developed for incorporation as addenda to the plan in that event.</p> <p><u>Ecology Response 1:</u> Concur with addition of this information in text. However, there are several more requirements needed to be satisfied: 1) Investigative sampling has to be done by level III laboratory. The EAL can only be used to support this sampling event, such as to determine the boundary of the contamination, to find the spot with the high concentration of contaminations, and so on. If initial samples at level II indicate a "no action," confirmatory level III analyses will have to be done to verify this alternative; 2) for every fifth sample, a split has to be taken and to sent off for level III analyses. This will help in determining validity of level II analyses as well as give some ICP/AA metals analyses; and 3) the test results should be not less than 10% CLP deliverable SW-846.</p> <p><u>Ecology/RL/WHC Resolution:</u> The mobile laboratory will not be used for these clean closure activities. All references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples. Offsite laboratory should follow the negotiated laboratory schedule listed in the <i>Hanford Federal Facility and Consent Order Tri-Party Agreement</i>.</p>	

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3.		<p>Deficiency: The closure plan cites many internal Westinghouse procedural manuals. It is not clear if these documents fulfill the procedures mandated by the regulations.</p> <p>Requirement: Revise the plan or provide copies of the procedures referenced.</p> <p>RL/WHC Response 1: Copies of the WHC control manuals cited in closure plans were furnished to Ecology's library in Lacey. The Ecology office in Kennewick should obtain as much information as possible from the Ecology Lacey office to support the review of RCRA closure plans.</p> <p><u>Ecology Response 1:</u> Concur.</p>	
4.	iii/25	<p>Deficiency: "idenytification" is a typographic error.</p> <p>Requirement: Correct the plan.</p> <p>RL/WHC Response 1: Typographical error will be corrected.</p> <p><u>Ecology Response 1:</u> Concur with the correction.</p>	
5.	1-1/12-13	<p>Deficiency: States that these demolition events were "a form of thermal treatment for <u>spent</u> or <u>abandoned</u> chemical waste." This is inconsistent with the waste description provided in Chapter 3, Process Information. On page 3-1, line 10, the waste is described as "discarded explosive."</p> <p>Requirement: Revise the text to resolve the contradiction.</p>	

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		<p>RL/WHC Response 1: Spent or abandoned wastes were never treated at HPADS. The text will be revised to state that only "discarded" explosive chemicals beyond their shelf life or which were no longer needed were treated at HPADS. With this revision the text will be consistent with the description on page 3-1.</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p>	
6.	1-1/21	<p>Deficiency: It is stated the closure plan will present the history of the waste treated, but the plan does not present adequate information to determine if the waste has been properly designated.</p> <p>Requirement: Provide sufficient information to designate the waste, including information regarding the source of the waste (i.e., process derived from), and a distinction between wastes disposed in commercial form, and those which were spent material.</p> <p>RL/WHC Response 1: Waste characterization per 40 CFR 261 and WAC 173-303 is summarized in Table 4-2 and in the Part A permit application. Table 4-2 was incorporated to show that the wastes treated at HPADS were amenable to thermal decomposition. As stated in the RL/WHC Response No. 1 to comment No. 5 only chemicals that were no longer needed or that were beyond their storage life were treated at HPADS.</p> <p>No "spent" materials were treated at HPADS.</p> <p><u>Ecology Response 1:</u> Concur with the explanation that no "spent" materials were treated at HPADS. The statement "only chemicals that were no longer needed or that were beyond their storage life were treated at HPADS." should be explained further, because,</p>	

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		<p>under 40 CFR 265.382, open burning of hazardous waste (except for detonation of waste explosives) is prohibited. According to the federal regulation, "waste explosives include waste which has the potential to detonate and" The term of "amenable to thermal decomposition" used by RL/WHC in the response was not accurate. Thus, elaborate in the text that if the chemicals in Table 4-2 satisfy the requirements.</p> <p>Ecology/RL/WHC Resolution: At the DQO meeting, all parties involved agreed that the chemicals treated at the HPADS were amenable to destruction because of their physical properties. A physical properties table will be added to the revision of Chapter 4.0.</p>	
7.	1-1/38-41	<p>Requirement: Describe how you will determine that contamination is not associated with Hanford Patrol Academy Demolition Sites (HPADS). State if RCRA post-closure care will be performed until CERCLA action takes place.</p> <p>RL\WHC Response 1: P1-1/Ln40 will be revised to read " . . . will be coordinated with CERCLA" Table 4-1 provides a summary of the wastes treated at HPADS. Any contaminants not due to the operation of HPADS, and above action level, will be considered past practice and remediated in coordination with CERCLA activities. Post closure care, if needed, will be performed as explained in Section 8.2.</p> <p><u>Ecology Response 1:</u> See NOD No. 1 (2) response.</p> <p>Ecology/RL/WHC Resolution: See Ecology/RL/WHC Resolution NOD No 1(2).</p>	

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8.	2-2/1-51	<p>Deficiency: The description of the demolition site does not provide adequate detail to allow potential exposure pathways to be evaluated.</p> <p>Requirement: Provide description of depth to water table, soil characteristics, and any containment used during the detonation. Incorporate any available Hanford meteorological information for the times of the events. Weather conditions may have influenced the dispersion of contaminants.</p> <p>RL/WHC Response 1: Information on groundwater is provided in Appendix 5A; information on the soil characteristics is located on P2-2/Ln10-14.</p> <p>Any meteorological data that may exist would be from the Hanford Weather Station located 15 miles from HPADS. Due to this distance the weather data will not provide a one-to-one correlation of wind speed/direction at HPADS. Although no meteorological data was kept, HPADS procedures prohibited detonation activities when winds exceeded 35 miles per hour, so it is extremely unlikely that any unreacted residues were carried beyond the sampling perimeter. In the event that unreacted residues are identified beyond the closure boundaries, soil sampling and analysis may require that the closure area boundary be expanded. Note that sampling will confirm the closure boundaries, as stated on page 6-1, lines 20-22.</p> <p><u>Ecology Response 1:</u> A. Initial sampling outside the assumed boundary of Area No. 1 has to be done (see also NOD Nos. 1(1) and 10 responses).</p>	

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		<p>B. 35mph wind speed is not restrictive enough to prevent dispersion. Refer to NOD No. 38 response for the requirements.</p> <p>Ecology/RL/WHC Resolution: All parties agreed to the location and boundaries of both closure areas (Ecology/RL/WHC Resolution NOD No. 1). Meteorological data on for the demolition events is provided in Appendix 3A of Rev. 1.</p>	
9.	2-2/17-20 and 2-2/25-28	<p>Deficiency: "The DOE-RL also has allowed usage of the firing ranges by non-Hanford personnel . . . but ended that practice in 1982." "Since 1986, . . . the Richland Police department and other personnel have used the range for firearms training." These statements appear to contradict each other.</p> <p>Requirement: Revise the text to resolve the contradiction.</p> <p>RL/WHC Response 1: P2-2/Ln17-20 will be revised to read "During the pre-RCRA operation of HPADS. . . allowed minimally controlled usage"</p> <p>Ecology Response 1: Response is not clear. Needs to be clarified by RL/WHC.</p> <p>Ecology/RL/WHC Resolution: Text will be revised to read, " The DOE-RL allowed minimally controlled usage of the firing ranges by non-Hanford personnel (e.g., the city of Richland Police Department and the Richland Rod and Gun Club), but ended that practice in 1982. After 1982, the DOE-RL began supervising usage of the firing ranges by non-Hanford personnel."</p>	
10.	2-2/46-50	<p>Deficiency: The plan states that the firing range containing Closure Area No. 1 has been repeatedly graded. Because of the</p>	

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		<p>grading, the entire firing range should be sampled to identify soil that may have been contaminated by the detonations.</p> <p>Requirement: Revise the plan to increase the area to be sampled.</p> <p>RL/WHC Response 1: Expansion of the detonation area due to soil dispersion during grading may have occurred but would not be significant when compared to the size of the closure area boundaries. These boundaries were established by personnel that were present during the detonation events and will be confirmed by the sample results.</p> <p>Ecology Response 1: Nothing outside the boundary will be confirmed without sampling outside the boundary (see requirement of the NOD No. 1 (1) response). Since regrading Area No. 1 could very possibly redistribute the surface layer of the contaminated soil in a non-negligible extent, in addition, there were no hard evidences other than personnel memory to locate the actual position for Area No. 1, initial sampling has to be done outside the assumed boundary of Area No. 1.</p> <p>Ecology/RL/WHC Resolution: See Ecology/RL/WHC Resolution response to NOD No. 1(1).</p>	
11.	2-3/17-22	<p>Requirement: Determine if this paragraph is still accurate with the recent security downgrades.</p> <p>RL/WHC Response 1: Section 2.4 will be revised, lines 8 to 22 will be deleted, and the remaining sentences will be incorporated into one paragraph.</p> <p>Ecology Response 1: Concur with the revisions.</p>	

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12.	3-1/10	<p>Deficiency: This description does not agree with Page 1-1, lines 12-13, which state that these demolition events were "a form of thermal treatment for <u>spent</u> or <u>abandoned</u> chemical waste."</p> <p>Requirement: Revise the text to resolve the contradiction and define discarded explosive chemicals more clearly.</p> <p>RL/WHC Response 1: No spent chemicals were treated at HPADS. The word 'spent' will be removed from page 1-1/ lines 12 to 13 for consistency with the Chapter 3.0 usage of 'discarded chemicals'.</p> <p><u>Ecology Response 1:</u> The discarded chemicals have to be waste explosives, because, under 40 CFR 265.382, open burning of hazardous waste (except for detonation of waste explosives) is prohibited (see also NOD No. 6).</p> <p>Ecology/RL/WHC Resolution: See Ecology/RL/WHC Resolution to NOD No. 6.</p>	
13.	3-1/14-16	<p>Deficiency: This paragraph implies that the detonations took place at multiple locations. Thus, the boundary of Closure Area 1 should be enlarged.</p> <p>Requirement: Revise the plan as necessary. See also comment 10.</p> <p>RL/WHC Response 1: Page 2-2/Ln46-47 states that sampling will occur on both sides of the boundary wall to "confirm" the boundary. Refer to NOD Nos. 1A and 37 comment responses.</p> <p><u>Ecology Response 1:</u> See NOD Nos. 1 (1) and 37 responses.</p> <p>Ecology/RL/WHC Resolution: See resolution to NOD No. 1(1) and 37.</p>	

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14.	3-1/27-32	<p>Requirement: The explosives used to initiate the detonation (and any regulated products potentially generated from the detonation) must be incorporated into the sampling and analysis plan.</p> <p>RL/WHC Response 1: WAC 173-303-610 requires that dangerous waste and dangerous waste constituents managed at the facility be addressed at closure. The HPADS Closure Areas are completely within the Hanford Patrol Academy Firing Ranges; which since the 1950s, and until Hanford is closed, serve as the firearms training area for the Hanford Security Forces, and with RL permission other police agencies. Therefore, the lead within the HPADS Closure Areas will be handled in coordination with the final Hanford Patrol Academy remedial action. RL/WHC believe that any lead bullet fragments and residues from explosives used to initiate the detonations are not distinguishable from the firearm's training bullets and other materials that were used at the firing ranges.</p> <p><u>Ecology Response 1:</u> List the types of explosives used in the detonations. If the explosives are the same as those used in the firearm's training, the responses will be considered enough. Otherwise, please answer the question.</p> <p>Ecology/RL/WHC Resolution: The DQO participants agreed that EPA Method 8330, Explosives Residues by HPLC, would be an indicator of elevated levels of unreacted detonation cord residues. EPA Method 8330 will be performed per the SAP.</p>	
15.	3-2/30-38	<p>Deficiency: This paragraph describes a demolition failure and a grass fire ignited by a detonation, but does not state when they occurred.</p>	

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		<p>Requirement: Revise the plan to answer the following questions: When did the incidents described in this paragraph take place? Was it before or after 1984? After other detonations, how were the remains of the containers managed? Were the containers, or pieces of containers, removed from the site? If so, how were they managed?</p> <p>RL/WHC Response 1: The incomplete detonation occurred on March 12, 1987. All containers except one metal can of ether (one pint) were destroyed. The ethyl ether container ruptured from the explosion and was burned. The following morning the contaminated soil was placed in 30 gallon drums. The drums were later shipped to an off-site treatment storage and disposal facility.</p> <p>The grass fire occurred on October 30, 1985. At that time, dry nuisance grasses were surrounding the detonation pit. This information will be incorporated in the closure plan.</p> <p><u>Ecology Response 1:</u> Wind conditions may have influenced the incidents. Provide meteorological data.</p> <p>Ecology/WHC/RL Resolution: Biased sample locations were agreed to during the DQO negotiations and are documented in the SAP. Meteorological data will be provided in the next revision.</p>	
16.	4-1/10-11	<p>Requirement: Provide the best estimate of the amount of material detonated before 1984. Clearly state the limitations of the data.</p> <p>RL/WHC Response 1: Prior to 1984 no accurate records of the detonation events were kept.</p> <p><u>Ecology Response 1:</u> See NOD Nos. 1 (2) and 37 responses.</p>	

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		<p>Ecology/RL/WHC Resolution: During the DQO negotiations, all parties agreed that no estimates of the amount of material detonated could be quantified, and that the physical properties of the pre-1984 inventory should not be significantly different from the post-1984 inventory (e.g., only explosive, highly reactive shock sensitive materials were treated in what is now Closure Area No. 1).</p>	
17.	4-1/31-35	<p>Deficiency: Table 4-3, referred to here, is not included in the closure plan.</p> <p>Requirement: Revise the plan by including the table or removing the reference.</p> <p>RL/WHC Response 1: See response to 1C.</p> <p><u>Ecology Response 1:</u> Refer to NOD No. 1(3) response.</p> <p>Ecology/RL/WHC Resolution: Table 4-3, Physical Properties of the Chemicals Treated at the HPADS, will be included in Rev. 1.</p>	
18.	6-1/20-22	<p>Deficiency: "The final closure area boundaries will be confirmed by the results of regulatory acceptable soil sampling and analyses." According to Page 7-6, lines 33-35, no samples are to be taken outside the boundaries of Closure Area 1. How will the boundaries be confirmed without taking samples outside the boundary?</p> <p>Requirement: The boundary must be determined by sampling and analyzing for indicator parameters. See comment 37.</p> <p>RL/WHC Response 1: Refer to NOD Nos. 1A and 37 comment responses.</p>	

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		<p>Deficiency: The term "regulatory acceptable" is open to interpretation.</p> <p>Requirement: Please replace with more specific wording.</p> <p>RL/WHC Response 1: This section will be revised to read, ". . . by the results of a pre-approved sampling and analysis plan."</p> <p>Ecology Response 1: See NOD Nos. 1 (1) and 37 responses for the first part of the question. Concur with the correction to the second part of the question.</p> <p>Ecology/RL/WHC Resolution: The boundary locations were agreed on at the DQO negotiations and are documented in the SAP.</p>	
19.	6-1/33-37	<p>Requirement: The closure plan should state that the metal posts marking Closure Area 1 are removed for safety when the firing range is in use.</p> <p>RL/WHC Response 1: The metal posts were removed/replaced as a procedural step during firing events. When the posts are removed their location is marked with wood stakes placed in the ground. Upon completion of firing activities, the stakes are removed and the metal posts are driven by hand into the ground. These steps are performed as part of procedure and does not affect on the closure plan or boundaries.</p> <p>Ecology Response 1: The demolition sites may have been contaminated already by hazardous wastes. Therefore, non TSD personnel should not have access at any time, including during the firing activities.</p>	

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		<p>Ecology/RL/WHC Resolution: At the DQO negotiations, all parties agreed that any unreacted residues would have remained within the boundaries of Closure Area No. 1. All parties also agreed that the Hanford Patrol Academy would remain in operation until it was no longer needed for training purposes.</p>	
20.	6-1/38-39	<p>Deficiency: The maximum soil depth of three feet for sampling is insufficient. Undetonated materials can be driven to considerable depths.</p> <p>Requirement: The depth should be determined by sampling and analyzing for indicator parameters.</p> <p>RL/WHC Response 1: Downward continuity of contamination will be evaluated as the sampling results indicate; i.e., contamination will be defined as necessary in all three primary directions. Refer to NOD No. 38 comment response.</p> <p><u>Ecology Response 1:</u> See NOD No. 38 response.</p> <p>Ecology/RL/WHC Resolution: Through the DQO negotiations, all parties agreed that samples would be collected in two distinct depth strata, at 0 to 6 inches and 12 to 18 inches below the surface, as is documented in the SAP.</p>	
21.	6-1/42	<p>Deficiency: ". . . a series of field screening surveys might be performed." This is not sufficient detail.</p> <p>Requirement: Explain how the decision will be made to perform field screening surveys, when the decision will be made, and how the screening methods will be chosen. Also provide the methods</p>	

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		<p>that will be used, the capabilities of the instruments to be used, and Data Quality Objectives.</p> <p>RL/WHC Response 1: Field screening methods may be applied in supplemental sampling to determine the extent of soil contamination. The need for supplemental sampling will be evaluated based on the results of initial sampling (described in Section 7.2). The decision to do field screening will not be made until initial sampling results have been compiled and reviewed with Ecology. The utility of various field screening instruments and methods will be considered based on their capabilities to identify specific contaminants of concern at appropriate detection levels (see also NOD No. 48 comment response). Proposed disposition for this comment is to delete the fifth paragraph on page 6-1, from line 41 to line 44.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: All parties at the DQO negotiations agreed that field screening will not be performed and that the samples will be analyzed at an offsite EPA-approved level III laboratory.</p>	
22.	6-2/4-5	<p>Deficiency: The plan states that background will be Site-wide background threshold values as defined in the <i>Hanford Site Soil Background</i> (DOE/RL 1992d). At present, this study is not complete and Ecology has not yet received final data packages for constituents of concern.</p> <p>Requirement: Ecology must review and approve the <i>Hanford Site Soil Background</i> (DOE/RL 1992d) before the values can be implemented for closure.</p>	

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		<p>RL/WHC Response 1: The Hanford Site Soil Background (DOE/RL 1992d) was issued for Ecology review May 14, 1993.</p> <p><u>Ecology Response 1:</u> Ecology did receive The <i>Hanford Site Soil Background</i>. However, the document was considered incomplete. There is still a huge task ahead in order to finish the site-wide background analysis (see detail in the memo from Charles Cline, WA State Department of Ecology, to Steven Wisness, US DOE, dated at May 10, 1993).</p> <p>Requirement: Ecology must review and approve the <i>Hanford Site Soil Background</i> (DOE/RL 1992d) before the values can be implemented for closure.</p> <p>Ecology/RL/WHC Resolution: Ecology/RL/WHC Resolution: Through the DQO process, all parties have agreed to use Hanford Site Soil Background levels as one of the criteria for action levels. Also, the Hanford Soil Background is listed as a closure performance standard in the Hanford Facility RCRA Permit, Section II.K.2.</p>	
23.	6-2/11-12	<p>Deficiency: This paragraph discusses the proposed method to determine cleanup levels. It is said that the health-based levels will be based on equations and exposure assumptions presented in the <i>Hanford Site Baseline Risk Assessment Methodology</i> (DOE/RL 1992B). This is not appropriate.</p> <p>Requirement: Health-based levels, if permitted for closure, are determined from the Model Toxic Control Act (MTCA).</p>	

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		<p>RL/WHC Response 1: HSBRAM is the onsite procedure, approved by Ecology, that implements MTCA. Copies of HSBRAM have been supplied to Ecology.</p> <p><u>Ecology Response 1:</u> HSBRAM is not approved to implement MTCA by Ecology. Instead, only some of the risk assessment requirements of the MTCA Cleanup Regulation was incorporated in HSBRAM by US DOE (see detail in the Memo from US DOE to George Hofer, US EPA, and Roger Stanley, WA Department of Ecology, dated at May 5, 1993).</p> <p><u>Requirement:</u> Health-based levels, if permitted for closure, are determined from the Model Toxic Control Act (MTCA).</p> <p>Ecology/RL/WHC Resolution: Through the DQO process, action levels were defined, and agreed to by all parties, as levels above the Hanford Site soil background levels identified in <i>Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes (DOE-RL 1993)</i> and MTCA (WAC 173-340) Method B levels.</p>	
24.	6-3/25-26	<p><u>Requirement:</u> Strike "and implemented by the <i>Hanford Site Baseline Risk Assessment Methodology</i> (DOE-RL 1992c)." See comment number 23.</p> <p>RL/WHC Response 1: See comment No. 23 response.</p> <p><u>Ecology Response 1:</u> See NOD No. 23 response.</p> <p>Ecology/RL/WHC Resolution: See resolution to NOD No. 23.</p>	

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25.	6-4/26-41	<p>Deficiency: There is no way to determine if contamination is from HPADS activities or other sources, therefore all contamination at the site must be addressed.</p> <p>Requirement: Revise the plan to address all contamination.</p> <p>Note: You may wish to consider remediating the entire site under RCRA rather than deferring to CERCLA since the same waste types are present.</p> <p>RL/WHC Response No. 1: Table 4-1 provides a summary of the dangerous wastes treated at the HPADS. Sample analysis indicating contamination other than the wastes managed at the HPADS will be remediated in coordination with CERCLA activities as explained on page 6-4, lines 34-40.</p> <p>Continuous use of the Hanford Patrol Academy is necessary to maintain overall Hanford site security.</p> <p><u>Ecology Response 1:</u> See NOD No. 1 (2) response.</p> <p>Ecology/RL/WHC Resolution: See NOD No. 1 (2) response.</p>	
26.	6-4/38-40	<p>Deficiency: This sentence should state, "if the soil is contaminated <u>only</u> from sources other than HPADS activities."</p> <p>Requirement: Revise the text.</p> <p>RL/WHC Response 1: The text will be revised with the following deletions: ". . . in addition to HPADS activities . . ." from line 35 and lines 38-40. With these deletions this section states that</p>	

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		contamination from HPADS will be addressed under RCRA, and contamination from other sources will be coordinated with CERCLA.	
		<u>Ecology Response 1:</u> See NOD No. 1 (2) response.	
		Ecology/RL/WHC Resolution: See NOD No. 1 (2) response.	
27.	F6-1	Deficiency: This flowchart shows actions based on whether the contaminants found are RCRA or CERCLA. I understand that CERCLA contaminants expected at the site include those from wastes detonated before 1984. Also, samples are to be analyzed only for RCRA waste constituents. In that case, you cannot identify contaminants as RCRA or CERCLA.	
		Requirement: Revise to agree with revised plan.	
		RL/WHC Response 1: The flowchart will not be revised. If a contaminant from the waste inventory is detected above the action level, it will be addressed by RCRA, regardless of its regulatory status.	
		<u>Ecology Response 1:</u>	
		A. Refer action level to NOD No. 1(3) response.	
		B. RL/WHC Response 1 was not based on the flowchart.	
		C. The definition of CERCLA/RCRA integration in flow chart (F6-1) was vague. Refer to NOD No. 1(2) response.	

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28.	7-1/18-45	<p>Ecology/RL/EPA Resolution: Figure 6-1 will be revised to address RCRA/RPP integration. Refer to NOD 1(3) for resolution on action levels and 1(2) for resolution on RCRA/RPP.</p> <p>Deficiency: The text described possible existence of a canister of napalm B buried in either of the HPADS areas, and proposed a ground-penetrating radar (GPR) survey. The size of the canister is important in setting up the grid for a GPR survey. Nowhere in the text was the size of the object mentioned. A canister of very small size (eg., one or two feet length) would be difficult to detect at a five foot grid interval. Has an electromagnetic induction (EMI) survey been considered? Both GPR and EMI surveys show good results in identifying shallow buried metallic objects.</p> <p>Requirement: Discuss the reasons for choosing a GPR survey in the closure plan.</p> <p>RL/WHC Response 1: The canister is identified in text as containing 5 lb. of napalm B compound.</p> <p>Assuming a unit weight of 50 lbs/ft³, the container could be as small as 1 pt or 1 qt. Theoretically, either GPR or EMI could be used to locate a buried metal container of this size. With EMI, the WHC geophysics staff was pessimistic that a 1-qt container could be clearly distinguished from other objects such as a 50-cal bullet (i.e., there was concern that EMI would produce more false positives). Upon further review of the text, and with the benefit of recent field experience with these survey techniques, the WHC geophysics staff agrees that a smaller (say 1-meter) grid would be more appropriate. Text will be revised to reflect this assessment.</p>	

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		<p><u>Ecology Response 1:</u> Concur with revision.</p> <p>Ecology/RL/WHC Resolution: On September 26, 1994, a preliminary GPR survey was performed. Because of the copious presence of foreign debris (e.g., bullets, spent cartridges, and rocks, and the anomalous radar signatures they generate during the survey), GPR personnel determined that the presence or absence of the canister could not be ascertained. At this time, no future GPR activities are anticipated by RL/WHC. The text will be revised accordingly.</p>	
29.	7-2/1-2	<p>Question: If the mobile laboratory is not available, what will be the effect on the schedule? Will the closure still be completed in 180 days? Note that the mobile laboratory can only be used for indicator sampling to determine areas of contamination. See comment 2.</p> <p>Requirement: The name of the laboratory that will be conducting the analyses must be submitted to Ecology before closure begins.</p> <p>RL/WHC Response 1: If the mobile laboratory is not available to support sampling at the HPADS closure areas, then sample analysis would have to be performed by an offsite contractor laboratory. The following schedule forecast would apply in that event:</p> <ul style="list-style-type: none">- Sampling: 1 week (no change)- Offsite analysis: 12 weeks (9 weeks longer than shown for ML)- Data Evaluation: 12 weeks (no change)	

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30.	7-3/15-17	<p>Offsite analysis would add 9 weeks to the initial (investigative) phase of soil sampling. Because the ML is now offering Analytical Level II services, rather than Level III, an additional round of confirmatory sampling will be required. The breakdown for offsite analysis (listed above) will increase the schedule in Figure 7-3 by 25 weeks. Closure in 180 days is infeasible.</p> <p><u>Ecology Response 1:</u> The increase of 25 weeks is not acceptable according to TPA. In TPA 9.6.2, it is stated that non-rad waste analyses have a maximum turnaround time of 50 days. Also, in TPA 9.6, the maximum validation and transfer times are 21 and 15 days, respectively. Thus, the maximum per Sample Delivery Group (SDG) should be 86 days. Revise the text accordingly.</p> <p><u>Ecology/RL/WHC Resolution:</u> The mobile laboratory will not be used for these clean closure activities. Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples. Offsite laboratories should follow the negotiated laboratory schedule listed in the Tri-Party Agreement.</p> <p><u>Deficiency:</u> Microbial activity in this area is not very efficient. The sentence should read, "Unreacted volatiles and semivolatiles contaminant levels might have been <u>reduced</u> via microbial activity." It is unlikely that they would have been eliminated.</p> <p><u>Requirement:</u> Revise the text.</p> <p><u>RL/WHC Response 1:</u> Text will be revised to read, ". . . reduced via microbial activity and exposure to the desert environment."</p>	

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		<u>Ecology Response 1:</u> Concur with the revision.	
31.	7-3/37-48	<p>Deficiency: This paragraph states, "It is generally acknowledged that detonation and thermal destruction are very efficient processes, and that any dangerous waste constituents that might remain in the soil at either closure area probably would exist at very low concentrations..." A reference should be provided for this statement.</p> <p>Requirement: Revise the text.</p> <p>RL/WHC Response 1: Sentence will be revised to read "It is <u>believed</u> that detonation and thermal destruction are <u>relatively</u> efficient processes, and that any dangerous waste constituents that might remain in the soil at either closure area <u>are likely to</u> exist at very low concentrations, such that detection might be difficult." (Additional clarification to be provided by Ecology as appropriate.)</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p>	
32.	7-3/44-48	<p>Deficiency: Portable field screening instruments are considered level I, not level I and II.</p> <p>Requirement: Revise the text.</p> <p>Response: The text will be revised.</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p>	

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		<p>Ecology/RL/WHC Resolution: Field screening will not be performed. All samples will be analyzed at an offsite level III laboratory per the DQO negotiations.</p>	
33.	7-3/21	<p>Requirement: Define "action levels" for each constituent. The action levels must be approved by Ecology before closure begins. See comment .</p> <p>RL/WHC Response 1: Action levels are defined on page 6-2, line 1-9.</p> <p>Response: Action levels will be provided.</p> <p><u>Ecology Response 1:</u> Refer action level to NOD No. 1 (3) response.</p> <p>Ecology/RL/WHC Resolution: Through the DQO process, all parties agreed that to meet criteria for clean closure of the HPADS, the soil sampling and analytical results must verify that the levels of discarded explosive chemical products derived from the HPADS operations are below action levels. Agreed action levels are defined as levels above the Hanford Site soil background levels identified in <i>Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes</i> and MTCA Method B levels.</p>	
34.	7-5/9-11	<p>Deficiency: Benzoyl Peroxide is not unstable in the presence of moisture; it will explode when in the environment of <1 % water, and it should be mixed in an environment of at least 33% water (Hawleys Condensed Chemical Dictionary, Sax and Lewis, 1987, p. 134).</p> <p>Requirement: Revise the text.</p>	

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		<p>RL/WHC Response 1: Text will be revised to read as follows: "Butyllithium is unstable in the presence of moisture or moist air (e.g., soil moisture originating as dew or precipitation) (Sax and Lewis 1987, p. 188; Aldrich 1986, p. 251). Benzoyl peroxide is unstable under conditions of reduced moisture (i.e., < 1%) (Sax and Lewis 1987, p. 134); soil moisture conditions under 1% are common at the Hanford Site during the summer months of the year."</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p> <p>Ecology/RL/WHC Resolution: This section will be deleted from the next revision of the closure plan because it dealt with using the onsite mobile laboratory. All samples will be analyzed at an offsite level III laboratory per the DQO negotiations.</p>	
35.	7-5/41-42	<p>Deficiency: Nitrate (NO_3^-) is not "environmentally benign" at or above regulatory limits. The decomposition products listed should also be verified.</p> <p>Requirement: Revise the text.</p> <p>RL/WHC Response 1: Accept. Will insert ". . . in trace quantities" at the end of line 43. (Additional clarification to be provided by Ecology as appropriate.)</p> <p><u>Ecology Response 1:</u> Concur with the answer to the first part of the question. Second part of the question remains to be answered.</p> <p>Ecology/RL/WHC Resolution: The SAP documents the agreed on analyses for chemical inventory and degradation products. This section will be deleted from Rev. 1 of the closure plan</p>	

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36.	7-6/26-29	<p>because all samples will be analyzed at an offsite level III laboratory.</p> <p>Requirement: Add a provision to sample any visibly contaminated areas in addition to grid sampling.</p> <p>RL/WHC Response 1: There are no visibly contaminated areas. As discussed in Section 3.0, the sites were inspected immediately after demolition events, and any visibly contaminated areas were cleaned up. Specific instances where cleanups were performed are noted in paragraph 4, page 3-2.</p>	
37.	7-6/33-35	<p><u>Ecology Response 1:</u> Concur. See also NOD No. 15 response.</p> <p>Deficiency: The sample locations given are all within the established boundaries of Closure Area 1. Page 6-1, lines 20-22, states that the boundaries may be adjusted based on the sampling results. How could the boundaries be adjusted if no samples are taken outside the boundaries?</p> <p>Requirement: Samples must be taken outside the expected boundaries to determine the actual location of the boundaries. See also comment 10.</p> <p>RL/WHC Response 1: As indicated in Chapter 4.0 and Table 4-1, a number of small (e.g., 1 pint or 1 quart) containers were detonated at Closure Area No. 1 on one occasion in 1984. The containers were either initiated by rifle fire (i.e., detonated individually) or placed together in a shallow, hand-excavated pit and detonated en masse. The closure area boundaries are believed to be sufficiently large in this case to include any/all potential soil contamination from the 1984 demolition event. The principal</p>	

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		<p>issue is one of identifying any localized residual contamination within the designated closure area. If sample results from any of the locations identified in Figure 7-1 indicate that contaminants (i.e., any of the analytes of interest in Table 7-1) are present at levels approaching proposed action levels, applicable field screening methods would be used to determine the extent of contamination (within or beyond the current boundary).</p> <p><u>Ecology Response 1:</u> A. Refer action level to NOD No. 1(3) response. B. Note: Field screening instruments usually do not have the required detection levels to verify an area of contamination, and it is only indicative.</p> <p><u>Requirement:</u> The possible contaminations from the detonations before 1984 should also be sampled. Because of no hard evidences on the boundary of Area No. 1 and the regradation, initial sampling outside the so-called boundary has to be done for Area No. 1 (see also NOD Nos. 1(1) and 1(2) responses).</p> <p><u>Ecology/RL/WHC Resolution:</u> See resolution to NOD No. 1(1), (2), and (3).</p>	
38.	7-7/20-38	<p>Deficiency: At each sampling location, sampling and analysis for organics should be conducted at various depths to determine the depth of contamination. Closure Area 2 is gradually filling in as a result of erosion. The plan does not describe how the surface elevation of the pit during the detonations will be determined.</p>	

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Requirement: Revise the plan to include sampling and analysis at a minimum of two feet intervals to a depth of twelve feet below the surface elevation during detonation.

RL/WHC Response 1: By nature, demolition events would have deposited reaction/combustion products (i.e., potential residual contamination) on the soil column surface (i.e., contamination inherently would be a "top down" phenomenon). Even at the point of initiation, products would not be injected or driven into the ground. The shock wave from the explosion and pressure generated by the expanding gases would cause the reaction products, container shards, and loose soil to be directed upward (the unconfined direction), not downward. It is not a reasonable expectation that contaminants could somehow be driven 12 feet into the ground as the result of the activities described in the closure plan.

Extensive research has been conducted at the Hanford Site regarding moisture evapotranspiration of soil moisture and infiltration (recharge) through the vadose zone. It has generally been determined, with some exceptions for isolated locations where the near-surface soils are extremely coarse, that wetting fronts generally do not penetrate to depths exceeding about 4 feet. Sampling to a depth of 12 feet would require working with either a hollow-stem auger rig or a backhoe. Either option represents a major departure (in terms of time and cost) from the proposed plan. To attempt to resolve this issue, WHC would propose to sample to a depth of 4 feet at the open circled locations shown in Figures 7-1 and 7-2 in the plan. WHC also would be willing to offer to resample at extended depths at any location where initial sampling results indicate that contaminants are present at or close to proposed action levels.

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Concerning the elevation of the invert of the pit at the time of the most recent demolition event: it may not be feasible to provide this information with any degree of certainty. No effort was made to record or identify the invert surface datum while the site was in use, and there may be no surviving tangible evidence that would enable WHC to accurately identify the elevation at this time.

Ecology Response 1: The closure should be processed to achieve the performance standard of WAC 173-303-610(2) rather than be restricted by any proposed plan. Adjusting sampling depth according to the initial sampling results is considered acceptable. However, initial biased sampling to 12 feet was required at least 30% of the proposed sampling locations. It has to include the two sampling locations near the geometric center of the site. Otherwise, experimental and/or theoretical demonstrations must be furnished to show that the penetration depth of the waste explosives and byproducts from the detonation process and following precipitations are less than 12 feet under the specific geological conditions of the detonation sites.

A biased sampling in the down-wind direction will also be required unless experimental and/or theoretical demonstrations can be furnished to show that the migration distance of the waste explosives and the byproducts is negligible assuming that the wind speed is less than, and/or equal to, 35 mph.

For Area No. 2, the beginning depth of sample should be the invert of the demolition pit not the current surface. If no way exists to determine the position of the invert, it should be deep enough to exclude any refill after the last detonation.

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		Ecology/RL/WHC Response: The SAP documents the sampling agreements.	
39.	7-8/8-12	<p>Requirement: Explain why the adequacy of currently available background data cannot be evaluated now.</p> <p>RL/WHC Response 1: When Section 7.0 of the closure plan draft was prepared, the list of analytes to be reported in the <i>Hanford Site Soil Background</i> report (DOE/RL 1992d) had not been finalized. However, it was recognized at an early stage of work on the plan that the majority of the analytes of interest would be organics. As stated on page 7-7, line 50 continuing to page 7-8, line 2, background values for organic analytes will be assumed to be negligibly small (i.e., essentially zero). The adequacy of background data for inorganics depends on the type of analyte(s) involved and the analytical method(s) used for quantitation. For example, <i>Hanford Site Soil Background</i> information for metals would not be usable as a basis for comparison because the background data were obtained by ICP and AA methods, whereas the proposed Environmental Analytical Laboratory will be analyzing metals by XRF. The only currently identified inorganic analyte of interest for HPADS is chloride (Table 7-2). Analysis by IC is proposed. A threshold value for chloride (determined by IC) is available in the <i>Hanford Site Soil Background</i> document. Section 7.2.3.2 will be updated in Revision 1 to reflect the current status.</p> <p><u>Ecology Response 1:</u></p> <p>A. For inorganic analyses, Level III (ICP/AA) should be used, thus data will be comparable to Hanford Site Soil Background.</p> <p>B. Analysis by IC is acceptable as level II for analytical support; however, since little historical data available, do</p>	

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		<p>normal ICP/AA analyses for investigative phase. Describe also the methodology of IC more completely.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile onsite laboratory will be removed (including the use of XRF). Offsite laboratories capable of EPA analytical level III will be used for all soil samples. Through the DQO process, all sampling and analytical concerns were resolved. Constituents of concern and analytical methods were identified and agreed to by all parties. See the SAP for specific agreements.</p>	
40.	7-8/(all), 7-9/(all)	<p>Deficiency: Any initial characterization analyses must be performed by level III criteria, which is an EPA certified licensed, stationary laboratory. The mobile laboratory (level II analyses) should only be used to aid in determining a sampling location for characterization and plume mapping during the remediation.</p> <p>Requirement: Revise the plan.</p> <p>RL/WHC Response 1: See comment No. 2.</p> <p>Ecology Response 1: See NOD No. 2 response.</p>	
41.	7-9/37-45	<p>Deficiency: X-ray fluorescence is not an approved method for metals characterization. It is only to be used as an in-field screening method to determine sampling locations or areas of contamination (plume mapping).</p> <p>Requirement: Revise the plan.</p>	

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RL/WHC Response 1: XRF will be identified in the text as a method that is not sanctioned in SW-846, and a method for which Hanford Site-wide background data have not been collected.

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		<p><u>Ecology Response 1:</u> Concur with the revision.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
42.	7-9/47-51	<p>Requirement: Detection limits for the constituents listed must be below the regulatory limits, when possible. If regulatory limits are below detection limits, the method with the lowest detection limit must be used.</p> <p>RL/WHC Response 1: Statements will be inserted at the beginning of Section 7.2.4 advising (1) that the information included in this section is general in nature and is not intended to indicate or specify analytes of interests for HPADS closure areas Nos. 1 and 2 and (2) the proposed analytes for the two HPADS closure areas are listed in Tables 7-1 and 7-2. (Clarification to be provided by Ecology.)</p> <p><u>Ecology Response 1:</u> Any analytical work at level II should have detection limits close or below regulated limits - response does not discuss how detection limits were chosen (criteria) here.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
43.	7-10/20	<p>Deficiency: The capabilities of on-site mobile laboratories are not "equivalent" to analytical level III. In certain analyses, they may be similar.</p>	

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		<p>Requirement: Revise plan to meet WAC 173-303-110 methods.</p> <p>RL/WHC Response 1: Accept. Mobile laboratory capabilities will be identified in Revision 1 as analytical Level II. Refer to NOD No. 2 comment response.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
44.	7-10/29-36	<p>Deficiency: The reasoning for doing duplicate samples is to determine the laboratory's precision. If the laboratory does the duplicate preparation, they will know which samples are the same and the reason for doing duplicate samples would be void.</p> <p>Requirement: Revise the plan to meet SW-846 requirements.</p> <p>RL/WHC Response 1: Terminology appearing in SW-846, Chapter 1.0 (Quality Control) will be used. Separate definitions will be provided in Section 7.2.5 for duplicates (prepared in the field) and replicates (prepared in the lab).</p> <p><u>Ecology Response 1:</u> Concur with the revisions. SW-846 was not referenced in Chapter 9. Correct the error.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed.</p>	

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		Offsite laboratories capable of EPA analytical level III will be used for all soil samples.	
45.	7-11/31-32	<p>Question: Is a "sample lot" the same as a "sample batch" (defined on page 7-10, lines 30-32)? If so, use consistent terminology. If not, define "sample lot."</p> <p>Requirement: Use terms as defined in regulations.</p> <p>RL/WHC Response 1: The intent in Rev. 0 was that the two terms are synonymous as they appeared in context. WAC 173-303-040 does not define either "sample batch" or "sample lot." SW-846 Section 1 (Quality Control) defines the term "analytical batch" for use in the intended context. "Analytical batch" will be used in place of "sample lot" and "sample batch" in the revised text.</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
46.	7-13/3-29	<p>Deficiency: Was the initial sampling plan statistically designed? The sampling plan must be evaluated by a statistician prior to any work, to determine if the sampling and analyses are adequate to answer the information listed in this section.</p> <p>Requirement: Refer to Ecology statistical guidance.</p> <p>RL/WHC Response 1: The draft plan was reviewed by a qualified statistician. RL/WHC does not use Ecology's statistical guidance</p>	

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		<p>package; information on statistical guidance is found in Section 7.2.8. The sample locations were determined using a random number algorithm as explained in Section 7.2.3.1. The statistical package used by WHC is equivalent to, or better than, that presented in Ecology guidance.</p> <p><u>Ecology Response 1:</u> Submit the statistical package used by WHC for comparison with the Ecology package.</p> <p>Ecology/RL/WHC Resolution: Through the DQO process, all sampling and analytical concerns were resolved. Constituents of concern and analytical methods were identified and agreed to by all parties. See the SAP for specific agreements.</p>	
47.	7-13/34	<p>Requirement: The action levels need to be determined prior to sampling. The text should mention when action levels will be proposed and contaminant levels will be compared against proposed action plans. More information is needed on the site background threshold values. At present, the Hanford soil background study is not complete and, as far as we know, we have yet to receive the final data packages for various inorganics and organics of our concern. The study must be approved by Ecology prior to use.</p> <p>RL/WHC Response 1: Regarding action levels, refer to NOD No. 1C comment response. See comment No. 22 for information on site soil background.</p> <p><u>Ecology Response 1:</u> See NOD No. 1 (3) response regarding action level and NOD No. 22 for the response on site soil background.</p> <p>Ecology/RL/EPA Resolution: See resolution to NOD No. 1 (3)</p>	

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48.	7-14/16-30	<p>Deficiency: The random sampling method for the calculation of volume of contaminated soil is not acceptable. Although the determination of sampling locations by using random algorithm for initial characterization as specified in section 7.2.3 is acceptable, the location of sampling point for calculation of the volume of contaminated soil demands a systematic protocol. Sampling plans with well defined grid patterns will be a good approach for this. However, the grid spacing, location, etc. might vary depending on the results obtained in the initial characterization. The grid spacing, location, etc., must be approved by Ecology before it is implemented.</p> <p>Requirement: Submit a sampling protocol to Ecology for approval before sampling.</p> <p>RL/WHC Response 1: A sampling protocol will be provided in the closure plan for Ecology approval.</p> <p><u>Ecology Response 1:</u> Include the sampling protocol in next revision for Ecology's approval.</p> <p>Ecology/RL/WHC Resolution: Through the DQO process, all sampling and analytical concerns were resolved. Constituents of concern and analytical methods were identified and agreed to by all parties. See the SAP for specific agreements.</p>	
49.	7-14/35	<p>Deficiency: Two feet vertical depth is not sufficient.</p> <p>Requirement: Revise the text. See comment 38.</p> <p>RL/WHC Response 1: Refer to NOD No. 38 comment response.</p>	

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		<u>Ecology Response 1:</u> See NOD No. 38 response.	
		<u>Ecology/RL/WHC Resolution:</u> See resolution to NOD No. 38.	
50.	7-15/17-22	<p>Deficiency: The application of water during removal to control dust needs careful examination and will depend on the contaminants of concern. There is a good chance that contaminants can migrate with water downward during the process. This is especially so since excavation is limited to the top two feet of the material. Other dust control devices may have to be applied depending on the nature of the contaminants. Also, creating a damp condition of the soil before excavation is risky.</p> <p>Requirement: Determine the detailed process after we receive all the information on contaminants of concern. Submit to Ecology for approval before implementation.</p> <p>RL/WHC Response 1: This information will be provided to Ecology before implementation.</p> <p><u>Ecology Response 1:</u> Concur.</p>	
51.	7-16/13-26	<p>Deficiency: Regulatory requirements require that verification sample analyses be done at level III or IV. A mobile laboratory does not qualify. Verification analyses must be done in accordance with SW-846.</p> <p>Requirement: Revise the text.</p> <p>RL/WHC Response 1: Refer to NOD No. 2 comment response.</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p>	

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		Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile onsite laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.	
52.	F7-1 and F7-2	Requirement: The map legend should explain what the black dots with a circle surrounding it means. RL/WHC Response 1: The legend will be clarified. <u>Ecology Response 1:</u> Concur. Ecology/RL/WHC Resolution: Figures 7-1 and 7-2 will be removed from Rev. 1. Refer to the SAP for sample locations.	
53.	F7-1 and F7-2	Deficiency: Sampling locations do not cover any areas in the downwind direction. Requirement: Sampling must be done to characterize all areas that could possibly be contaminated. See comment 18. RL/WHC Response 1: See response to comments 8 and 10. <u>Ecology Response 1:</u> See NOD Nos. 8 and 10 responses. Ecology/RL/WHC Resolution: Through the DQO process, all sampling and analytical concerns were resolved. Constituents of concern and analytical methods were identified and agreed to by all parties. See the SAP for specific agreements.	
54.	F7-2	Requirement: Show location of demolition pit on grid.	

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		<p>RL/WHC Response 1: The grid will be revised to incorporate the demolition pit.</p> <p><u>Ecology Response 1:</u> Concur with the revision.</p> <p>Ecology/RL/WHC Resolution: Figures 7-1 and 7-2 will be deleted from Rev. 1. See the SAP for specific agreements regarding sample location.</p>	
55.	F7-3	<p>This closure schedule does not allow for soil removal or show the times the firing range will be out of use.</p> <p>Requirement: Show on the schedule the times the firing range will be out of use. Provide an estimate of the additional time needed if soil removal is necessary.</p> <p>RL/WHC Response 1: RL/WHC believes that HPADS will be clean closed so soil removal is not necessary. In the event contamination is detected, the amount of contaminated soil will be determined based on soil sampling results and the constituent specific action levels and cannot be calculated prior to the soil sampling program.</p> <p><u>Ecology Response 1:</u> Clean closure doesn't mean that the site is clean. To achieve clean closure, the contaminated materials should either be removed from the sites or decontaminated. It is irrational to assume that clean closure will be achieved due to no contaminations, even before sampling. Therefore, provide a time schedule in the next revision for a probable event of soil removing and decontamination.</p>	

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56.	F7-4	<p>Ecology/RL/WHC Resolution: As a result of the DQO negotiations, all parties agreed to a two-phased sampling approach. During phase I sampling, the samples should verify the RL/WHC belief that clean closure can occur without any further remedial action. If contaminants are detected above action levels, all parties will reconvene to determine the DQO requirements. During this time frame, a soil removing and decontamination schedule will be provided.</p> <p>Deficiency: If Westinghouse Hanford Company is the "co-operator" of the site, then a representative of Westinghouse Hanford Company should sign the closure certification. See page iii, lines 34-44.</p> <p>Requirement: Revise the figure.</p> <p>RL/WHC Response 1: This comment mischaracterizes the legal nature of contractor responsibilities and would result in management inefficiencies because it attempts to inaccurately portray RL and WHC as equal partners with no distinction of responsibilities.</p> <p>In Ecology's Dangerous Waste Regulations, "operator" is defined as the person responsible for the <u>overall</u> operation of a facility (WAC 173-303-040). WHC is not responsible for the overall operation of HPADS. The RL, Ecology, and the Environmental Protection Agency (EPA) have previously agreed in the Federal Facility Agreement and Consent Order (FFACO) that RL owns and operates the Hanford Facility. WHC has a more limited and specific role under its contract with the RL and may not be identified as responsible for all closure activities on the HPADS. Certifying the closure plan as co-operator is not required by the regulations. Certifying the closure plan is required by the owner or operator and an independent registered professional engineer</p>	

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<u>No.</u>	<u>Page/Line No.</u>	<u>Comment/Response</u>	<u>Concurrence</u>
		<p>(WAC 173-303-610). RL is the owner and operator and its signature along with the independent registered professional engineer is all that is required on the closure plan certification. A signature line for WHC will not be added to the certification.</p> <p><u>Ecology Response 1:</u> The response is contrary to the statement at the paragraph 4 of page iii in the closure plan. Also, according to the Hanford Facility Dangerous Waste Permit (Site wide permit), co-operator has to sign whatever he has done.</p> <p><u>Ecology/RL/WHC Resolution:</u> It was agreed that WHC does not sign on 'whatever' has to be done. It was agreed that the owner/operator and licensed independent professional engineer were the only signatures required.</p>	
57.	T7-1 and T7-2	<p>Deficiency: These tables are inadequate.</p> <p>Requirement: Appropriate methodologies and detection limits need to be listed. Also list method modifications and metal analyses.</p> <p>Note: All method modifications must be approved by Ecology.</p> <p>RL/WHC Response 1: Methodologies listed in Tables 7-1 and 7-2 are for EAL analyses. Analytical levels in Tables 7A-1 and 7A-2 will be revised from Level III to Level II. No metals have been proposed as analytes of interest in this plan.</p> <p>New text will be included at the end of Section 7.2.4 and in Section 7A.7 indicating that the EAL will work to controlled manual(s). Copies of the manuals will be made available to Ecology for review and approval when issued by WHC. WHC will have</p>	

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No.	Page/Line No.	Comment/Response	Concurrence
		<p>Ecology-approved procedures in place in advance of sampling and analysis.</p> <p>Additional discussion will be provided at the end of Section 7.2.2 regarding future submittal of analytes tables for confirmatory sampling (and verification sampling as necessary).</p> <p>A footnote will be added to Tables 7-1 and 7-2 to indicate that PQLs are identified in Tables 7A-1 and 7A-2. (Clarification to be provided by Ecology).</p> <p><u>Ecology Response 1:</u> The terminologies in the tables are not accurate. For example, TCL is for CLP, not SW-846. Correct the mistake. See also NOD No. 65 for the requirements of detection limits and methodologies.</p> <p>Ecology/RL/WHC Resolution: Tables 7-1 and 7-2 and 7A-1 and 7A-2 will be removed from Rev. 1. Through the DQO process, all sampling and analytical concerns were resolved. Constituents of concern and analytical methods were identified and agreed to by all parties. See the SAP for specific agreements.</p>	
58.	8-2/26-28	<p>Deficiency: The plan does not answer the following questions: How will access to the contaminated areas be controlled when even the fence posts marking the location must be removed during use of the firing range? Will the firing range be closed until CERCLA remediation takes place? When is the CERCLA study and remediation scheduled to take place?</p> <p>Requirement: Revise to provide answers.</p>	

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		<p>RL/WHC Response 1: The signs are affixed to poles that are removed from the post holes during firing activities. Upon completion of the firing activities the signs are returned to the post hole. The firing range will be maintained under controlled access throughout the firing activities.</p> <p>The firing range will remain in operation and will not be closed until CERCLA remediation takes place.</p> <p>The CERCLA study and remediation schedule is being prepared by the U.S. Army Corps of Engineers.</p> <p><u>Ecology Response 1:</u> Are those present kept off the demo. areas during firing events? See the earlier comment on the same subject. Include in next revision the description of control access procedure to the two demolition sites during use of the firing range according to WAC 173-303-310.</p> <p>Ecology/RL/WHC Resolution: Administrative controls keep personnel out of Closure Area No. 1 during firing events.</p> <p>Information regarding access to the HPADS will be included in Rev. 1 of the closure plan.</p>	
59.	APP 5A-4/27-28	<p>Requirement: Provide hydraulic properties that are available.</p> <p>RL/WHC Response 1: No hydraulic studies were performed in the immediate area. The best available reference is, DOE-RL, 1990, Phase 1 Remedial Investigation Report for the Hanford Site 1100-EM-1 Operable Unit.</p> <p><u>Ecology Response 1:</u> Concur.</p>	

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60.	APP 7A-1/32-33	<p>Deficiency: Confirmation samples cannot be analyzed by a "mobile laboratory" to determine the presence of contaminants of concern.</p> <p>Requirement: Revise the plan.</p> <p>RL/WHC Response 1: Refer to NOD No. 2 comment response.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
61.	APP 7A-1/40-45	<p>Requirement: If remediation is required, confirmatory samples are required and must be done in an Ecology approved laboratory, not a mobile laboratory.</p> <p>RL/WHC Response 1: Refer to NOD No. 2 comment response.</p> <p><u>Ecology Response 1:</u> Concur.</p>	

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		<p>Ecology/RL/WHC Resolution: Throughout the closure plan, references to using the mobile laboratory will be removed. Offsite laboratories capable of EPA analytical level III will be used for all soil samples.</p>	
62.	APP 7A-2/1-15	<p>Requirement: EPA-QAMS-005/80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans", should also be referenced.</p> <p>RL/WHC Response 1: This information will be included.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: The text reference will be incorporated in Rev. 1.</p>	
63.	APP 7A-3/23-44	<p>Requirement: These samples are not expected to be classified as "radioactive"; therefore, they must be shipped off-site to an Ecology approved laboratory.</p> <p>RL/WHC Response 1: Lines 35-39 will be revised to be consistent with the comment response for NOD No. 2.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: The HPADS is not a radiologically controlled area; this section will be deleted from Rev. 1. The samples will be radiation released before being shipped offsite for analysis.</p>	

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64.	APP 7A-5/9-11	<p>Deficiency: It states that Tables 7A-1 and 7A-2 identify the methodology and analyte-specific quantitation limits, but they do not.</p> <p>Requirement: Correct these tables to contain this information.</p> <p>RL/WHC Response 1: Methodology and quantitation limits are specified in the tables. Also refer to NOD No. 57 comment response. (Clarification to be provided by Ecology).</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Response: The tables and references to them will be deleted from Rev. 1. Information on the quantitation limits for the agreed on analyses is found in SW-846.</p>	
65.	APP 7A-9/a11	<p>Deficiency: This section is incomplete.</p> <p>Requirement: Call out methodology for characterization.</p> <p>RL/WHC Response 1: Clarification to be provided by Ecology.</p> <p><u>Ecology Response 1:</u></p> <p>A. Give the specific method No. from SW-846.</p> <p>B. PQLs are different for different materials at different laboratories. Thus, relate them to each contaminant and the laboratories which will be used to test them.</p> <p>Ecology/RL/WHC Resolution: The agreed on EPA analysis methods are summarized in the SAP and the PQLs for each analytical method are summarized in SW-846.</p>	

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66.	APP 7A-10/18-19	<p>Deficiency: The reference provided for validation procedures, "Data Validation Procedures for Chemical Analysis" (WHC-SD-EN-SPP-002), is a validation procedure for Contract Laboratory Program (CLP) sample data, not analyses performed under SW-846.</p> <p>Requirement: The correct reference should be "Sample Management and Administration" (WHC-CM-5-3).</p> <p>RL/WHC Response 1: The reference will be corrected.</p> <p><u>Ecology Response 1:</u> Concur.</p> <p>Ecology/RL/WHC Resolution: <i>Date Validation Procedures for Chemical Analyses</i> (WHC-SD-EN-SPP-002) provides procedures to WHC staff and subcontractors tasked with the validation of chemical analytical data produced as the result of Hanford Site environmental investigations. This document is a supplement to <i>Sample Management and Administration</i> (WHC-CM-5-3), which includes validation procedures for sample data performed under SW-846.</p>	

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FOREWORD

The Hanford Site is owned by the U.S. Government and operated by the U.S. Department of Energy, Richland Operations Office. Dangerous waste and mixed waste (containing both radioactive and dangerous components) are produced and managed on the Hanford Facility. The dangerous waste is regulated in accordance with the *Resource Conservation and Recovery Act of 1976* and the *State of Washington Hazardous Waste Management Act of 1976* [as administered through the Washington State Department of Ecology "Dangerous Waste Regulations," *Washington Administrative Code* 173-303]. The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act of 1954*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the *Resource Conservation and Recovery Act* and *Washington Administrative Code* 173-303.

For purposes of the *Resource Conservation and Recovery Act* and the Washington State Department of Ecology "Dangerous Waste Regulations," the Hanford Site is considered to be a single facility. The single dangerous waste permit identification number issued to the Hanford Site by the U.S. Environmental Protection Agency and the Washington State Department of Ecology is U.S. Environmental Protection Agency/State Identification Number WA7890008967. This identification number encompasses over 60 treatment, storage, and/or disposal units within the Hanford Site. All waste management activities carried out under the assigned identification number are considered to be 'onsite'.

Westinghouse Hanford Company is a major contractor to the U.S. Department of Energy, Richland Operations Office and serves as co-operator of the Hanford Patrol Academy Demolition Sites, the unit addressed in this closure plan.

Westinghouse Hanford Company is identified in the closure plan as a 'co-operator' and signs in that capacity. Any identification of Westinghouse Hanford Company as an 'operator' elsewhere in this closure plan is not meant to conflict with Westinghouse Hanford Company's designation as a co-operator but rather is based on Westinghouse Hanford Company's contractual status (i.e., as an operations and engineering contractor) for the U.S. Department of Energy.

The *Hanford Patrol Academy Demolition Sites Closure Plan* consists of a Hanford Facility Dangerous Waste Part A Permit Application, Form 3, (Revision 4), and a closure plan. An explanation of the Part A Form 3 submitted with this closure plan is provided at the beginning of the Part A section. The closure plan consists of nine chapters and six appendices.

This *Hanford Patrol Academy Demolition Sites Closure Plan* submittal contains information current as of December 15, 1994.

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ACRONYMS AND ABBREVIATIONS

1		
2		
3		
4	ASTM	American Society for Testing and Materials
5		
6	CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
7		
8	CFR	<i>Code of Federal Regulations</i>
9		
10	DOE-RL	U.S. Department of Energy, Richland Operations Office
11	DQO	data quality objective
12		
13	Ecology	Washington State Department of Ecology
14	EII	environmental investigation instruction
15	EPA	U.S. Environmental Protection Agency
16		
17	GPR	ground-penetrating radar
18		
19	HEIS	Hanford Environmental Information System
20	HPADS	Hanford Patrol Academy Demolition Sites
21		
22	IRIS	integrated risk information system (database)
23		
24	KD	known distance
25		
26	MDL	method detection limit
27	MTCA	<i>Model Toxics Control Act</i>
28		
29	QAPJP	quality assurance project plan
30	QI	quality instruction
31	QR	quality requirement
32		
33	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
34	RPP	RCRA Past Practice
35		
36	SAP	Sampling and Analysis Plan
37	SMO	sample management organization
38	SWMU	solid waste management unit
39		
40	Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
41	TSD	treatment, storage, and/or disposal
42		
43	WAC	<i>Washington Administrative Code</i>
44		
45	WHC-CAS	Westinghouse Hanford Company Commercial Analytical Services
46		

1 **DEFINITION OF TERMS**
2

3 Definitions are based on use throughout this document.
4

5 **Accuracy**--The degree of agreement between a measurement (or the mean value of
6 a set of measurements) to the true value. Accuracy is the measure of the bias
7 in a measurement system. Sampling accuracy normally is assessed through the
8 evaluation of sample blanks, while analytical method accuracy and specific
9 sample matrix effects are assessed through the analysis of control standards
10 and spiked samples.
11

12 **Audit**--Audits are considered to be systematic checks to verify the quality of
13 operation of one or more elements of the total measurement system. In this
14 sense, audits could be of two types: (1) performance audits, in which
15 quantitative data are independently obtained for comparison with data
16 routinely obtained in a measurement system or (2) system audits, involving a
17 qualitative onsite evaluation of laboratories or other organizational elements
18 of the measurement system for compliance with established quality assurance
19 program and procedure requirements. For environmental investigations at the
20 Hanford Site, performance audit requirements are fulfilled by periodic
21 submittal of blind samples to the primary laboratory or the analysis of split
22 samples by an independent laboratory. System audit requirements are
23 implemented through the use of standard surveillance procedures.
24

25 **Comparability**--Comparability is an expression of the relative confidence with
26 which one data set might be compared with another.
27

28 **Completeness**--Completeness is a quantitative parameter expressing the
29 percentage of measurements judged to be valid.
30

31 **Deviation**--Deviation refers to a planned departure from established criteria
32 that might be required as a result of unforeseen field situations or that
33 might be required to correct ambiguities in procedures that may arise in
34 practical applications.
35

36 **Facility/facility**--Dependent on context, the term 'facility', as used in this
37 closure plan, could refer to the following.
38

39 The Hanford Facility is a single *Resource Conservation and Recovery Act*
40 (RCRA) facility identified by the U.S. Environmental Protection Agency
41 (EPA)/State Identification Number WA7890008967 that consists of over
42 60 treatment, storage, and/or disposal (TSD) units conducting dangerous waste
43 management activities. These TSD units are included in the *Hanford Facility*
44 *Dangerous Waste Part A Permit Application* (DOE-RL 1988b). The Hanford
45 Facility consists of all contiguous land, and structures, other appurtenances,
46 and improvements on the land, used for recycling, reusing, reclaiming,
47 transferring, storing, testing, or disposing of dangerous waste, which, for
48 the purposes of the RCRA, are owned by the U.S. Government and operated by the
49 DOE-RL.
50

1 A facility as defined in WAC 173-303-040, i.e., building nomenclature
2 commonly used at the Hanford Site. In this context, the term 'facility'
3 remains as part of the title for various TSD units (e.g., 2727-S Storage
4 Facility, Hexone Storage and Treatment Facility).
5

6 **Nonconformance**--A nonconformance is a deficiency in characteristic,
7 documentation, or procedure that renders the quality of material, equipment,
8 services, or activities unacceptable or indeterminate. When the deficiency is
9 of a minor nature, does not effect a permanent or significant change in
10 quality if it is not corrected, and can be brought into conformance with
11 immediate corrective action, the deficiency shall not be categorized as a
12 nonconformance. However, if the nature of the condition is such that it
13 cannot be immediately and satisfactorily corrected, it shall be documented in
14 compliance with approved procedures and brought to the attention of management
15 for disposition and appropriate corrective action.
16

17 **Precision**--Precision is a measure of the repeatability or reproducibility of
18 specific measurements under a given set of conditions. Specifically,
19 precision is a quantitative measure of the variability of a group of
20 measurements compared to their average value. Precision normally is expressed
21 in terms of standard deviation, but also could be expressed as the coefficient
22 of variation, relative standard deviation, or range (i.e., maximum value minus
23 minimum value). Precision is assessed by means of duplicate and/or replicate
24 sample analysis.
25

26 **Quality assurance**--Quality assurance refers to the total integrated quality
27 planning, quality control, quality assessment, and corrective action
28 activities that collectively ensure that the data from monitoring and analysis
29 meet all end user requirements and/or the intended end use of the data.
30

31 **Quality assurance project plan**--The quality assurance project plan is an
32 orderly assembly of management policies, project objectives, methods, and
33 procedures that defines how data of known quality will be produced for a
34 particular project or investigation.
35

36 **Quality control**--Quality control refers to the routine application of
37 procedures and defined methods to the performance of sampling, measurement,
38 and analytical processes.
39

40 **Representativeness**--Representativeness is the degree to which data accurately
41 and precisely represent a characteristic of a population parameter, variations
42 at a sampling point, or an environmental condition. Representativeness is a
43 qualitative parameter that is most concerned with the proper design of a
44 sampling program.
45

46 **Site-wide background**--The natural background established for the Hanford Site.
47 This does not include contributions from anthropogenic sources unrelated to
48 Hanford Site operations.
49

50 **Validation**--Validation refers to a systematic process of reviewing a body of
51 data against a set of criteria to provide assurance that the data are
52 acceptable for their intended use.

1 **Verification**--Verification refers to the process of determining whether
2 procedures, processes, data, or documentation conform to specified
3 requirements. Verification activities might include inspections, audits,
4 surveillances, or technical review.

PART A


1
2
3
4 The Part A Permit Application, Form 1, included in this closure plan was
5 submitted to the Washington State Department of Ecology in May 1988. The
6 Part A Permit Application, Form 1, consists of three pages.
7

8 The Part A Permit Application, Form 3, covers the Hanford Patrol Academy
9 Demolition Sites. The original Part A Permit Application, Form 3, was
10 submitted on November 1, 1985. Revision 1 of the Part A Permit Application,
11 Form 3 was prepared to add new demolition sites, and was submitted on
12 August 15, 1987. Revision 2 of the Part A Permit Application, Form 3, was
13 prepared to separate several demolition sites into individual Part A permit
14 applications and to add Westinghouse Hanford Company as co-operator.
15 Revision 2 was submitted on November 16, 1987. Revision 3 of the Part A
16 Permit Application, Form 3, updates waste codes based on data obtained from
17 the waste inventory. Revision 4 of the Part A Permit Application, Form 3, was
18 prepared to delete state-only dangerous waste code WC01 and replace it with
19 WC02 in accordance with WAC 173-303, as amended in December 1993.
20

21 The Part A Permit Application, Form 3 (Revision 4), included with this
22 closure plan consists of five pages, one figure, and one photograph.

1
2
3
4
5

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FORM 1	State of Washington Department of Ecology 	WASHINGTON STATE DANGEROUS WASTE PERMIT GENERAL INFORMATION <i>(Read "Form 1 Instructions" before starting)</i>	L. EPA/STATE LD. NUMBER <div style="border: 1px solid black; padding: 2px; display: inline-block;"> WA 7169010181967 </div>
-----------------------------	---	--	--

II. NAME OF FACILITY
 U.S. DEPARTMENT OF ENERGY - HANFORD SITE

III. FACILITY CONTACT

A. NAME & TITLE (Last, First, & Title)	B. PHONE (area code & no.)
LAWRENCE, MICHAEL J., MANAGER	509 376 7395

IV. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX			
P.O. BOX 550			
B. CITY OR TOWN		C. STATE	D. ZIP CODE
RICHLAND		WA	99352

V. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER			
HANFORD SITE			
B. COUNTY NAME			
BENTON			
C. CITY OR TOWN		D. STATE	E. ZIP CODE
RICHLAND		WA	99352
			F. COUNTY CODE (2 digits)
			005

VI. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
9711 <small>(Industry)</small> NATIONAL SECURITY	8922 <small>(Industry)</small> NUCLEAR NONCOMMERCIAL DEVELOPMENT AND EDUCATION		
C. THIRD		D. FOURTH	
9611 <small>(Industry)</small> ADMINISTRATION AND GENERAL ECONOMICS PROGRAM	4911 <small>(Industry)</small> STEAM-ELECTRIC GENERATION		

VII. OPERATOR INFORMATION

A. NAME		B. Is the name listed in Item VI-A also the owner?	
DEPARTMENT OF ENERGY - RICHLAND OPERATIONS WESTINGHOUSE HANFORD COMPANY (WHC)		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
C. STATUS OF OPERATOR (Enter the appropriate letter or type the answer and "Other", specify.)		D. PHONE (area code & no.)	
F - FEDERAL M - PUBLIC (other than federal or state) S - STATE O - OTHER (specify) P - PRIVATE		509 376 7395	
E. STREET OR P.O. BOX		F. PHONE (area code & no.)	
PO BOX 550 / PO BOX 1970		509 376 7803	
F. CITY OR TOWN		G. STATE	H. ZIP CODE
RICHLAND		WA	99352
VIII. INDIAN LAND			
Is the facility located on Indian land? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			

**DOE-RL: OWNER/CO-OPERATOR; WHC: CO-OPERATOR FOR CERTAIN UNITS ON THE HANFORD SITE. COMPLETE BACK PAGE

IX. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

X. NATURE OF BUSINESS (provide a brief description)

- o NATIONAL DEFENSE NUCLEAR MATERIAL PRODUCTION
 - o ENERGY RESEARCH AND TECHNOLOGY DEVELOPMENT
 - o DEFENSE NUCLEAR WASTE MANAGEMENT
 - o BYPRODUCT STEAM, SOLD FOR ELECTRIC POWER GENERATION
- AND SIC 15: BUILDING CONSTRUCTION - GENERAL CONTRACTORS AND OPERATIVE BUILDERS

XI. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICE TITLE (Print or Type)

B. SIGNATURE

C. DATE

SEE ATTACHMENT

WA7890008967

FORM 1

DANGEROUS WASTE PERMIT GENERAL INFORMATION

XI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Michael J. Lawrence
Michael J. Lawrence
Manager, Richland Operations
United States Department of Energy

5-19-88
Date

W. M. Jacob
William M. Jacob
President
Westinghouse Hanford Company
Co-operator

5/13/88
Date

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 character/inch).

FORM 3	DANGEROUS WASTE PERMIT APPLICATION	1. EPA/STATE I.D. NUMBER												
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">W</td><td style="width: 20px;">A</td><td style="width: 20px;">7</td><td style="width: 20px;">8</td><td style="width: 20px;">9</td><td style="width: 20px;">0</td><td style="width: 20px;">0</td><td style="width: 20px;">0</td><td style="width: 20px;">8</td><td style="width: 20px;">9</td><td style="width: 20px;">6</td><td style="width: 20px;">7</td> </tr> </table>	W	A	7	8	9	0	0	0	8	9	6	7
W	A	7	8	9	0	0	0	8	9	6	7			

FOR OFFICIAL USE ONLY		COMMENTS								
APPLICATION APPROVED	DATE RECEIVED <i>(mo., day, & yr.)</i>									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td><td style="width: 20px;"> </td> </tr> </table>									

II. FIRST OR REVISED APPLICATION
Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

<input type="checkbox"/> 1. EXISTING FACILITY (See instructions for definition of "existing" facility. Complete item below.)	<input type="checkbox"/> 2. NEW FACILITY (Complete item below)
--	--

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20px;">MO.</th><th style="width: 20px;">DAY</th><th style="width: 20px;">YR.</th> </tr> <tr> <td style="text-align: center;">08</td><td style="text-align: center;"> </td><td style="text-align: center;">84</td> </tr> </table> <p>FOR EXISTING FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)</p>	MO.	DAY	YR.	08		84	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20px;">MO.</th><th style="width: 20px;">DAY</th><th style="width: 20px;">YR.</th> </tr> <tr> <td style="text-align: center;"> </td><td style="text-align: center;"> </td><td style="text-align: center;"> </td> </tr> </table> <p>FOR NEW FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR IS EXPECTED TO BEGIN</p>	MO.	DAY	YR.			
MO.	DAY	YR.											
08		84											
MO.	DAY	YR.											

B. REVISED APPLICATION (place an "X" below and complete Section I above)

<input checked="" type="checkbox"/> 1. FACILITY HAS AN INTERIM STATUS PERMIT	<input type="checkbox"/> 2. FACILITY HAS A FINAL PERMIT
--	---

III. PROCESSES - CODES AND CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the (Section III-C).

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.

1. AMOUNT - Enter the amount.

2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			Treatment:		
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS	OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY
Disposal:					
INJECTION WELL	D80	GALLONS OR LITERS			
LANDFILL	D81	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER			
LAND APPLICATION	D82	ACRES OR HECTARES			
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS			
UNIT OF MEASURE			UNIT OF MEASURE		
GALLONS.....	G	LITERS PER DAY.....	V	ACRE-FEET.....	A
LITERS.....	L	TONS PER HOUR.....	D	HECTARE-METER.....	F
CUBIC YARDS.....	Y	METRIC TONS PER HOUR.....	W	ACRES.....	B
CUBIC METERS.....	C	GALLONS PER HOUR.....	E	HECTARES.....	Q
GALLONS PER DAY.....	U	LITERS PER HOUR.....	H		

EXAMPLE FOR COMPLETING SECTION III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

LINE NUMBER	A. PRO-CESS CODE (from list above)	B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY	LINE NUMBER	A. PRO-CESS CODE (from list above)	B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY
		1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)				1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	T 0 4	568	V		7				
2					8				
3					9				
4					10				

Continued from the front.

III. PROCESSES (continued)

SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

T04

The Hanford Patrol Academy Demolition Sites (HPADS) were two demolition sites (Closure Area No. 1 and No. 2 identified on page 7 of 7) located near the 1100 Area of the Hanford Facility. These demolition sites were used to detonate discarded explosive chemical products generated on the Hanford Site that were determined to either be in excess or beyond designated shelf life (T04). The treatment design capacity of the HPADS was 568 liters (150 gallons) of discarded explosive chemical products per day. The last detonation event at the HPADS occurred on October 27, 1991.

IV. DESCRIPTION OF DANGEROUS WASTES

- A. DANGEROUS WASTE NUMBER - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.
- B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.
- C. UNIT OF MEASURE - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS.....	P	KILOGRAMS.....	K
TONS.....	T	METRIC TONS.....	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

1. Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

EXAMPLE FOR COMPLETING SECTION IV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. DANGEROUS WASTE NO. (enter code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES																	
	1. PROCESS CODES (enter)							2. PROCESS DESCRIPTION (if a code is not entered in D(1))																
1	K	0	5	4	900	P	T	0	3	D	8	0												
X-2	D	0	0	2	400	P	T	0	3	D	8	0												
X-3	D	0	0	1	100	P	T	0	3	D	8	0												
X-4	D	0	0	2			T	0	3	D	8	0												included with above

Continued from page 2.
 NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

I.D. NUMBER (entered from page 1)

W A 7 8 8 0 0 0 8 8 6 7

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES	
				1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D 0 0 1	1,000	K	T04	Treatment-Other (Demolition)
2	D 0 0 2				
3	D 0 0 3				
4	D 0 1 8				
5	P 0 2 2				
6	P 0 4 8				
7	P 1 0 5				
8	U 1 0 8				
9	U 1 1 7				
10	U 1 3 3				
11	U 2 1 3				
12	U 2 3 4				
13	W T 0 1				
14	W T 0 2				
15	W P 0 1				
16	W P 0 3				
17	W C 0 2				Included With Above
18					
19					
20					
21					
22					
23					
24					
25					
26					

Continued from the front.

V. DESCRIPTION OF DANGEROUS WASTES (continued)

USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION D(1) ON PAGE 3.

The HPADS were used for the treatment of nonradioactive explosive, ignitable, shock-sensitive, and/or reactive discarded chemical products. The discarded chemical products treated at the HPADS all exhibited the dangerous waste characteristics of ignitability (D001) and reactivity (D003). Some of the discarded chemical products also exhibited the dangerous waste characteristic of corrosivity (D002) and may have the state-only designations for toxic extremely hazardous waste (WT01), toxic dangerous waste (WT02), persistent - halogenated hydrocarbons, extremely hazardous waste, (WP01), persistent - polycyclic aromatic hydrocarbons, extremely hazardous waste, (WP03), and/or carcinogenic dangerous waste (WC02). The Estimated Annual Quantity of Dangerous Waste (item IV.B) of 1,000 kilograms (2,204 pounds) represents the maximum total amount of discarded chemical products believed to have been treated at the HPADS.

v. FACILITY DRAWING Refer to attached drawing.

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS Refer to attached photographs.

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

VII. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawings and photos.

LATITUDE (degrees, minutes, & seconds)				LONGITUDE (degrees, minutes, & seconds)			

VIII. FACILITY OWNER

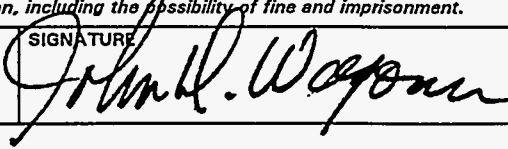
A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER				2. PHONE NO. (area code & no.)			
3. STREET OR P.O. BOX			4. CITY OR TOWN		5. ST.	6. ZIP CODE	

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type) John D. Wagoner, Manager U.S. Department of Energy Richland Operations Office	SIGNATURE 	DATE SIGNED 12/15/94
---	---	-------------------------

OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

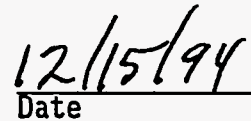
NAME (print or type) SEE ATTACHMENT	SIGNATURE	DATE SIGNED
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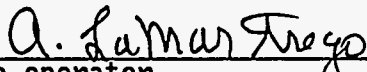
X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

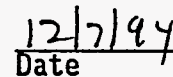


Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

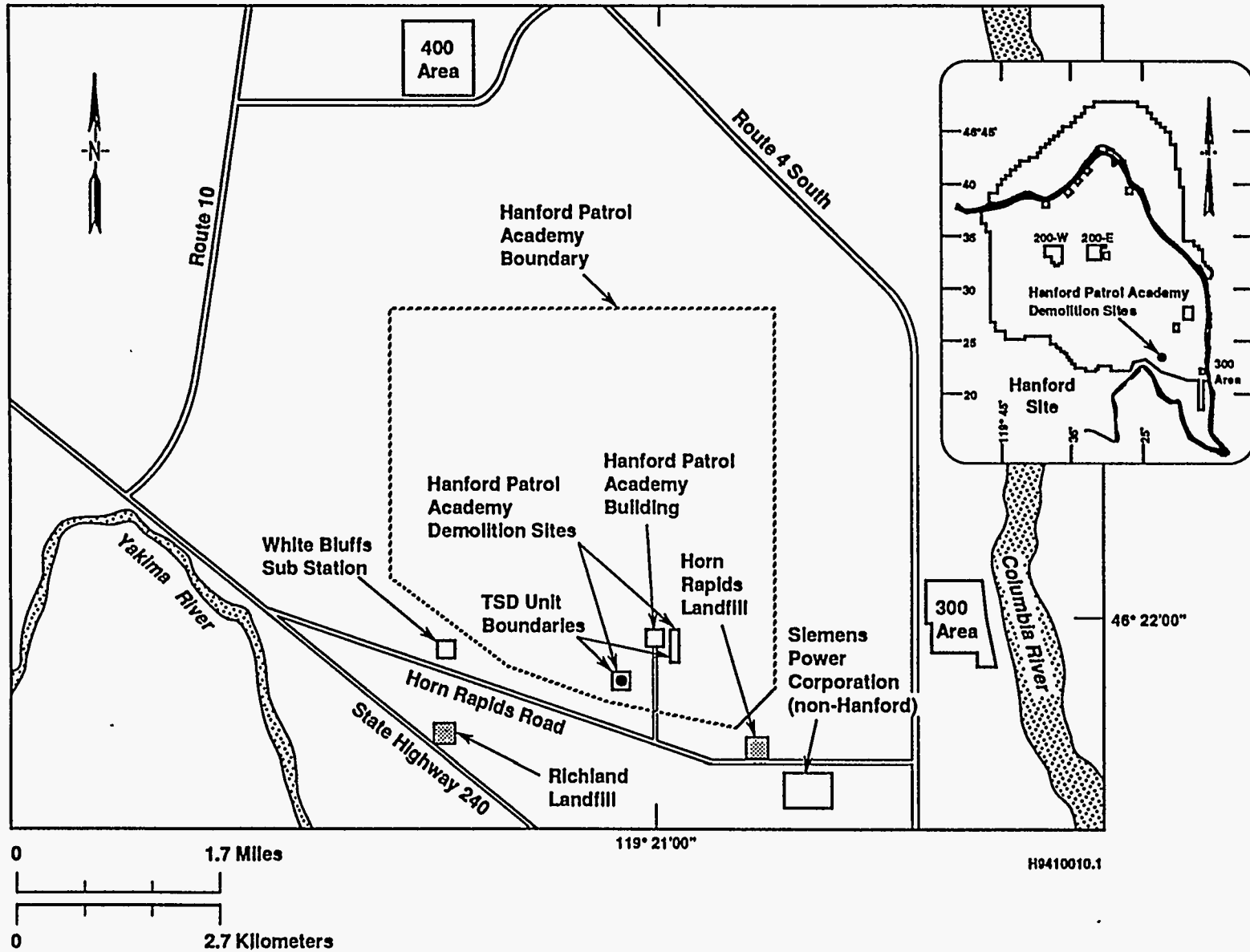

Date



Co-operator
A. LaMar Trego, President
Westinghouse Hanford Company

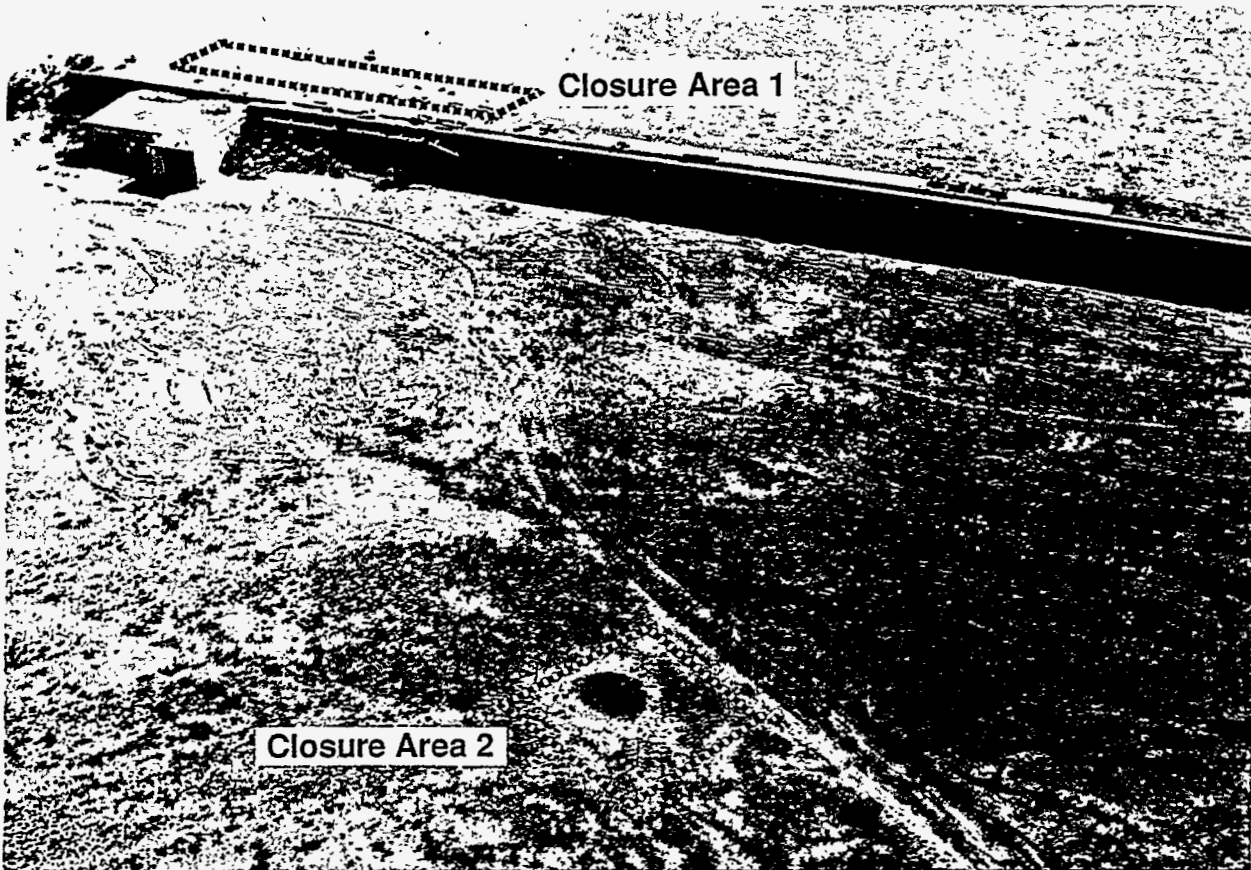

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Hanford Patrol Academy Demolition Sites



WA7890008967

HANFORD PATROL ACADEMY DEMOLITION SITES



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(PHOTO TAKEN 1990)

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1.0 INTRODUCTION

This chapter provides background information for the Hanford Patrol Academy Demolition Sites (HPADS) and provides an overview of the contents of the HPADS closure plan.

1.1 BACKGROUND

From 1975 to 1991, the HPADS were used for demolition events. These demolition events were a form of thermal treatment for discarded explosive chemical products that were beyond their shelf life or no longer needed. Because the HPADS will no longer be used for this thermal activity, the sites will be closed. Closure will be conducted pursuant to the requirements of the Washington State Department of Ecology (Ecology) "Dangerous Waste Regulations", *Washington Administrative Code* (WAC) 173-303-610 and 40 *Code of Federal Regulations* (CFR) 270.1.

This closure plan presents a description of the HPADS, the history of the waste treated, and the approach that will be followed to close the HPADS. Because dangerous waste does not include the source, special nuclear, and by-product material components of mixed waste, radionuclides are not within the scope of WAC 173-303 or of this closure plan. The information on radionuclides is provided only for general knowledge where appropriate. Only dangerous constituents derived from HPADS operations will be addressed in this closure plan in accordance with WAC 173-303-610(2)(b)(i).

The HPADS are two distinct closure areas within the Hanford Patrol Academy training area. Specifically, the two closure areas are within the Known Distance rifle range (KD range or No. 5 range).

The HPADS are not located within an operable unit; therefore, any contamination not associated with operation of the treatment, storage, and/or disposal (TSD) unit will be evaluated by the creation of a RCRA past practice solid waste management unit.

It is anticipated that the Hanford Patrol Academy and its training area (i.e., the firing range complex) will be operated throughout the cleanup and postclosure monitoring period of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1994), that is, to approximately the year 2050.

1.2 CLOSURE PLAN OBJECTIVE

The objective of this closure plan is to support clean closure of the HPADS. Clean closure, as used in this context, means that no dangerous waste or dangerous waste contaminated soil will remain onsite to pose a threat to human health and the environment. To meet the criteria for clean closure of the HPADS, analytical results must verify that the levels of discarded explosive chemical products derived from HPADS operations are below action

1 levels. Action levels are defined as levels above the Hanford Site soil
2 background levels identified in *Hanford Site Background: Part 1, Soil*
3 *Background for Nonradioactive Analytes* (DOE-RL 1993) and *Model Toxics Control*
4 *Act* (MTCA) (WAC 173-340) Method B levels. If analysis determines that levels
5 of the discarded explosive chemical products derived from the HPADS operations
6 exceed these guidelines, a Phase II investigation will be developed.
7

9 1.3 HANFORD PATROL ACADEMY DEMOLITION SITES CLOSURE PLAN CONTENTS

10 The HPADS closure plan consists of the following nine chapters.
11

- 12 • Introduction (Chapter 1.0)
- 13 • Facility Description (Chapter 2.0)
- 14 • Process Information (Chapter 3.0)
- 15 • Waste Characteristics (Chapter 4.0)
- 16 • Groundwater Monitoring (Chapter 5.0)
- 17 • Closure Performance Standards (Chapter 6.0)
- 18 • Closure Activities (Chapter 7.0)
- 19 • Postclosure Plan (Chapter 8.0)
- 20 • References (Chapter 9.0).

21
22 A brief description of each chapter is provided in the following
23 sections.
24

25 1.3.1 Facility Description (Chapter 2.0)

26
27 This chapter provides a brief description of the Hanford Site and the
28 location and description of the HPADS. Information on Hanford Site security
29 also is provided.
30
31

32 1.3.2 Process Information (Chapter 3.0)

33
34 This chapter describes how the HPADS processed the waste and explains the
35 overall waste treatment system.
36
37

38 1.3.3 Waste Characteristics (Chapter 4.0)

39
40 This chapter discusses the waste inventory and the characteristics of the
41 waste that was treated at the HPADS.
42
43

44 1.3.4 Groundwater Monitoring (Chapter 5.0)

45
46 This chapter discusses the probability that groundwater contamination has
47 not occurred and that groundwater monitoring is not needed.
48
49
50
51

1 1.3.5 Closure Performance Standards (Chapter 6.0)
2

3 This chapter discusses the closure strategy, performance standards for
4 protection of health and the environment, and closure activities.
5
6

7 1.3.6 Closure Activities (Chapter 7.0)
8

9 This chapter describes closure activities.
10
11

12 1.3.7 Postclosure Plan (Chapter 8.0)
13

14 This chapter outlines provisions for postclosure care, if required.
15
16

17 1.3.8 References (Chapter 9.0)
18

19 References used throughout this closure plan are listed in this chapter.
20 All references listed here, which are not available from other sources, will
21 be made available for review, upon request, to any regulatory agency or public
22 commentor. References can be obtained by contacting the following:
23

24 Administrative Records Specialist
25 Public Access Room H6-08
26 Westinghouse Hanford Company
27 P.O. Box 1970
28 Richland, Washington 99352

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2.0 FACILITY DESCRIPTION

This chapter briefly describes the Hanford Site, the Hanford Facility, and the location of the HPADS, and provides information on Hanford Site security.

2.1 GENERAL HANFORD SITE DESCRIPTION

The Hanford Site covers approximately 560 square miles (1,450 square kilometers) of semiarid land that is owned by the U.S. Government and managed by the U.S. Department of Energy, Richland Operations Office (DOE-RL). The Hanford Site is located northwest of the city of Richland, Washington (Figure 2-1). The city of Richland adjoins the southeasternmost portion of the Hanford Site boundary and is the nearest population center. In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related activities for the production and purification of special nuclear materials and other nuclear activities. The mission of the Hanford Site recently has focused on waste management and environmental remediation and restoration.

Activities on the Hanford Site are centralized in numerically designated areas. The reactors are located along the Columbia River in the 100 Areas. The reactor fuel reprocessing units are in the 200 Areas, which are on a plateau approximately 7 miles (11 kilometers) from the Columbia River. The 300 Area, located adjacent to and north of Richland, contains the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, 5 miles (8 kilometers) northwest of the 300 Area, contains the Fast Flux Test Facility used for testing liquid metal reactor systems. Adjacent to and north of Richland, the 1100 Area contains offices associated with administration, maintenance, transportation, and materials procurement and distribution. The 3000 Area, between the 1100 Area and 300 Area, contains engineering offices and administrative offices. Administrative offices also are located in the 700 Area, which is in downtown Richland. The 600 Area covers all locations not specifically given an area designation.

2.2 FACILITY DESCRIPTION AND GENERAL PROVISIONS

The Hanford Facility is a single *Resource Conservation and Recovery Act* (RCRA) facility identified by the U.S. Environmental Protection Agency (EPA)/State Identification Number WA7890008967 that consists of over 60 treatment, storage, and/or disposal (TSD) units conducting dangerous waste management activities. These TSD units are included in the *Hanford Facility Dangerous Waste Part A Permit Application* (DOE-RL 1988b). The Hanford Facility consists of all contiguous land, and structures, other appurtenances, and improvements on the land, used for recycling, reusing, reclaiming, transferring, storing, testing, or disposing of dangerous waste, which, for the purposes of the RCRA, are owned by the U.S. Government and operated by the DOE-RL.

1 2.3 DESCRIPTION OF HANFORD PATROL ACADEMY DEMOLITION SITES
2

3 The Hanford Patrol Academy is about 2 miles (3.2 kilometers) south-
4 southwest of the 300 Area and 0.5 mile (0.8 kilometer) north of the Horn
5 Rapids Road, which is the northern boundary of the city of Richland,
6 Washington (Figure 2-1).
7

8 The physical character of the Hanford Patrol Academy training area,
9 including the TSD unit, is generally that of slightly sloped sand dunes.
10 Vegetation has been removed from the firing range complex, including the TSD
11 unit. This was necessary for fire prevention and safety reasons (e.g., bullet
12 ricochets).
13

14 In the 1940's, the U.S. Army developed and used the six firing ranges
15 that are now defined as the Hanford Patrol Academy Firing Range Complex. The
16 DOE-RL allowed minimally controlled use of the firing ranges by non-Hanford
17 personnel (e.g., the City of Richland Police Department and the Richland Rod
18 and Gun Club), but ended that practice in 1982. After 1982, the DOE-RL began
19 supervising use of the firing ranges by non-Hanford personnel. The TSD unit
20 is on the KD firing range, separated by the concrete and earthen slope known
21 as the 'target butt'. Figures 2-2 and 2-3 show the location of the Hanford
22 Patrol Academy and the firing ranges. Figures 2-4 and 2-5 detail the location
23 of the TSD unit.
24

25 During independent interviews of Hanford Site personnel, it was revealed
26 that, in 1975, a metal canister of napalm B¹ was used as a rifle target
27 during a training exercise. The napalm canister was shot repeatedly and
28 failed to detonate. A subsequent attempt was made to ignite the canister with
29 direct flame, which failed. The canister was then buried on one of the firing
30 ranges, approximately 3 feet (1 meter) below surface. The specific location
31 of the canister is unknown. It is believed that at the time of the training
32 exercise, the gasoline was no longer in the gel matrix of the napalm or the
33 canister may have been empty. Because this was not a RCRA activity, no
34 further action is planned in association with this closure.
35

36 Since 1986, the firing range has been predominantly used for firearms
37 training by the Hanford Patrol and, with the permission and supervision of the
38 DOE-RL, the Richland Police Department and other personnel have used the range
39 for the same purpose. It is planned that the Hanford Patrol will continue to
40 use the firing range complex and, in particular, the KD range, throughout the
41 closure and postclosure monitoring phases of the Hanford Site's cleanup
42 (through the year 2050). Also, it is anticipated that the KD range will
43 continue to be available for selected Richland Police Department training
44 purposes. However, detonation of discarded explosive chemical products that
45 are beyond their shelf life or are determined to be excess will no longer
46 occur at the HPADS.
47

48 ¹A full canister containing approximately 5 pounds (2.2 kilograms) of
49 napalm B would have been the size of a 1-pint or 1-quart container.

1 The demolitions occurred within the KD range bullet impact area. Closure
2 Area No. 1 is immediately south of the target butt at the change in slope
3 (invert). Closure Area No. 2 is about 180 feet (55 meters) north of the
4 target butt (Figure 2-4). Figure 2-5 shows the locations and physical
5 dimensions of the closure areas.
6

7 The boundary for Closure Area No. 1 was determined by the combined
8 judgment of personnel who witnessed the demolition events. Documentation of
9 the boundaries of Closure Area No. 1 is unknown. Because the firing range has
10 been repeatedly graded, any visible evidence of the detonations has been
11 eliminated. Based on personnel interviews, the boundary of Closure Area No. 1
12 is on the south side of the KD range target butt and is 115 feet (35 meters)
13 in length. The centerline is at the break in the slope between the mound of
14 the target butt and the flat ground in front of the target butt and extends
15 16.4 feet (5 meters) laterally (north and south) from the centerline, as shown
16 in Figure 2-5.
17

18 In November 1984, detonation events were moved to behind the target butt
19 (Closure Area No. 2) to minimize damage to Hanford Patrol Academy structures
20 resulting from air blast. Closure Area No. 2 was physically demarcated before
21 December 1989 [*Hanford Patrol Firing Range Safety Assessment Document*
22 (WHC 1989b)] with four steel fence posts and wire that support closure area
23 signs. As shown in Figure 2-4, Closure Area No. 2 is about 246 feet
24 (75 meters) north of Closure Area No. 1 and 180 feet (55 meters) north of the
25 target butt's concrete wall. As shown in Appendix 2A, the existing detonation
26 pit is about 10 feet (3 meters) in diameter.
27

28 During the data quality objectives (DQO) process, all parties agreed to
29 the recreated boundaries of Closure Area No. 1 and that Closure Area No. 2 has
30 not changed position.
31

32 2.4 SECURITY INFORMATION

33 The entire Hanford Site is a controlled-access area. The Hanford Site
34 maintains around-the-clock surveillance for the protection of government
35 property, classified information, and special nuclear materials. The Hanford
36 Patrol maintains a continuous presence of armed guards to provide Hanford Site
37 security.
38

39 The training area is controlled by a locked gate. Access to the training
40 area (which includes the HPADS closure areas) must be obtained from the
41 Hanford Patrol Academy firing range safety officer. All personnel accessing
42 these areas must have a U.S. Department of Energy-issued security
43 identification badge indicating the appropriate authorization. Personnel also
44 might be subject to a search of items carried into or out of these areas.
45

46 The closure areas have been roped off and delineated with warning signs
47 to restrict personnel entry. The signs, stating "DANGER--UNAUTHORIZED
48 PERSONNEL KEEP OUT" in English, are visible from all angles of approach, and
49 are legible from a distance of at least 25 feet (7.6 meters).
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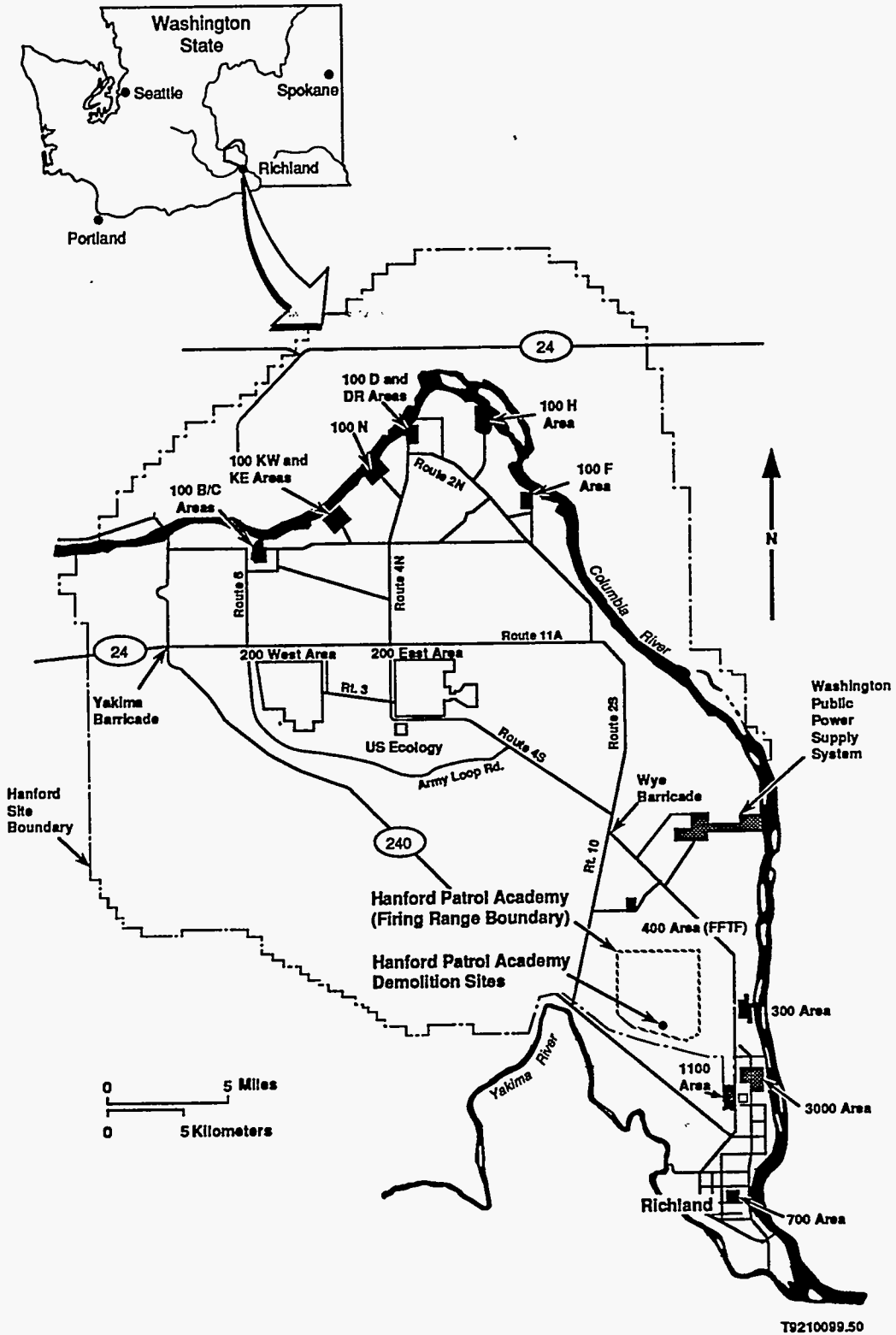
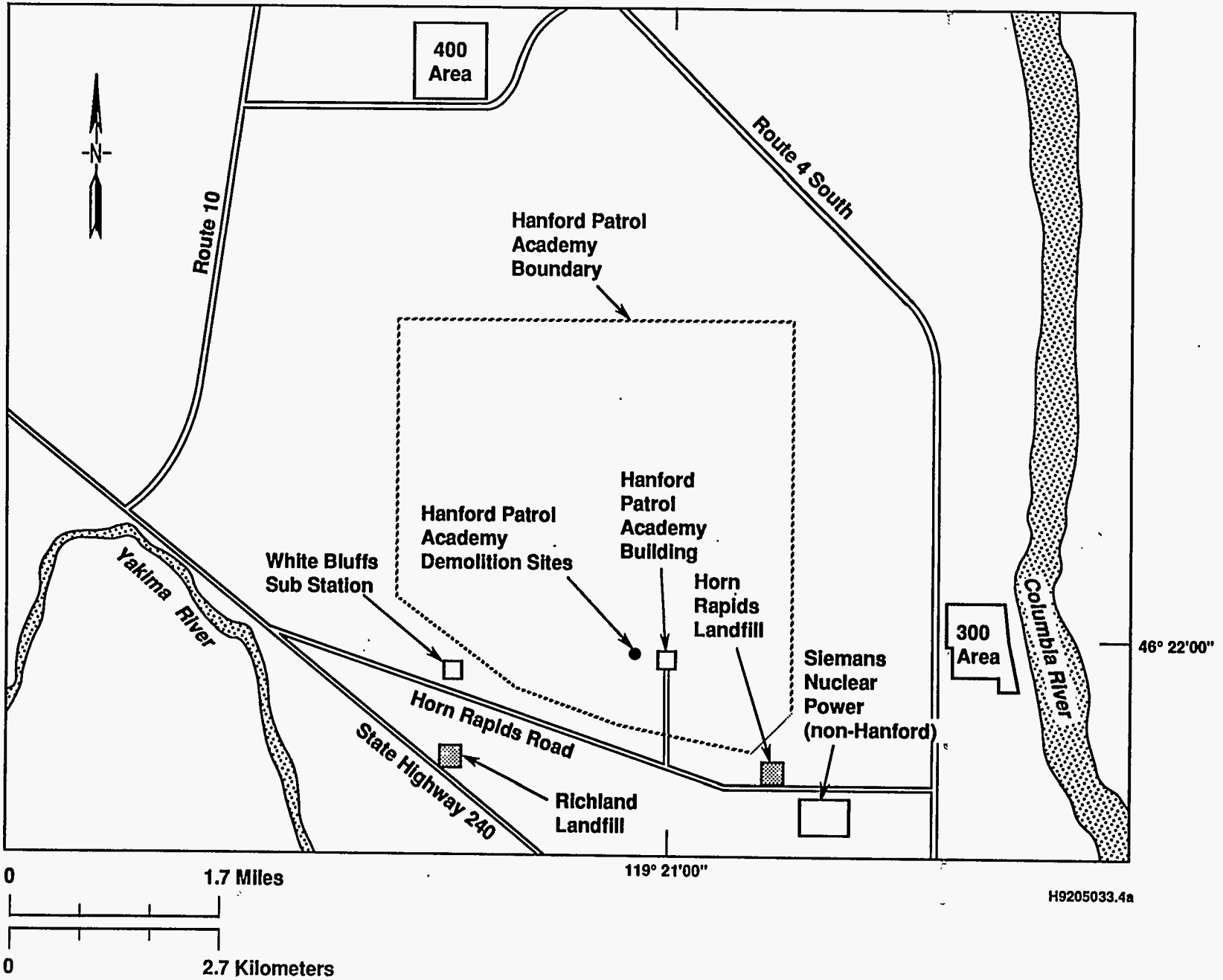


Figure 2-1. Hanford Site.

Figure 2-2. Hanford Patrol Academy Location.



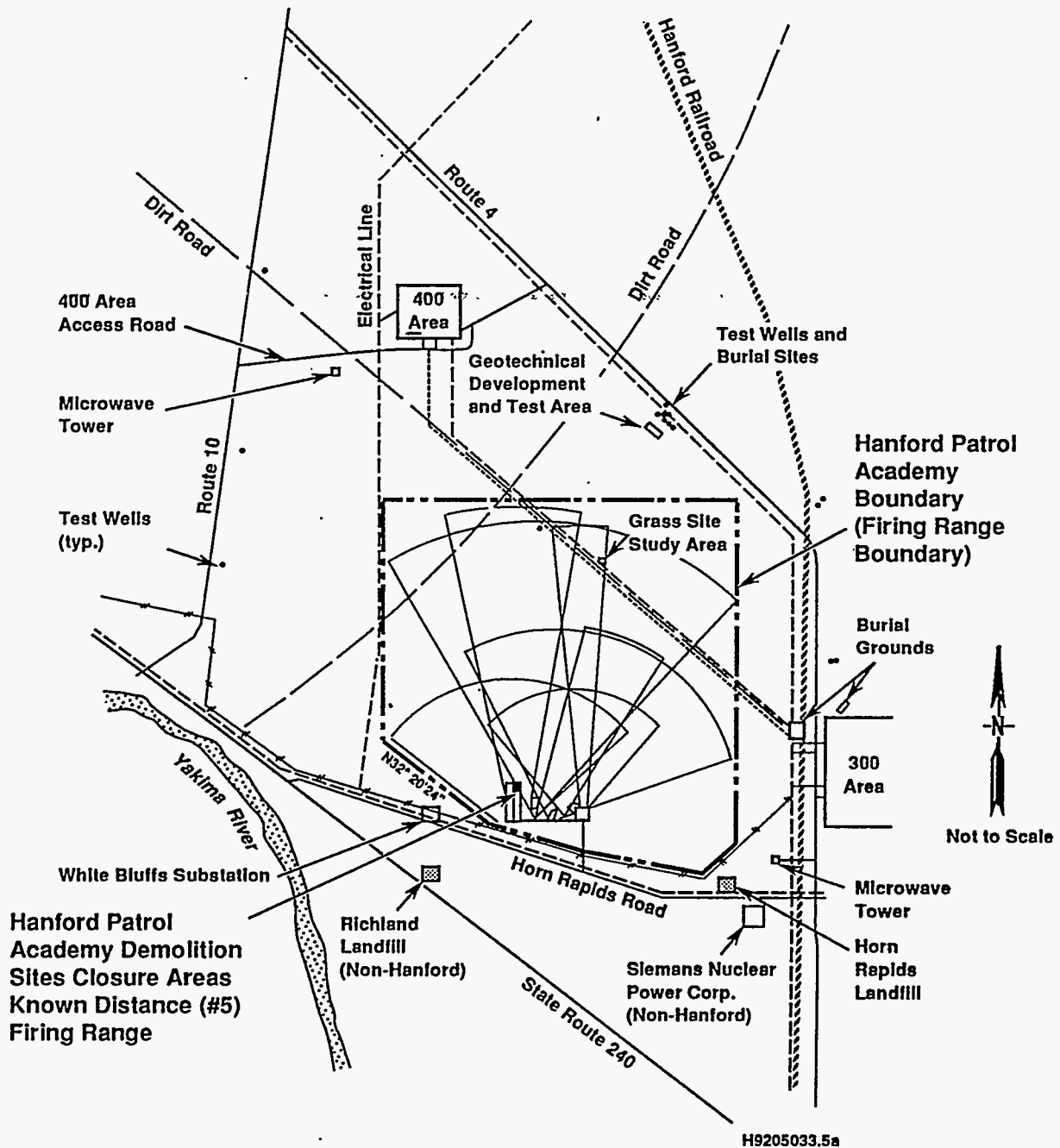


Figure 2-3. Hanford Patrol Academy Boundary.

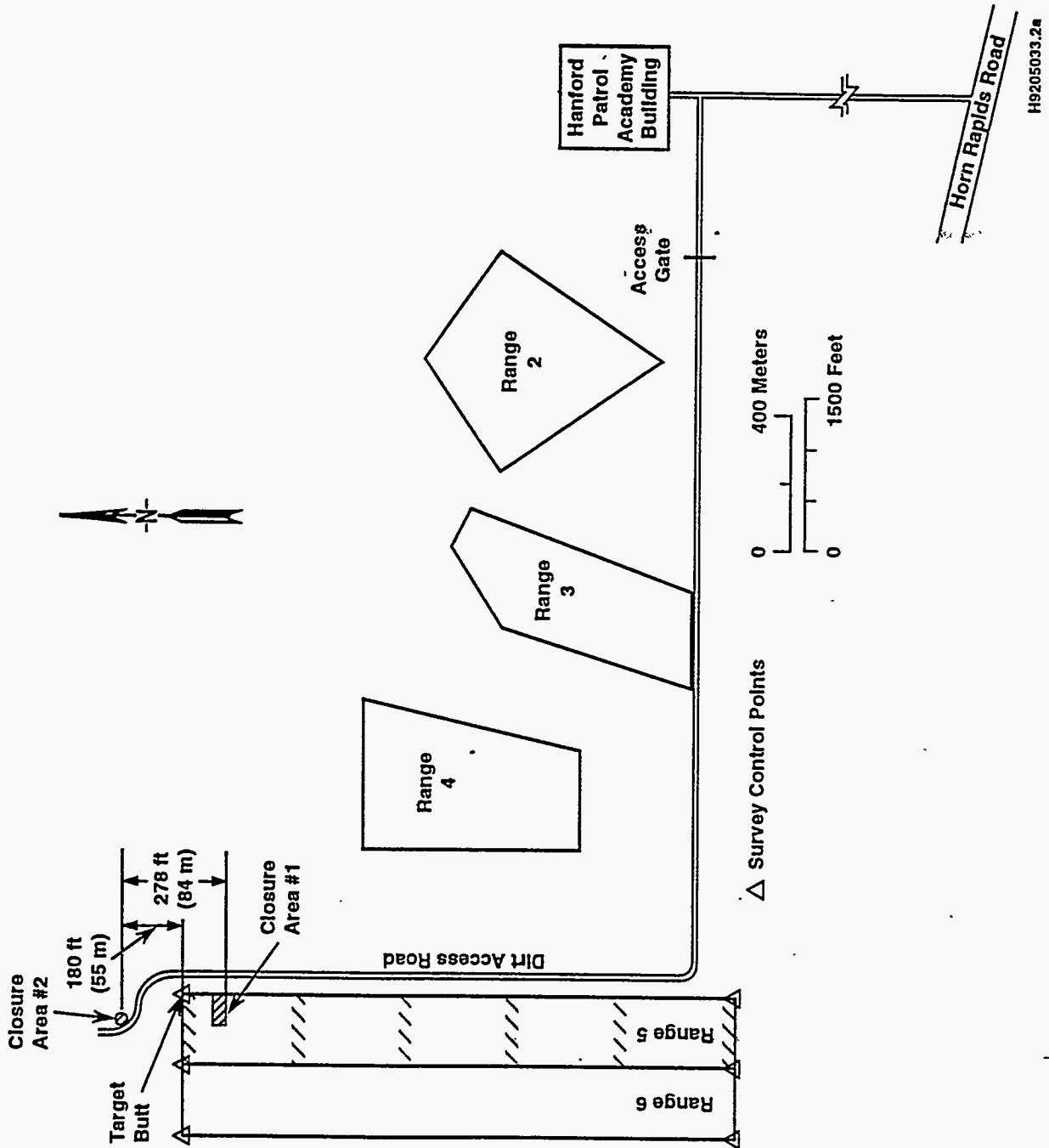
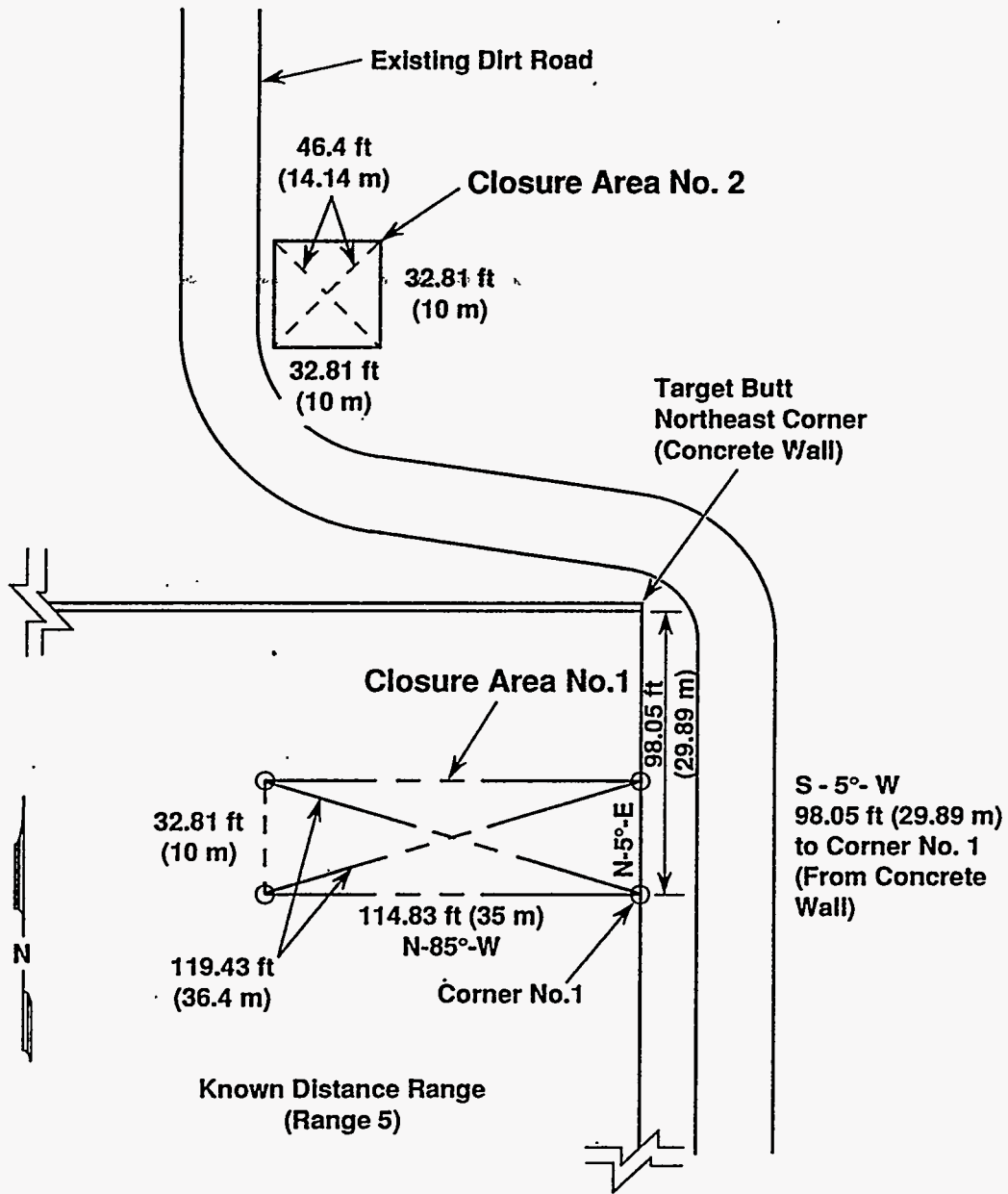


Figure 2-4. Known Distance Range and Closure Area Details.



Based on Compass and Tape Survey of Field Conditions
(Not to Scale)

38210099.1

Figure 2-5. Hanford Patrol Academy Demolition Sites Closure Areas.

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3.0 PROCESS INFORMATION

Demolition of discarded explosive chemical products that were determined to be either excess or beyond designated shelf life was performed at the Hanford Patrol Academy Firing Range No. 5 from 1975 through October 27, 1991. In 1975, discarded explosive chemicals were detonated using M14 rifle fire to initiate the detonation of individual chemical containers. These containers were placed on the ground at the invert of Firing Range No. 5.

In October of 1984, onsite organizations started to document the removal from their inventory of any nonradioactive explosive, shock-sensitive, chemical products that exceeded the manufacturer's recommended shelf life. Typically, solid waste engineering organizations would coordinate the transportation and demolition events. To minimize worker safety concerns and transportation hazards, similar demolition sites were established in the 200 Areas [*218-E-8 Borrow Pit Closure Plan* (DOE-RL 1994a) and *200 West Ash Pit Closure Plan* (DOE-RL 1994b)].

Starting in 1984, the City of Richland Police Department Bomb Squad supplied commercial explosives and initiated the HPADS demolitions. The designated chemical containers were transported in the City of Richland's bomb trailer. Detonations in the HPADS closure areas occurred in specially hand-excavated holes to control air blast damage and to enhance the explosive effects of the demolition.

The discarded explosive chemical products were placed in the City of Richland Police Department bomb trailer after the day shift ended and transported to the HPADS. Hanford Patrol and Hanford Fire Department personnel provided escort vehicles [e.g., a lead Hanford Patrol vehicle with flashing lights, the bomb trailer and its tractor, the command vehicle, a fire truck, other vehicles (if involved), and a Hanford Patrol vehicle with lights flashing]. The Hanford Patrol Academy was cleared of nonessential personnel, and a safety zone was established. The demolition pit was prepared before arrival of the discarded explosive chemical products.

The usual detonation sequence was to place the containers into the pit. Then explosives were placed above and around the containers, and the explosives were 'wired-in'. Additional detonation cord sometimes was used to wrap specific, large-sized chemical containers to ensure better explosive efficiency. After the demolition personnel evacuated the blasting zone, the explosives were detonated with an electric blasting cap.

Following the detonation, onsite personnel would inspect the demolition pit and survey the area around the pit. When available, an organic vapor analyzer was used to determine that the discarded chemicals were consumed in the detonation. No records were kept of the post-detonation inspections. Immediately following the post-demolition inspection, the City of Richland Bomb Squad retrieved its electrical blasting line, other blasting equipment, and unused explosives. The demolition event was considered complete with the release of the Hanford Patrol Academy for routine activities.

1 Periodically throughout the Hanford Patrol Academy Firing Range Complex,
2 the vegetation was removed systematically to minimize potential brush fires
3 and for other firing range safety precautions (e.g., ricochets). This
4 practice also occurred at both of the closure areas and is depicted in
5 Appendix 2A.
6

7 On October 30, 1985, a grass fire was ignited by a detonation, and
8 immediately extinguished by the on-hand Hanford Fire Department personnel.
9 The firing ranges and closure areas were graded (scarified) routinely to
10 remove vegetation to reduce the potential for fire. Interviews with former
11 demolition personnel revealed that on March 12, 1987, a demolition failure
12 occurred. Following surveys with the organic vapor analyzer, an ether can
13 remnant and ether-contaminated soil were placed in several 30-gallon
14 (113.6-liter) containers and sent to an offsite TSD facility for disposal
15 (Appendix 3A).
16

17 Meteorological data from the Hanford Weather Station is included in
18 Appendix 3B for the detonation events that occurred after 1984.

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4-3. Physical Properties and MTCA Method B Cleanup Levels
for Discarded Chemical Products at the Hanford
Patrol Academy Demolition Sites T4-3

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4.0 WASTE CHARACTERISTICS

This chapter addresses the waste inventory and waste treated at the HPADS.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

Chemicals treated at the HPADS (1984 to 1991) totaled approximately 570 pounds (260 kilograms) [Table 4-1 (references are located in Appendix 4A)]. The inventory consisted of nonradioactive discarded explosive chemical products, which were either totally consumed during the various detonations or rendered harmless by natural processes over time. The explosive, shock-sensitive, flammable, ignitable, and/or highly-reactive properties of the chemicals were used to bring about their chemical decomposition and/or destruction during detonation. The chemicals were rendered harmless to human health and the environment by the thermal characteristics of the explosions. Additionally, because of the volatility and instability of the chemicals under atmospheric conditions, even if the detonations were not 100 percent efficient, sufficient time would have passed since the last detonation for the natural processes of oxidation (through exposure to the atmosphere) and hydration (through exposure to water) to decompose the chemicals.

No records could be located to determine the type and quantity of detonation cord and electric blasting caps used to initiate the detonation events. Because of their explosive properties, these materials would not be expected to persist in the environment since the detonation events. Through the DQO process, the DOE-RL and regulators agreed that an analysis for detonation residues would verify the presence or absence of residues from these explosive initiators or accelerants.

4.2 WASTE TREATED AT THE HANFORD PATROL ACADEMY DEMOLITION SITES

Table 4-2 tabulates the waste designations per WAC 173-303-070. Additional information concerning the waste detonated at the HPADS is located in Appendix 4A. Selection of chemicals for detonation generally was based on explosive, shock-sensitive, and/or flammable properties. Data presented in Table 4-3 indicate that all chemicals should have volatilized or decomposed during the detonation event or in the desert environment. The waste designations in Table 4-2 indicate that all of the waste was ignitable and reactive.

Table 4-3 also contains information on available MTCA Method B cleanup levels for involved constituents.

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1 Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy
2 Demolition Sites. (sheet 1 of 4)

3
4 CLOSURE AREA NO. 1
5

6	Chemical	Amount (kg)	Container number/size	Detonation date	Reference ¹
7	Ethyl Ether	11.40	25x1 pt.	16-Aug-84	PNL-84-004
8	Tetrahydrofuran	5.82	6x1 qt.	16-Aug-84	PNE-84-007
9	Perchloric Acid	3.12	8x1 pt.	16-Aug-84	PNL-83-020
10	2-Butoxyethanol	3.96		16-Aug-84	PNL-83-014

11
12
13 CLOSURE AREA NO. 2
14

15	Chemical	Amount (kg)	Container number/size	Detonation date	Reference ¹	Original Location ²
16	Ethyl Ether	0.41		Nov-84	RHO	1167
17	Perchloric Acid	48.18		Nov-84	RHO	1167
18						
19	2,4,6-Trinitroresorcinol	0.025		30-Oct-85	PNL	3714
20	2,4-Dinitroresorcinol	0.070		30-Oct-85	PNL	3714
21	2,4 Dinitrophenol	0.50		30-Oct-85	PNL	3714
22	2,4-Dinitrophenylhydrazine	0.13		30-Oct-85	PNL	3714
23	α -Nitrosomethyl Isobutyl	0.17		30-Oct-85	PNL	3714
24	Ketone					
25	Butyl Ethanol	7.00		30-Oct-85	PNL	306E
26	Carbon Disulfide	9.80		30-Oct-85	PNL	332
27	Ethyl Ether	3.80		30-Oct-85	PNL	SIGMA 5
28	Glycol Dimethyl Ether	0.80		30-Oct-85	PNL	332
29	Hexanitrodiphenylamine	0.07		30-Oct-85	PNL	3714
30	Perchloric Acid	17.30		30-Oct-85	PNL	LSL 11
31	Picric Acid	0.10		30-Oct-85	PNL	3714
32	Picryl Chloride	0.30		30-Oct-85	PNL	3714
33	Tetrahydrofuran	49.70		30-Oct-85	PNL	SIGMA 5
34	Trinitrotoluene	0.10		30-Oct-85	PNL	3714
35	Perchloric Acid	0.19		30-Oct-85	UNC	100N Area
36	Magnesium Perchlorate	0.50		30-Oct-85	PNL	332
37	Tetrahydrofuran	0.48		30-Oct-85	PNL	332
38	Perchloric Acid	0.30		30-Oct-85	PNL	332

Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy
Demolition Sites. (sheet 2 of 4)

	Chemical	Amount (kg)	Container number/size	Detonation date	Reference ¹	Original location ²
1						
2	CLOSURE AREA NO. 2					
3						
4						
5	Ethyl Ether	12.00	1-gal	12-Mar-87	WHC	329
6	Isopropyl Ether	4.00	1-pt	12-Mar-87	PNL	331
7	Picric Acid	0.20	1-pt	12-Mar-87	PNL	331
8	Ethyl Ether	4.00	1-pt	12-Mar-87	PNL	331
9						
10	Borontrifluoride Ether Complex	0.40	1	25-Aug-87	PNL 22-129	332
11						
12	1,4-Dioxane	0.50	1	25-Aug-87	PNL	332
13	Tetrahydrofuran	0.10	1	25-Aug-87	PNL	332
14	Hydrazine Monohydrate	0.50	1	25-Aug-87	PNL	332
15	Borontrifluoride Methanol Complex	1.00	1	25-Aug-87	PNL	332
16						
17	Butyllithium/Benzene Mixture (1:3)	0.20	1	25-Aug-87	PNL 22-125	332
18						
19	Borontrifluoride/Methanol Mixture (14:86)	0.05	1	25-Aug-87	PNL	332
20						
21	Borontrifluoride Ether Complex	0.10	1	25-Aug-87	PNL	332
22						
23	2,4-Dinitrophenylhydrazine	0.03	1	25-Aug-87	PNL	332
24	Allyl Ether (100%)	.0005	1	25-Aug-87	PNL	332
25	Triethyl Aluminum	0.30	1	25-Aug-87	PNL 22-114	332
26	Naphthacene	0.003	1	25-Aug-87	PNL	332
27	2-Methylfuran (100%)	.0005	1	25-Aug-87	PNL	332
28	Tetrahydrofuran	3.80	1	25-Aug-87	PNL 22-125	331
29	1,4 Dioxane	1.00	1	25-Aug-87	PNL	331
30						
31	Perchloric Acid	0.14		09-Dec-87	UNC	100N Area
32	Magnesium Perchlorate	0.50		09-Dec-87	PNL	332
33	Tetrahydrofuran	0.48		09-Dec-87	PNL	332
34	Perchloric Acid	0.30		09-Dec-87	PNL	332
35	Trinitrotoluene	0.10		09-Dec-87	PNL	3714
36	Picric Acid	0.20		09-Dec-87	PNL	3714
37						
38	1,4 Dioxane	2.59		21-Jun-88	WHC	100N Area
39	Ethyl Ether	2.14		21-Jun-88	PNL	332

Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy
Demolition Sites. (sheet 3 of 4)

	Chemical	Amount (kg)	Container number/size	Detonation date	Reference ¹	Original location ²
1						
2						
3						
4	CLOSURE AREA NO. 2					
5	Perchloric Acid	0.13		21-Jun-88	PNL	332
6	Ethyl Ether	0.25		21-Jun-88	PNL	332
7	Picryl Chloride	0.08		21-Jun-88	PNL	332
8	Picric Acid	0.62		21-Jun-88	PNL	332
9	Lithium Triethylborohydride	0.90		20-Dec-88	PNL-24-556	332
10	Ethyl Ether	1.50		20-Dec-88	PNL-24-737	332
11	Ethyl Ether	10.80		20-Dec-88	PNL	332
12	2,2',4,4',6,6'-Hexanitrodi- phenylamine	0.05		20-Dec-88	PNL	332
13						
14	Picryl Chloride	0.03		20-Dec-88	PNL-24-764	332
15	1,4-Dioxane	0.50		20-Dec-88	PNL-24-764	332
16						
17	2,4-Dinitrophenylhydrazine	0.11		10-Feb-89	NONE	331
18						
19	Tetrahydrofuran	1.00		02-Mar-89	PNL-24-878	332
20	Hydrazine Monohydrate	0.80		02-Mar-89	PNL-25-054	332
21	2,4-Dinitrophenylhydrazine	0.20		02-Mar-89	PNL-25-114	331
22	Perchloric Acid	7.00		02-Mar-89	PNL-25-114	331
23	Ethyl Ether, anhydrous	1.00		02-Mar-89	PNL-25-114	331
24	Benzoyl Peroxide	0.45		02-Mar-89	PNL-25-114	331
25	Tetrahydrofuran	7.60		02-Mar-89	PNL-25-114	331
26	1,4-Dioxane	3.00		02-Mar-89	PNL-25-114	331
27	2,4,6,2',6'-Hexanitrodi- phenylamine	0.20		02-Mar-89	PNL-25-114	331
28						
29						
30	Picryl Chloride	0.06	1-4 oz	26-Apr-89	PNL-25-209	332
31	1,4 Dioxane	5.45	11-pt.	26-Apr-89	PNL-25-209	332
32	p-Dioxane	1.00	1-1/2 gal	26-Apr-89	PNL-25-209	332
33	Tetrahydrofuran	3.80	1-gal	26-Apr-89	PNL-25-209	332
34	Nitrocellulose/Isopropyl Alcohol	2.00	2-pt	26-Apr-89	PNL-25-209	332
35						
36	n-Butyl Ether	0.50	1-qt	26-Apr-89	PNL-25-209	332

Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy
Demolition Sites. (sheet 4 of 4)

CLOSURE AREA NO. 2

Chemical	Amount (kg)	Container number/size	Detonation date	Reference ¹	Original location ²
Dibutyl Tetra Ethylene Glycol	2.00	1-2 l	26-Apr-89	PNL-25-209	332
2-Methoxyethyl Ether	1.00	1-l	26-Apr-89	PNL-25-209	332
1,3,5-Trinitrobenzene	0.05	1-50 g	26-Apr-89	PNL-25-209	332
1,4 Diethoxybutane	0.50	1-pt	26-Apr-89	PNL-25-209	332
2-Ethoxybutanone	0.10	1-100 g	26-Apr-89	PNL-25-209	332
Dimethoxypropane	0.03	1-25 g	26-Apr-89	PNL-25-209	332
Di-tert-butyl-ether	0.03	1-25 g	26-Apr-89	PNL-25-209	332
2,4,6-Trinitro-m-toluene	0.10	1-100 g	26-Apr-89	PNL-25-209	332
Hexanitrodiphenylamine	0.03	1-100 g	26-Apr-89	PNL-25-209	332
Ammonium Perchlorate	0.45	1-500 g	26-Apr-89	PNL-25-210	332
Benzoyl Peroxide	0.10	1-100 g	26-Apr-89	PNL-25-210	332
Hydrazine Monohydrate	2.00	3-500 g	26-Apr-89	PNL-25-210	332
Tetrahydrofuran	4.00	1-gal	26-Apr-89	PNL-25-210	332
Sodium-Potassium Alloy	0.50	5-gal	26-Apr-89	WHC-25-134	3718-F
Sodium Azide	0.10	1-100 g	19-Jul-89	WHC-252-82	2101M/208
1,3,5 - Trinitrobenzene	0.05	1	06-Jun-90	PNL	300 AREA
Lithium Aluminum Hydride	1.00	1	06-Jun-90	PNL	300 AREA
Hydroxylamine Hydrochloride	0.25	1	27-Oct-91	10948	T-Plant

¹Disposal request letter (Appendix 4A).
²Building number unless otherwise noted.

PNL = Pacific Northwest Laboratories.
RHO = Rockwell Hanford Operations.
UNC = United Nuclear Company.
WHC = Westinghouse Hanford Company.

1 Table 4-2. Summary of Waste Treated at the Hanford Patrol Academy
2 Demolition Sites. (sheet 1 of 2)

3	Chemical identification	Quantity (kg)	Complete waste designation (40 CFR 261, WAC 173-303)
4	Closure Area No. 1		
5	2-Butoxyethanol	3.96	D001, D003, WT02
6	Ethyl ether	11.40	D001, D003, U117, WT02
7	Perchloric acid	3.12	D001, D002, D003, WT02
8	Tetrahydrofuran	5.82	D001, D003, U213, WT02
9	Subtotal	24.29	
10	Closure Area No. 2		
11	Allyl ether	0.0005	D001, D003, WT01
12	Ammonium perchlorate	0.45	D001, D003, WT02
13	Benzoyl peroxide	0.55	D001, D003
14	Boron trifluoride ether complex	0.50	D001, D002, D003, WP01
15	Boron trifluoride methanol	1.05	D001, D002, D003, WP01,
16	complex		WT02
17	Butyl ethanol;	7.00	D001, D003
18	syn. 2-hexanol		
19	n-butyl ether	0.52	D001, D003, WT02
20	Butyllithium/benzene mixture	0.20	D001, D003, D018, WC02,
21	(1:3)		WT01
22	Carbon disulfide	9.80	D001, D002, P022, WT02
23	Dibutyl tetraethylene glycol	2.00	D001, D003
24	1,4-Diethoxybutane	0.50	D001, D003
25	2,2-Dimethoxypropane	0.025	D001, D003
26	2,4-Dinitrophenol	0.50	D001, D003, P048, WT02
27	2,4-Dinitrophenylhydrazine	0.46	D001, D003
28	2,4-Dinitroresorcinol	0.07	D001, D003
29	1,4,-Dioxane (syn. p-Dioxane)	14.04	D001, D003, U108, WC01, WT02
30	2-Ethoxybutanone	0.10	D001, D003
31	(Ethylene) Glycol dimethyl ether	0.80	D001, D003
32	Ethyl ether	35.89	D001, D003, U117, WT02

Table 4-2. Summary of Waste Treated at the Hanford Patrol Academy
Demolition Sites. (sheet 2 of 2)

	Chemical identification	Quantity (kg)	Complete waste designation (40 CFR 261, WAC 173-303)
1	Hexanitrodiphenylamine	0.34	D001, D003
2	Hydrazine monohydrate	3.30	D001, D002, D003, U133, WC02
3	Hydroxylamine hydrochloride	0.25	D001, D003
4	Isopropyl ether	4.00	D001, D003, WT02
5	Lithium aluminum hydride	1.00	D001, D002, D003
6	Lithium triethylborohydride	0.90	D001, D002, D003
7	Magnesium perchlorate	1.00	D001, D003
8	2-Methoxyethyl ether	1.00	D001, D003
9	2-Methylfuran	0.0005	D001, D003, WT01
10	Naphthacene	0.003	WP03
11	Nitrocellulose/isopropyl alcohol	<2	D001, D003
12	A-Nitrosomethyl isobutyl ketone	0.17	D001, D003
13	Perchloric acid	73.54	D001, D002, D003, WT02
14	Picric acid	1.12	D001, D002, D003
15	Picryl chloride	0.46	D001, D003
16	Sodium azide	0.10	D001, D002, P105, WT02
17	Sodium-potassium alloy	0.50	D001, D002, D003
18	Tetrahydrofuran	70.96	D001, D003, U213, WT02
19	Triethylaluminum in toluene	0.30	D001, D003
20	1,3,5-Trinitrobenzene	0.10	D001, D003, U234, WT02
21	2,4,6-Trinitroresorcinol	0.025	D001, D003
22	2,4,6-Trinitrotoluene	0.30	D001, D003, WT02
23	Subtotal	235.84	
24			
25	Total waste treated	260.14	
26			

1 Table 4-3. Physical Properties and MTCA Method B Cleanup Levels for Discarded Chemical Products
 2 at the Hanford Patrol Academy Demolition Sites. (sheet 1 of 3)

Waste Identity, Quantity and Indexes	Quantity and Indexes			Physical Properties/Health Parameters							MTCA-Method B Soil Clean-Up Levels			
	Chemical Identification	Quantity (kg)	Merck Number	C.A.S.† Number	Phys. State at STP	Flash Point (°C)	Specific Gravity	Melting Point (°C)	Vapor Pressure (mm Hg)	Misc††	Oral Chronic RID (kg*d)/mg	Cancer Slope Factor (kg*d)/mg	Non-Cancer	Cancer
Allyl Ether	0.0005	290	557-40-4		liquid	-6	0.805			fl, tx				
Ammonium Perchlorate	0.450	568	7790-98-9		solid	350	1.950	130		fl, ss				
Benzoyl Peroxide	0.550	1128	94-36-0		solid	68	1.334	106	<1	ex, tx				
Boron Trifluoride Ether complex	0.500	1352	109-63-7		liquid	63.8	1.154	-60	45	fl, ms				
Boron Trifluoride Methanol cmpix	1.050		373-57-9		liquid	11	1.203	<38		fl				
2-Butoxyethanol	3.955	1559	111-76-2		liquid	60	0.902	-94	0.76	fl				
Butyl Ethanol; syn. 2-hexanol	7.000		626-93-7		liquid	41	0.810			com				
n-butyl ether	0.525	1568	142-96-1		liquid	25	0.764	-98	4.8	fl				
Butyllithium/Benzene mix. (25:75)	0.200													
Butyllithium (in cyclohexane)			598-30-1		liquid	-17	0.769			pyr, ms				
Benzene		1074	71-43-2		liquid	-11	0.877	6	75	ex, tx, fl	2.90E-02		3.40E+01	
Carbon Disulfide	9.800	1818	75-15-0		liquid	-30	1.266	-111		fl, tx	1.00E-01		8.00E+03	
Dibutyl Tetraethylene Glycol	2.000													
1,4-Diethoxybutane	0.500													
2,2-Dimethoxypropane	0.025		77-76-9		liquid	-11	0.847	-47	74	ex				
2,4-Dinitrophenol	0.500	3274	51-28-5		solid	ex	1.683	115		ex, tx, fl	2.00E-03		1.60E+02	
2,4-Dinitrophenylhydrazine	0.463	3277	119-26-6		solid	209		194	dec	fl, ex				
2,4-Dinitroresorcinol	0.070	3278	519-44-8		solid	ex		146		ex, hs				
1,4-Dioxane; syn. p-Dioxane	14.040	3294	123-91-1		liquid	12	1.036	12	27	fl, tx	1.10E-02		9.10E+01	
2-Ethoxybutanone	0.100													
(Ethylene) Glycol Dimethyl Ether	0.800	3213	110-71-4		liquid	-6	0.867	-58	61.2	fl				
Ethyl Ether	47.296	3762	60-29-7		liquid	-45	0.700	-123	442	fl, ex	2.00E-01		1.60E+04	
Hexanitrodiphenylamine	0.345	3340	131-73-7		solid	29	1.640	243	dec	ex				
Hydrazine Monohydrate	3.300	4692	7803-57-8		liquid	76	1.032	-50		fl, rv, tx				
Hydroxylamine Hydrochloride	0.250	4759	5470-11-1		solid	140	1.670	151	dec	ex, ms				
Isopropyl Alcohol†††; syn. Propanol	<2	5096	67-63-0		liquid	11.7	0.786	-89	40	fl				

T4-3.1

Table 4-3. Physical Properties and MTCA Method B Cleanup Levels for Discarded Chemical Products at the Hanford Patrol Academy Demolition Sites. (sheet 2 of 3)

Waste Identity, Quantity and Indexes	Quantity and Indexes			Physical Properties/Health Parameters							MTCA-Method B Soil Cleanup Levels			
	Chemical Identification	Quantity (kg)	Merck Number	C.A.S.† Number	Phys. State at STP	Flash Point (°C)	Specific Gravity	Melting Point (°C)	Vapor Pressure (mm Hg)	Misc††	Oral Chronic RiD (kg*d)/mg	Cancer Slope Factor (kg*d)/mg	Non-Cancer	Cancer
Isopropyl Ether	4.000	5100	108-20-3		liquid	-28	0.726	-86	150	ss, fl				
Lithium Aluminum Hydride	1.000	351	16853-85-3		solid	fl	0.917	125	dec	fl, rv, ms				
Lithium Triethylborohydride	0.900		22560-16-3		liquid	-17	0.920			fl, rv, ms				
Magnesium Perchlorate	1.000	5557	10034-81-8		solid	dec	1.980	251	dec	ex, fl				
2-Methoxyethyl ether	1.000	3148	111-96-6		liquid	57	0.945	-64	1.7	cm				
2-Methylfuran	0.0005		534-22-5		liquid	-30	0.914	-89	139	fl, tx				
Naphacene	0.003	6288	92-24-0		solid	unk	1.350	>300		ss, rv				
Nitrocellulose †††	<2	8022	9004-70-0		solid	4	1.660			fl, ex				
a-Nitrosomethyl Isobutyl ketone	0.174													
Perchloric Acid	76.653	7110	7601-90-3		liquid	dec	1.764	-4	unk	ex				
Picric Acid	1.120	7380	88-89-1		liquid	unk	1.000	0	14	ex				
Picryl Chloride	0.465	7390	88-88-0		solid	unk	1.797	83	unk	ex				
Sodium Azide	0.100	8526	26628-22-8		solid	fl	1.846			ex, rv, tx	4.00E-03		3.20E+02	
Sodium-Potassium Alloy (NaK)	0.500		11135-81-2		liquid	fl	0.847	19		ex, rv				
Tetrahydrofuran	76.780	9144	109-99-9		liquid	-14	0.889	-108	145	fl				
Triethylaluminum in Toluene	0.300	324	97-93-8		liquid	4	0.848	-95		pyr, ms				
1,3,5-Trinitrobenzene	0.100	9639	99-35-4		solid	fl	1.688	122	0.39	ex, ss	5.00E-05		4.00E+00	
2,4,6-Trinitroresorcinol	0.025	8828	82-71-3		solid	ex		180		ex, ss				
2,4,6-Trinitrotoluene	0.300	9643	118-96-7		solid	fl	1.654	80	0.04	dec, tx	5.00E-04	3.00E-02	4.00E+01	3.30E+01

Abbreviations:

com-combustible
dec-decomposes
ex-explosive
fl-flammable
hs-heat sensitive

ms-moisture sensitive
pyr-pyrophoric
rv-reactive
ss-shock sensitive
STP-standard temperature and pressure
tx-toxic

unk-unknown

Notes:

†C.A.S. - Chemical Abstract System Registry Numbers

††Reactivity/Characteristic

†††Nitrocellulose and Isopropyl Alcohol occurred as a 2 kg mixture of unknown proportions

T4-3.2

1 Table 4-3. Physical Properties and MTCA Method B Cleanup Levels for Discarded Chemical Products
 2 at the Hanford Patrol Academy Demolition Sites. (sheet 3 of 3)

Equations:

$$\text{Non-Cancer Cleanup Level} = (\text{RID} \cdot \text{ABW} \cdot \text{UCF} \cdot \text{HQ}) / (\text{SIR} \cdot \text{ABI} \cdot \text{FOC})$$

$$\text{Cancer Cleanup Level} = (\text{RISK} \cdot \text{ABW} \cdot \text{LIFE} \cdot \text{UCF}) / (\text{SIR} \cdot \text{ABI} \cdot \text{DUR} \cdot \text{FOC}) / \text{Cancer Slope Factor}$$

Parameters:

	Units	Units	
		non-cancer	cancer
Unit Conversion Factor (UCF)	mg/kg	1E+06	1E+06
Average Body Weight (ABW)	kg	16	16
Soil Ingestion Rate (SIR)	mg/day	200	200
Gastrointestinal Absorption Rate (ABI)		1	1
Frequency of Contact (FOC)		1	1
Hazard Quotient (HQ)		1	
Lifetime (LIFE)			75
Duration of Exposure (DUR)	yrs		6
Cancer Risk Level (RISK)	yrs		1E-06

T4-3.3

Table 4-3. Hanford Patrol Academy Demolition Site Discarded Chemical Products Physical Properties and MTCA Method B Clean-Up Levels

Equations:

Non-Cancer Cleanup Level = $(RfD \cdot ABW \cdot UCF \cdot HQ) / (SIR \cdot ABI \cdot FOC)$

Cancer Cleanup Level = $(RISK \cdot ABW \cdot LIFE \cdot UCF) / (SIR \cdot ABI \cdot DUR \cdot FOC) / \text{Cancer Slope Factor}$

Parameters:

	Units	Units	
		non-cancer	cancer
Unit Conversion Factor (UCF)	mg/kg	1E+06	1E+06
Average Body Weight (ABW)	kg	16	16
Soil Ingestion Rate (SIR)	mg/day	200	200
Gastrointestinal Absorption Rate (ABI)		1	1
Frequency of Contact (FOC)		1	1
Hazard Quotient (HQ)		1	
Lifetime (LIFE)			75
Duration of Exposure (DUR)	yrs		6
Cancer Risk Level (RISK)	yrs		1E-06

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5.0 GROUNDWATER MONITORING

Based on knowledge of the demolitions conducted at the HPADS, and on limited but pertinent groundwater information, it is considered extremely unlikely that the demolition site chemicals interacted with groundwater because (1) rainfall at the Hanford Site is slight, thus limiting contaminant migration, and (2) it is believed that all significant quantities of chemicals were destroyed in the explosion or volatilized to the atmosphere.

A characterization of groundwater quality and geohydrologic conditions in the vicinity of HPADS is presented in Appendix 5A. Groundwater wells that monitor the uppermost unconfined aquifer exist at two locations near the HPADS. At one of the locations, a well also monitors the uppermost confined aquifer. These wells were constructed before RCRA standards, and are not optimally located to monitor flow underneath the HPADS. Groundwater at the wells currently is monitored as part of the Hanford sitewide environmental surveillance program conducted by Pacific Northwest Laboratory under U.S. Department of Energy Order 5400.1.

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter describes the closure strategy, closure performance standards, and overview of closure activities.

6.1 CLOSURE STRATEGY

Clean closure is the proposed closure strategy (Figure 6-1). Data from chemical analyses of soil samples will be used to confirm closure. All other materials (e.g., buildings) were purposely kept beyond the potential influence of the demolition events. Therefore, only the soil media will be tested to determine closure.

Soil samples have been taken in and adjacent to the boundaries of the HPADS as specified in the Sampling and Analysis Plan (SAP) (Appendix 7C). In order to clean close the HPADS, soil analytical results must verify that potentially dangerous waste constituents treated at the site are not present above action levels. The analytical results will be evaluated and compared with action levels to verify that the concentration of all detonation activity residues are at or below action levels. The closure area boundary locations, constituents of concern, and the analytical methods were agreed on through the DQO process by taking into account the waste inventory, reactive by-products, chemical degradation, and detonation materials. The analytical methods are listed in the SAP (Appendix 7C).

Action levels are defined as levels above the Hanford Site soil background levels identified in the *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 1993) and the *Model Toxics Control Act* (MTCA) (WAC 173-340) Method B. If data indicate that levels are above both these guidelines, a Phase II investigation will be developed. This is not anticipated because of the efficiency of the detonation reaction and weathering of unreacted residues.

For noncarcinogens, the principal variable relating human health to action levels is the oral reference dose. It is defined as the level of daily human exposure at or below which no adverse effect is expected to occur during a lifetime. For carcinogens, the cancer slope factor is the basis for determining human health effects; it is a measurement of risk per unit dose. The oral reference dose and cancer slope factor are chemical specific and are obtained from the integrated risk information system (IRIS) database (EPA 1989). Health-based levels will be based on values that are current at the time of approval of this plan.

The HPADS is not located within the boundaries of a *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) operable unit. If, in the course of closure, contaminants not associated with the operation of the TSD unit are detected, a solid waste management unit (SWMU) will be created and the site will be remediated as a RCRA past practice (RPP) activity.

1 **6.2 CLOSURE PERFORMANCE STANDARDS**
2

3 The closure performance standards in WAC 173-303-610(2) require the owner
4 or operator to close the TSD unit in a manner that:
5

6 "(a)(i) Minimizes the need for further maintenance;
7

8 (ii) Controls, minimizes or eliminates to the extent necessary to
9 protect human health and the environment, postclosure escape of
10 ~~dangerous waste, dangerous constituents, leachate, contaminated~~
11 ~~run-off, or dangerous waste decomposition products to the ground,~~
12 ~~surface water, ground water, or the atmosphere; and~~
13

14 (iii) Returns the land to the appearance and use of surrounding
15 land areas to the degree possible given the nature of the previous
16 dangerous waste activity."
17
18

19 **6.2.1 Minimize the Need for Future Maintenance**
20

21 The closure performance standard in WAC 173-303-610(2)(a)(i) requires the
22 owner or operator of a TSD unit to close the site in a manner that minimizes
23 the need for further maintenance. As discussed in Section 6.1, the strategy
24 proposed for closure (i.e., that the site is clean by demonstration that the
25 contaminants are below action levels or by waste removal) will minimize the
26 need for future maintenance.
27
28

29 **6.2.2 Protect Human Health and the Environment**
30

31 The HPADS is to be clean closed. Consistent with this intent and
32 strategy, the following actions will be/or have been taken (as necessary) in
33 advance of closure certification.
34

- 35 • Surface soils will be sampled and analyzed for dangerous waste
36 constituents.
- 37
- 38 • If necessary, contaminated soil will be removed to attain acceptable
39 soil cleanup values as determined by methods prescribed in
40 WAC 173-340. Verification sampling and analysis will be performed.
41
42

43 **6.2.3 Return Land to the Appearance and Use of Surrounding Land**
44

45 In accordance with WAC 173-303-610(2)(a)(iii), the owner or operator of a
46 TSD unit is required to close the unit in a manner that returns the land to
47 the appearance and use of surrounding land areas to the degree possible given
48 the nature of the previous dangerous waste activity.
49

50 When clean closed, the HPADS closure areas will be returned to the
51 Hanford Patrol Academy. The Hanford Patrol Academy training activities are
52 expected to continue to about the year 2050.

1 The proposed mode of closure for the HPADS is clean closure. No
2 specific closure activities are proposed for the demolition sites that would
3 involve reconfiguration of the surface of the sites. However, minor regrading
4 or revegetation may be performed for fire prevention or safety reasons (e.g.,
5 bullet ricochets). In the present condition, the demolition sites conform to
6 the use and appearance of surrounding land.
7

8 9 **6.3 OVERVIEW OF CLOSURE ACTIVITIES**

10
11 The activities presented in this section are divided into planning and
12 physical activities.
13

14 15 **6.3.1 Planning Activities**

16
17 The DQO planning process was used to ensure that the performance
18 standards are met to the satisfaction of all the stakeholders. This DQO
19 process provided the framework for the SAP and defined the data needs and
20 uses. The SAP provides the documentation of agreement and decisions regarding
21 establishing and meeting action levels for the HPADS.
22

23 24 **6.3.2 Physical Activities**

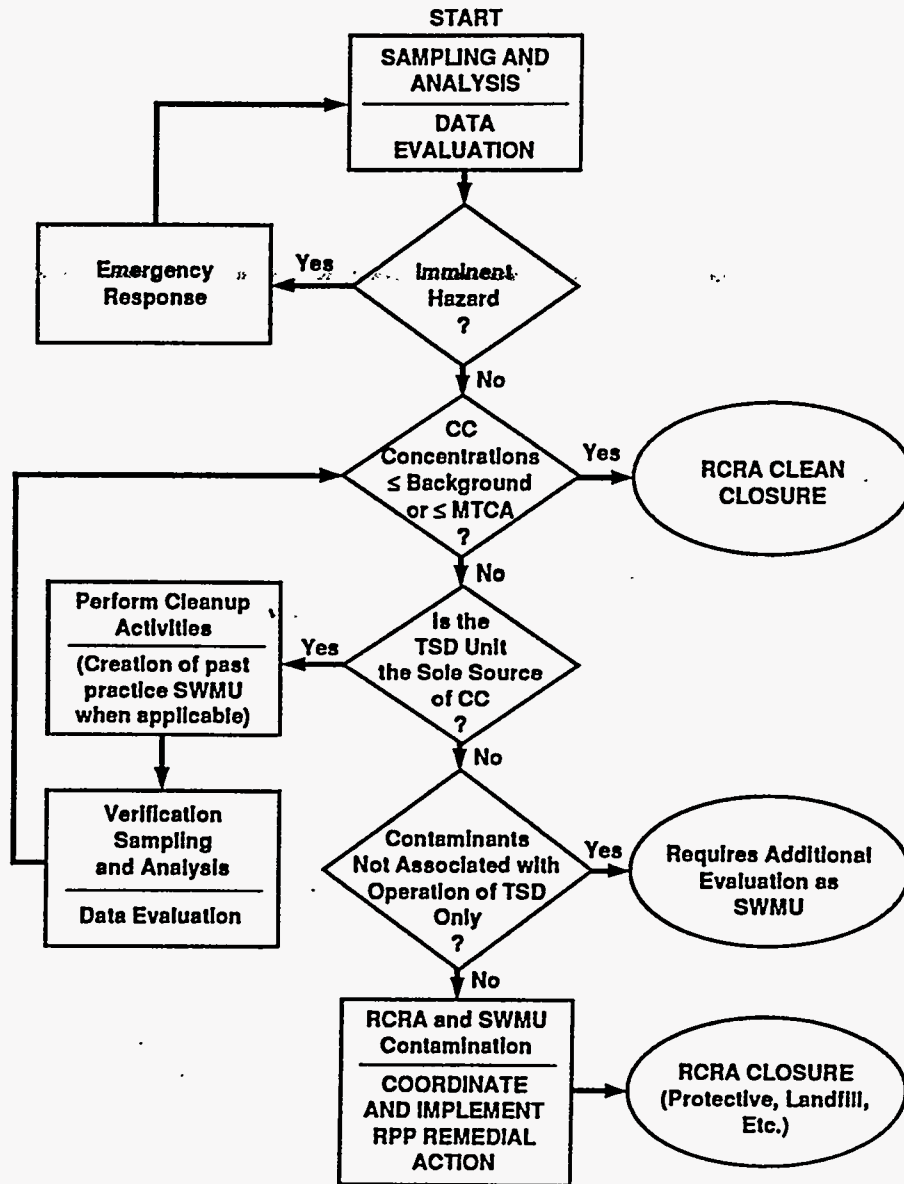
25
26 The physical activities that lead to closure are as follows. The details
27 of the closure activities are provided in Chapter 7.0.
28

- 29 • Collect soil samples from within the closure areas and from
30 surrounding soils. Sample locations and collection methods are
31 discussed in Chapter 7.0, Section 7.2.3, Sampling Methodology.
32
- 33 • Analyze samples in accordance with EPA-approved procedures and
34 evaluate analytical results. Samples will be analyzed in an offsite
35 contract laboratory capable of performing to EPA Analytical level III
36 standards.
37
- 38 • Compare analytical results to action levels to determine the presence
39 or absence of contaminants, to determine the extent of contamination,
40 or to facilitate decisions concerning remediation.
41
- 42 • If contamination levels for all constituents of concern listed in
43 Chapter 7.0, Table 7-1, are below the action levels, the HPADS will be
44 clean closed.

- 1 • If contamination at the HPADS is above the action levels in the
2 near-surface soils, one of the following actions will be taken.
3
4 - If the contamination is from HPADS activities only, soil will be
5 treated and/or disposed of in a RCRA-permitted landfill.
6
7 - If the soil is contaminated with dangerous waste constituents from
8 other sources in addition to HPADS activities, the site will be
9 evaluated as a new SWMU. The site would then be turned over for RPP
10 remediation.
11
12 - If the soil is contaminated only from sources other than HPADS
13 activities, the site will be evaluated as a new SWMU and remediation
14 will occur under RPP remedial action of the SWMU.
15

16 All equipment used in performing closure activities will be
17 decontaminated or disposed of at a RCRA-permitted facility.
18

19 Closure activities will be monitored by an independent registered
20 professional engineer who will certify that closure activities are
21 accomplished in accordance with the specifications of the approved closure
22 plan. The certification will be sent by registered mail or an equivalent
23 delivery service.



H9410016.1

- CC = Contaminants of concern.
- Background = Hanford Site-wide background threshold (upper limit of the range of concentrations) for soil (DOE-RL 1993).
- Clean Closure = Closure based on the criterion that dangerous waste is not present in concentrations greater than background or MTCA Method B; no further remedial action to be taken.
- RPP = RCRA past practice.
- DW = Dangerous waste as defined in WAC 173-303.
- SWMU = Solid Waste Management Unit
- Verification Sampling = Sampling and analysis used to evaluate the success of contaminant removal.

Figure 6-1. Closure Strategy Flowchart.

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1
2
3
4 **7.0 CLOSURE ACTIVITIES**

5 This chapter describes the proposed closure activities for the HPADS. In
6 conformance with Chapter 6.0, this chapter provides the specific field
7 sampling and laboratory analytical procedures that will be applied to identify
8 the soil contamination (if any) that originated from TSD unit activities at
9 the HPADS. When validated, the analytical results will be used to determine
10 the appropriate closure strategy (presented in Chapter 6.0 and illustrated in
11 Figure 6-1). The SAP (Appendix 7C) has been developed from the process
12 information (Chapter 3.0), waste inventory (Chapter 4.0), and the closure
13 strategy (Chapter 6.0). Appendix 7A is the quality assurance project plan
14 (QAPjP) for soil sampling and analysis.
15

16 **7.1 GROUND-PENETRATING RADAR SURVEY**

17
18 As discussed in Chapter 2.0, in 1975 a canister of napalm B might have
19 been buried in one of the HPADS closure areas. Although this napalm canister
20 was not associated with the RCRA activities at the HPADS, there was a concern
21 that the canister might be encountered during sampling of the closure areas
22 and could be a threat to the sampling personnel. Therefore, to ensure worker
23 safety, a ground-penetrating radar (GPR) survey was planned to check the
24 closure areas to determine if the canister was present in the shallow
25 subsurface of either area. On September 26, 1994, a preliminary GPR survey
26 was performed. Because of the presence of copious foreign debris (e.g.,
27 bullets, spent cartridges) and rocks, anomalous radar signatures were
28 generated. Ground-penetrating radar personnel determined that the presence or
29 absence of the canister could not be ascertained. Because sampling of the
30 HPADS was completed on September 26, 1994 without incident, no further action
31 will be taken to locate the napalm canister.
32

33 Performance of GPR surveys is described in Environmental Investigation
34 Instructions (EII) 11.2, "Geophysical Survey Work, Appendix A: Ground-
35 Penetrating Radar" (WHC 1988a). This EII provides descriptions of the
36 equipment used, calibration, maintenance, and data collection procedures, and
37 data interpretation.
38
39

40 **7.2 SOIL SAMPLING AND ANALYSIS CRITERIA**

41
42 The DQO planning process was used to develop a two-phase soil sampling
43 and analysis approach. Phase I soil samples were collected to assess whether
44 dangerous waste constituents are present in surface soils at the two HPADS
45 closure areas. These samples were analyzed at an offsite analytical level III
46 laboratory. If contaminants are present at levels in excess of proposed
47 action levels, the stakeholders will reconvene and a Phase II sampling program
48 will be planned.

1 7.2.1 Sampling and Data Quality Objectives
2

3 To create a suitable soil sampling and analysis scheme, it was necessary
4 to have a general understanding of explosives and detonations. An explosive
5 is a chemical or a mixture of chemicals capable of producing an explosion
6 (i.e., detonation) through the liberation of stored energy. All explosive
7 substances produce heat; nearly all of them produce gas (Davis 1943).
8 Explosives are classified as low explosives (or propellants), primary
9 explosives (or initiators), and high explosives. Low explosives are
10 combustible materials, which always include an oxidizer component, such that
11 combustion is supportable whether or not air is present. Low explosives burn
12 but do not explode. Instead, rapid accumulation of the gas products of
13 combustion in a confined space is the cause of the explosion.
14

15 Primary and high explosives undergo an instantaneous chemical
16 transformation when detonation is initiated, which liberates large quantities
17 of heat or heat and gas, thus producing an explosion. Detonation is distinct
18 from combustion. By themselves, many primary and high explosives will not
19 support combustion. Primary explosives are sensitive to both heat and shock.
20 High explosives generally exhibit sensitivity to shock only, and generally
21 must receive a relatively strong shock, as from a primary explosive, to
22 detonate. Primary and high explosives are characterized by a property termed
23 brisance, referring to the production of a shock wave during detonation,
24 because of the characteristically high propagation velocities involved.
25

26 Chemicals that were identified as candidates for demolition at the HPADS
27 included strong oxidizers and reducing agents (i.e., low explosives when
28 combined), chemicals such as ethers and furans that are highly flammable and
29 form shock-sensitive degradation products, and chemical compounds that were
30 recognized as primary or high explosives or chemical cognates of such
31 explosives.
32

33 The HPADS demolition events could be characterized as follows.
34

- 35 • Initiation by a primary explosive, resulting in propagation of a
36 shock wave through the mass of chemical containers. The shock wave
37 would have caused any other primary or high explosive chemicals
38 present to detonate.
39
- 40 • Nonexplosive chemicals would be dispersed (in the case of solids), or
41 atomized (in the case of liquids), directed upward (the only
42 unconfined direction) by the partial confinement of the shallow pit,
43 and ignited by the heat released by the explosion, causing the
44 fireball. The explosion also could have had the effect of fragmenting
45 some of the chemicals that were present.
46
- 47 • The shock wave from the explosion and the expanding gases from the
48 fireball would have caused unreacted residues (if any) to be dispersed
49 within 3 radii [15 feet (4.6 meters)] of the original blasting
50 surface.
51

1 Before October 1984, HPADS demolition of individual containers was
2 initiated by rifle fire. For most demolition events after 1984, the assembled
3 collection of chemical containers was wrapped with detonating cord (a primary
4 explosive), surrounded by a blasting agent (propellant) and/or a high
5 explosive (dynamite), and initiated electrically. In each multiple-chemical
6 demolition event, detonation was typically accompanied by a distinct fireball
7 (indicative of combustion).
8

9 Some chemical residues can persist in the surface soil for many years.
10 However, in the intervening time since the most recent demolition event on
11 October 27, 1991, volatile organic residues in the soil might have been lost
12 to the atmosphere through vaporization. Unreacted volatiles and
13 semivolatiles also might have been reduced in the soil column by microbial
14 activity and exposure to the desert environment (e.g., volatilization and
15 photodegradation).
16

17 The primary objective of soil sampling is to determine whether dangerous
18 waste contaminants are present in surface soils at the HPADS at levels
19 exceeding the proposed action levels. Potential contaminants (i.e.,
20 constituents of concern) were selected based on the waste inventory for the
21 HPADS. Analytical methods were required to provide the capabilities to
22 identify and quantify these constituents if the constituents are present in
23 the soil.
24

25 If dangerous waste constituents are present at or above proposed action
26 levels, a second objective of sampling is to determine the extent and areal
27 distribution of contamination. The efficiency of thermal destruction during
28 the demolition events is not directly assessable at this late date. Any
29 chemical constituents that were not effectively destroyed in the explosion
30 simply might have been dispersed across the detonation site. Recognizing this
31 possibility, the sampling scheme was designed to obtain data that will, if
32 necessary, support an assessment regarding the adequacy of existing HPADS
33 closure area dimensions.
34

35 It is generally acknowledged that detonation and thermal destruction are
36 efficient processes, and that any dangerous waste constituents that might
37 remain in the soil at either closure area probably would exist at very low
38 concentrations, such that detection might be difficult. Therefore, a
39 sufficiently conservative EPA analytical support level (level III) was invoked
40 for analysis to minimize concerns that dangerous waste concentrations above
41 the proposed action levels would be undetected.
42

43 Data quality objectives were developed to describe the overall level of
44 uncertainty in environmental data that decisionmakers are willing to accept.
45 Typically, data quality requirements are specified in terms of objectives for
46 precision, accuracy, representativeness, comparability, and completeness.
47 Project-specific DQOs for HPADS soil sampling activities are identified in
48 Appendix 7A and the SAP (Appendix 7C).
49
50

1 **7.2.2 Analytical Parameters**
2

3 As listed in Chapter 4.0, Tables 4-1 through 4-3, the demolition events
4 at the HPADS closure areas included a variety of organic and inorganic
5 constituents that were (or were suspected to be) characteristic reactive
6 and/or ignitable waste (as defined in WAC 173-303-090). The majority of the
7 chemical compounds were of two general types: (1) organic chemicals that form
8 unstable degradation products (e.g., ethers and furans that produce
9 shock-sensitive peroxides) and (2) reactive powdered metals and metal salts.
10 The analytical methods of interest for Phase I soil sampling are listed in
11 Section 6.0 of the SAP (Appendix 7C).
12
13

14 **7.2.3 Soil Sampling Methodology**
15

16 The following sections discuss sample locations, background samples, and
17 analytical instrumentation and procedures.
18

19 **7.2.3.1 Sample Locations.** Soil samples were taken from the locations
20 indicated in the SAP (Appendix 7C). The numbers and types of samples
21 collected and submitted for analysis per EII procedures consisted of the
22 following.
23

24 **Closure Area No. 1:**
25

- 26 • Eleven soil samples were collected for full analysis from region A and
27 B in Closure Area #1 as shown in Figure 2 of the SAP (Appendix 7C).
28 Four samples were collected in Region A, where the detonations
29 occurred. Seven samples were collected in region B, where any
30 unreacted residues would have been distributed as a result of grading
31 (Chapter 3.0).
32
- 33 • Two field split samples were collected from region A for full
34 analysis.
35

36 **Closure Area No. 2:**
37

- 38 • Fourteen soil samples were collected for full analysis from specific
39 locations within a 15-foot (4.6-meter) radius centered about the
40 detonation pit as shown in Figure 3 of the SAP (Appendix 7C).
41
- 42 • Two field split samples were collected from the center of the
43 detonation pit for full analysis.
44

45 The Phase I sampling activities at Closure Areas #1 and #2 occurred on
46 the same day (September 26, 1994); therefore, one equipment blank (silica
47 sand) for full analysis and one trip blank (silica sand) for volatile organic
48 analysis only were collected.
49

50 Samples were collected using decontaminated hand tools at each closure
51 area. At each location sampled, windblown soil and debris were pushed
52 aside. Samples were taken from two distinct intervals 0 to 6 inches (0 to

1 15 centimeters) and 12 to 18 inches (30 to 46 centimeters) below grade, as
2 specified in the SAP (Appendix 7C). Chemical residues from the demolition
3 events would have been deposited on the surface of the soil column. Over
4 time, the soluble constituents would have undergone gradual removal by
5 successive wetting fronts (from rainfall and snowmelt events) and redeposited
6 lower in the soil profile. With the proposed sampling approach, leachable or
7 otherwise mobile constituents that might have been reduced to concentrations
8 below detection limits at the soil surface still could be detected at depth.
9 If volatile organics remain in the soil at the closure areas, they will be
10 more readily detectable at shallow depths below the soil surface, rather than
11 in the 0 to 6-inch (0 to 15-centimeter) interval. Specific soil sample
12 locations and depths are described in the SAP (Appendix 7C). The soil samples
13 were analyzed at an offsite, level III laboratory.
14

15 Soil samples (including blanks and field splits) received preassigned
16 sample numbers in conformance with EII 5.10, "Obtaining Sample Identification
17 Numbers and Accessing HEIS Data" (WHC 1988a). The samples were chilled on ice
18 per EII procedures. Samples were stored temporarily and transported to the
19 analytical laboratory in an ice chest.
20

21 **7.2.3.2 Background Samples.** A Hanford Sitewide assessment of natural
22 constituent background levels has been performed (WHC 1991a; WHC 1991b). The
23 majority of dangerous waste constituents detonated at the HPADS closure areas
24 were organic chemicals, for which background values are unavailable. For
25 these constituents, concentration data will be compared to MTCA Method B
26 levels. A few compounds on the waste inventory contained inorganic metal and
27 halide elements. Residues from these compounds could include oxides, cations,
28 and/or various anions with nonzero background values. Results from the
29 Hanford Sitewide assessment will be available for use in data interpretation.
30 The adequacy of available Hanford Sitewide background data for HPADS site-
31 specific contaminants will be evaluated in conjunction with the interpretation
32 of soil sample analytical results. No independent assessment of local
33 background values is planned to support closure.
34
35

36 **7.2.4 Field Documentation**

37
38 The field team leader maintained a logbook during soil sampling and GPR
39 surveying activities, in accordance with EII 1.5, "Field Logbooks"
40 (WHC 1988a). Information pertinent to ongoing activities at the closure areas
41 was recorded in a legible manner with indelible ink in the logbook.
42
43

44 **7.2.5 Evaluation of Data**

45
46 Data reliability will be evaluated through a review of field
47 documentation, sample handling procedures, analytical procedures, offsite
48 laboratory documentation, and calibration records. The purpose of the review
49 will be to establish the reliability of the data by verifying that the samples
50 were labeled, handled, and controlled in a manner designed to minimize the
51 possibility of physical misidentification. Procedures for quality control
52 documentation will follow SW-846, Chapter 1, "Quality Assurance" (EPA 1990).

Analytical data returned from the contract laboratory will be validated according to requirements described in *Data Validation Procedures for Chemical Analyses* (WHC 1993).

7.2.6 Statistical Evaluation

Analytical results will be reviewed and summarized. Procedures for calculating detection and quantitation limits of constituents and for reporting of data will follow the guidance in SW-846, Chapter 1, "Quality Assurance" (EPA 1990) and *Characterization and Use of Soil and Groundwater Background for the Hanford Site* (WHC 1991a). Constituents will be eliminated from further consideration in cases where all results are below detection limits (provided the detection limit is below background). For the remaining constituents, data will be tabulated for statistical evaluation. Summary statistics will be computed. The following information for individual constituents will be summarized for presentation:

- Total number of values
- Number of values less than detection limits
- Minimum value
- Maximum value
- Median
- Mean
- Standard deviation
- Coefficient of variation.

Data analysis and evaluation procedures will be used that: (1) balance the false positive and false negative error rates; (2) are appropriate for the distribution of sample data for each analyte; and (3) are consistent with the nature of the data (e.g., the proportion of 'nondetects' in the data sets) and the applicable regulatory limits (background values or risk-based standards). Appropriate statistical methods might include (but would not be limited to) tests on means, percentiles, and/or proportions.

7.2.7 Determination of Proposed Action Levels

Soil cleanup action levels were developed from Hanford Site background threshold values (DOE-RL 1993) and MTCA Method B (WAC 173-340). Action levels were developed for all contaminants of concern during the DQO process (Appendix 7C). Contaminant levels will be compared to proposed action levels to assess the need for remedial action. If a determination is made that some remedial action is necessary as a condition of closure, a remedial action plan will be prepared.

1 **7.3 REMOVAL OF CONTAMINATED SOIL**
2

3 If soil sampling results and assessments of remedial options indicate
4 that soil removal is necessary to close the HPADS, this section of the closure
5 plan will be implemented as indicated in Figure 6-1. This section describes
6 the following activities relating to soil removal:
7

- 8 • Estimating the volume of contaminated soil to be removed
- 9 • Soil removal survey control
- 10 • ~~Soil removal operations~~
- 11 • Verification sampling.
- 12
- 13

14 **7.3.1 Estimating the Volume of Contaminated Soil to be Removed**
15

16 The volume of contaminated soil will be determined based on soil sampling
17 results (i.e., the indicated constituents and their respective concentrations
18 and distributions) and the constituent-specific proposed action levels
19 (i.e., soil cleanup values). The volume of contaminated soil will be
20 calculated in the following manner.
21

- 22 • Soil sample information will be plotted on a closure area plan
23 drawing.
- 24
- 25 • For each contaminated area, the volume of soil to be removed will be
26 estimated by the results obtained in the initial characterization.
- 27
- 28 • A Phase II investigation will be proposed to define the location of
29 soil constituents of concern. The location of the site contamination
30 must be known with some degree of certainty to begin any soil
31 excavation. Supplemental sampling with portable field screening
32 instrumentation might be carried out to better define the areal extent
33 of contamination.
- 34
- 35

36 **7.3.2 Soil Removal Survey Control**
37

38 Corner stakes have been installed at each closure area boundary to
39 provide survey control for soil sampling. Corner monuments may be installed
40 to serve as control points (i.e., semipermanent reference points with known
41 horizontal and vertical coordinates) for any soil removal excavation work.
42 If removal of contaminated soil at either closure area is necessary for
43 closure, additional survey control may be provided as needed to effectively
44 manage and document the excavation work. As preliminary actions, a survey
45 grid will be projected over the area to be excavated, and a controlled drawing
46 of the existing site topography will be prepared identifying all control point
47 positions and soil sample locations. Depending upon the size and shape of the
48 excavation area, elevation surveys and grade stakes will be used (as
49 appropriate) to control the work. The controlled drawing will be modified to
50 show the extent of soil removed and the final site surface configuration.
51 Afterward, the survey grid and the drawing(s) will assist in location control
52 and documentation for verification sampling.

1 **7.3.3 Soil Removal Operations**
2

3 If soil removal is necessary and if the contaminated soil volume is
4 sufficient, the soil removal operation will be performed using standard types
5 of earth-moving equipment (e.g., grader, front-end loader, backhoe, and rear
6 dump trucks). Excavation will be performed with either a backhoe or a
7 front-end loader. Dust suppression would be employed, if needed, to minimize
8 dust generation and potential releases of contaminants (e.g., a water truck
9 could apply water periodically to the excavation area and adjacent affected
10 areas). Dust-control activities will be repeated as necessary to maintain the
11 soil in a condition sufficient to minimize or eliminate dust production.
12

13 If the contaminated soil volume is small, 55-gallon (208-liter)
14 containers will be used. Alternatively, soil could be bulk loaded into rear
15 dump trucks. Contaminated soil (containerized or bulk loaded) will be
16 transported to a permitted (or interim status) disposal facility.
17 Contaminated soil will be prepared for shipment (i.e., labeled, marked, and
18 placarded) as required in WAC 173-303-190, which incorporates by reference the
19 applicable federal regulations on hazardous waste shipments (49 CFR 172, 173,
20 178, and 179). An EPA hazardous waste manifest will be prepared to document
21 each offsite shipment of contaminated soil as required in WAC 173-303-180 and
22 40 CFR 262.
23

24 If soil removal is necessary, the affected area will be recontoured with
25 surrounding soils. After excavation and before recontouring of the removal
26 areas, the affected area will undergo verification sampling (Chapter 6.0,
27 Figure 6-1). Recontoured surface elevations will be checked against firing
28 range design elevations to ensure that the firing range can fulfill its
29 intended purpose. A final revision of the controlled closure area map will be
30 prepared to show the 'as built' configuration of the firing range.
31

32 As appropriate, the destination of any removed soil will be identified in
33 the Administrative Record for HPADs. This identification will be undertaken
34 concurrently with the closure certification (Section 7.8).
35
36

37 **7.3.4 Verification Sampling**
38

39 Verification sampling will be performed following soil removal to
40 establish that residual concentrations of the constituents of concern are
41 below action levels (i.e., the objective of soil removal has been attained).
42 Verification samples will be taken from the newly exposed surface resulting
43 from soil removal. Verification samples will be analyzed in an offsite
44 contracted laboratory. The scope of sample analysis will be limited to
45 quantifying the residual concentrations of constituents of concern to compare
46 these concentration values to the cleanup standards. Before verification
47 sampling, the number and location of the samples and the analytical methods
48 will be submitted for regulatory concurrence. It is envisioned that
49 verification samples would be analyzed by the same procedures identified in
50 Section 7.2.2.
51
52

1 **7.4 PERSONNEL TRAINING**

2
3 Appendix 7B contains a brief description of the training courses.
4 Training for soil sampling personnel is covered within the EIIs. All
5 personnel entering the TSD unit during closure must have 40 hours of hazardous
6 waste training as defined in 29 CFR 1910.120. Before performing closure
7 activities, specific work plans will be submitted to the lead regulatory
8 agency for review. These documents will detail the specific work activities
9 and will not be written until the latest technology and specific materials and
10 equipment are known.
11

12
13 **7.5 SCHEDULE FOR CLOSURE**

14
15 Closure of the HPADS will begin on notification by Ecology of plan
16 approval. Closure will proceed according to the schedule presented in
17 Figure 7-1.
18

19
20 **7.6 CLOSURE CONTACTS**

21
22 The following office (or its successor) is the official contact for the
23 Hanford Patrol Academy Demolition Sites closure plan:
24

25 Office of Environmental Assurance,
26 Permits, and Policy
27 U.S. Department of Energy,
28 Richland Operations Office
29 825 Jadwin Avenue
30 P.O. Box 550
31 Richland, Washington 99352
32 (509) 376-5441
33

34
35 **7.7 AMENDMENT OF CLOSURE PLAN**

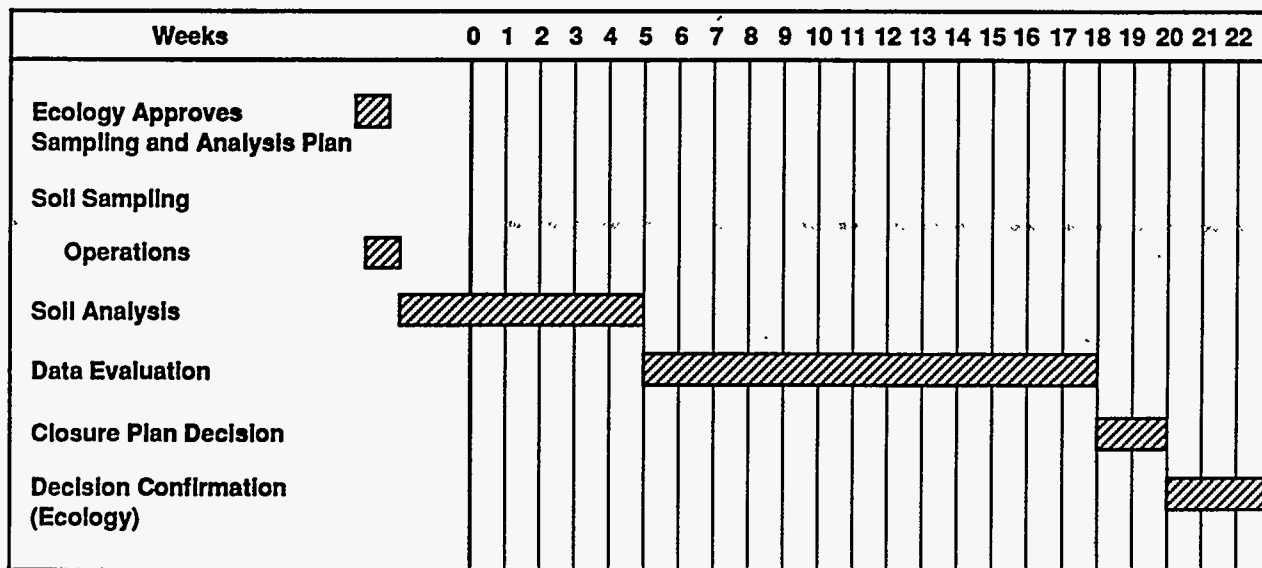
36
37 The closure plan for the HPADS will be amended whenever changes in
38 operating plans or unit design affect the closure plan; whenever there is a
39 change in the expected year of closure; or if, when conducting closure
40 activities, unexpected events require a modification of the closure plan. The
41 closure plan will be modified in accordance with WAC 173-303-610. This plan
42 may be amended any time before certification of final closure of the HPADS.
43

44 If an amendment to the approved closure plan is required, the DOE-RL will
45 submit a written request to the lead regulatory agency to authorize a change
46 to the approved plan. The written request will include a copy of the closure
47 plan amendment for approval.

1 **7.8 CERTIFICATION OF CLOSURE AND SURVEY PLAT**
2

3 Within 60 days of closure of the HPADS, the DOE-RL will submit to the
4 Benton County Auditor and the lead regulatory agency a certification of
5 closure and a duly certified survey plat. The certification of closure will
6 be signed by both the DOE-RL and a registered independent professional
7 engineer, stating that the unit has been closed in accordance with the
8 approved closure plan. The certification will be submitted by registered mail
9 or an equivalent delivery service. Documentation supporting the independent
10 registered professional engineer's certification will be supplied on request.
11 of the regulatory authority.
12

13 The DOE-RL and the independent professional engineer will certify with a
14 document similar to Figure 7-2.



H9209024.1a

Figure 7-1. Hanford Patrol Academy Demolition Sites Closure Schedule.

**CLOSURE CERTIFICATION
FOR**

Hanford Site
U.S. Department of Energy, Richland Operations Office

We, the undersigned, hereby certify that all _____
_____ closure activities were performed in accordance
with the specifications in the approved closure plan.

Owner/Operator Signature DOE-RL Representative
(Typed Name)

Date

_____ P.E.# _____ State _____
Signature Independent Registered Professional Engineer Date
(Typed Name, Professional Engineer license number, state of issuance, and date
of signature)

Figure 7-2. Typical Closure Certification Document.

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8.0 POSTCLOSURE PLAN

In the event that the HPADS cannot be clean closed and that residual soil contamination remains after soil removal activities, a postclosure permit application for the HPADS will be submitted in accordance with WAC 173-303 regulations.

8.1 NOTICE IN THE GENERAL INDEX

This closure plan proposes that the HPADS be closed with no residual soil contamination that would pose a threat to human health or the environment. However, if clean closure cannot be secured, the following action will be taken in accordance with WAC 173-303-610(1)(b). Within 60 days of the certification of closure, the DOE-RL will sign, notarize, and file for recording the notice indicated below. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in the General Index.

TO WHOM IT MAY CONCERN

The United States Department of Energy, Richland Operations Office, an operations office of the United States Department of Energy, which is a department of the United States Government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 265.120 and WAC 173-303-610(10) (whichever is applicable):

- (a) The United States of America is, and since April 1943, has been in possession in fee simple of the following described lands: (legal description of the Hanford Patrol Academy Demolition Site)
- (b) The United States Department of Energy, Richland Operations Office, by operation of the Hanford Patrol Academy Demolition Sites, has disposed of hazardous and/or dangerous waste under other terms of regulations promulgated by the United States Environmental Protection Agency and the Washington State Department of Ecology (whichever is applicable) at the above described land.
- (c) The future use of the above described land is restricted under terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable)
- (d) Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of waste disposed of on the above property

1 (e) The United States Department of Energy, Richland Operations Office
2 has filed a survey plat with the Benton County Planning Department
3 and with the United States Environmental Protection Agency,
4 Region 10, and the Washington State Department of Ecology (whichever
5 are applicable) showing the location and dimensions of the Hanford
6 Patrol Academy Demolition Sites and a record of the type, location,
7 and quantity of waste treated.
8
9

10 8.2. POSTCLOSURE CARE

11
12 Postclosure care is required when a TSD unit has residual contamination
13 that poses a problem to human health or the environment. At the HPADS,
14 underlying soils and possibly groundwater might have been contaminated by
15 waste treated during HPADS operations. Under the Tri-Party Agreement,
16 source contamination and groundwater operable units will be investigated
17 and remediated under the RPP RCRA field investigation/corrective measure study
18 process.
19

20 With the general exception of an imminent environmental hazard, any
21 extensive soil remediation will take place under the RPP RCRA field
22 investigation/corrective measure study process. While awaiting remediation
23 under the RPP process, some level of RCRA monitoring might be necessary to
24 ensure that the HPADS poses no threat to human health or the environment. The
25 scope of the monitoring would be limited to contaminated soil that would pose
26 a threat to human health or the environment. The HPADS might not be
27 considered closed until the remediation under the RPP process is complete.
28 Before any soil remediation under RPP, steps might be taken to isolate any
29 contamination. The exact nature of these steps would be determined at the
30 time the need was identified, and this information would be added to the
31 closure plan. In addition, access to the areas of contamination would be
32 controlled to protect personnel and prevent the migration of contamination.
33

34 During the period between closure of the HPADS and soil remediation under
35 RPP, the closure areas would be inspected yearly at a minimum. The
36 inspections would determine the need for maintenance of any temporary covers
37 or other physical barriers. Any required maintenance would be performed by
38 Hanford Site personnel.
39

40 Any data obtained from sampling and analyses during RCRA closure
41 activities will be part of the official record and will be included in the
42 closure plan. These data will be taken into account and used during the
43 RPP evaluation of the SWMU, as well as any data collected specifically for
44 the RPP evaluation.

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APPENDIX 2A

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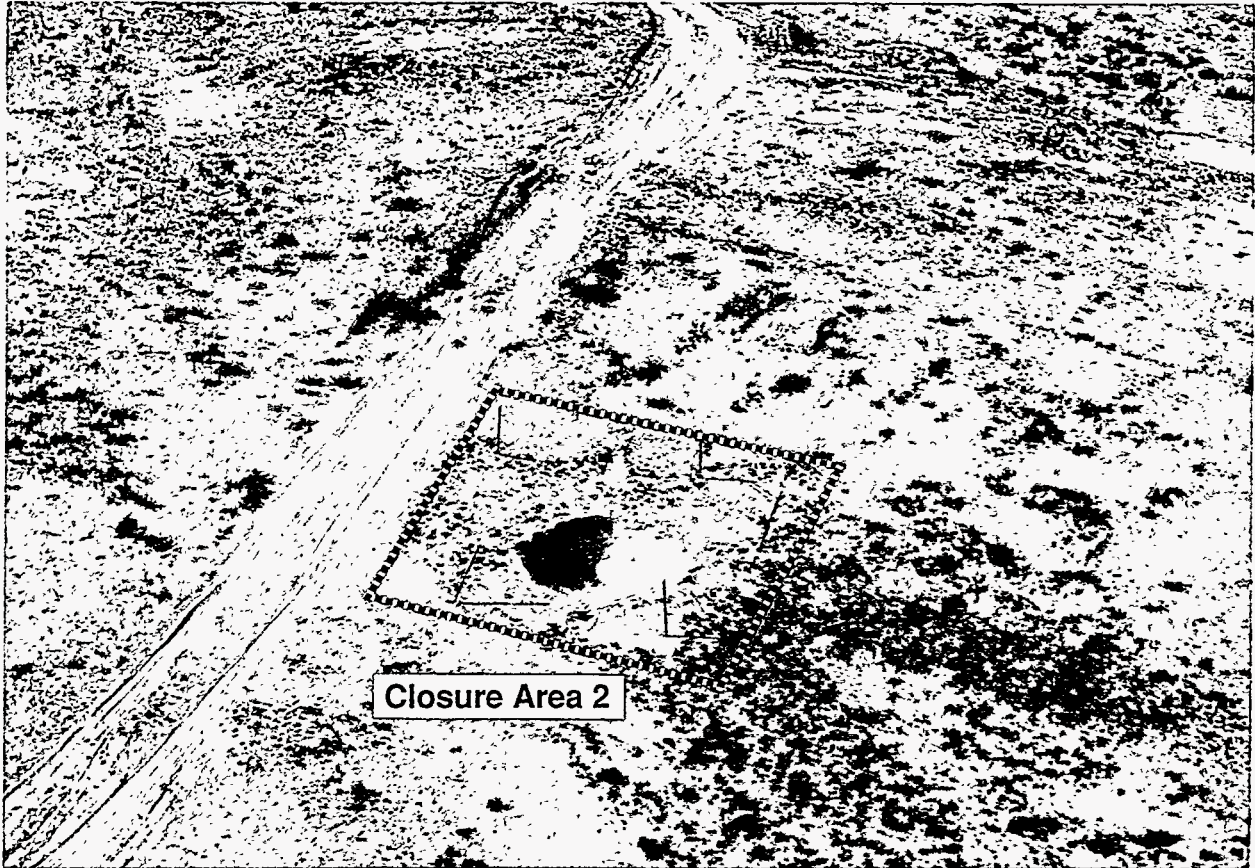
PHOTOGRAPHS

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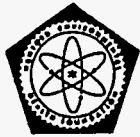
APPENDIX 3A

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**SOIL SAMPLING INFORMATION FOR THE HANFORD PATROL ACADEMY
DEMOLITION SITES MARCH 1987 DETONATION EVENT**

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HANFORD ENVIRONMENTAL
HEALTH FOUNDATION

September 4, 1990

CO# 15711

Westinghouse Hanford Company
MSIN R2-82

Attn: K.A. Ayster

SOIL ANALYSIS

The results of the analyses performed on the two soil samples received June 21, 1990, are tabulated below. These samples were reportedly from the detonation pit.

The samples were analyzed for 1,3,5-trinitrobenzene (TNB), total lithium, and total aluminum. The analyses were performed by ATI in accordance with approved protocols.

Sample ID	Sample Description	Total Metals mg/Kg	Organics mg/Kg
Det-90-01-A	Sandy Soil	5970 Aluminum 8.6 Lithium	<0.34 1,3,5-TNB
Det-90-01-B	Sandy Soil	6220 Aluminum 8.1 Lithium	<0.17 1,3,5-TNB

Your samples are being returned to you for disposal.

If you have any questions regarding this report, please contact Environmental Health Sciences.

T. J. Gilfoil
Environmental Health Sciences

kw

OIL & HAZARDOUS WASTE ANALYSIS REQUEST FORM
 (Samples will not be accepted with out all necessary, properly completed paper work)

REQUESTOR

Sample # Det-90-01-D

Name K.A. Ayster Company WHC
 Bldg/Area 2750 E-200E Phone 3-5015
 Work Order ML82E MSIN 12-82

For Lab Use Only
 CO # 15711
 Rec'd 6-21-90
 Log # F90-6-691

SAMPLE CONTAINERS - All oils and organic samples shall be submitted in glass containers with teflon-lined caps. Other samples shall be submitted in containers appropriate for the requested analyses. Consult HEHF lab (6-6980) for assistance in container selection and sample quantity requirements.

SAMPLE DESCRIPTION

Sampling Location Detonation Pit Type of Container 55 gal. drum
 Method of Sampling Transformer
Glass tubing Hydraulic System
Coliwas Other(describe)
Other(describe) Pick up dirt & place in bottle Glass Bottle

Description of material sampled (Label information, transformer #, original use, drum #, suspected concentrations etc) Soil from ric. detonation pit. Materials detected were ethyl ether, lithium Aluminum Hydride, and 1,3,5-Trinitrobenzene

Is sample submitted representative of all phases present in container sampled? Yes Is a radiation survey needed? No
 If "yes": external only _____
 : external & internal _____

(Copy of all survey data must be attached)

CHAIN OF CUSTODY

Sampled by J.W. Olson
 Date Sampled 6-7-90
 Date Relinquished 6-7-90

Received by K.A. Ayster
 Date Received 6-7-90
 Date Relinquished _____

Shipped by K.A. Ayster
 Date Received 6-7-90
 Date Relinquished 6-21-90

Received for Lab _____
 Date Received _____
 Storage Location _____

REQUESTED ANALYSES

___ PCBs Required Detection Limit: ___ 2 ppm ___ 1 ppm ___ 0.05 ppm ___ Other
 ___ Ignitability (Flash Point) ___ Oil Metals (As, Cd, Cr, Pb)
 ___ Halogenated Hydrocarbons ___ Polynuclear Aromatics (PAHs)
 ___ Corrosivity: ___ pH ___ Steel Corrosion ___ Anions (F, Cl, NO₃, NO₂, PO₄, SO₄)
 ___ EP Toxicity: ___ 8 Metals ___ Pesticides ___ Basic cations (Na, K, NH₃)
 ___ Other Metals (list) ___ Glycols
 ___ Solvent ID by GCMS ___ Reactivity
 ___ Other Analysis (Specify) Ethyl Ether, lithium, Aluminum, 1,3,5-Trinitrobenzene

REPORTING DEADLINE

Does sample have 90/day clock running or other compliance deadline? No

SEND REPORT TO

Name K.A. Ayster
 MSIN 12-82

If yes, clock start date _____
 or compliance due date _____
 If no, desired due date _____

RETURN SAMPLE TO

Name M.R. Romasos
 Bldg 2750 E Area 200E

OIL & HAZARDOUS WASTE ANALYSIS REQUEST FORM
(Samples will not be accepted with out all necessary, properly completed paper work)

REQUESTOR

sample # Det-90-01-A

Name K.A. Ayster Company WHC
Bldg/Area 2750E/200E Phone 3-5015
Work Order MLE2E MSIN R2-82

For Lab Use Only
CO # 15711
Rec'd 6-21-90
Log #E90-6-690

SAMPLE CONTAINERS - All oils and organic samples shall be submitted in glass containers with teflon-lined caps. Other samples shall be submitted in containers appropriate for the requested analyses. Consult HEHF lab (6-6980) for assistance in container selection and sample quantity requirements.

SAMPLE DESCRIPTION

Sampling Location Detonation Pit

Type of Container

Method of Sampling

- 55 gal. drum
Transformer
Hydraulic System
Other(describe) Glass bottle

Glass tubing

Coliwas

Other(describe) pick up dirt & place in bottle

Description of material sampled (Label information, transformer #, original use, drum #, suspected concentrations etc) Soil from the detonation pit. Materials detonated were ethylether, lithium aluminum Hydride and 1,3,5-trinitrobenzene.

Is sample submitted representative of all phases present in container sampled? yes

Is a radiation survey needed? NO
If "yes": external only
: external & internal

(Copy of all survey data must be attached)

CHAIN OF CUSTODY

Sampled by J.W. Olson
Date Sampled 6-7-90
Date Relinquished 6-7-90

Received by K.A. Ayster
Date Received 6-7-90
Date Relinquished

Shipped by K.A. Ayster
Date Received 6-7-90
Date Relinquished 6-21-90

Received for Lab
Date Received
Storage Location

REQUESTED ANALYSES

- PCBs Required Detection Limit: 2 ppm 1 ppm 0.05 ppm Other
Ignitability (Flash Point) Oil Metals (As, Cd, Cr, Pb)
Halogenated Hydrocarbons Polynuclear Aromatics (PAHs)
Corrosivity: pH Steel Corrosion Anions (F, Cl, NO3, NO2, PO4, SO4)
EP Toxicity: 8 Metals Pesticides Basic cations (Na, K, NH3)
Other Metals (list) Glycols
Solvent ID by GCMS Reactivity
Other Analysis (Specify) ethyl ether, lithium aluminum, 1,3,5-trinitrobenzene.

REPORTING DEADLINE

Does sample have 90 day clock running or other compliance deadline? NO

SEND REPORT TO

Name K.A. Ayster
MSIN R2-82

If yes, clock start date
or compliance due date
If no, desired due date

RETURN SAMPLE TO

Name M.A. Rowland
Bldg 2750E Area 200E



HANFORD ENVIRONMENTAL
HEALTH FOUNDATION

File

February 26, 1990

CO 14242

Westinghouse Hanford Company
MSIN D2-65

Attn: M. R. Romsos

WASTE CHARACTERIZATION - DEMOLITION SITE SOIL

The following are the results of the analysis of the soil sample received July 21, 1989. This sample was reportedly soil from the demolition site at the Patrol Academy. The purpose of the analysis was to look for residual contamination from the materials detonated during the last year.

Benzene was determined on a methanol extract of the soil in accordance with USEPA methods 8021 and 5030 (SW-846, 3rd Ed.) using purge and trap followed by gas chromatography with photoionization detection. 1,4-Dioxane was determined on the same methanol extract using direct injection into a gas chromatograph with flame ionization detection.

The remaining analyses were done by Analytical Technologies, Inc. Hydrazine was determined colorimetrically in accordance with ASTM D1385. A semi-volatiles GC/MS scan was done following EPA method 8270 (SW-846, 2nd Ed.). The purpose of this scan was to look for nitrophenols and other possible combustion products. The complete list of compounds scanned is attached.

<u>Sample ID</u>	<u>Analytical Results</u>
DET-89-04	<0.125 mg/Kg benzene <5 mg/Kg 1,4-dioxane 0.084 mg/Kg hydrazine No 2,4-dinitrophenol or other semi-volatiles noted (see attached for compound list and detection limits)

Your sample is being returned to you for disposal.

If you have any questions regarding this report, please contact Environmental Health Sciences.

Maurice K. Hamilton

M. K. Hamilton, CIH
Laboratory Director
Environmental Health Sciences

cc: J. Kessner, OSM, T6-08



ATI I.D. : 00216801

.EST : EPA 3270 (GC/MS FOR SEMIVOLATILE ORGANICS)

CLIENT	: HANFORD ENVIRONMENTAL HEALTH FND.	DATE SAMPLED	: 01/26/90
PROJECT #	: MSD-STB-431842	DATE RECEIVED	: 01/30/90
PROJECT NAME	: WASTE ANALYSIS	DATE EXTRACTED	: 02/15/90
CLIENT I.D.	: E89-7-466	DATE ANALYZED	: 02/20/90
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
N-NITROSODIMETHYLAMINE	<0.17
PHENOL	<0.17
ANILINE	<0.17
BIS (2-CHLOROETHYL) ETHER	<0.17
2-CHLOROPHENOL	<0.17
1,3-DICHLOROBENZENE	<0.17
1,4-DICHLOROBENZENE	<0.17
BENZYL ALCOHOL	<0.17
1,2-DICHLOROBENZENE	<0.17
2-METHYLPHENOL	<0.17
BIS (2-CHLOROISOPROPYL) ETHER	<0.17
4-METHYLPHENOL	<0.17
N-NITROSO-DI-N-PROPYLAMINE	<0.17
XACHLOROETHANE	<0.17
TROBENZENE	<0.17
ISOPHORONE	<0.17
2-NITROPHENOL	<0.17
2,4-DIMETHYLPHENOL	<0.17
BENZOIC ACID	<0.85
BIS (2-CHLOROETHOXY) METHANE	<0.17
2,4-DICHLOROPHENOL	<0.17
1,2,4-TRICHLOROBENZENE	<0.17
NAPHTHALENE	<0.17
4-CHLOROANILINE	<0.17
HEXACHLOROBUTADIENE	<0.17
4-CHLORO-3-METHYLPHENOL	<0.17
2-METHYLNAPHTHALENE	<0.17
HEXACHLOROCYCLOPENTADIENE	<0.17
2,4,6-TRICHLOROPHENOL	<0.17
2,4,5-TRICHLOROPHENOL	<0.85
2-CHLORONAPHTHALENE	<0.17
2-NITROANILINE	<0.85
DIMETHYL PHTHALATE	<0.17
ACENAPHTHYLENE	<0.17
3-NITROANILINE	<0.85
ACENAPHTHENE	<0.17
2,4-DINITROPHENOL	<0.85
NITROPHENOL	<0.85
ENZOFURAN	<0.17
2,4-DINITROTOLUENE	<0.17
,6-DINITROTOLUENE	<0.17
DIETHYLPHTHALATE	<0.17

(CONTINUED NEXT PAGE)



TEST : EPA 8270 (GC/MS FOR SEMIVOLATILE ORGANICS)

COMPOUNDS	RESULTS
4-CHLOROPHENYL PHENYL ETHER	<0.17
FLUORENE	<0.17
4-NITROANILINE	<0.85
4,6-DINITRO-2-METHYLPHENOL	<0.85
N-NITROSODIPHENYLAMINE	<0.17
4-BROMOPHENYL PHENYL ETHER	<0.17
HEXACHLOROBENZENE	<0.17
PENTACHLOROPHENOL	<0.85
PHENANTHRENE	<0.17
ANTHRACENE	<0.17
DI-BUTYL PHTHALATE	<0.17
FLUORANTHENE	<0.17
BENZIDINE	<1.7
PYRENE	<0.17
BUTYLBENZYLPHthalATE	<0.17
3,3-DICHLOROBENZIDINE	<0.34
BENZO (a) ANTHRACENE	<0.17
BIS (2-ETHYLHEXYL) PHTHALATE	<0.17
CHRYSENE	<0.17
DI-N-OCTYLPHthalATE	<0.17
BENZO (b) FLUORANTHENE	<0.17
BENZO (k) FLUORANTHENE	<0.17
BENZO (a) PYRENE	<0.17
BENZO (1,2,3-cd) PYRENE	<0.17
DIBENZO (a,h) ANTHRACENE	<0.17
BENZO (g,h,i) PERYLENE	<0.17

SURROGATE PERCENT RECOVERIES

NITROBENZENE-D5 (%)	48
2-FLUOROBIPHENYL (%)	60
TERPHENYL (%)	71
PHENOL-D6 (%)	47
2-FLUOROPHENOL (%)	86
2,4,6-TRIBROMOPHENOL (%)	61

Sampling Plan for Patrol Academy Blasting Pit to Determine Extent of Land Banned Contamination to Soil Onsite

A grid will be set up around the blasting pit (see figure 1). It will consist of radials every 45° aligned to magnetic north (0°) and distances from the pit edge of 10, 20, 30, 40, 50, 75, 100, 150 and 200 feet (the pit is 10 feet in diameter). Seventeen points will be selected from a random number table and numbers 11-19, 21-29, ..., 81-89 accepted.

These points will be plotted on the grid as follows:

0° radial = 1, 45° radial = 2, ..., 315° radial = 8
200 foot mark = 1, 150 foot mark = 2, ..., 10 foot mark = 9

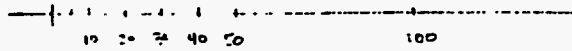
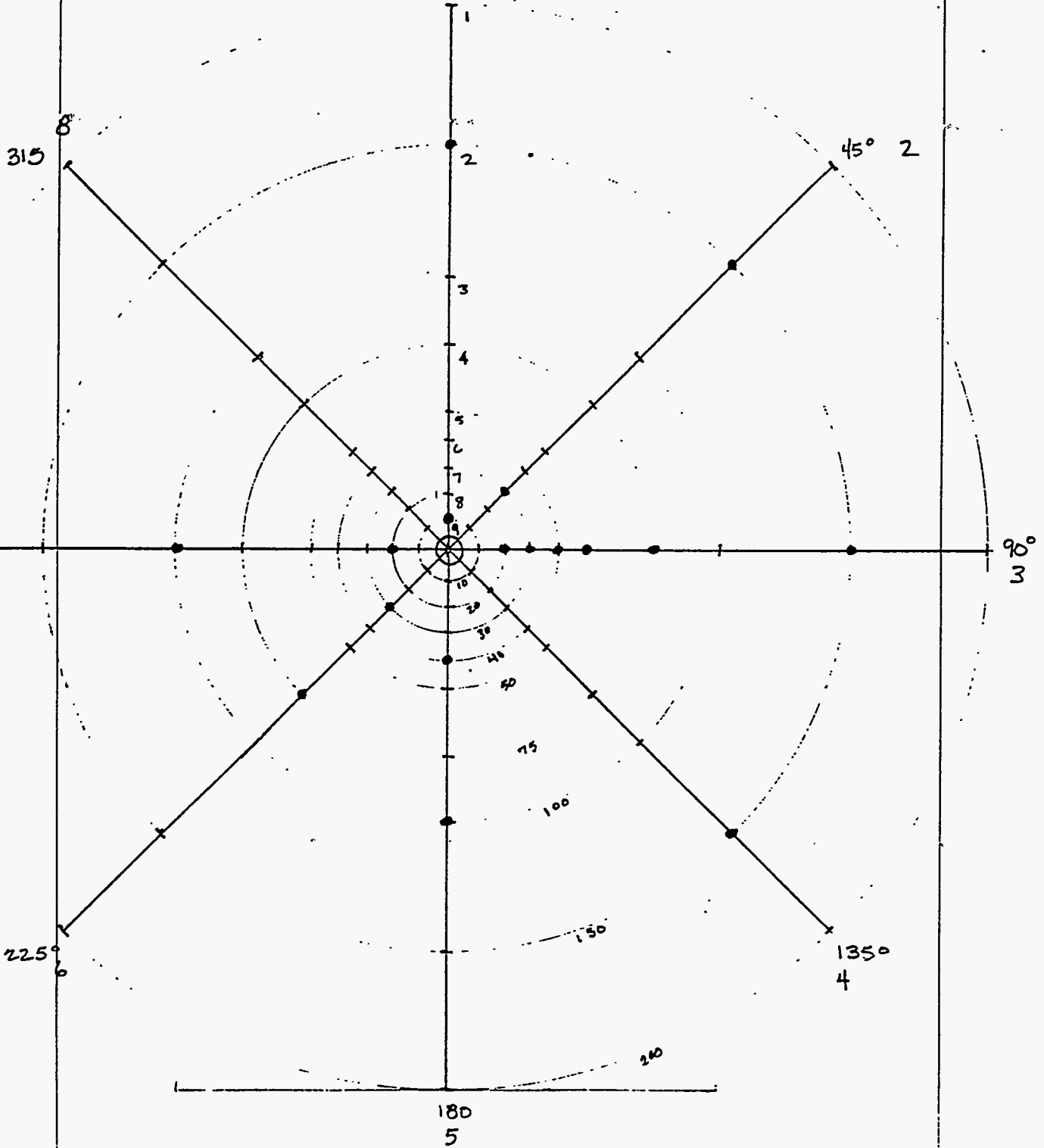
Approximately 4 ounces of soil will be taken from each point and placed in a large container (5 gallon pail or bag). The contents will be thoroughly mixed and two samples taken. The remaining soil will be returned to the ground.

Procedure

1. Place rod in center of detonation pit
2. Mark distances with tape (10, 20, 30, 40, 50, 75, 100, 150, and 200).
3. Use a compass to find radial and have assistant walk out with rope to sample distance along radial.
4. Take 4 ounces of soil including topsoil and place in container.
5. Repeat steps 3 and 4 until no more points lie along radial.
6. Move to next radial and repeat steps 3 - 5.
7. When completed, mix soil in container well and remove two samples.
8. Pour remaining soil to ground.
9. Mark samples accordingly.

Patrol Academy Demolition Pit Sampling Plan

Assumptions: Pit is 10' wide (diameter).
Pit is located 500' from retaining wall.
1 0° (Magnetic)



J. W. Olson

Random Numbers for Sampling Blasting Pit

<u>Sample #</u>	<u>Random Number</u>
1.	75
2.	67
3.	27
4.	35
5.	53
6.	78
7.	34
8.	32
9.	64
10.	19
11.	12
12.	37
13.	22
14.	36
15.	42
16.	56
17.	38



**Northwest
EnviroService
Inc.**

November 14, 1988

Mr. Mike Romsos
Westinghouse Hanford Company
P.O. Box 1970
R1 - 51
Richland, Wa. 99352

Dear Mike,

Please find the enclosed results for NWES Job # 12-6355.01.

The soil samples, marked Det 3 and Det 4, were submitted for Picric Acid Analysis.

If you have any questions or need further information, please feel free to call any time.

Sincerely,

Northwest EnviroService, Inc.


Ali F. San
Lab Administrator

AFS/ts

Enclosures

Laucks ⁸⁰ years

Testing Laboratories, Inc.

940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Certificate

Chemistry, Microbiology, and Technical Services

CLIENT: Northwest EnviroServices, Inc.
P.O. Box 24443
Seattle, WA 98124
ATTN: Ali San

LABORATORY NO. 12325

DATE: Nov. 11, 1988

PO# 22919

REPORT ON: SOIL

SAMPLE

IDENTIFICATION: Submitted 09/29/88 and identified as shown below:

- 1) Sample #880915 B2
- 2) Sample #880915 C2

TESTS PERFORMED AND RESULTS:

parts per million (mg/kg), dry basis

	<u>1</u>	<u>2</u>
Picric Acid	0.50	37.

Respectfully submitted,

Laucks Testing Laboratories, Inc.


B. Gleason

BG:emt



This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

Laucks ⁸⁰ years

Testing Laboratories, Inc.

940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Certificate

Chemistry, Microbiology, and Technical Services

APPENDIX

Copy of Chain-of-Custody is Attached



This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



**Northwest
EnviroService
Inc.**

LAB REPORT

Romsos

DATE: 9-15-87

SAMPLE #: 870915-R

GENERATOR NAME: Westinghouse Hanford

GENERATOR SAMPLE #: DET-1

ADDRESS: P.O. Box 1970

WPQ #:

Richland, WA 99352

MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Product Name Soil		Process Generating Waste Clean up	
Physical State At 78°F. <input checked="" type="checkbox"/> Solid <input type="checkbox"/> Sludge <input type="checkbox"/> Liquid <input type="checkbox"/> Powder	Free Liquids at 78°F. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Volume _____	Flash Point <input type="checkbox"/> < 70°F. <input type="checkbox"/> ≥ 140°F. <input type="checkbox"/> Closed Cup <input type="checkbox"/> 70°F. - 100°F. <input checked="" type="checkbox"/> No Flash <input type="checkbox"/> Open Cup <input type="checkbox"/> 101°F. - 139°F. <input type="checkbox"/> Exact _____	Layers <input type="checkbox"/> Multilayered <input type="checkbox"/> Bi-Layered <input checked="" type="checkbox"/> Homogenous
pH <input type="checkbox"/> < 2 <input type="checkbox"/> 10.1 - 12 <input type="checkbox"/> 2 - 4 <input type="checkbox"/> > 12 <input type="checkbox"/> 4.1 - 10 <input checked="" type="checkbox"/> Exact <u>6.7</u>	Solids <input type="checkbox"/> By Volume Total <u>Ca 100</u> % Dissolved _____ % Suspended _____ %	Density (Sp. G.) <u>> 1</u> <input type="checkbox"/> Liquid lbs./gal. <input type="checkbox"/> Solid lbs./ft. ³	Odor <input checked="" type="checkbox"/> None <input type="checkbox"/> Strong <input type="checkbox"/> Mild Describe _____
METALS Total (PPM) <input type="checkbox"/> EPA Extraction Procedure (mg/L) Arsenic (As) <u>ND</u> Mercury (Hg) <u>ND</u> Barium (Ba) <u>ND</u> Nickel (Ni) <u>7</u> Cadmium (Cd) <u>< 0.1</u> Selenium (Se) <u>ND</u> Chromium (Cr) <u>< 0.1</u> Silver (Ag) <u>ND</u> Copper (Cu) <u>8</u> Zinc (Zn) <u>30</u> Lead (Pb) <u>14</u> Nondetectable _____ REACTIVES AND OTHER WASTES (PPM) Amines _____ PCB S <u>≤ 1</u> Cyanides _____ Other's _____ Sulfides _____		WASTE PRODUCT CHEMICAL COMPOSITION (Account For 100% of Total) Other (Specify): H ₂ O _____ % Dirt/wood/grass <u>CA 100</u> % HCl _____ % H ₂ SO ₄ _____ % HNO ₃ _____ % NaOH _____ % Phenols _____ % Chlorides _____ %	

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed waste	< 500 mg/L		

COMMENTS: _____

ANALYSIS PERFORMED BY: TAR/RB



**Northwest
EnviroService
Inc.**

LAB REPORT

Romsos

DATE: 9-15-87

SAMPLE #: 870915-S

GENERATOR NAME: Westinghouse Hanford GENERATOR SAMPLE #: DET-2

ADDRESS: P.O. Box 1970 WPQ #:

Richland, WA 99352 MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Waste Product Name Soil			
Process Generating Waste Clean up			
Physical State At 70°F. <input checked="" type="checkbox"/> Solid <input type="checkbox"/> Sludge <input type="checkbox"/> Liquid <input type="checkbox"/> Powder	Free Liquids at 70°F. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Volume _____	Flash Point <input type="checkbox"/> < 70°F. <input type="checkbox"/> ≥ 140°F. <input type="checkbox"/> 70°F. - 100°F. <input checked="" type="checkbox"/> No Flash <input type="checkbox"/> 101°F. - 139°F. <input type="checkbox"/> Exact _____ <input type="checkbox"/> Closed Cup <input type="checkbox"/> Open Cup	Layers <input type="checkbox"/> Multilayered <input type="checkbox"/> Bi-Layered <input checked="" type="checkbox"/> Homogenous
pH <input type="checkbox"/> < 2 <input type="checkbox"/> 10.1 - 12 <input type="checkbox"/> 2 - 4 <input type="checkbox"/> > 12 <input type="checkbox"/> 4.1 - 10 <input checked="" type="checkbox"/> Exact <u>7.3</u>	Solids <input type="checkbox"/> By Volume Total <u>Ca 100</u> % Dissolved _____ % Suspended _____ %	Density (Sp. G.) <u>> 1</u> <input type="checkbox"/> Liquid lbs./gal. <input type="checkbox"/> Solid lbs./ft. ³	Odor <input checked="" type="checkbox"/> None <input type="checkbox"/> Strong <input type="checkbox"/> Mild Describe _____
METALS <input checked="" type="checkbox"/> Total (PPM) <input type="checkbox"/> EPA Extraction Procedure (mg/L)		WASTE PRODUCT CHEMICAL COMPOSITION (Account For 100% of Total)	
Arsenic (As) <u>ND</u> Mercury (Hg) <u>ND</u> Barium (Ba) <u>ND</u> Nickel (Ni) <u>6</u> Cadmium (Cd) <u>< 1</u> Selenium (Se) <u>ND</u> Chromium (Cr) <u>2</u> Silver (Ag) <u>ND</u> Copper (Cu) <u>9</u> Zinc (Zn) <u>30</u> Lead (Pb) <u>16</u> Nondetectable _____	H ₂ O _____ % HCl _____ % H ₂ SO ₄ _____ % HNO ₃ _____ % NaOH _____ % Phenols _____ % Chlorides _____ %	Other (Specify): <u>Dirt/Wood/Grass</u> <u>Ca 100</u> % _____ % _____ % _____ % _____ % _____ % _____ %	
REACTIVES AND OTHER WASTES (PPM) Amines <u>ND</u> PCB S <u>≤ 1</u> Cyanides <u>ND</u> Other's _____ Sulfides <u>ND</u>			

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed Wastes	< 500 mg/L	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

COMMENTS: _____

ANALYSIS PERFORMED BY: TAR/RB



**Northwest
EnviroService
Inc.**

LAB REPORT

Romsos

DATE: 9-15-87

SAMPLE #: 870915-T

GENERATOR NAME: Westinghouse Hanford GENERATOR SAMPLE #: DET3

ADDRESS: P.O. Box 1970 WPQ #:

Richland, WA 99352 MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Waste Product Name Soil	
Process Generating Waste Clean up	
Physical State At 78°F. <input checked="" type="checkbox"/> Solid <input type="checkbox"/> Sludge <input type="checkbox"/> Liquid <input type="checkbox"/> Powder	Free Liquids at 78°F. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Volume _____
pH <input type="checkbox"/> < 2 <input type="checkbox"/> 10.1 - 12 <input type="checkbox"/> 2 - 4 <input type="checkbox"/> > 12 <input type="checkbox"/> 4.1 - 10 <input checked="" type="checkbox"/> Exact 7.0	Solids <input type="checkbox"/> By Volume Total Ca 100 % Dissolved _____ % Suspended _____ %
Flash Point <input type="checkbox"/> < 70°F. <input type="checkbox"/> ≥ 140°F. <input type="checkbox"/> 70°F. - 100°F. <input checked="" type="checkbox"/> No Flash <input type="checkbox"/> 101°F. - 139°F. <input type="checkbox"/> Exact _____	Layers <input type="checkbox"/> Multilayered <input type="checkbox"/> Bi-Layered <input checked="" type="checkbox"/> Homogenous
Density (Sp. G.) <input checked="" type="checkbox"/> > 1 <input type="checkbox"/> Liquid lbs./gal. <input type="checkbox"/> Solid lbs./ft. ³	Odor <input checked="" type="checkbox"/> None <input type="checkbox"/> Strong <input type="checkbox"/> Mild Describe _____
Color Brown	
METALS	
<input checked="" type="checkbox"/> Total (PPM) <input type="checkbox"/> EPA Extraction Procedure (mg/L)	
Arsenic (As) ND Barium (Ba) ND Cadmium (Cd) < 1 Chromium (Cr) < 1 Copper (Cu) 9.9 Lead (Pb) 17	Mercury (Hg) ND Nickel (Ni) 7 Selenium (Se) ND Silver (Ag) ND Zinc (Zn) 40 Nondetectable _____
REACTIVES AND OTHER WASTES (PPM) Amines ND Cyanides ND Sulfides ND	PCB S < 1 Other's _____
WASTE PRODUCT CHEMICAL COMPOSITION (Account For 100% of Total)	
H ₂ O _____ % HCl _____ % H ₂ SO ₄ _____ % HNO ₃ _____ % NaOH _____ % Phenols _____ % Chlorides _____ %	Other (Specify): Dirt/Wood/Grass 100 %

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed Wastes	< 500 mg/L		

COMMENTS:

ANALYSIS PERFORMED BY: TAR/RB

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APPENDIX 3B

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**HANFORD WEATHER STATION METEOROLOGICAL DATA FOR HANFORD PATROL
ACADEMY DEMOLITION SITES DETONATIONS OCCURRING AFTER 1984**

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1 Wind Speed/Direction at the Hanford Weather Station.

2 Date	Wind speed (miles per hour)	Direction	Rain
3 August 16, 1984	5.2	W	None
4 October 30, 1985	8.2	W	None
5 March 12, 1987	7.2	SE	0.42"
6 August 25, 1987	4.3	NE	None
7 December 9, 1987	10.4	SW	0.55"
8 June 21, 1988	8.0	W	None
9 December 20, 1988	2.9	NW	0.13"
10 February 10, 1989	1.2	NE	None
11 March 2, 1989	6.1	NW	0.07"
12 April 26, 1989	4.7	NW	0.03"
13 July 19, 1989	6.5	NW	None
14 June 6, 1990	4.8	SW	0.36"
15 October 27, 1991	6.3	NW	Trace

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APPENDIX 4A

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WASTE INVENTORIES

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Date August 27, 1984

To Leonard Lust

From Jeene Hobbs *Jeene*

Subject CHEMICAL DISPOSAL

Disposal request approval for #PNL-84-004, 25# of ether, is no longer needed. This chemical plus 6 quarts of tetrahydrofuran and 7 pints of perchloric acid from #PNL-84-007, 1/2 pint of perchloric acid from #PNL-83-020, and 4500 mL of 2-butoxyethanol from #PNL-83-014 were exploded by the Richland Bomb Squad on August 16, 1984. This information is provided to help you update your records.

If you have any questions, please contact me on 376-1361.

/slw

REQUEST TO DISPOSE OF NONRADIOACTIVE HAZARDOUS WASTE

PNL-84-004

I. GENERATION: The Generator should complete Part I and forward this form to:

WS&DT
202.S/200 West
Rockwell

A. Generator's Name: Jeene Hobbs Phone: 6-1631 Address: 3762/300 Area Company: PNL

B. Custodian's Name: Al Scott Phone: _____ Address: _____ Company: _____

C. Waste Description: (If more than five items, attach additional sheets)

Generic Name	Total Quantity	Type of Container	Number of Containers	(Check One)			Hazard Class
				Sol.	Liq.	Gas	
1. Ether - dated 11/80	25#	metal	25		X		Flammable liq
2. (these cans have never been opened - but they are way past their shelflife.)							
3.							
4.							
5.							

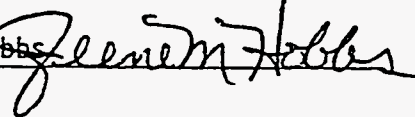
D. Have appropriate labels been affixed to containers? _____ Not required _____

E. Have efforts been made to recycle (e.g., excess) waste? NA

F. Has waste been treated in any manner? no If so, how? _____

G. Storage Location: 332/300 Area

H. "I hereby certify that this material has been released by Radiation Monitoring (if applicable) and that Part One of this form has been completed to the best of my knowledge." Survey Card Number: _____

Generator's Signature: Jeene Hobbs  Date: 27 January 84

II. APPROVAL

A. Approved for disposal by Name: _____ Phone: _____ Address: _____ Co.: _____
Date: _____ Signature: _____

B. Packaging Requirements (specify): _____

C. Disposal Location: _____ Chemical Trench, _____ Asbestos Trench,
(check one) _____ 212-P (Storage), _____ Other

III. TRANSPORTATION/DISPOSAL

A. Transporter(s) Name: _____ Phone: _____ Address: _____ Company: _____

B. Date Transported/Disposed: _____

C. Transporter(s) Signature: _____

REQUEST TO DISPOSE OF NONRADIOACTIVE HAZARDOUS WASTE

PWL-83-014

I. GENERATION: The Generator should complete Part I and forward this form to:

WS&DT
202-S/200 West
Rockwell

3-27

A. Generator's Name: Jeene Hobbs Phone: 6-1631 Address: 3762 Company: PNI

B. Custodian's Name: Jack McCarthy Phone: _____ Address: 326 Company: HEDI

C. Waste Description: (If more than five items, attach additional sheets)

Generic Name	Total Quantity	Type of Container	Number of Containers	(Check One)			Hazard Class
				Sol.	Liq.	Gas	
1. 1,4-dioxane ^{D.W.}	3 pt	1 pt glass	3		X		flammable liq
2. nitromethane	1 pt	glass	1		X		flammable
3. methylene chloride	2 pt	1 pt glass	2		X		ORM-A
4. Anhydrone	1#	glass	1		X		
5. 2 butoxyethanol (ethylene glycol monobutyl ether)	4500 ml	500ml glass	9		X		combustible

D. Have appropriate labels been affixed to containers? _____ Not required _____ They will be.

E. Have efforts been made to recycle (e.g., excess) waste? no

F. Has waste been treated in any manner? no If so, how? _____

G. Storage Location: 332/300 Area

H. "I hereby certify that this material has been released by Radiation Monitoring (if applicable) and that Part One of this form has been completed to the best of my knowledge." Survey Card Number: _____

Generator's Signature: Jeene Hobbs *Jeene M Hobbs* Date: 25 May 83

II. APPROVAL

A. Approved for disposal by Name: G.R. Cox Phone: 3-3679 Address: 202-S/200 W Co.: Rockwell

Date: June 6, 1983 Signature: G.R. Cox

B. Packaging Requirements (specify): Package #7 & 8 in absorbant for offsite shipment, ALL others packed in absorbant for onsite disposal at the chemical trench.

C. Disposal Location: X Chemical Trench, _____ Asbestos Trench, _____
(check one) _____ 212-P (Storage), 2127-S/200-W Other (offsite shipment)

III. TRANSPORTATION/DISPOSAL

A. Transporter(s) Name: _____ Phone: _____ Address: _____ Company: _____

B. Date Transported/Disposed: _____

C. Transporter(s) Signature: _____

Chemical Waste Disposal Logsheet

Disposal Request Number	Date	Chemical/Generator	RHO approval date	Manifest Number & date
PNL-84-001	2-2-84	Russ Barrows / Berta Thomas Ed Blanton / Al Scott mixed organics	June 25, 1989	
PNL-84-002	1-27-84	Mercury Pat Raney Pat Hackett Scott Wilbur	June 12, 1989 x	
PNL-84-003	1-27-84	SRC, crude oil, shale oil wash / Al Scott		
PNL-84-004	1-27-84	Ether - dated 11/80 Al Scott		
PNL-84-005	1-27-84	Hg contaminated lab waste / lg - Al Scott	June 12, 1989 x	
PNL-84-006	2-7-84	Calcium nitrate / Sodium nitrate Rob Cuello - lg fiberboard	June 25, 1989 x	
PNL-84-007	2-7-84	329 Chemical Storage Art Bruce	June 12, 1989	84-005
PNL-84-008	2-28-84	Misc Solids 329 Bldg	June 25, 1989	
PNL-84-009	2-28-84	Bromine Perchloric Acid	June 25, 1989	
PNL-84-010	2-28-84	3705 Photo chemicals	June 25, 1989	
PNL-84-011	2-28-84	Karl Pool 314	June 25, 1989	
PNL-84-012	3-6-84 <small>sent 4-23-84</small>	Mercury & Phenol Soln Terry Dana / Kris McFadden	June 12, 1989 x	
PNL-84-013	4-23-84	231-8 Mike McCoy	June 18, 1989	
PNL-84-014 was PNL-83-022	6-11-84	1717K Richard McDowell	July 9, 1989	OCU for Asphalt Emulsion

Blown up
8/26/84
by Richlan
Bomb
Squad





Pacific Northwest Laboratories

Project Number _____

Internal Distribution

IH&S
GR Cox, RHO
JT Denovan
M Romos, RHO
JMH File/LB

Date October 12, 1984
To Building Managers
From J. M. Hobbs *slw for 10-16-84*
Subject DISPOSAL OF PEROXIDE-FORMING CHEMICALS

Rockwell is organizing a site-wide ether and peroxide-forming chemical disposal. This is a one-time event to clean out storage of old ethers and peroxide-forming chemicals.

The worst of the peroxide-forming compounds are ethers, acetals, dienes, amides, and vinyl monomers. Some of the chemicals react with air to produce explosive peroxides even without concentration. Some common peroxide-forming chemicals are listed below.

Common Peroxide-Forming Chemicals

- Diethyl ether (ethyl ether)
- Diisopropyl ether
- ? { Cyclohexene
- Cyclooctene
- Decalin
- p-dioxane
- Tetrahydrofuran
- Tetralin
- Vinyl acetone

Perchloric acid and picric acid solutions may also be included for disposal.

Please identify peroxide-forming chemicals that need to be disposed and their location on the attached form and return to me no later than October 19. My address is 3762 Bldg/300 Area/PV.

If you have any questions, contact me on 376-1631.

/slw

RECEIVED
OCT 16 1984
E. R. JUB *slw*

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By R.T. Hallen

Building No. PSL

1 Box of Misc. Bottles of Items for Disposal

Chemical Name	Number of Containers	Container Size	Container Type	Location
THF	3	1 gal/12	glass	605
Phenol	1	1 lb	"	605/PSL
ammonium sulfide sol	3	1 pt.	"	"
Dichloro Ethane	1	1 l	"	"
+ several small bottles of assorted Chem.				

RETURN TO J. M. HOBBS - 3752/300/PNL



X-PCW } Please
~~ETAA~~ } respond
to Hobbs.
Jm

Bill - do you do this

Project Number ^{dit} _{file}

Internal Distribution
WJ Apley
MC Bampton
TD Chikalla
TJ Doherty
WA Glass
CR Hann
GJ Posakony
PM Potter
RA Stokes
BE Vaughan
File/LB

Date October 19, 1984
To Distribution
From Ernie Job *Ernie Job*
Subject Peroxide Forming Chemicals Disposal

The attached memo with a form for listing subject chemicals for disposal asks for an unrealistic response date. Please prepare the list anyway, as quickly as possible, for EDL, PSL, CEL, MDL, MRC, RTL, 2400 Stevens and 100D.

Return the completed form to Ernie Job in ESB. We will compile the lists and send the information to Jeanne Hobbs.

ERJ:ds

Attachment

RECEIVED

OCT 19 1984

T.D. CHIKALLA

Internal Distribution

IH&S
GR Cox, RHO
JT Denovan
M Romsos, RHO
JMH File/LB

Date October 12, 1984

To Building Managers

From J. M. Hobbs *slw for*

Subject DISPOSAL OF PEROXIDE-FORMING CHEMICALS

Rockwell is organizing a site-wide ether and peroxide-forming chemical disposal. This is a one-time event to clean out storage of old ethers and peroxide-forming chemicals.

The worst of the peroxide-forming compounds are ethers, acetals, dienes, amides, and vinyl monomers. Some of the chemicals react with air to produce explosive peroxides even without concentration. Some common peroxide-forming chemicals are listed below.

Common Peroxide-Forming Chemicals

Diethyl ether (ethyl ether)
Diisopropyl ether
Cyclohexene
Cyclooctene
Decalin
p-dioxan
Tetrahydrofuran
Tetralin
Vinyl acetone

376-1631

Perchloric acid and picric acid solutions may also be included for disposal.

Please identify peroxide-forming chemicals that need to be disposed and their location on the attached form and return to me no later than October 19. My address is 3762 Bldg/300 Area/PNL.

If you have any questions, contact me on 376-1631.

/slw

RECEIVED

OCT 19 1984

R & NS

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By Frederic Burton

Building No. LSL-II

Chemical Name	Number of Containers	Container Size	Container Type	Location
ETHYLENE GLYCOL MONOMETHYL ETHER	1	GAL	PLASTIC	1311
PERCHLORIC ACID 70%	2	PINT	GLASS	1420

RETURN TO J. M. HOBBS - 3762/300/PNL

Zenker's

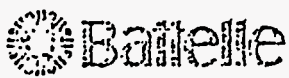
1000 ml H₂O

50 gm Hg chloride

25 gm K dichromate

10 gm Sodium sulfate

5ml glacial acetic to 100 ml soln



Pacific Northwest Laboratories

Project Number _____

RECEIVED

Internal Distribution

APR 11 1985

R & NS

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs *Jeene*

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

2 x 1.5 pound Perchloric Acid 707a-HSA-II -1420

Margaret M. Cullloch 375-2175
-2978

4-10-85 M-Mc



Battelle

Pacific Northwest Laboratories

Project Number _____

RECEIVED

APR 15 1985

R & NS

Internal Distribution

SK Campbell
JS Fruchter
FO Gladfelder
CL Nelson
File
LB

Date April 12, 1985
To Jeene M. Hobbs - Lab Safety
From T. Randy Pahl - Geosciences R&E
Subject Chemical Disposal

Ref: Hobbs to PNL Building Managers, April 5, 1985

The Precipitation Chemistry Network uses Rooms 1415, 1419, and 1514 of Sigma V. All of these laboratory rooms have been searched for the items mentioned in the referenced memo, and none were found.

Since your last visit, we have accumulated 3 gallons of phenol in water waste (126 gram/gal). This is located in Room 1415 of Sigma V.

TRP/van

Add to Blow up list -

2

glycol dimethyl ether
tetraglyme (7 1.1 kg bottles)

2pt Benzene w/ N-Butyl Lithium

Check on disposal request for
CS Abernethy - lab cleanout
Al Scott | last fall

Carbon Disulfide ?

Dimethyl Sulfoxide



Battelle

Pacific Northwest Laboratories

RECEIVED

APR 19 1985

R & NS

Project Number PM Potter

Internal Distribution
GR&E Section Mgrs.
EL Kelley
File/lb

Date April 9, 1985
To Distribution
From FO Gladfelder *Frank*
Subject Peroxide-Forming Chemical Disposal

Ref: Memo, JM Hobbs to Building Manager, dated April 5, 1985, subject as above. (copy attached)

Please review and take necessary actions to satisfy requirements of the attached memo. As noted in the memo Jeene has requested a response no later than April 18. Please direct your response (if any) to her with copy to me. ✓

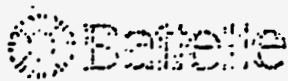
Thanks in advance for your prompt attention to this request.

FOG:cla

11/18/85

*Jeene,
None for Tech. Support Section.*

*PM Potter
c.c: F.O. Gladfelder
Full*



Pacific Northwest Laboratories

Project Number _____

Internal Distribution

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs *Jeene*

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and ~~unstable~~ chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

DON'T SAY IT --- Write It!

DATE 4.9.85

TO Jane Hobbs

FROM Art Bruce

RECEIVED

APR 9 1985

Ref. Chemical Disposal

R & NS

It does not look like I have any peroxide-forming chemicals to be disposed of at this time.

There is a box ~ 2 cubic ft. of unmarked solid chemicals at 320 Bldg that need to be disposed of. The contact is Bob Stebin or Bob Kiddy on 6-3605.



"TO MAKE LIFE LAST, PUT SAFETY FIRST"



RECEIVED

APR 15 1985

R. J. H. C.

Internal Distribution

SK Campbell
JS Fruchter
FO Gladfelder
CL Nelson
File
LB

Date April 12, 1985

To Jeene Hobbs

From Debbie Sklarew ^{*D. Sklarew*} - Geosciences R&E

Subject Your memo on "Peroxide-Forming Chemical Disposal"

I have the following items in Sigma 5:

ethyl ether -1- can (opened) - Rm 1411 - under hood
 -1- 1 gal bottle (unopened) - back dock - Solvent
 cabinet #1
THF -2- 1 gal bottles (opened) - Rm 1510 - under hood
 -6- 1 gal bottles (unopened) - Back dock - Solvent
 cabinet #1

(Key to the solvent cabinet is in Rm 1411 - desk drawer)
Thanks!

DSS/mgs

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

RECEIVED

APR 10 1985

R & NS

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs *Jeene*

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

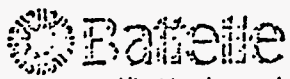
If you have questions, contact me on 376-1631.

/slw

Jeene,

*None - 324 Bldg. or
Jones.*

JK



Pacific Northwest Laboratories

Project Number _____

Internal Distribution

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs *Jeene*

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

Don -

Back to blowing up chemicals -
They haven't yet -

Have's what I have - TF RHD

calls, move ahead with it.

Please call Gen Davison in PSL.

She may have some of these chemicals.

She was supposed to call me back.

See attached sheets

Also

Percarbonic Acid -

320 Bldg 1PT Christ Baumgardner

331 Rm 103 3PT SaMei Le

Ether

25 1PT

Deb Sklarus

Call these folks to coordinate
if this comes off; Jeanne

Rockwell Hanford Operations
Energy Systems Group
P.O. Box 800
Richland, WA 99352



RECEIVED
OCT 5 1984
R J NS

October 2, 1984

In reply, refer to Letter R84-3497

Ms. J. M. Hobbs
Laboratory Safety Department
Pacific Northwest Laboratory
Richland, Washington 99352

Dear Ms. Hobbs:

ORGANIC PEROXIDE DISPOSAL


This is to inform you that we are presently coordinating with the Richland Bomb Disposal Squad and other necessary elements to dispose of some potentially explosive organic peroxides which Rockwell Hanford Operations (Rockwell) has on site.

Mr. M. R. Romsos of my staff has informed me that you have a one-pound container of ether which requires disposal. In order to save the Bomb Disposal Squad a trip, we would like to have your ether disposed of during our scheduled pickup.

Mr. Romsos and Mr. G. R. Cox of my staff both wish to express their concern over transporting this material other than by the means described in this correspondence. Since professional personnel and equipment will be available, we strongly suggest they be utilized, and thereby reduce the potential risk to personnel.

Mr. Romsos will be in contact with you when the pickup times are defined. Information from you will be required concerning proper procedures for your facility. If you have any questions on this matter, feel free to contact Mr. Romsos on 373-3948.

Very truly yours,


R. C. Beagley, Manager
Industrial Hygiene & Safety

RDB/MRR:dtk

NOV 2 1964

D 2 46

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By C.S. Abernethy

Building No. 331/300 Area

Chemical Name	Number of Containers	Container Size	Container Type	Location
<i>Perchloric Acid</i>	<i>1</i>	<i>1 pt</i>	<i>glass bottle</i>	<i>Room 158</i>

RETURN TO J. H. HOBBS - 3762/300/PNL



Pacific Northwest Laboratories

Date: 11-14-84

To: Teeene

From: DON SOMMER

① Mark Panther / police dept
ready to dispose / blow up your
chemicals. He says he will
blow them up later

② Mike Romsos wants you
to give him a call at
373-2304 about disposing
of some chemicals

Final
6/3/86

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352



Rockwell
international

RECORDED HAZARDOUS MATERIAL SAFETY
MAY 28 1986
ACTION
REF # R86-2499
TITLE
FILE 332
RETURN TO
EXTD

In reply, refer to letter

MAY 28 1986

Mr. D. L. Lundstrom
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Mr. Lundstrom:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-83

Reference: Chemical Waste Disposal Request 86-009,
April 2, 1986, D. L. Lundstrom to Solid Waste
Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and U. S. Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatibility.

DISPOSAL ANALYSIS NO. PNL-22-83

THE FOLLOWING ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE. THESE WASTES SHOULD BE DISPOSED OF BY DETONATION. PLEASE CONTACT:

M. R. ROMSOS 373-4032

TO MAKE FURTHER ARRANGEMENTS.

1. Chlorine trioxide

2. Tetrahydrofuran

*Chromium
trioxide*

1 lb

100 ml

DETONATION DISPOSAL 3/19/86 R1

CHEM NAME	AMOUNT	CONT. MATERIAL	LOCATION	OWNER	ADDITIONAL NOTES
2,4,6-TRINITRO RESORCINOL	25 GRAMS	PLASTIC	3714 BLDG.	PNL	CONTACT E. MARTIN, EXPLOSIVE
2,4-DINITRO RESORCINOL	70 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN
2,4-DINITROPHENOL	500 GRAMS	PLASTIC	3714 BLDG.	PNL	CONTACT E. MARTIN, EXPLOSIVE YELLOW CRYSTALS
2,4-DINITROPHENYL HYDRAZINE	125 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN, NO REFERENCE IN RTECS, "EXPLOSIVE?" MARKED ON BOTTLE
ALPHA-NITROSO METHYL ISOBUTYLKETONE	174 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN, MARKED EXPLOSIVE ON CONTAINER, NO LISTING IN RTECS OR OTHER MANUALS.
BUTOXYETHANOL	1 QUART	GLASS	325 BLDG.	WHC	WES KNIGHT OWNER
BUTYL CELLUSOLVE	100 MILLILITERS	GLASS	325 BLDG./RM. 312	WHC	APPROX. 5-10 YEARS OLD, IN FLAMMABLE STORAGE CABINET, ETHYLENE GLYCOL MONOBUTYL ETHER
BUTYL ETHANOL	2.5 GAL.	METAL BUCKET	306E BLDG./SHOP	WHC	2-BUTOXYETHANOL, (ETHYLENE GLYCOL MONOBUTYL ETHER), APPROX. 10 YEARS OLD
CARBON TRICHLORIDE	1 POUND	GLASS	326 BLDG./RM. 39B	WHC	AT LEAST 15 YEARS OLD, CONTAINER FULL, ON SHELF, RESEMBLES PICTIC ACID, NOT LISTED IN RTECS
ETHYL ETHER	1 PINT	METAL	SIGMA 5	PNL	
	2 PINTS	METAL	REDOX, BACK DOCK	RHD	MINIMUM 10 YEARS OLD, CRYSTALIZED
		METAL	3746A	PNL	
HEXANITRODIPHENYLAMINE	70 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN, POT

DETONATION DISPOSAL 3/19/86 R1

CHEM NAME	AMOUNT	CONT. MATERIAL	LOCATION	OWNER	ADDITIONAL NOTES
DIETHYL ETHER	1 PINT	METAL	3745B	PML	PML REQUIRED TO FURNISH JUSTIFICATION, MAY NOT BE RECOVERED
PERACETIC ACID	100 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E. MARTIN, APPROX. 20 YEARS OLD, EXPLOSIVE
PEROXYL CHLORIDE	300 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E. MARTIN, EXPLOSIVE, IN TWO ALMOST EMPTY CONTAINERS.
TETRAHYDROFURAN	6-1PINT CONTAINERS	GLASS	3714 BLDG.	PML	E. MARTIN, 20 YEARS OLD, 3/4 FULL
METHYL PHTHALATE	100 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E. MARTIN, EXPLOSIVE

DISPOSAL ANALYSIS NO. PNL-22-129

- Each container must be legibly numbered on both the top and sides, using the manifest number and a unique container number, e.g., PNL-22-129-1.
- The weight of the outer container, if over 110 pounds, must be marked on the container.
- Packagings containing liquids must be marked "This End Up", with an arrow.
- In accordance with 49 CFR 172.301 and 172.304, all markings must be legible, durable, and in a color which contrasts with the container.

NONHAZARDOUS WASTE

The following items are not hazardous wastes as defined in WAC 173-303, and may be disposed of to a drain:

1. Phenylcyclohexane	(86-010, #3)	250 ml
2. Methylaniline	(86-026, #3)	500 g
3. Diphenyl methane	(86-010, #7)	0.96 liter
4. Ethyl naphthalene	(86-010, #8)	12 @ 10 g

THE FOLLOWING IS HAZARDOUS WASTE WHICH IS UNSTABLE OR EXPLOSIVE.

This waste should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

1. Boron trifluoride etherate (86-026, #4) 1 kg

WC01
D001
D003
(EHW)

LIPABS
8/25/87



Rockwell
International

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

In reply, refer to letter

*Received
6/19/86
Kor
Danna*

Ms. J. M. Hobbs
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Ms. Hobbs:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-176

Reference: Chemical Waste Disposal Request No. 86-040, June 5, 1986,
J. M. Hobbs to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with state of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatibility.

DISPOSAL ANALYSIS NO. PNL-22-176

NONHAZARDOUS WASTE

The following items are not hazardous wastes as defined in WAC 173.303, and may be sent to the Central Landfill Trash Trench for disposal. Please package these wastes so they are securely contained for transport and disposal.

NO MANIFEST IS REQUIRED FOR THESE ITEMS.

1. Ferric Oxide: 0.45 kg

UNSTABLE OR EXPLOSIVE WASTES

The following are hazardous wastes which are unstable or explosive. These wastes should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

1. Carbon Disulfide: Five 500-ml bottles (1.0 kg)
P022
D003
D001
(EHW)

332 BUILDING (OUTSIDE 300 AREA)

Tetrahydrofuran	100 ml	glass	
Tetrahydrofuran	2.0 kg	glass	2-1 gallon
Tetrahydrofuran	4 kg	glass	
Triethylborane -1 M solution in hexane	0.5 kg	glass in metal	
Lithium hydride	0.23 kg	glass	
Acrolein	0.4 kg	glass	
Hydrazine	1 kg	crate	
Aluminum Chloride	0.45 kg	glass	
Unsymmetrical dimethyl hydrazine	0.01 kg	glass	
γ -nitrobenzoyl chloride	0.1 kg	glass	
Sodium peroxide	0.34 kg	metal	3 containers
Benzene/butyl lithium solution	0.9 kg	glass	
Waste solvent hexane/benzene/butyl lithium/ tetrahydrofuran	1 kg	glass	
Chromium metal powder	1 lb	glass	
Organic mixture: 40 % toluene 20 % ether 5 % benzene 5% ethyl acetate 30 % petroleum ether	4 kg	glass	
Organic mixture: 50 % heptane 50 % di-ethyl ether	4 kg	glass	
Organic mixture: 5 % ethyl ether 5 % allyl magnesium bromide	1 kg	glass	

332 BUILDING (CONTINUED)

Organic mixture	4 kg	glass
20 % benzene		
20 % ethyl acetate		
10 % tetrahydrofuran		
10 % toluene		
10 % ether		
1 % hydrogen sulfide		
29 % methanol		

LSL-II BUILDING (3000 AREA)

Ethyl ether	4 pints	metal	at least 9 years old
Ethyl ether	6 gallons	glass	age unknown
Ethyl ether	1 gallon	glass	unopened, age unknown
Picric acid	5 grams	glass	re-wetted crystals
Picric acid	1 lb	glass	dry crystals

SIGMA 5 BUILDING (3000 AREA)

Ethyl ether	1 pint	metal	unopened, age unknown
-------------	--------	-------	-----------------------

RTL BUILDING (3000 AREA)

Isopropyl ether	1 kg	glass	at least 2 1/2 yrs old, partially empty
-----------------	------	-------	---

325 BUILDING (300 AREA)

Butoxyethanol	1 quart	glass	age unknown
Butyl Cellusolve	100 ml	glass	5-10 years old

326 BUILDINGS (300 AREA)

Carbon Trichloride	1 lb	glass	15 years old, resembles picric acid
--------------------	------	-------	-------------------------------------

306E BUILDING (300 AREA)

Ethyl Ethanol	2.5 gal	metal	greater than 10 years old
---------------	---------	-------	---------------------------

301-S BUILDING (2000 AREA)

Ethyl Ether

2.5 gal

greater than 10 years old

3714 BUILDING (INSIDE 308 PROTECTED AREA, INSIDE 300 AREA)

Picric Acid	100 grams	glass	approximately 20 years old, explosive
Picryl Chloride	300 grams	glass	explosive, in two almost empty containers
Tetrahydrofuran	6-1 pint cont.	glass	20 years old, 3/4 full
Trinitrotoluene	100 grams	glass	explosive
4,6 - Trinitro Resorcinol	25 grams	plastic	explosive
2,4 - Dinitro Resorcinol	70 grams	glass	
2,4 - Dinitrophenol	500 grams	plastic	explosive, yellow crystals
2,4 - dinitrophenyl hydrazine	125 grams	glass	explosive"? marked on bottle
1pha-nitrosomethylisobutylketone	174 grams	glass	marked explosive on container
Hexanitrodiphenylamine	70 grams	glass	potentially explosive?

329 BUILDING (INSIDE 300 AREA)

Picric Acid	100 g	glass	old and dry
-------------	-------	-------	-------------

3745B BUILDING (INSIDE 300 AREA)

Phenyl ether	1 pint	metal	age unknown
--------------	--------	-------	-------------

3746A BUILDING (INSIDE 300 AREA)

Ethyl Ether	2 pints	metal	age unknown
-------------	---------	-------	-------------

ENCLOSURE II

CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
Ethyl Ether	3	12K	1 gal. glass	PF	329 Bldg.
Isopropyl Ether	6	4K	1 pt. glass	PF	331 Bldg.
Picric Acid	1	.2K	1 pt. glass	PF	331 Bldg.
Ethyl Ether	6	4K	1 pt. metal	PF	331 Bldg.

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352



Rockwell
International

REGISTERED
HAZARDOUS MATERIAL
815574

SEP 12 1986

ACTION

ROUTE

886-4221
AEROX

TICKLE

FILE

RETURN TO

USER

SEP 13 1986

In reply, refer to letter 886-4221

Mr. D. L. Lundstrom
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Mr. Lundstrom:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-251

Reference: Chemical Waste Disposal Request 86-058, June 19, 1986,
D. L. Lundstrom to Solid Waste Processing and
Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatibility.

DISPOSAL ANALYSIS NO. PNL-22-251

THE FOLLOWING ITEMS ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE. THESE WASTES SHOULD BE DISPOSED BY DETONATION. PLEASE CONTACT M. R. ROMSOS ON 373-4032 TO MAKE ARRANGEMENTS.

<u>Item Number</u>	<u>Waste</u>	<u>Quantity/Container/Amount</u>
1 (D001, F001, WTO2, WPO1, WCO1, F003)	35.0% methanol	1 glass bottle 3.0 kg 1-gal
	10.0% diethyl ether	
	17.0% tetrahydrofuran	
	14.0% carbon tetrachloride	
	1.0% p-Dioxane	
	22.0% N,N-dimethylformamide	
	1.0% p-xyloquinone	
5 (WPO1, F001, F005, WTO1, WCO1)	2.0% water	1 glass bottle 3.0 kg 1-gal
	30.0% acetone	
	5.0% hexane or heptane	
	3.0% ethyl acetate	
	14.0% tetrahydrofuran	
	4.0% carbon tetrachloride	
	5.0% benzene	
	4.0% p-dioxane	
	3.0% toluene	
	1.0% methyl isobutenyl ketone	
	5.0% 2-furaldehyde	
	3.0% 2,4-dimethyl-3-dioxolane-2-methanol	
	4.0% N,N-dimethylacetamide	
	1.0% chlorotoluene	
	15.0% decahydronaphthalenes	
	1.0% tetrahydronaphthalene	
7 (D001, WPO1, F003, F005, WTO2)	25.0% methanol	1 glass bottle 3.0 kg 1-gal
	25.0% tetrahydrofuran	
	25.0% isooctane	
	10.0% methyl phenyl ethanone	
	8.0% toluene	
	3.0% 2-ethyl-5-methyl-2-dioxane	
	4.0% benzene propanoyl chloride plus tetramethylbenzene	

DISPOSAL ANALYSIS NO. PNL-22-251

<u>Item Number</u>	<u>Waste</u>	<u>Quantity/Container/Amount</u>		
11 (FO03, FO05, WT02, WP01, WC01, DO01)	45.0% methanol	1	glass bottle 1-gal	3.0 kg
	0.5% acetone			
	6.0% C ₆ -C ₈ hydrocarbons			
	29.0% tetrahydrofuran			
	1.0% benzene			
	4.0% 1-chloro-2-propanol			
	13.0% toluene			
	1.0% methyl phosphate			
	0.5% 2-ethyl-5-methyl-1,4-dioxane			
	12 (DO01, WP01, WT01, FO05, FO03, FO01, WC01)			
10.0% methanol				
5.0% carbon tetrachloride				
5.0% benzene				
10.0% heptane				
10.0% toluene				
3.0% pyrridine borane				
3.0% N,N-dimethyl acetamide				
2.0% methyl isobutenyl ketone				
2.0% pentoxone				

85-001: Parolite ~~1/85~~ ~ 1/85

— Parolite from Johnston ~ 1/85
Scheele

85-002 Parachloric acid ~ 1/85
Burton

— Elvich Buti ~ 7/85

OWNER	CHEM NAME	LOCATION	AMOUNT	CONT. SIZE
1 PNE	PERCHLORIC ACID	RM 122/622R BLDG.	500 MILLILITERS	1 PINT
1 WHC	BUTYL ETHANOL	SHOP/306 E BLDG.	2.5 GAL.	5 GAL.
10 PNE	2,4-DINITRO RESORCINOL	3714 BLDG.	70 GRAMS	1 PINT
11 PNE	PICRYL CHLORIDE 2	3714 BLDG.	300 GRAMS	1 PINT
12 PNE	PICRIC ACID	3714 BLDG.	100 GRAMS	1 PINT
13 PNE	CARBON DISULFIDE	332	3-1 GAL. CONTAINERS	1 GAL.
14 PNE	BENZENE WITH N-BUTYL LITHIUM	332	2-1 PT. CONTAINERS	?
15 PNE	GLYCOL DIMETHYL ETHER	332	2-1 PINT CONTAINERS	1 PINT
16 PNE	PERCHLORIC ACID	332 BLDG.	1 PT.	1 PINT
17 PNE	PERCHLORIC ACID	EST-II/RM. 1420	2-1.5 LB. CONTAINERS	1.5 LB.
18 PNE	PERCHLORIC ACID	320 BLDG./OUTSIDE ACID CAB.	500 ML.	1 PINT
19 PNE	TETRAHYDROFURAN	E5/BACK DOCK/SOLVENT CAB. 1	6-1 GAL. BOTTLES	1 GAL.
2 PNE	PERCHLORIC ACID	RM 122/622R BLDG.	200 MILLILITERS	1 PINT
2 WHC	BUTYL CELLUSOLVE	RM. 312/325 BLDG.	100 MILLILITERS	1 PT.
20 PNE	TETRAHYDROFURAN	E5/RM. 1510/UNDER HOOD	2-1 GAL. BOTTLES	1 GAL.
21 PNE	ETHYL ETHER	E5/BACK DOCK/SOLVENT CAB. 1	1 GAL.	1 GAL.
22 PNE	ETHYL ETHER	E5/RM 1411/UNDER HOOD	1 POUND	1 POUND
23 PNE	PERCHLORIC ACID	331 BLDG./RM. 103	3-1 PINT CONTAINERS (1/3 FULL)	1 PINT
24 PNE	PERCHLORIC ACID	PSL BLDG./RM. 605	3/4 PINT	1 PINT
3 PNE	TETRAHYDROFURAN	3714 BLDG.	6-1 PINT CONTAINERS	1 PINT
3 WHC	CARBON TRICHLORIDE	RM.398/326 BLDG.	1 POUND	1 PT.
4 PNE	ALPHA-NITROSOMETHYLISOBUTYLKE TONE	3714 BLDG.	174 GRAMS	?
4 WHC	ETHYL ETHER	309 BLDG.	1/4 PT.	1 PINT
5 PNE	2,4,6-TRINITRO RESORCINOL	3714 BLDG.	25 GRAMS	?
6 PNE	2,4-DINITROPHENOL	3714 BLDG.	500 GRAMS	1
7 PNE	TRINITROTOLUENE	3714 BLDG.	100 GRAMS	1 PINT
8 PNE	2,4-DINITROPHENYL HYDRAZINE 2	3714 BLDG.	125 GRAMS	1
8 PNE	HEXANITRODIPHENYLAMINE	3714 BLDG.	70 GRAMS	?

Jeannie, The highlighted ones are yours,
 we might be rescheduling for the
 29th. I'll be in touch.

Mike

Add 1pt ether 331 Rm 104 open

ISSUED
MATERIAL
DATE
OCT 23 1985
LOCATION
ROUTE
AERON
TICKET
FILE
REMARKS
TOTAL



Battelle

Pacific Northwest Laboratories

Project Number _____

Internal Distribution

JH Choate
FO Gladfelder
SC Hawley
ER Job
SW Li
EC Martin
MJ Pueschner
GL Roberts
DS Sklarew
JMH/File/LB

Date October 24, 1985
To Distribution
From Jeene Hobbs *Jeene*
Subject Disposal of Peroxide Forming Chemicals

Arrangements have finally been made to dispose of your potentially explosive chemicals. We will be collecting them with assistance from the City of Richland Bomb Squad.

The collection date is Wednesday, October 30, after regular business hours. I will come around either Tuesday or Wednesday to make sure that I can still find the chemicals.

If you have any questions, please call me on 376-1631.

JMH:jl

Copy to Romas
4/22/85

UNSTABLE CHEMICAL DISPOSAL

Chemical	Quantity	Age	Building/Location	Contact & Phone Number
ethyl ether opened	1 # can	?	Z5 - Rm 1411 Under hood	Deb Sklarew
ethyl ether unopened	1 gal bottle	?	Z5 back dock Solvent cabinet #1	Deb Sklarew Key to solvent cabinet in Rm 11 desk drawer
Tetrahydrofuran opened	2 - 1 gal bottles	?	Z5 - Rm 1510 Under hood	Deb Sklarew
Tetrahydrofuran unopened	6 - 1 gal bottles	?	Z5 back dock Solvent cabinet #1	Deb Sklarew
Perchloric Acid	500 ml	> 5 yr	320 Bldg - Acid Cabinet Outside	Bob Kiddy 6-3005
Perchloric Acid 70%	2 - 1.5#	> 1 yr	LSL-II, Rm 1420 Worth hood	Fred Burton 5-2031
Perchloric Acid	1 - 1 pt	> 2 yr	332	Jeanne Hobbs 6-1631
tetra glyme (glycol dimethyl ether)	2 - 1 kg	> 2 yr	332	Jeanne Hobbs 6-1631
Benzene w/ N-butyl lithium	2 - 1 pt	> 1 yr	332	Jeanne Hobbs 6-1631

DON'T SAY IT --- Write It!

DATE 5/8/85

TO Jeanne Hobbs

FROM Dick Lee (375-3830)
2400 Stevens

<u>Chemical</u>	<u>quantity</u>	<u>bdg</u>	<u>Rm</u>	
Perchloric Acid	~ 200ml	622R	122	
"	~ 500ml	"	122	← unopened glass bulb

Sorry for the late response to your memo. I've been out of town.

Dick Lee



"TO MAKE LIFE LAST, PUT SAFETY FIRST"



4/16/85

RECEIVED

APR 30 1985

R & NS

MICE

I HAVE (for disposal)

Explosives

- 100 g - Picric Acid >300°C percussion
(10-20% water transportation)
- 300 g picric acid ?
- 70g 2,4 di nitro resorcinol stony fused
- 70g Hexa nitro diphenylamine HAS TENDAC TO EXPLODE
- 300g 2,4 di nitro diphenylamine (initiat)
- 125g 2,4-dinitro phenyl hydrazone Bottle also explo.
- 100g Trinitro toluene explodes by percussion w/ paper ch. 1. in Absorb. through skin
- 500g 2,4-dinitro phenol TOXIC
- 25g 2,4,6-Trinitro resorcinol decomposes on rapid heating
- 174g 2-nitroso-methylisobutyl Ketone ?

6 joints Tetrahydrofuran

3714 Bldg

E.C. Martin

6-3578

I can't get a hold of Jones - maybe you can tell her to contact me

Thanks

Gen

3714 BUILDING (INSIDE 308 PROTECTED AREA, INSIDE 300 AREA)

Picric Acid	100 grams	glass	approximately 20 years old, explosive
Picryl Chloride	300 grams	glass	explosive, in two almost empty containers
Tetrahydrofuran	6-1pint cont.	glass	20 years old, 3/4 full
Trinitrotoluene	100 grams	glass	explosive
4,6-Trinitro Resorcinol	25 grams	plastic	explosive
2,4-Dinitro Resorcinol	70 grams	glass	
2,4-Dinitrophenol	500 grams	plastic	explosive yellow crystals
2,4-dinitrophenyl hydrazine	125 grams	glass	explosive"? marked on bottle
Alpha-nitrosomethylisobutylketone	174 grams	glass	marked explosive on container
Hexanitrodiphenylamine	70 grams	glass	potentially explosive?,

329 BUILDING (INSIDE 300 AREA)

Picric Acid	20 g	glass	old and dry
Alumina & Picric Acid	150 g	1 gal	water cover

3745B BUILDING (INSIDE 300 AREA)

Phenyl ether	1 pint	glass	age unknown
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3746A BUILDING (INSIDE 300 AREA)

Ethyl Ether	2 pints	metal	age unknown
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332 Building (OUTSIDE 300 AREA)

Tetrahydrofuran	100 ml		glass
Tetrahydrofuran	3.0 kg	glass	3-1 gallon
Tetrahydrofuran	4 l		glass
Triethylborane -1 M solution in hexane	0.5 kg	glass in metal	
Lithium hydride	0.23 kg		glass
Acrolein each	0.4 kg	glass	in metal 3 items 100g
Hydrazine	1 kg		crate
Aluminum Chloride	0.45 kg		glass
Unsymmetrical dimethyl hydrazine	0.01 kg		glass
p-nitrobenzoyl chloride	0.1 kg		glass
Sodium peroxide	0.34 kg	metal	3 containers
Benzene/butyl lithium solution	0.9 kg		glass
Waste solvent hexane/benzene/butyl lithium/ tetrahydrofuran	1 kg		glass
Chromium metal powder	1 lb		glass
Organic mixture: 40% toluene 20% ether 5% benzene 5% ethyl acetate 30% petroleum ether	4 l		glass
Organic mixture: 50% heptane 50% di-ethyl ether	4 kg		glass
Organic mixture: 78% ethyl ether 22% allyl magnesium bromide	1 kg		glass

332 Building (CONT)

Alumimium Chloride	1 4 oz	
Hydrazine	1 kg	crate
Organic mixture: 20% benzene 20% ethyl acetate 10% tetrahydrofuran 10% toluene 10% ether 1% hydrogen sulfide 29% methanol	4 kg	glass
Organic Mixture: 85% Hexane 5% Ether 10% Ethylacetate	1 gal	glass
Organic Mixture: 30% Et ₂ O 10% H ₂ O 10% MeOH 40% IPA 10% Pentane	1 gal	glass
40% Organic Mixture: 25% iso-octane 20% t-Butyl methyl ether 10% ether 5% Acetone	1 gal	1 glass
80% Organic Mixture: 5% methylene chlorite 5% acetone 5% Benzene 5% acetonitrile 5% ether	1 gal	glass
Organic Mixture 10% Dichlormethone 75% Hexane 5% Ether 10% Ethyl Acetate	1 gal	glass

332 Building (contd)

Organic Mixture:

50% Hexane		
10% Acetone	1 gal	glass
10% Ether		
20% Benzene		
10% THF		

carbon sulfide	5-1#	glass
----------------	------	-------

Boron trifluoride etherate	1#	glass
----------------------------	----	-------

Butyl lithium waste	1 l	glass
---------------------	-----	-------

LSL - II BUILDING (3000 AREA)

Ethyl ether	5 pints	metal	at least 9 yrs old
-------------	---------	-------	--------------------

Ethyl ether	8 liters	glass	age unknown
-------------	----------	-------	-------------

Ethyl ether	1 gallon	glass	unopened, age unknown
-------------	----------	-------	--------------------------

Picric acid	5 grams	glass	re-wetted crystals
-------------	---------	-------	--------------------

Picric acid	1 lb	glass	dry crystal
-------------	------	-------	-------------

Picric acid	1 lb	glass	dry crystals
-------------	------	-------	--------------

SIGMA 5 BUILDING (3000 AREA)

Ethyl ether	1 pint	metal	unopened, age unknown
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RTL BUILDING (3000 AREA)

Isopropyl	1 kg	glass	at least 2 1/2 yrs old, partially empty
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Shipped
6/11/86

→ JMH

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352



Rockwell
International

In reply, refer to letter R86-2632

Ms. J. M. Hobbs
Pacific Northwest Laboratory
Post Office Box 999 -
Richland, Washington 99352

3, 2, 1 2x200 2x100

TAL-22-82-2
Waste fam-Lig

Dear Ms. Hobbs:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-125

Reference: Chemical Waste Disposal Requests 86-019, 86-020, 86-027,
86-028 and 86-029, April 30, 1986, J. M. Hobbs to
Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and U. S. Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatibility.

DISPOSAL ANALYSIS NO. PNL-22-125

THE FOLLOWING ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE.

These wastes should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

- | | | | |
|---|---------------|-------------------|----------|
| 1. Benzene/butyl lithium solution | (86-028, #7) | 1 qt
(0.9 kg) | - HIPADS |
| 2. Waste solvent:
hexane/benzene/butyl lithium/
tetrahydrofuran | (86-019, #8) | 1 qt
(1 kg) | - HIPADS |
| 3. Tetrahydrofuran | (86-019, #38) | 1 gal
(4 kg) |) HIPADS |
| 4. Chromium metal powder | (86-027, #23) | 1 lb | |
| 5. Organic mixture:
40% toluene
20% ether
5% benzene
5% ethyl acetate
30% petroleum ether | (86-028, #2) | 1 gal
(4 kg) |) ZW |
| 6. Organic mixture:
50% heptane
50% di-ethyl ether | (86-020, #30) | 1 gal
(4 kg) |) ZW |
| 7. Organic mixture:
78% ethyl ether
22% allyl magnesium bromide | (86-019, #7) | 1 liter
(1 kg) |) ZW |
| 8. Organic mixture:
20% benzene
20% ethyl acetate
10% tetrahydrofuran
10% toluene
10% ether
1% hydrogen sulfide
29% methanol | (86-020, #18) | 1 gal
(4 kg) |) ZW |

Revision to ENCLOSURE II (July 22, 1987 Letter)

CHEMICALS TO BE DETONATED IN ADDITION TO ENCLOSURE II LIST
August 25, 1987

Chemical Name	Quantity	Total Amount	Type of Container	Status (*)	Location (Bldg.)
Ether	1	1 lb	Can	PF	331A
Ether	3	3 lb	Can	F	331
Perchloric Acid	4	1 L	Glass	3 F 1 PF	332
Sodium Sulfide	1	1 lb	Glass	PF	332
Sodium Peroxide	2	2 lb	Glass	PF	332
Tertiary butyl amine borane	2	2 oz	Glass	F	332
Organic Mixture 95% tetrahydrofuran 5% toluene	1	4 L	Glass	F	332
Organic Mixture 48% tetrahydrofuran 52% trichloroethane	1	3.8 kg	Glass	F	332
Organic Mixture 93% tetrahydrofuran 1% methanol 4% H ₂ O 4% trichloroethane	1	3.8 kg	Glass	F	332
Black Powder	1	1 lb	Metal	F	Patrol Academy

- * F Full container, has not been opened.
- PF Partially full container, has been opened.

August 5

ENCLOSURE II

CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
Tetrahydrofuran	1	3.8K	glass	F	331 Bldg.
1,4 - Dioxane	1	1K	glass	F	331 Bldg.
Boron trifluoride ether complex	1	.4K	glass	PF	332 Bldg
1,4 - Dioxane	1	.5K	glass	F	332 Bldg.
Tetrahydrofuran	1	.1K	glass	PF	332 Bldg.
Hydrazine monohydrate	1	.5K	glass	F	332 Bldg.
Boron trifluoride methanol complex	1	1K	glass	PF	332 Bldg.
Butyllithium/ benzene mixture (25% / 75%)	1	.2K	glass	F	332 Bldg.
Boron trifluoride/ methanol mixture (14% / 86%)	1	.05K	glass	F	332 Bldg.
Boron trifluoride ether complex	1	.1K	glass	PF	332 Bldg.
2,4 Dinitrophenyl hydrazine	1	.025K	plastic	F	332 Bldg.
Allyl ether (100%)	1	.0005K	glass	PF	332 Bldg.
Triethyl aluminum	1	.3K	metal	PF	332 Bldg.
Naphthacene	1	.003K	glass	PF	332 Bldg.
2-Methylfuran (100%)	1	.0005K	glass	PF	332 Bldg.

DON'T SAY IT -- WRITE IT!!

June 23, 1988

TO: Those Listed

FROM: G. G. Meade *G. G. Meade*

cc: J. L. Davidson - DOE-RL/A5-55
R. L. Nelson - DOE-RL/A5-55
L. G. Musen - DOE-RL/A5-55
GGI-File/1b

WESTINGHOUSE HANFORD COMPANY DETONATION OF EXPLOSIVE CHEMICALS
SCHEDULED FOR JUNE 21, 1988

Letter #8853769 from R. E. Peterson to J. R. Patterson of Department of Energy - Richland Operations Office (DOE-RL), Safety and Environment Division requested approval of the detonation of certain explosive chemicals scheduled for June 21, 1988. The activity was approved by DOE on June 14, 1988. Pacific Northwest Laboratory requested that two additional containers of explosive chemicals be added to the detonation inventory. They are:

- 1 pint-size container of perchloric acid about 1/4 full - obviously old.
- 1 pint-size container of ether about 1/2 full - obviously old.

After a phone consultation with Mr. J. L. Davidson of DOE-RL, Safety and Environment Division, he approved the addition of the two containers listed above to the inventory of chemicals to be detonated.

This DSI serves to modify Enclosure II of Letter 8853769. This DSI should be attached to the letter.

Distribution

J. R. Bell	R3-60	G. G. Meade	R3-54
G. M. Christensen	R2-30	J. W. Olson	R1-51
H. F. Daugherty	R2-28	R. E. Peterson	R2-30
B. G. Essary	S0-46	M. R. Romsos	R1-51
D. E. Good	S0-97	E. L. Stairer	S0-46
D. G. Harlow	R2-01	S. A. Wever	B3-04
W. M. Jacobl	B3-01	D. D. Wodrich	R2-23
D. W. Lindsey	R1-51	D. L. Wegener	X6-18

tat

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

ENCLOSURE II

CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
1,4 - DIOXANE	5	2,500 ml.	glass/500 ml.	PF	100N
Ethyl Ether	1	3,000 ml.	glass/1 gallon	PF	332
perchloric	1/4 pint eth	PNL			
Ethyl Ether	1/2 pint	PNL			
picryl chloride	-	ap			
picric acid		1 gast jar			
		litre			

ENCLOSURE II

CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
Lithium Triethylborohydride (PNL-24-556)	1	0.9 Kg	1 quart	F	332
Ethyl Ether (PNL-24-737)	3	1.5 Kg	1 pint	F	332
Ethyl Ether	4	10.8 Kg	4 liter	F	332
2,2',4,4',6,6'- hexanitrodiphenylamine	1	0.05 Kg	4 ounce	PF	332
Picryl Chloride (PNL-24-764)	1	0.025 Kg	25 grams	F	332
Dioxane (PNL-24-764)	1	0.5 Kg	500 grams	F	332

DISPOSAL ANALYSIS NO. PNL-24-737

REACTIVE CHEMICAL

The following chemical has been determined to be reactive and shall NOT be shipped to the 616 Nonradioactive Dangerous Waste Storage Facility.

Item #1290 (3 cans of ethyl ether, 1 pound each)

Please contact M. R. Romsos on 373-4032 to discuss a possible direct offsite shipment of this waste or onsite detonation.

DISPOSAL ANALYSIS NO. PNL-24-764

REACTIVE WASTE

The following item is considered to be explosive and cannot be shipped off-site. Please contact M. R. Romsos on 373-4032 to make arrangements for on-site detonation.

#1517	picryl chloride	1	glass	25g	.025 K
#1340	dioxane	1	glass	500g	.5 K

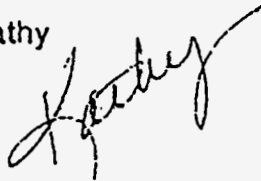
Memo to Mike Romsos
from Kathy Poston
Re: items for detonation for December detonation

The following items have either been designated for detonation by Westinghouse, or have characteristics which make them good candidates for detonation:

Item	Number of containers	Chemical	Quantity
1	1-1 Kg	Lithium Triethylborohydride	.9 Kg
2	3-1 Pint	Ethyl Ether	1.5 Kg
3	4-4 Liter	Ethyl Ether	10.8 Kg
4	4-oz	2,2',4,4',6,6'- hexanitrodiphenylamine	0.05 Kg

Item numbers 1 and 2 have been designated by Westinghouse for detonation, item 3 is at least five years old, and item 4 is very old, and shock sensitive, used as a booster explosive. If you have any questions, give me a call at 376-3752.

Thanks, Kathy



ENCLOSURE II
 CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
----------------------	-----------------	---------------------	------------------	---------------	-----------------

Lithium Triethylborohydride (PNL-24-556)	1	0.9 Kg	1 quart	F	332
Ethyl Ether (PNL-24-737)	2	1.5 Kg	1 pint	F	332
Ethyl Ether	1	0.9 Kg	4 liter	F	332
2,2',4,4',5,5'- hexanitrodiphenylamine	1	0.05 Kg	1 ounce	PF	332
Bicryl Chloride (PNL-24-764)	1	0.025 Kg	25 grams	F	332
Bixenone (PNL-24-764)	1	0.5 Kg	500 grams	F	332

2,4 Dinitrophenylhydrazine

1

402

402

F

331



From: Site Hazardous Waste Engineering Support Unit 13841-89-010
 Phone: 3-3516 2750E/A119/200E R1-51
 Date: February 22, 1989
 Subject: GENERATOR LOGBOOK NUMBER 89-013, SITE HAZARDOUS WASTE ENGINEERING SUPPORT
 UNIT LOGBOOK NUMBER PNL-25-114

To: K. A. Poston P7-68

cc: M. R. Romsos R2-82
 RLG: File/LB *dlh*

The following items are to be detonated on site:

<u>Item #</u>	<u>Containers</u>	<u>Total wt.</u>	<u>Chemical</u>	<u>Waste Codes</u>
2053	2 ea 25 g, 5 ea 4 oz	.2 K	2,4-dinitrophenylhydrazine	D003 WT02
2054	8 ea 1 pt, 1 ea 1 oz glass	7 K	perchloric acid (70%)	WT02 D001 D002 D003
2055	1 ea 1 qt metal	1 K	ethyl ether, anhydrous	U117 D003
2056	2 ea 1 pt cardboard	.45 K	benzoyl peroxide	D001 D003
2057	2 ea 1 gal glass	7.6 K	tetrahydrofuran	U213 WT02 D001 D003
2058	1 ea 1 pt, 1 ea 1 gal, glass	3 K	dioxane	U108 WT01 WC01 D001 D003
2059	1 ea 200 g glass inside lead box	200 g	2,4,6,2',4',6'- hexanitrodiphenylamine	D003

If you have any questions or concerns on the subject, please contact me on 3-3516.

R. L. Granberg
 R. L. Granberg
 Technician

cmc

DISPOSAL ANALYSIS NO. PNL-25-054

SHOCK SENSITIVE/EXPLOSIVE

The following waste is shock sensitive and must be disposed of by contacting M. R. Romsos on 373-4032.

#1928 Hydrazine, monohydrate 2 1 qt glass .8 K

ir MAC 173-3,
re Tabpacked,

Page 4

Page 5 of 16

OSAL ANALYSIS NO. PNL-24-878

SHOCK SENSITIVE

Waste listed below shall be disposed of by contacting M. R. Romsos on 373-4032, for possible onsite detonation or direct offsite shipment.

#1691	ethyl ether, anhydrous	4, 1 gal glass containers	10.6 K
#1705	sodium sulfide	4, 2 Kg plastic containers	8 K
#1706	tetrahydrofuran	2, 500 ml glass	1 K
#1719	2,2',4,4,6,6' hexanitro-diphenylamine	1, 4 oz glass	0.05 K

WATER REACTIVE

Waste listed below is water reactive and shall be stored at the generating facility. Contact M. R. Romsos on 373-4032 to arrange for direct offsite shipment.

#1718	waste calcium carbide	2, metal 5 lb cans	4.5 K
-------	-----------------------	--------------------	-------

PNL-25-209

Complete unsh. parts and forward to: Hazardous Waste Unit 2750E/A 113/200E Westinghouse	CHEMICAL WASTE DISPOSAL REQUEST			Manifest No.
	Generator Logbook No. <u>89-028</u>			Disposal Analysis Distribution*
Requested By <i>Glen Thorton</i>	Telephone No. <i>6-7688</i>	Address <i>P7-68</i>	Company <i>PNL</i>	1. Generator 4. _____ 2. H.W.U. 5. _____ 3. _____ 6. _____
Signature/Date <i>Glen Thorton 3/16/89</i>		Accumulation Date <i>3/16/89</i>		*May be used by generator as needed.

WASTE DESCRIPTION (For additional items, continue on the back of this form)

A Item No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Waste Status	L Container Status
Example 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% in Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH < 2 Flash point > 200°F	C	O	F
Example 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
Example 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 < 1 ppm	Liquid, pH = 8.2 Flash Point > 200°F	None	U	MT
<i>2295</i>	<i>9</i>	<i>1 pt</i>	<i>Glass</i>	<i>4.5 Kg</i>	<i>1,4-Dioxane</i>	<i>> 6 years</i>	<i>100</i>	<i>liquid</i>	<i>E</i>	<i>O</i>	<i>PF</i> <i>332</i>
<i>2296</i>	<i>1</i>	<i>1/2 gal</i>	<i>glass</i>	<i>1 kg</i>	<i>p-Dioxane</i>	<i>Unknown age</i>	<i>100</i>	<i>liquid</i>	<i>E</i>	<i>O</i>	<i>PF</i> <i>332</i>
<i>2298</i>	<i>1</i>	<i>1 gal</i>	<i>glass</i>	<i>3.8 kg</i>	<i>Tetrahydrofuran</i>	<i>Tetrahydrofuran unknown age</i>	<i>100</i>	<i>liquid</i>	<i>E</i>	<i>O</i>	<i>F</i> <i>332</i>
<i>2297</i>	<i>2</i>	<i>1 pt</i>	<i>Metal Can</i>	<i>2 kg</i>	<i>Nitrocellulose Isopropyl Alcohol</i>	<i>Nitrocellulose Isopropyl Alcohol</i>	<i>> 70% < 30%</i>	<i>Solid Possibly Evaporated</i>	<i>E</i>	<i>O</i>	<i>F</i> <i>332</i>
<i>2299</i>	<i>1</i>	<i>1 qt</i>	<i>glass</i>	<i>5 kg</i>	<i>n-Butyl Ether</i>	<i>Age unknown</i>	<i>100</i>	<i>liquid</i>	<i>E</i>	<i>O</i>	<i>F</i>

INSTRUCTIONS

- Accumulation Date - List the accumulation date of the oldest waste
- Column A - Item Number - Item number for each unique waste.
- Column B - Number of Containers - Number of containers of a unique waste to be disposed
- Column C - Container Size - Size of containers specified in Column B. If multiple container sizes, specify number and size of each
- Column D - Container Description - Specify container's DOT specification. If non-DOT container or unknown, specify type, e.g. steel drum
- Column E - Total Waste Quantity - Total waste quantity (in kilograms only) of each unique waste to be disposed
- Column F - Waste Description - Specify trade name or general description of each unique waste. If waste material is a paint, specify color for evaluation of pigments.
- Column G - Chemical Components - List all organic and inorganic components of the unique waste using specific chemical names. Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste

- Column H - Weight (%) - For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.
- Column I - Physical Properties - Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.
- Column J - Hazards - Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).
- Column K - Waste Status - Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).
- Column L - Container Status - Indicate whether container is: Full (F), Partially Full (PF), Empty (< 1/4 in. in 55 Gal Drums) (MT), Triple Rinsed (TR).

Complete u. . . parts and forward to: Hazardous Waste Unit 2750E/A 113/200E Westinghouse		CHEMICAL WASTE DISPOSAL REQUEST			Manifest No. _____
Generator Logbook No. <u>89-032</u>		Disposal Analysis Distribution*			
Requested By <u>Glen Thornton</u>	Telephone No. <u>62-7688</u>	Address <u>P7-68</u>	Company <u>PNL</u>		1. Generator _____ 4. _____
Signature/Date <u>Glen Thornton 3/24/89</u>	Accumulation Date <u>3/24/89</u>				2. H.W.U. _____ 5. _____
					3. _____ 6. _____
					*May be used by generator as needed.

WASTE DESCRIPTION (For additional items, continue on the back of this form)

A	B	C	D	E	F	G	H	I	J	K	L
Item No	No. of Containers	Container Size	Container Description	Total Waste Quantity (kg)	Waste Description	Chemical Components	Weight %	Physical Properties	Hazards	Waste Status	Container Status
Example 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% In Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH < 2 Flash point > 200 °F	C	O	F
Example 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
Example 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 < 1 ppm	Liquid, pH = 8.2 Flash Point > 200 °F	None	U	MT
2340	1	100g	Glass	25g	HEXANITRODI PHENYL Amine	SAME	100	Solid	E	O	PF
2340 2341	1	.5 k	Glass	450g	Ammonium Perchlorate	SAME	100	Solid	E	O	F
2342	1	100g	Glass	100g	Benzoyl Peroxide	SAME	100	Solid	E	O	F
2075	3	500g	Glass	1.5 k	Hydrazine Hydrate	SAME	100	Liquid	E	O	PF
2076	1	1 gal	Glass	0.5 k	Hydrazine Hydrate	SAME	100	Liquid	E	O	PF

INSTRUCTIONS

Accumulation Date - List the accumulation date of the oldest waste

Column A - Item Number - Item number for each unique waste

Column B - Number of Containers - Number of containers of a unique waste to be disposed

Column C - Container Size - Size of containers specified in Column B. If multiple container sizes, specify number and size of each

Column D - Container Description - Specify container's DOT specification. If non-DOT container or unknown, specify type, e.g. steel drum

Column E - Total Waste Quantity - Total waste quantity (in kilograms only) of each unique waste to be disposed

Column F - Waste Description - Specify trade name or general description of each unique waste. If waste material is a paint, specify color for evaluation of pigments.

Column G - Chemical Components - List all organic and inorganic components of the unique waste using specific chemical names. Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste

Column H - Weight (%) - For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.

Column I - Physical Properties - Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.

Column J - Hazards - Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).

Column K - Waste Status - Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).

Column L - Container Status - Indicate whether container is: Full (F), Partially Full (PF), Empty (< 1/2 in in 55 Gal Drums) (MT), Triple Rinsed (TR).



Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support Unit 13841-89-012
Phone: 3-3516 2750E/A119/200E R1-51
Date: March 6, 1989
Subject: GENERATOR LOGBOOK NUMBER 87-257, SITE HAZARDOUS WASTE ENGINEERING SUPPORT
UNIT LOGBOOK NUMBER WHC-25-134

To: M. E. Burnside L6-40

cc: M. R. Romsos R2-82 *llh*
RLG: File/LB

The following item is to be detonated on site:

<u>Container</u>	<u>Total wt</u>	<u>Chemical</u>	<u>Waste Codes</u>
1 ea, 5 gal, DM	0.5 K	Sodium potassium alloy	D001, D003

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
R. L. Granberg
Technician

cmc

Complete unshaded Hazardous Waste Unit R1-51 Westinghouse	Manifest No. _____		
	Disposal Analysis Distribution*		
CHEMICAL WASTE DISPOSAL REQUEST			
Generator Logbook No. 87-257			
Requested By	Telephone No.	MSIN	Company
M.E. Burnside	6-0426	LG-40	WMC
Signature/Date	Accumulation Date	Generating Facility	
M.E. Burnside	3-1-89	3718F	

1. Generator	4. _____
2. H.W.U.	5. _____
3. _____	6. _____

* May be used by generator as needed.

WASTE DESCRIPTION (For additional items, continue on the back of this form)

A	B	C	D	E	F	G	H	I	J	K	L
Item No.	No. of Containers	Container Size	Container Description	Total Waste Quantity (kg)	Waste Description	Chemical Components	Weight %	Physical Properties	Hazards	Waste Status	Container Status
Sample 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% in Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH < 2 Flash point > 200 °F	C	O	F
Sample 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
Sample 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 < 1 ppm	Liquid, pH = 8.2 Flash Point > 200 °F	None	U	MT
1	1	5 gal	steel Drum	.5	Potassium + Sodium Alloy (NAK)	NAK and possibly oil		Liquid	T, R,	O	PF
					May present Explosive hazard (in storage for 2 yrs)						

INSTRUCTIONS

Accumulation Date - List the accumulation date of the oldest waste

Column A - Item Number - Item number for each unique waste.

Column B - Number of Containers - Number of containers of a unique waste to be disposed

Column C - Container Size - Size of containers specified in Column B. If multiple container sizes, specify number and size of each.

Column D - Container Description - Specify container's DOT specification. If non-DOT container or unknown, specify type, e.g. steel drum.

Column E - Total Waste Quantity - Total waste quantity (in kilograms only) of each unique waste to be disposed

Column F - Waste Description - Specify trade name or general description of each unique waste. If waste material is a paint, specify color for evaluation of pigments.

Column G - Chemical Components - List all organic and inorganic components of the unique waste using specific chemical names. Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste.

Column H - Weight (%) - For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.

Column I - Physical Properties - Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.

Column J - Hazards - Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).

Column K - Waste Status - Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).

Column L - Container Status - Indicate whether container is: Full (F), Partially Full (PF), Empty (< 1/4 in. in 55 Gal Drums) (MT), Triple Rinsed (TR).

ENCLOSURE II
CHEMICALS TO BE DETONATED

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
1,4 - DIOXANE (PNL-25-209)	11	5.45 Kg	1-pt	PF	332
p-Dioxane (PNL-25-209)	1	1.0 Kg	1/2-gal	PF	332
Tetrahydrofuran (PNL-25-209)	1	3.8 Kg	1-gal	F	332
Nitrocellulose/ Isopropyl Alcohol (PNL-25-209)	2	2.0 Kg	1-pt	F	332
n-Butyl Ether (PNL-25-209)	1	5.0 Kg	1-qt	F	332
Dibutyl Tetra Ethylene Glycol (PNL-25-209)	1	2.0 Kg	2-liter	F	332
2-Methoxyethylether (PNL-25-209)	1	1.0 Kg	1-liter	F	332
n-Propylether (PNL-25-209)	1	0.5 Kg	1-pt	F	332
1,3,5-Trinitro Benzene (PNL-25-209)	1	0.05 Kg	50-g	F	332
1,4-Diethoxybutane (PNL-25-209)	1	0.5 Kg	1-pt	F	332
2-Ethoxybytanone (PNL-25-209)	1	0.1 Kg	100-g	F	332
Dimethoxypropane (PNL-25-209)	1	0.025 Kg	25-g	F	332

Note: F = full, PF = partially full

CHEMICALS TO BE DETOANTED (Continued)

<u>CHEMICAL NAME</u>	<u>QUANTITY</u>	<u>TOTAL AMOUNT</u>	<u>CONTAINER</u>	<u>STATUS</u>	<u>LOCATION</u>
Diethyleneglycol (PNL-25-209)	1	0.025 Kg	25-g	F	332
		<i>Same only list once!</i>	<i>June 4-28-89</i>		
Di-tert-butyl- ether (PNL-25-209)	1	0.025 Kg	25-g	F	332
2,4,6-Trinitro- m-toluene (PNL-25-209)	1	0.1 Kg	100-g	F	332
Hexanitrodiphenyl- amine (PNL-25-210)	1	0.025 Kg	100-g	PF	332
Ammonium Perchlorate (PNL-25-210)	1	0.45 Kg	500-g	F	332
Benzoyl Peroxide (PNL-25-210)	1	0.1 Kg	100-g	F	332
Hydrazine Hydrate (PNL-25-210)	3	1.5 Kg	500-g	PF	332
Hydrazine Hydrate (PNL-25-210)	1	0.5 Kg	1-gal	PF	332
Tetrahydrofuran (PNL-25-210)	1	4.0 Kg	1-gal	F	332
Sodium-Potassium Alloy (NaK) (WHC-25-134)	1	0.5 Kg	5-gal	PF	3718F
Picryl Chloride	1	0.06 Kg	4-oz	PF	332

June 1-28-89

Note: F = full, PF = partially full



From: Site Hazardous Waste Engineering Support
 Phone: 3-3516 2750E/A119/200E/R1-51
 Date: April 19, 1989
 Subject: GENERATOR LOG #89-028, SHWES LOG #PNL-25-209

13841-89-022

To: G. T. Thornton P7-68

cc: J. W. Olson R2-82
 M. R. Romsos R2-82
 D. W. Wilson *DW* R1-51
 RLG File/LB

The following items are to be detonated on site:

<u>Item #</u>	<u>Containers</u>	<u>Total Wt.</u>	<u>Chemical</u>	<u>Waste Codes</u>
2295	11 ea, 1-pt glass	5.0 K	1,4-dioxane	WT01, WC01, D001, D003
2296	1 ea, 1-gal glass	1 K	p-dioxane	WT01, WC01 D001, D003
2298	1 ea, 1-gal glass	3.8 K	tetrahydrofuran	U213, WT02 D001
2297	2 ea, 1-pt metal	2 K	nitrocellulose in isopropyl alcohol	D001, D003
2299	1 ea, 1-qt glass	.5 K	n-butyl ether	WT02, D001 D003
2301	1 ea, 1-l glass	1 K	2-methoxy ethyl ether	D003
2302	1 ea, 1-pt glass	.5 K	n-propyl ether	D001, D003
2303	1 ea, 50-gm glass	.05 K	1,3,5-trinitro- benzene	D003
2309	1 ea, .1-K glass	.1 K	2,4,6-trinitro- m-toluene	WT02, D001 D003
3691	1 ea, 4-oz glass	.06 K	picryl chloride	WP01, D003
2300	1 ea, 2-l glass	2 K	dibutyl tetra- ethylene glycol	N/A
2304	1- ea, 1-pt glass	.5 K	diethoxybutane	N/A

G. T. Thornton
Page 2
April 19, 1989

13841-89-022

<u>Item #</u>	<u>Containers</u>	<u>Total Wt.</u>	<u>Chemical</u>	<u>Waste Codes</u>
2305	1 ea, 1-K glass	.1 K	2-ethoxybutanone	N/A
2306	1 ea, .025-K glass	.025 K	dimethoxypropane	N/A
2308	1 ea, .025-K glass	.025 K	ditertbutylether	N/A

Contact M. R. Romsos on 373-4032 for any further instructions.

Items #2307 and #3692 are being deleted from the Chemical Waste Disposal Request because the reference material lists no acute hazards.

If you have any questions or concerns, please contact me on 373-3516.

R.L. Granberg
R. L. Granberg, Technician
Site Hazardous Waste
Engineering Support

rjh



From: Site Hazardous Waste Engineering Support
 Phone: 3-3516 2750E/A119/200E/R1-51
 Date: April 4, 1989
 Subject: GENERATOR LOG #89-032, SHWES LOG #PNL-25-210

13841-89-018

To: G. T. Thornton P7-68

cc: M. R. Romsos R2-82
 D. W. Wilson R1-51
 RLG File/LB

The following items are to be detonated onsite:

<u>Item #</u>	<u>Containers</u>	<u>Total Wt.</u>	<u>Chemical</u>	<u>Waste Codes</u>
2340	1-ea 100 g glass	.025 K	hexadinitrophenylamine	D003
2341	1-ea .5 K glass	.45 K	ammonium perchlorate	D003
2342	1-ea 100 g glass	.1 K	benzoyl peroxide	D003
2359	1-ea 1 gal glass	4.0 K	tetrahydrofuran	U213 WT02 D001 D003

Contact M. R. Romsos on 373-4032 for further instructions.

Items #2075 and 2076 will be put on a chemical waste disposal analysis as this unit believes these should be shipped offsite for disposal.

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
 R. L. Granberg
 Technician

rjh



Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support Unit 13841-89-012
 Phone: 3-3516 2750E/A119/200E R1-51
 Date: March 6, 1989
 Subject: GENERATOR LOGBOOK NUMBER 87-257, SITE HAZARDOUS WASTE ENGINEERING SUPPORT
 UNIT LOGBOOK NUMBER WHC-25-134

To: M. E. Burnside L6-40

cc: M. R. Romsos R2-82 *llh*
 RLG: File/LB

The following item is to be detonated on site:

<u>Container</u>	<u>Total wt</u>	<u>Chemical</u>	<u>Waste Codes</u>
1 ea, 5 gal, DM	0.5 K	Sodium potassium alloy	D001, D003

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
 R. L. Granberg
 Technician

cmc

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

GENERATOR	UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No. WA 7890008967	Manifest Document No. (PNL) 25209 (D)	22. Page 2 of 5	Information in the shaded areas is not required by Federal law.		
	Generator's Name DEPARTMENT OF ENERGY, RICHLAND OPERATIONS P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352 PHONE (509) 373-4032 OR (509) 375-5491, att: MR ROMSOS				L. State Manifest Document Number			
	24. Transporter Company Name				25. US EPA ID Number		M. State Generator's ID	
	26. Transporter Company Name				27. US EPA ID Number		N. State Transporter's ID	
							O. Transporter's Phone	
							P. State Transporter's ID	
							Q. Transporter's Phone	
	28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)			29. Containers		30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
	a.	X	WASTE FLAMMABLE LIQUID, N.O.S. UN1993	1	CF	.21	K	WT02, D001, 0003 WP01
	b.							
c.								
d.								
e.								
f.								
g.								
h.								
i.								
S. Additional Descriptions for Materials Listed Above					T. Handling Codes for Wastes Listed Above			
32. Special Handling Instructions and Additional Information								
TRANSPORTER	33. Transporter Acknowledgement of Receipt of Materials					Date		
	Printed/Typed Name				Signature	Month	Day Year	
FACILITY	34. Transporter Acknowledgement of Receipt of Materials					Date		
	Printed/Typed Name				Signature	Month	Day Year	
35. Discrepancy Indication Space								

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WA 7890008967
 Manifest Document No. (WHC)25134(D)

2. Page 1 of 1
 Information in the shaded areas is not required by Federal law.

Generator's Name and Mailing Address
 DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
 P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352

A. State Manifest Document Number

B. State Generator's ID

4. Generator's Phone (509) 373-4032(w)/375-5491(h) att: MR ROMSOS

C. State Transporter's ID

D. Transporter's Phone

5. Transporter 1 Company Name RICHLAND POLICE/DOE-RL
 6. US EPA ID Number WA7890008967

E. State Transporter's ID

F. Transporter's Phone

7. Transporter 2 Company Name NONE
 8. US EPA ID Number N/A

G. State Facility's ID

H. Facility's Phone

9. Designated Facility Name and Site Address
 DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
 P.O. BOX 550, 2401 STEVENS DR., RICHLAND, WA 99352
 CHEMICAL DETONATION PIT
 10. US EPA ID Number WA7890008967

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers		13. Total Quantity	14. Unit Wt/Vol	15. Waste No.
	No.	Type			
a. Waste Sodium potassium alloy, solid Flammable solid, UN1422, "Dangerous when wet" (D003)	1	DM	.5	K	D001, D003
b.					
c.					
d.					

Additional Descriptions for Materials Listed Above
 o Additional information and public reporting burden on accompanying paperwork.
 o All materials on this manifest are suspected of being shock sensitive and will be disposed of by detonation.

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
 RETURN TO GENERATOR IF NOT DELIVERED

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
 If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Signature: M.E. Burnside
 Month Day Year: 4 26 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
 Printed/Typed Name: RICHLAND POLICE BOMB SQUAD
 Signature: _____
 Month Day Year: _____

Signature: _____
 Month Day Year: _____

18. Transporter 2 Acknowledgement of Receipt of Materials
 Printed/Typed Name: NONE
 Signature: NA
 Month Day Year: _____

Signature: NA
 Month Day Year: _____

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
 Printed/Typed Name: _____
 Signature: _____
 Month Day Year: _____

Signature: _____
 Month Day Year: _____

CHEMICAL WASTE DISPOSAL ANALYSIS NO. WHC-25-282

ISSUE DATE JUN 05 1989WASTE GENERATORName D. J. AlexanderAddress R3-54Organization Westinghouse Hanford CompanyTelephone 373-2627Generator Logbook No. N/AAccumulation
Date April 24, 1989Waste Shipment Deadline Date July 21, 1989SITE HAZARDOUS WASTE ENGINEERING SUPPORT

2750E/A113/200 East (MSIN R1-51)

Disposal Analysis by G. A. Hackett 6-01-89 Telephone 373-4809Approval(s) G. A. Hackett
G. A. Hackett
Site Hazardous Waste Engineering
Support RepresentativeD. W. Wilson 6/5/89
D. W. Wilson, ManagerINSPECTION: Inspection G. O. Boness
Representative 376-7627

TRANSPORTATION: SEE APPLICABLE FACILITY FOR TRANSPORTATION REPRESENTATIVE.

WASTE STORAGE/DISPOSAL DESTINATION(S) [Check applicable facility(s)]

<u>XX</u>	616 Nonradioactive Dangerous Waste Storage Facility/616 Building/600 Area	Transportation Representative	<u>P. L. Hemsworth</u> <u>373-1881</u>
<u> </u>	212-P PCB Storage Facility 212-P Building/200 North Area Facility Representative <u>S. M. Baker</u> <u>373-3806</u>	Transportation Representative	<u>R. G. Dean</u> <u>376-1420</u>
<u> </u>	Central Landfill Nonregulated Drum Storage Area/600 Area	Transportation Representative	<u>R. G. Dean</u> <u>376-1420</u>
<u>XX</u>	Central Landfill Trash Trench/600 Area		
<u>XX</u>	Shock Sensitive/Reactive/Explosive Waste Disposal	Representative	<u>M. R. Romsos</u> <u>373-4032</u>
<u> </u>	Other: _____		

PICK UP ON MONDAYS & TUESDAYS ONLY - SCHEDULE APPROXIMATELY 1 WEEK IN ADVANCE.

Attachments

S. M. Baker (PCB Facility only)
G. O. Boness
J. E. Chulos (616 Facility only)
P. L. Hemsworth (616 Facility only)

D. E. Phelps (Central Landfill only)
M. R. Romsos
SHWES File

DISPOSAL ANALYSIS NO. WHC-25-282

EXPLOSIVE WASTE

The following waste is determined to be explosive, and must be disposed of by contacting Mike Romsos on 3-4032.

#22 Sodium Azide 1 100-g glass jar (unopened) .1 K.

DON'T SAY IT --- *Write It!*

DATE June 19, 1989

TO M. R. Romsos

FROM G. A. Hackett
373-4809

cc: SHWES File

SUBJECT: Chemical Waste Disposal Request No. WHC-25-282

Following is the information you requested on Sodium Azide:

Proper Shipping Name: Waste Sodium Azide (Land Ban: P105)
Hazard Class: Poison B
I.D NO.: UN1687
Waste No's: P105, D003, WT02 (EHW)
Label: Poison

+

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

+

MIKE - Please Add 2 containers to
item 2295 from disposal request 89-028
(PML-NUMBER). These are 2 more 1 pt
bottles of 1,4 Dioxane of unknown age.
This would bring the total for
item 2295 to 11, 1 pt. bottles of
1,4 - Dioxane for the next detonation.

3/29

Weight per bottle? 0.475 kg ea. Thanks

$$\text{Total} = 4.5 + 2(0.475) = 5.45 \text{ kg}$$

Glenn Johnston

4-11-89

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. WA 7890008967		Manifest Document No. (PNL) 25209 (D)		2. Page 1 of 2		Information in the shaded areas is not required by Federal law.			
		Generator's Name and Mailing Address DEPARTMENT OF ENERGY, RICHLAND OPERATIONS P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352						A. State Manifest Document Number			
4. Generator's Phone (509) 373-4032(w)/375-5491(h) att: MR ROMSOS						B. State Generator's ID					
5. Transporter 1 Company Name RICHLAND POLICE/DOE-RL				6. US EPA ID Number WA7890008967		C. State Transporter's ID		D. Transporter's Phone			
7. Transporter 2 Company Name NONE				8. US EPA ID Number N/A		E. State Transporter's ID		F. Transporter's Phone			
9. Designated Facility Name and Site Address DEPARTMENT OF ENERGY, RICHLAND OPERATIONS P.O. BOX 550, 2401 STEVENS DR., RICHLAND, WA 99352 CHEMICAL DETONATION PIT						10. US EPA ID Number WA7890008967		G. State Facility's ID			
						H. Facility's Phone					
GENERATOR	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)					12. Containers		13. Total Quantity		14. Unit Wt/Vol	15. Waste No.
	a. RI WASTE FLAMMABLE LIQUID N.O.S. UN1993 (nitrocellulose)(D003)					1 No. CF		4.075		K	D001, D003
	b. RI WASTE DIOXANE FLAMMABLE LIQUID, UN1165					2 No. CF		6		K	WT01, WC01, D001, D003
	c. RI WASTE FLAMMABLE LIQUID, N.O.S. UN1993 (D003)					1 No. CF		4.85		K	WT02, D001, D003
	d. X WASTE TETRAHYDROFURAN FLAMMABLE LIQUID, UN2056					2 No. CF		7.8		K	U213, WT02, D001
Additional Descriptions for Materials Listed Above o Additional information and public reporting burden on accompanying paperwork. o All materials on this manifest are suspected of being shock sensitive and will be disposed of by detonation.						K. Handling Codes for Wastes Listed Above					
15. Special Handling Instructions and Additional Information RETURN TO GENERATOR IF NOT DELIVERED											
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.											
Printed/Typed Name GT THORNTON					Signature <i>Glenn Thornton</i>			Month Day Year 4 26 89			
TRANSPORTER	17. Transporter 1 Acknowledgement of Receipt of Materials										
	Printed/Typed Name RICHLAND POLICE BOMB SQUAD					Signature			Month Day Year		
	18. Transporter 2 Acknowledgement of Receipt of Materials										
Printed/Typed Name NONE					Signature NA			Month Day Year			
FACILITY	19. Discrepancy Indication Space										
	20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.										
Printed/Typed Name					Signature			Month Day Year			

TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

Mail Original To:

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
H.W. Section R/6 M/S PV-11
Olympia, WA 98504-8711

FORM 6



DATE RECEIVED BY WDCE

DEPARTMENT USE ONLY

I. RECEIVING FACILITY INFORMATION

EPA/State I.D. #: WA 7890008967 Facility Name: U.S. Department of Energy
Facility Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352
Facility Contact Person: M R Romso Phone Number: (509) 373-4032

II. GENERATOR INFORMATION

EPA/State I.D. #: WA 7890008976 Generator Name: U.S. Department of Energy
Generator Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

III. TRANSPORTER INFORMATION

EPA/State I.D. #: N/A Transporter Name: Richland Police Department
Transporter Address (incl. City, State, Zip): 505 Swift Blvd., Richland, WA 99352
Driver's Name: J. L. Devin Driver's License No.: DELVIDL4425N State: WA
Vehicle License No: D29755 State: ICC or Other License Numbers: N/A
D33522

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility: 4/26/89
B. Identification of Waste(s)

1	2	3	4	5	6	7
NUM	Physical State	Chemical Nature	Handling Method Code	Dangerous Waste Number	Amount of Waste	HAZARDOUS
LINE	S=solid	O=Organic				NUMBER
NO.	L=liquid	I=Inorganic				
NO.	G=solids					
1.		(See Attached)				
2.						
3.		T18 = Detonation				

V. COMMENTS

Due to their age and method of storage, the chemicals described on this report were determined (through process knowledge), to be reactive and potentially shock sensitive. For safety reasons, the chemicals were transported in a trailer mounted bomb containment vessel to a Department of Energy-Richland Operations site permitted for this activity. The transportation vehicle was operated by the Richland Police Bomb Squad. Vehicle traffic during the transfer was controlled by site security personnel (transfer was performed during a low traffic time period). Ambulance and Fire Department Units were present during the operations. The bomb squad detonated the suspect chemicals using high explosives. The chemicals were not from an off-site generator.

VI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

MR Romso
PRINT OR TYPE NAME

SIGNATURE

9/21/89
DATE SIGNED

ATTACHMENT 1

RECEIVING FACILITY INFORMATION

EPA/State I.D. #: <u>W A 7 8 9 0 0 0 8 9 6 7</u>	Facility Name: U.S. Department of Energy
Facility Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352	
Facility Contact Person: <u>M R Romsos</u>	Phone Number: (509) 373-4032

GENERATOR INFORMATION

EPA/State I.D. #: <u>W A 7 8 9 0 0 0 8 9 6 7</u>	Generator Name: U.S. Department of Energy
Generator Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352	

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility:		4/26/89					
B. Identification of Waste(s)							
LINE NO.	1	2	Description of Waste	4 Hand- ling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 UNCL. K
	Physical State	Chemical Nature					
	S	0	Nitrocellulose (In iso-propyl alcohol)	S 0 1 0 0 0 3 T 1 8		2.0	K
	L	0	Dibutyl Tetra Ethylene Glycol	S 0 1 0 0 0 3 T 1 8		2.0	K
3.	L	0	2-Methoxyethylether	S 0 1 0 0 0 3 T 1 8		1.0	K
4.	S	0	1,3,5-Trinitro Benzene	S 0 1 0 0 0 3 T 1 8		0.05	K
5.	L	0	1,4-Diethoxybutane	S 0 1 0 0 0 3 T 1 8		0.5	K
6.	L	0	2-Ethoxybutanone	S 0 1 0 0 0 3 T 1 8		0.1	K
7.	L	0	Dimethoxypropane	S 0 1 0 0 0 3 T 1 8		0.025	K
8.	L	0	Di-tert-butyl ether	S 0 1 0 0 0 3 T 1 8		0.025	K
9.	S	0	Hexanitrodiphenylamine	S 0 1 0 0 0 3 T 1 8		0.025	K
10.	S	I	Ammonium Perchlorate	S 0 1 0 0 0 3 T 1 8		0.45	K
11.	S	0	Benzoyl Peroxide	S 0 1 0 0 0 3 T 1 8		0.1	K
	L	0	n-Propylether	S 0 1 0 0 0 3 T 1 8 0 0 0 3		0.5	K

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. WA 7 8 9 0 0 0 8 9 6 7 0 0 4 7 2		Manifest Document No. 7 0 0 4 7 2		2. Page 1 of 1		Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address DEPARTMENT OF ENERGY, RICHLAND OPERATIONS P.O. BOX 550, 2355 STEVENS DR., R2-82, RICHLAND, WA 99352		6. US EPA ID Number		A. State Manifest Document Number		B. State Generator's ID		C. State Transporter's ID	
4. Generator's Phone (509) 376-7688(w) att: GT THORNTON		7. Transporter 1 Company Name RICHLAND POLICE BOMB SQUAD		8. US EPA ID Number		D. Transporter's Phone (509) 943-9161		E. State Transporter's ID	
5. Transporter 2 Company Name NONE		9. Designated Facility Name and Site Address HANFORD PATROL ACADEMY DEMOLITION SITE		10. US EPA ID Number WA 7 8 9 0 0 0 8 9 6 7		F. Transporter's Phone		G. State Facility's ID	
11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)		12. Containers		13. Total Quantity		14. Unit W/Vol		Waste No.	
a. X Waste High Explosive Explosive A (1,3,5-Trinitrobenzene)		1 No. Type		.05		K		D003; U234 WT02	
b. X Waste Lithium Aluminum Hydride, Ethereal Flammable Liquid, UN1411		1 No. Type		1.0		K		D001; D003 WT02	
c.									
d.									
J. Additional Descriptions for Materials Listed Above		K. Handling Codes for Wastes Listed Above T18 (detonatic)							
15. Special Handling Instructions and Additional Information									
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.									
Printed/Typed Name Glenn Thornton					Signature Glenn Thornton for USDOE/PNL			Month Day Year 10/6/90	
17. Transporter 1 Acknowledgement of Receipt of Materials					Signature			Month Day Year	
Printed/Typed Name NA									
18. Transporter 2 Acknowledgement of Receipt of Materials					Signature			Month Day Year	
Printed/Typed Name NA									
19. Discrepancy Indication Space									
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.									
Printed/Typed Name MR Romso					Signature			Month Day Year 10/6/90	

ORIGINAL RETURN TO GENERATOR

00472

CHEMICAL WASTE SPOSAI REQUEST

Qualified Generator <i>Glenn Thornton</i>	MSIN <i>PT-608</i>	Telephone No. <i>376-7688</i>	Company <i>PNL</i>
Signature/Date <i>Glenn Thornton 4/17/90</i>	Accumulation Date <i>4/12/90</i>	Generating Facility <i>325/305-B</i>	

A	B	C	D	E	F	G	H	I	J	K
Item No.	Number of Containers	Container Description	Kg Waste	Waste Description	Chemical Components	Weight %	Physical Properties	Hazards	Status	
Example 1	1	55 gal DOT 17E	205	TURCO Decon 4512A Solution, 10% in Water	TURCO 4512A MSDS Attached Water	10.0	Liquid, pH < 2 Flash point > 200 °F	C	O	
Example 2	1	5 gal DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
Example 3	23	55 gal Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 < 1 ppm	Liquid, pH = 8.2 Flash Point > 200 °F	None	U	MT
1	1	Glass Bottle (18)	1 kg	Lithium Aluminum Hydride Ethyl Ether	Lithium Aluminum Hydride Ethyl Ether	3% 97%	Liquid Flammable potentially Explosive solids (peroxides?) ferme	F, E	O	F
2	1	Glass Bottle (4 oz)	0.05	Trinitrobenzene	Trinitrobenzene	100%	Solid Explosive	E	O	PF

WASTE DESCRIPTION

J - Waste status: (S)pill, (U)sed, (O)ld, (R)eacted
 K - Container status: (F)ull, Part full (PF), Empty (MT), Triple rinsed (TR) see WHIC-CM-5-16 for detailed instructions.

G - Weight must total 100%
 H - Physical properties: pH, flashpoint, (G) as, (L)iquid, (S)olid
 I - (C)orrosive, (F)lammable, (T)oxic, (E)xplosive, (P)ersistent, Carcinogen (X)
 Lab analysis, etc.

Complete and submit to:
 SITE HAZARDOUS WASTE ENGINEERING
 SUPPORT
 RI-51/WHC
 Westinghouse

Hazardous Waste Disposal Analysis Record (HWDAR)

Please disregard previous letter issued on September 25, 1991

ISSUE DATE OCT 08 1991

Page 1 of 9

DISPOSAL ANALYSIS No. 10948 Gen. Log No. T-91-015

GENERATOR R. W. Szelmeczka MSIN T3-28 PHONE 3-4329 COMPANY WHC

ACCUMULATION DATE 8/28/91 SHIPPING DEADLINE DATE 11/25/91

Analysis: Mandrake F. Pascua *Mandrake F. Pascua* Phone 376-4839

Review: *[Signature]* Approval: *[Signature]*
for M.A.S.

GENERAL INSTRUCTIONS

- Package, Label, and Mark according to the Shipping Summary Table (attached).
- All shipping containers must be in good condition and tightly closed.
- Container gross weight should be 450 pounds or less whenever possible.
- Complete a Uniform Hazardous Waste Manifest for shipments of regulated waste.
- All regulated waste must be inspected by Transportation Logistics (376-7627)
- Obtain radiological release or exemption within 24 hours before transport.
- Arrange for transport at least one week ahead of time.

SEE WHC-CM-5-16 AND WHC-CM-2-14 FOR DETAILS OF PACKAGING AND SHIPPING

<u>Waste Destination</u>	<u>Transportation Rep.</u>	<u>Phone Number</u>
<u>X</u> 616 Nonradioactive Waste Storage	R. Pedraza	373-1881
<u> </u> 212-P PCB Storage 200 North	P. C. Hendrix	376-0971
<u> </u> Non-regulated Drum Storage	P. C. Hendrix	376-0971
<u>X</u> Central Landfill Trash Trench	P. C. Hendrix	376-0971
<u>X</u> Other: Item #32	M. R. Romsos	376-4900

cc: Solid Waste Engineering Analysis, others as needed:

M. A. Sams	G2-03	D. L. Barron	S2-62
J. W. Pratt	T4-01	M. R. Romsos	N3-11
R. Pedraza	T3-21	Central Landfill operator	G4-07

WASTE SHIPPING SUMMARY

Page 7 of 9

MANIFEST NO: 10948
ITEM NUMBER: 42
SHIPPING NAME: Non-RCRA waste, liquid (continued)
WASTE CONTENT: Dow Corning (R) DB-110A Anti Foam Emulsion; 95% polyethylene glycol,
10% silicon fluid
QUANTITY: (1) glass bottle weighing 0.5 Kg
WASTE NUMBERS: WTO2, (DW)

ITEM NUMBER: 52
WASTE CONTENT: 100% sodium iodide
QUANTITY: (10) glass & plastic containers weighing 1.5 Kg
WASTE NUMBERS: WTO2, (DW)

ITEM NUMBER: 45 & 46 SHIPPING NAME: Waste Sodium dichromate
WASTE CONTENT: 100% sodium dichromate. (Land Ban: D007)
HAZARD CLASS: ORM-A
DOT ID NO: NA1479
DOT LABEL: Hazardous waste
PACKAGING: Per 49 CFR 173.505
QUANTITY: (1) glass bottle & (1) plastic bottle weighing a total of 0.9 Kg
WASTE NUMBERS: D007, D002, WCO1, WTO2, (EHW)
SHIP TO: 616 building CELL: 0

ITEM NUMBER: 49 SHIPPING NAME: Hazardous waste, solid, N.O.S.
WASTE CONTENT: 99% barium carbonate. (Land Ban: D005)
HAZARD CLASS: ORM-E
DOT ID NO: NA9189 (barium carbonate)
DOT LABEL: Hazardous waste
PACKAGING: Per 49 CFR 173.1300
QUANTITY: (1) glass bottle weighing 0.1 Kg
WASTE NUMBERS: D005, WTO2, (EHW)
SHIP TO: 616 building CELL: Any. except 0

ITEM NUMBER: 32 (Hydroxylamine hydrochloride, crystal)

- * This material can react violently with shock, friction, or heat according to the Material Safety Data Sheet.
- * Please contact Mike R. Romsos at 376-4900 for disposal of this waste.

The following waste is not regulated according to WAC 173-303 and 40 CFR 261.

- Item no. 7: (1) steel can weighing 0.5 Kg that contains 100% aluminum hydroxide.
- Item no. 8: (4) poly bottles weighing 0.25 Kg that contains DOW Corning Polystyrene Latex UPSL.
- Item no. 17: (1) plastic bottle weighing 0.5 Kg that contains 100% ferric oxide.
- Item no. 18: (1) plastic bottle weighing 0.5 Kg that contains 98-100% calcium chloride, dihydrate.

1

APPENDIX 5A

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**GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY
DEMOLITION SITES**

CONTENTS

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5A.0	GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES	APP 5A-1
5A.1	EXISTING GROUNDWATER WELLS	APP 5A-1
5A.2	GROUNDWATER DATA	APP 5A-1
5A.3	GEOLOGIC CHARACTERISTICS	APP 5A-2
5A.4	GEOHYDROLOGIC CHARACTERISTICS	APP 5A-4
5A.5	POTENTIAL MIGRATION	APP 5A-5
5A.6	SUMMARY	APP 5A-6

FIGURES

5A-1.	Well Locations	APP 5A-F1
5A-2.	Well Summary for 6-531-1 and 6-531-1P	APP 5A-F2
5A-3.	Well Summary for 6-528-E0	APP 5A-F3
5A-4.	Hydrographs for Wells 6-531-1 and 6-531-1P	APP 5A-F4
5A-5.	Water Quality Data	APP 5A-F5
5A-6.	Water Table Map	APP 5A-F6
5A-7.	100-Year Flood Event	APP 5A-F7

1 **5A.0 GROUNDWATER DATA FOR THE HANFORD PATROL**
2 **ACADEMY DEMOLITION SITES**
3
4

5 Two groundwater wells are located in the general vicinity of the HPADS;
6 one of these wells consists of two completions at a single location
7 (Figure 5A-1). These wells currently are being used by the Hanford Sitewide
8 environmental surveillance program, which is conducted by Pacific Northwest
9 Laboratory under DOE Order 5400.1. The wells were constructed before RCRA
10 well standards. The well construction characteristics are shown in
11 Figures 5A-2 and 5A-3. The well descriptions are from the original driller's
12 logs; no geologist logs are available.
13
14

15 **5A.1 EXISTING GROUNDWATER WELLS**
16

17 Well 699-S31-1 is located approximately 1 mile (1.6 kilometer) south of
18 the HPADS. The well is roughly up- (groundwater flow) gradient and is
19 completed to monitor the uppermost confined aquifer. The well was drilled in
20 1951 to a total depth of 228 feet (69.5 meters) where it bottomed in basalt.
21 The well is perforated between 93 and 103 feet (28.3 and 31.4 meters). While
22 drilling, groundwater from several hydrologic units were apparently
23 encountered. A second, 4-inch (10.2-centimeter) casing was installed inside
24 the larger casing, and a cement seal placed between 142 and 177 feet (43.3 and
25 53.9 meters), in an attempt to isolate groundwater from different strata. The
26 unperforated 4-inch (10.2-centimeter) casing is probably the well labeled
27 699-S31-1P. The well appears to monitor confined conditions near the base of
28 the Ringold Formation, or possibly a flow top in the uppermost basalt strata.
29

30 Well 699-S28-E0 (E "zero") is located approximately 0.75 mile
31 (1.2 kilometer) east of the HPADS. The well is downgradient and is completed
32 in the unconfined aquifer, with perforations between 90 and 180 feet (27.4 and
33 54.9 meters). The well was drilled in 1981 as a 'sanitary water well', and
34 bottomed in basalt at 236 feet (71.9 meters). A bentonite surface seal was
35 installed.
36

37 In the following sections, the 699- prefix is omitted from the well
38 numbers for brevity.
39
40

41 **5A.2 GROUNDWATER DATA**
42

43 Groundwater quality data and hydraulic head data described in the
44 following paragraphs for the two well locations are taken from the operating
45 contractor's Geosciences Group Paradox* database. This database is an
46 outgrowth of the former Hanford Groundwater Data Base, and fills an interim
47 need for a groundwater data management system while the Hanford Environmental
48 Information System (HEIS) is being developed. The data presented should be
49 used for informational purposes only.

50 *Paradox is a software product by Borland International.

1 Hydrographs for S31-1 and S31-1P are shown in Figure 5A-4. The change in
2 trends that occur in the late 1970's might be related to the removal of
3 piezometers, as indicated on a subsequent driller's log for that well. No
4 water level data are available for S28-E0. Water levels currently are being
5 measured routinely in S31-1.
6

7 Water quality data for each of the three wells are tabulated in
8 Figure 5A-5. Drinking water standards for selected constituents also are
9 shown. When a 'less-than' flag (<) appears after the sample date, this
10 indicates the results are below the detection limit, which is shown in the
11 analysis value column. For some results, the current detection limit shown is
12 lower than the detection limit in place at the time of analysis. None of the
13 wells currently contain water samples that exceed drinking water standards
14 (40 CFR 265.92). While some radionuclide activity is measurable, no activity
15 exceeds drinking water standards. Currently, all samples were below maximum
16 contaminant levels.
17

18 Currently available groundwater data are insufficient to fully evaluate
19 the potential for groundwater contamination as a result of HPADS operations.
20 However, given the nature of operations and the absence of appreciable liquid
21 waste disposal, none is expected.
22
23

24 5A.3 GEOLOGIC CHARACTERISTICS 25

26 The HPADS is located approximately 2.4 miles (3.9 kilometers) west of
27 the Horn Rapids Landfill entrance. It is situated at an elevation of
28 approximately 452 feet (137.8 meters) above mean sea level, between the Yakima
29 and Columbia Rivers, which are at elevations of approximately 370 feet
30 (172.8 meters) and 340 feet (103.6 meters), respectively. The land surface
31 slopes generally to the southwest toward the Yakima River and to the east
32 toward the Columbia River. Longitudinal dunes in the HPADS area trend
33 southwest-to-northeast and are on the order of 10 feet (3.0 meters). The
34 dunes are locally active, but for the most part, the dunes have been
35 stabilized by vegetation or have been reworked as a result of grading and
36 excavation for onsite activities.
37

38 The principal structural feature is the Pasco Basin, which is one of
39 several sediment-filled basins in the Central Columbia Plateau. The sediments
40 in the Pasco Basin, as well as of the entire Columbia Plateau, are underlain
41 by the Miocene age Columbia River Basalt Group. The sediments overlying the
42 basalts, from the basalts upward, include (1) the Ringold Formation;
43 (2) glaciofluvial deposits of the Hanford formation, which include Pasco
44 gravels and touchet beds; and (3) surficial eolian sediments and basalts.
45

46 Ringold Formation. This formation in the Pasco Basin ranges in age from
47 8.5 to 3.9 million years before present (DOE-RL 1988a). The Ringold Formation
48 directly overlies the uppermost basalt flows of the Columbia River Basalt
49 Group. The Ringold Formation is a fluvial sedimentary unit that exhibits
50 lateral facies variations. Major facies of the Ringold Formation include the
51 main river channel facies, overbank facies, and fanglomerate facies. Because

of facies variations and limited data, the stratigraphic relationship between Ringold units observed in the 3000, 300, and 1100 Areas, and well-studied sections in the western Pasco Basin, is not completely known.

Newcomb (1958) divided the Ringold Formation into three members, based on exposures at the type section along the southern end of the White Bluffs (located along the Columbia River on the east side of the Hanford Site). These are a "lower blue clay member", a "middle conglomerate member", and an "upper member". The "lower blue clay member" (now called the lower Ringold unit) is known to overlie a thin basal Ringold unit composed of clayey to gravelly sand. The lower unit is generally a clay or silt that often contains sandy or gravelly layers (Newcomb et al. 1972). The middle Ringold unit is generally a sandy gravel, with local sand or silt lenses. The upper Ringold unit, found mainly in the White Bluffs area to the north and across the Columbia River from the 300 Area, is composed mainly of fine sand and silt.

Hanford Formation. Overlying the Ringold Formation are mostly coarse-grained deposits, belonging to the Hanford formation. The Hanford formation is composed of deposits derived from the sudden release of Pleistocene-age ice-dammed lakes located north and east of the Columbia Plateau. The earliest floods occurred less than 800,000 years before present (Bjornstad et al. 1987); the last flood occurred approximately 13,000 years before present (Mullineaux 1986). Within the Pasco Basin, these floods incised into and stripped away much of the Ringold Formation.

Flood gravels consist of very coarse, sandy, cobble-boulder gravel within and adjacent to the main flood channels. Elsewhere, in areas marginal to flood channels, such as the western portion of the 300 Area, it appears that finer grained deposits consisting of pebbly gravels and sand were deposited.

The boundary between the Ringold and Hanford formations under the HPADS appears to be gradational, both in lithologic as well as hydrologic properties. In general, flood gravels of the Hanford formation can be differentiated from coarse-grained Ringold deposits by (1) less consolidation, (2) less alteration, (3) poorer sorting, and (4) higher percentages of angular basalt clasts. However, the contact is indistinct where flood gravels overlie coarse-grained Ringold facies, because sediment transported along the bases of flood channels consisted of mostly reworked deposits of the easily erodible Ringold Formation. Based on borehole cuttings alone, it is extremely difficult to differentiate between reworked and intact portions of the Ringold Formation.

Eolian Deposits. Overlying the Hanford Formation within the HPADS is a thin veneer of fine- to coarse-grained eolian sand deposits. The thickness of this unit is quite varied, ranging from 0 to 15 feet (0 to 4.6 meters). Eolian sand generally is lacking in areas where the surface has been disturbed by man. The contact between the eolian deposits and the Hanford Formation is well defined.

Geologic data obtained from the driller's logs for wells S31-1 and S28-E0 are limited. At the time the wells were drilled, general lithologic data were recorded by the driller and not by a trained geologist. Therefore,

1 lithologic information is ambiguous. Because of the relative location of the
2 HPADS to the 1100 and 300 Areas, it is reasonable to assume that the HPADS
3 have similar hydrogeologic and geologic features.
4
5

6 5A.4 GEOHYDROLOGIC CHARACTERISTICS 7

8 Groundwater beneath the area around the HPADS occurs in confined aquifers
9 within the basalt sequence and lower Ringold, the unconfined aquifer of the
10 Pasco gravels, and the sands and gravels of the Ringold Formation. The
11 boundary between the confined and unconfined aquifers is typically the
12 lowermost silt and clay member of the Ringold Formation (Lindberg and
13 Bond 1979). A confined aquifer might exist in gravel layers beneath this
14 silt/clay member, immediately above the basalt. The depth to the water table
15 in the vicinity of the HPADS is approximately 85 feet (25.9 meters). Because
16 of lateral facies variation, silt or clay lenses in the Ringold Formation
17 might function as aquitards on a local scale. Perched or semiperched water
18 conditions also might occur locally.
19

20 The unconfined aquifer in the area exhibits relatively high permeability,
21 particularly in the Pasco gravels. Aquifer pumping test and numerical
22 groundwater modeling for the 300 Area indicate transmissivities greater than
23 100,000 square feet (9,290 square meters) per day (Lindberg and Bond 1979).
24 The storativity of the unconfined aquifer has been estimated at 0.1 in
25 hydrologic studies of the 300 Area (Lindberg and Bond 1979). Aquifer tests
26 conducted in the north Richland well field (ICF 1987) indicate a
27 transmissivity of 86,000 square feet (7,989 square meters) per day, and
28 storativity of 0.11. No measurements of these parameters other than hydraulic
29 properties of the aquifers beneath the HPADS are available. However,
30 available data suggest that hydrologic properties of the HPADS might be
31 similar to those of the 1100 Area.
32

33 Water table maps for the Hanford Site indicate that within the vicinity
34 of the HPADS, the water table dips east-northeast and ranges in elevation from
35 370 to 375 feet (112.8 to 114.3 meters) above mean sea level (Figure 5A-6).
36 Regional groundwater flow in the HPADS is thought to be generally west to
37 east, and controlled by the elevation difference between the Yakima and
38 Columbia Rivers. The Yakima River is recharging the unconfined aquifer, which
39 in turn discharges to the Columbia River. There are a number of factors that
40 might complicate this relatively simple description:
41

- 42 • Spatial differences in hydraulic conductivity of the unconfined
43 aquifer
- 44
- 45 • The river stage of both the Yakima and Columbia Rivers
- 46
- 47 • Infiltration to the unconfined aquifer from irrigation
- 48
- 49 • Upward leakage (discharge) from the confined aquifer to the lower part
50 of the unconfined aquifer
51

- 1 • A water table that sometimes lies within the higher permeability Pasco
2 gravels and in other areas within the lower permeability Ringold
3 Formation.
4

5 Given the heterogeneity of both the Pasco gravels and the Ringold
6 Formation, together with the various recharge/discharge points and seasonal
7 variations in withdrawal, the groundwater flow conditions in the HPADS closure
8 areas are likely to be complex, and direction and rate of groundwater flow are
9 likely to change with time.

10 11 12 **5A.5 POTENTIAL MIGRATION** 13

14 No soil data currently exist (beyond Appendix 3A) to establish whether
15 or not mobile residues from demolition events are present. Transport of
16 potential residues might occur by (1) infiltration of precipitation,
17 (2) extreme floods of the Yakima and Columbia Rivers, (3) or unreported liquid
18 waste disposal.
19

20 Precipitation for the Hanford Site is measured at the Hanford
21 Meteorological Station. The average annual precipitation at the Hanford
22 Meteorological Station is 6.3 inches (16 centimeters). The total annual
23 precipitation ranges (98 percentile) from 3.15 to 11 inches (8 to
24 28 centimeters). Most of the precipitation takes place during the winter,
25 with nearly half of the annual amount occurring in the months of November
26 through February. Days with greater than 0.5 inch (1.3 centimeter) of
27 precipitation occur less than 1 percent of the year. Rainfall intensities of
28 1 inch (2.54 centimeter) for 1 hour are expected only once every 500 years.
29 Winter monthly average snowfall ranges from 0.3 inch (0.8 centimeter) in March
30 to 5.3 inches (13.5 centimeters) in January. The record snowfall of
31 24.4 inches (62 centimeters) occurred in February 1916, but the second highest
32 snowfall is less than half this amount (DOE 1987). To date, the very small
33 amount of precipitation in the region has not been proven to be capable of
34 driving contaminants to the water table.
35

36 Average annual pan evaporation exceeds 60 inches (152.4 centimeters).
37 Average annual lake evaporation ranges from 39 to 41 inches (99.1 to
38 104.1 centimeters). Actual evapotranspiration is essentially equivalent to
39 annual precipitation (Leonhart 1979). Because potential evapotranspiration
40 greatly exceeds significant annual precipitation, it is unlikely that
41 precipitation promotes movement of contaminants to groundwater. For further
42 information on the current state of knowledge regarding infiltration of
43 precipitation on the Hanford Site, refer to Rockhold et al. (1990) and
44 Smoot et al. (1989).
45

46 The 100-year flood event is another possible mechanism for transport of
47 mobile residues. Figure 5A-7 shows the highest floods on record and probable
48 maximum floods. During probable maximum flooding, the HPADS closure areas
49 would not be inundated by floodwaters. Thus, flooding would not affect the
50 HPADS (Figure 5A-7).
51

1 As described in the closure plan, there is no recollection of any liquid
2 waste disposal within the closure sites. The only known item that is buried
3 at the site is a 5-gallon (18.9-liter) container of napalm-B, which did not
4 detonate after numerous ignitions. The container was buried somewhere nearby
5 the HPADS and according to the closure plan, ground-penetrating radar will be
6 used to locate the buried container. The 1100-EM-1 Operable Unit work plan
7 contains CERCLA information about the Hanford Patrol Academy area
8 (DOE-RL 1988a).
9

10 5A.6 SUMMARY

11 Existing groundwater data provide very limited information concerning
12 possible groundwater contamination within the area of the closure sites. Two
13 wells located near the closure sites are not directly within the apparent flow
14 path under the closure sites, and therefore, are not the best indicators for
15 closure area groundwater contaminants.
16
17

18 Process knowledge, as described in the closure plan, indicates no free
19 liquids have been released to the soil in the closure areas, thus reducing the
20 likelihood of contaminants within the groundwater. The 5-gallon (18.9-liter)
21 canister of napalm-B buried in the relative proximity of the closure areas has
22 little likelihood of impacting groundwater.
23
24

25 The available groundwater data do not suggest contamination attributable
26 to the HPADS. The description of activities at the HPADS also suggests a low
27 potential for contamination of the uppermost aquifer. The results of planned
28 soil sampling activities, as described in the closure plan, will help to
29 evaluate the potential for groundwater contamination.

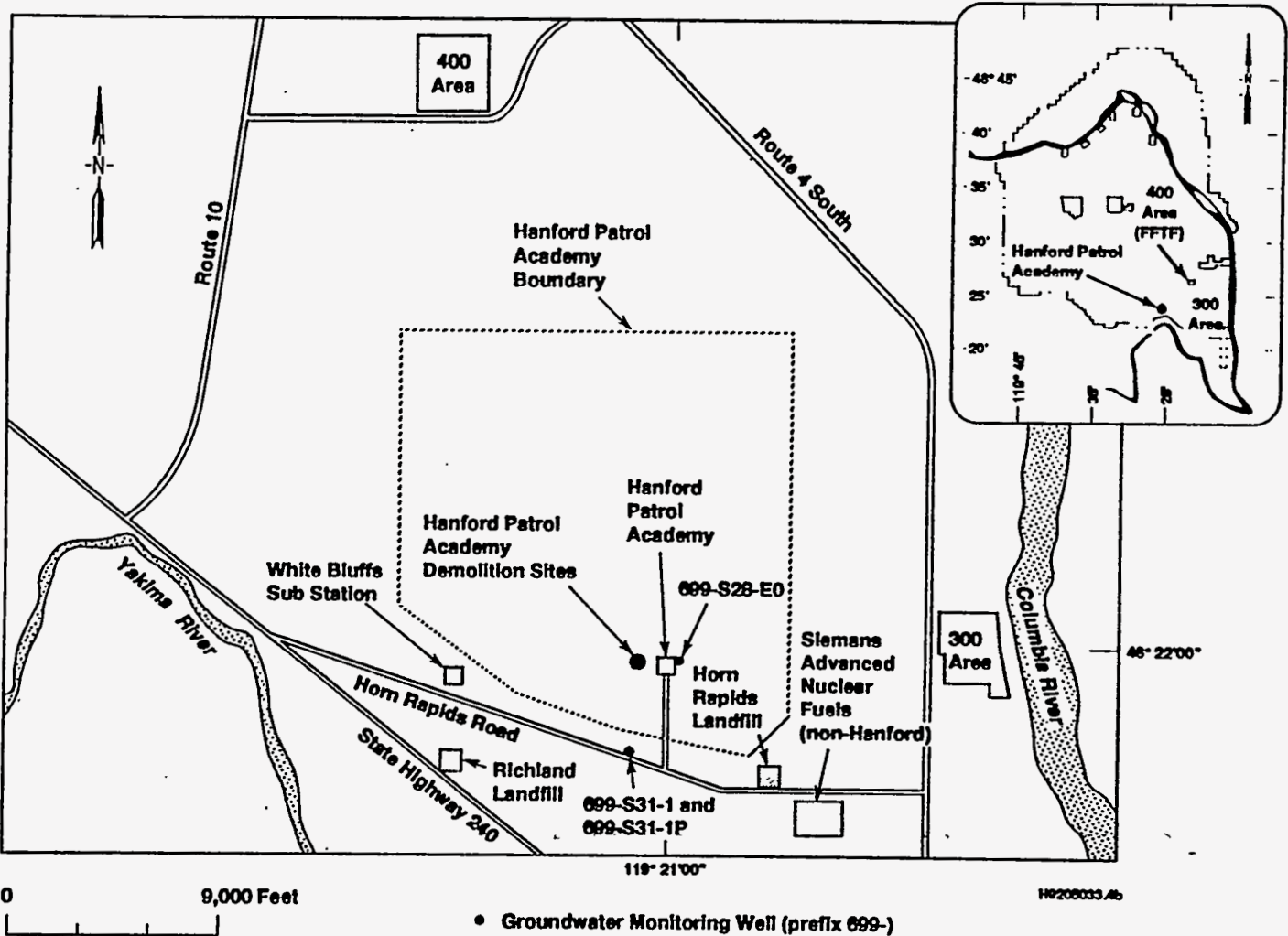


Figure 5A-1. Well Locations.

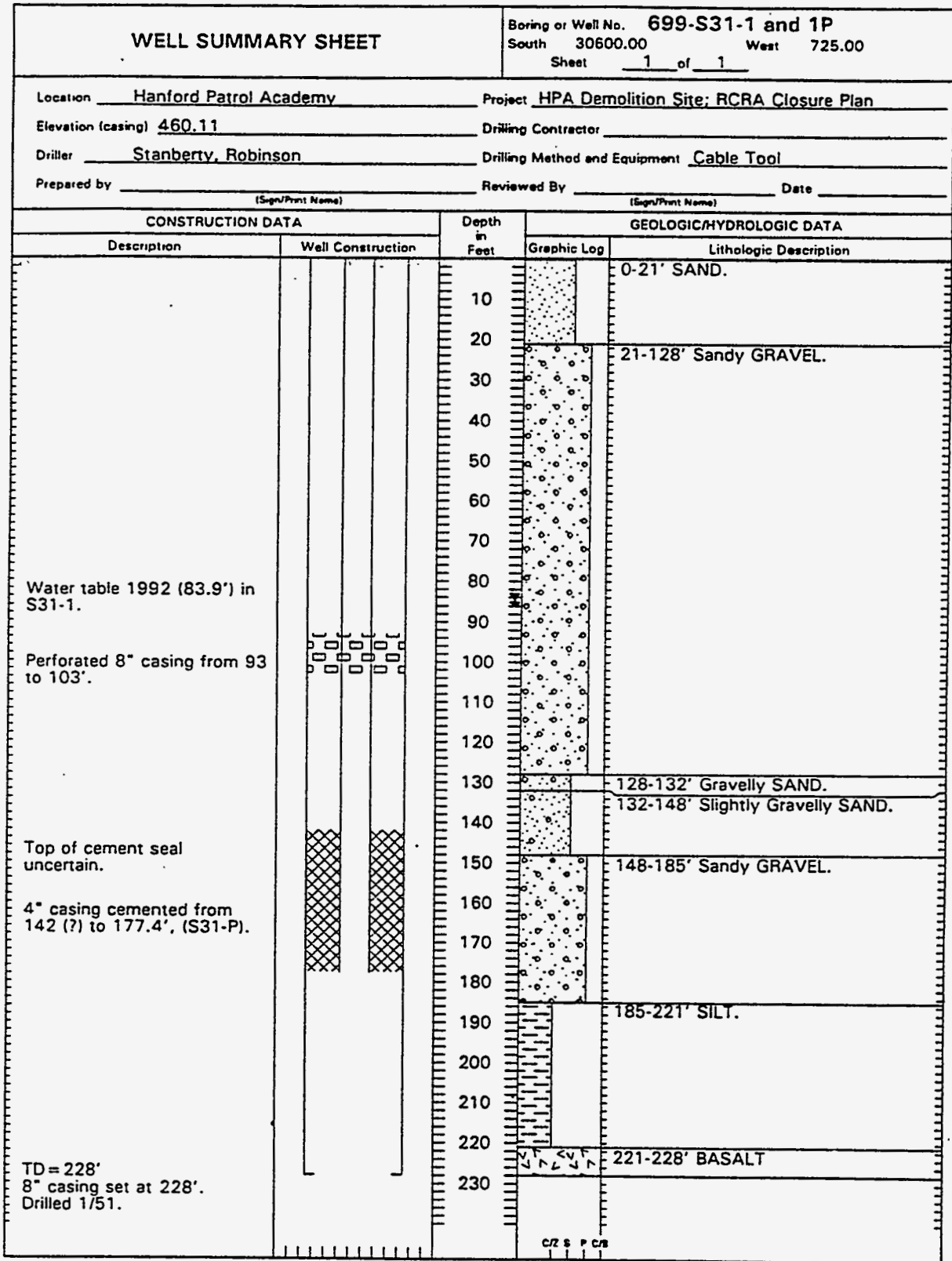


Figure 5A-2. Well Summary for 6-531-1 and 6-531-1P.

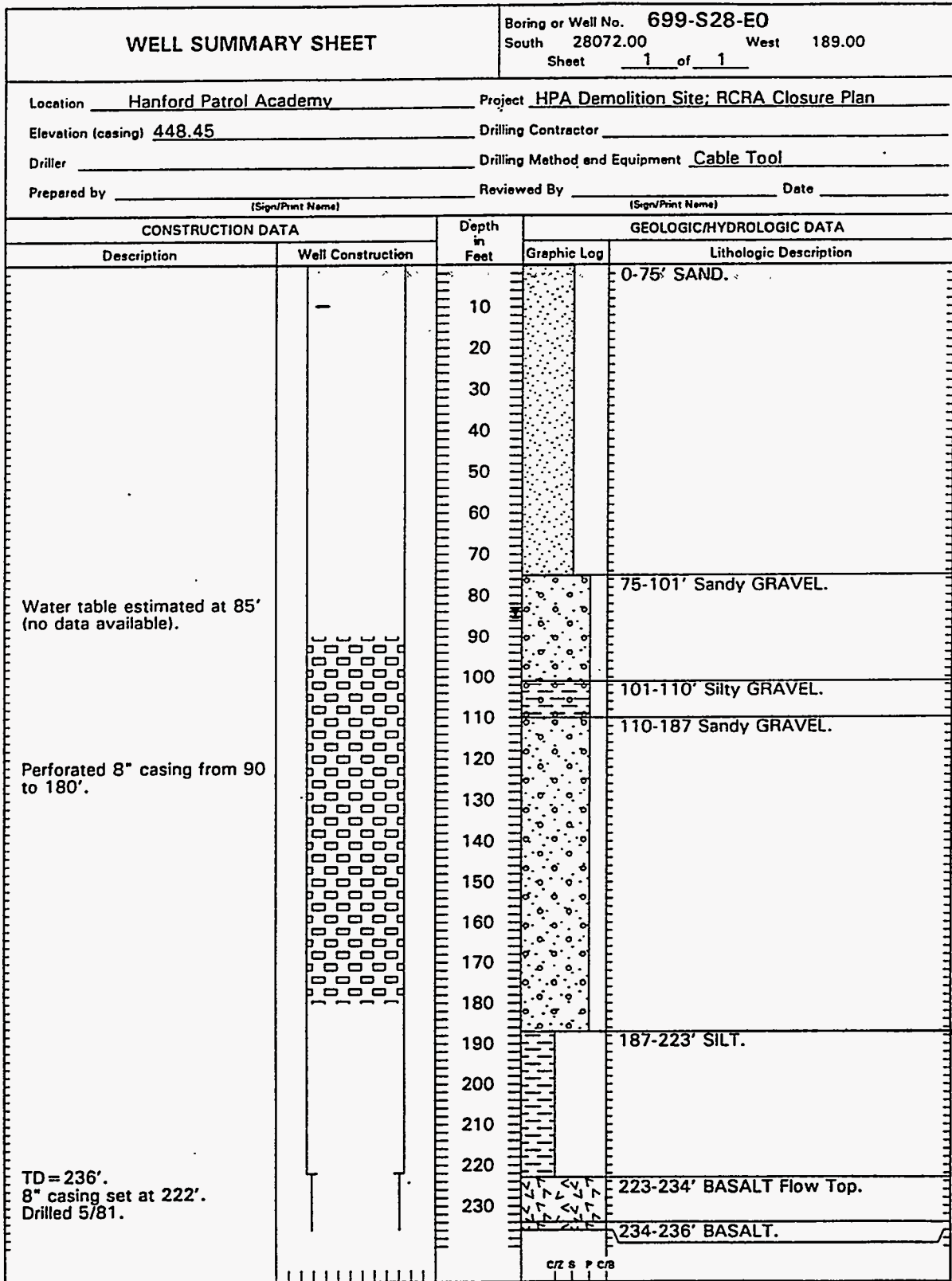


Figure 5A-3. Well Summary for 6-528-E0.

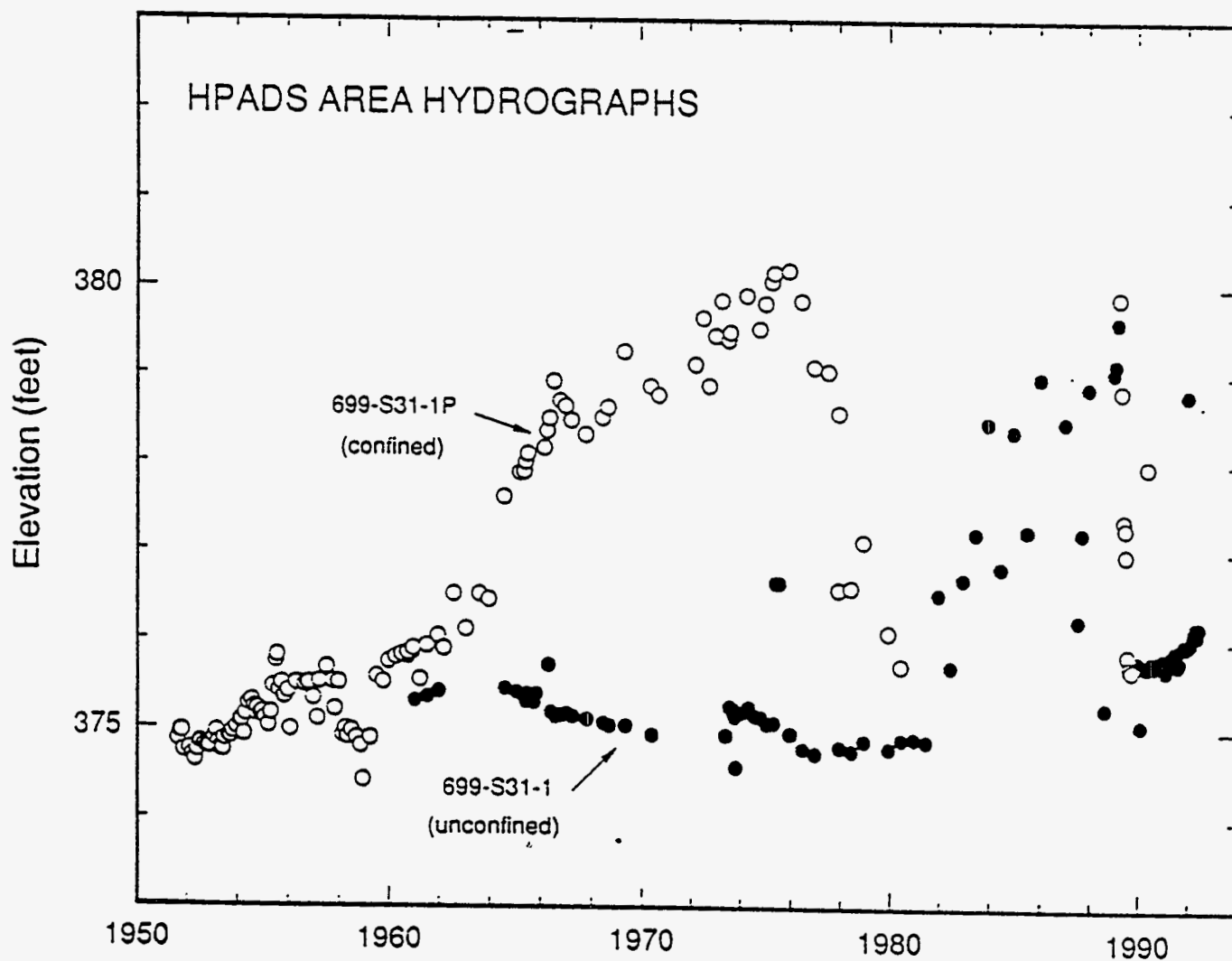


Figure 5A-4. Hydrographs for Wells 6-531-1 and 6-531-1P.

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S28-E0	Alpha, High Detection Level		PCI/L	4.0	15.0	4/07/89	< .4
						10/20/89	1.7
	Bromide		PPB	1000.0		5/04/92	U 500.0
	Chloride		PPB	500.0	250000.0	5/04/92	9700.0
	Fluoride		PPB	500.0	4000.0	5/04/92	300.0
	Gross alpha		PCI/L	4.0	15.0	1/10/86	1.7
						5/29/86	2.0
						7/09/86	2.0
						10/30/86	4.1
						1/26/87	2.0
						6/03/87	1.7
						7/24/87	1.9
						10/25/87	1.8
						2/17/88	1.5
						4/15/88	1.5
						7/21/88	1.1
						11/16/88	1.4
						1/20/89	< .2
						Gross beta	
	5/29/86	4.7					
	7/09/86	3.4					
	10/30/86	4.8					
	1/26/87	5.8					
	6/03/87	8.2					
	7/24/87	6.0					
	10/25/87	5.9					
	2/17/88	5.5					
	4/15/88	4.2					
	7/21/88	3.6					
	11/16/88	3.4					
	1/20/89	3.1					
	4/07/89	3.3					
	10/20/89	4.6					
Iodine-129 (Drinking Water Sta		PCI/L	1.0	1.0	7/21/88	< .0	
Nitrate		PPB	500.0	45000.0	10/30/86	10900.0	
					1/26/87	10600.0	
					6/03/87	10100.0	
					5/04/92	9200.0	
Nitrate, High Detection Level		PPB	2500.0	45000.0	7/24/87	9640.0	
					10/25/87	10500.0	
					2/17/88	8990.0	
					4/15/88	8690.0	
					7/21/88	8400.0	
11/16/88	9800.0						

Figure 5A-5. Water Quality Data. (sheet 1 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT				
	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value			
6-S28-EO	Nitrate, High Detection Level	PPB	2500.0	45000.0	1/20/89	10300.0			
					4/07/89	9500.0			
					10/20/89	9000.0			
	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	1/10/86	9.7			
					5/29/86	1.7			
					7/09/86	8.7			
					3/15/84	11.0			
					1/07/85	24.0			
	Nitrate-Ion	MG/L	.5	45.0	2/04/85	20.0			
					4/19/85	19.0			
					10/26/85	42.0			
					12/30/85	82.0			
					5/04/92	U 200.0			
					5/04/92	U 400.0			
	Nitrite	PPB	1000.0	3300.0	5/04/92	U 200.0			
	Phosphate	PPB	1000.0		5/04/92	U 400.0			
	Plutonium-238	PCI/L	.1	1.6	2/01/91	U -.0			
	Plutonium-239/40	PCI/L	.1	1.2	2/01/91	U -.0			
	Strontium-90	PCI/L	5.0	8.0	1/10/86	< .2			
					5/29/86	< .8			
					7/09/86	< .0			
					10/30/86	< .4			
					1/26/87	< .0			
					6/03/87	< .3			
					7/24/87	< .2			
					10/25/87	< .0			
					2/17/88	< .4			
					4/15/88	< -.0			
					7/21/88	< -.2			
					11/16/88	< -.0			
Sulfate	PPB	500.0	250000.0	1/20/89	< -.2				
				4/07/89	< .2				
				10/20/89	< -.2				
				5/04/92	22000.0				
				Technetium-99	PCI/L	15.0	900.0	2/01/91	U .1
				Tritium	PCI/L	500.0	20000.0	3/15/84	-330.0
								1/07/85	180.0
								2/04/85	-320.0
								4/19/85	-12.0
10/26/85	150.0								
12/30/85	< 120.0								
1/10/86	< -41.9								
5/29/86	< -112.0								
7/09/86	< 3.2								
10/30/86	< 98.2								
	1/26/87	< -62.3							

Figure 5A-5. Water Quality Data. (sheet 2 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT						
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value				
6-S28-E0	Tritium		PCI/L	500.0	20000.0	6/03/87	< 89.3				
						7/24/87	< -99.3				
						10/25/87	< 85.9				
						2/17/88	< -164.0				
						4/15/88	< -167.0				
						7/21/88	< 165.0				
						11/16/88	< -68.0				
						1/20/89	< -263.0				
						4/07/89	< -88.4				
						10/20/89	< -92.8				
						Uranium	PCI/L	.5	40.0	4/19/85	30.0
										2/17/88	1.4
										4/15/88	1.4
										7/21/88	1.3
11/16/88	.8										
6-S31-1	1,1,1,2-tetrachlorethane	PPB	10.0			8/24/87	< 10.0				
						8/04/88	< 10.0				
	1,1,1-trichloroethane	PPB	5.0	200.0			7/18/86	< 10.0			
							6/22/87	< 10.0			
							8/24/87	< 10.0			
	1,1,2,2-tetrachlorethane	PPB	5.0				8/04/88	< 5.0			
							8/24/87	< 10.0			
	1,1,2-trichloroethane	PPB	5.0				8/04/88	< 10.0			
							7/18/86	< 10.0			
	1,1-dichloroethane	PPB	5.0				6/22/87	< 10.0			
							8/24/87	< 10.0			
							8/04/88	< 5.0			
	1,1-dichloroethylene	PPB	10.0		7.0		8/24/87	< 10.0			
							8/04/88	< 10.0			
	1,1-dimethylhydrazine	PPB	10.0				6/22/87	< 3000.0			
	1,2,3,4-tetrachlorobenzene	PPB	10.0				7/18/86	< 10.0			
							6/22/87	< 10.0			
8/24/87							< 10.0				
8/04/88							< 10.0				
1,2,3,5-tetrachlorobenzene	PPB	10.0				7/18/86	< 10.0				
						6/22/87	< 10.0				
						8/24/87	< 10.0				
						8/04/88	< 10.0				
1,2,3-trichlorobenzene	PPB	10.0				8/24/87	< 10.0				
						7/18/86	< 10.0				

Figure 5A-5. Water Quality Data. (sheet 3 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT			RESULT			
	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value	
6-S31-1	1,2,3-trichlorobenzene	PPB	10.0		6/22/87	< 10.0	
					8/24/87	< 10.0	
					8/04/88	< 10.0	
	1,2,3-trichloropropane	PPB	10.0			8/24/87	< 10.0
						8/04/88	< 10.0
						7/18/86	< 10.0
	1,2,4,5-tetrachlorobenzene	PPB	10.0			6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 10.0
	1,2,4-trichlorobenzene	PPB	10.0			7/18/86	< 10.0
						6/22/87	< 10.0
						8/24/87	< 10.0
	1,2-dibromo-3-chloropropane	PPB	10.0		.2	8/24/87	< 10.0
						8/04/88	< 10.0
						8/04/88	< 10.0
	1,2-dibromoethane	PPB	10.0			8/24/87	< 10.0
						8/04/88	< 10.0
						7/18/86	< 10.0
	1,2-dichlorobenzene	PPB	10.0			6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 10.0
	1,2-dichloroethane	PPB	5.0		5.0	8/24/87	< 10.0
						8/04/88	< 10.0
						8/24/87	< 10.0
	1,2-dichloropropane	PPB	5.0		5.0	8/24/87	< 10.0
						8/04/88	< 10.0
						6/22/87	< 3000.0
	1,2-dimethylhydrazine	PPB	10.0			8/04/88	< 10.0
7/18/86						< 10.0	
6/22/87						< 10.0	
1,2-diphenylhydrazine	PPB	10.0			8/04/88	< 10.0	
					7/18/86	< 10.0	
					6/22/87	< 10.0	
1,3,5-trichlorobenzene	PPB	10.0			8/24/87	< 10.0	
					8/04/88	< 10.0	
					7/18/86	< 10.0	
1,3-dichlorobenzene	PPB	10.0			6/22/87	< 10.0	
					8/24/87	< 10.0	
					8/04/88	< 10.0	
1,3-dichloropropene	PPB	5.0			8/24/87	< 10.0	
					8/04/88	< 10.0	
					8/24/87	< 10.0	
1,4-dichloro-2-butene	PPB	10.0			8/04/88	< 10.0	
					8/04/88	< 10.0	
					8/04/88	< 10.0	
1,4-naphthoquinone	PPB	10.0			8/04/88	< 10.0	
					8/04/88	< 10.0	
					8/04/88	< 10.0	
1-chloro-2,3-epoxypropane	PPB	10.0			8/04/88	< 10.0	
					8/04/88	< 10.0	
					8/04/88	< 10.0	
1-naphthylamine	PPB	10.0			8/04/88	< 10.0	
					8/04/88	< 10.0	
					8/04/88	< 10.0	
2,3,4,6-tetrachlorophenol	PPB	10.0			8/04/88	< 10.0	
					8/04/88	< 10.0	
					8/04/88	< 2.0	
2,4,5-T	PPB	2.0			8/04/88	< 2.0	
					8/04/88	< 2.0	
					8/04/88	< 2.0	

Figure 5A-5. Water Quality Data. (sheet 4 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT			RESULT		
	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	2,4,5-TP silvex	PPB	2.0	10.0	10/17/85	< 1.0
					7/18/86	< 1.0
					8/04/88	< 2.0
	2,4,5-Trichlorophenol	PPB	10.0		8/04/88	< 50.0
	2,4,6-trichlorophenol	PPB	10.0		8/04/88	< 10.0
	2,4-D	PPB	2.0	100.0	10/17/85	< 1.0
					7/18/86	< 1.0
					8/04/88	< 2.0
	2,4-dichlorophenol	PPB	10.0		8/04/88	< 10.0
	2,4-dimethylphenol	PPB	10.0		8/04/88	< 10.0
	2,4-dinitrophenol	PPB	10.0		8/04/88	< 50.0
	2,4-dinitrotoluene	PPB	10.0		8/04/88	< 10.0
	2,6-dichlorophenol	PPB	10.0		8/04/88	< 10.0
	2,6-dinitrotoluene	PPB	10.0		8/04/88	< 10.0
	2-acetylaminofluorene	PPB	10.0		8/04/88	< 10.0
	2-chloroethyl vinyl ether	PPB	5.0		8/24/87	< 10.0
					8/04/88	< 10.0
	2-chloronaphthalene	PPB	10.0		8/04/88	< 10.0
	2-chlorophenol	PPB	10.0		8/04/88	< 10.0
	2-cyclohexyl-4,6-dinitrophenol	PPB	10.0		8/04/88	< 10.0
	2-methyl-2-(methylthio) propio	PPB	10.0		8/04/88	< 10.0
	2-methylaziridine	PPB	10.0		8/04/88	< 10.0
	2-methylactonitrile	PPB	10.0		8/04/88	< 10.0
	2-naphthylamine	PPB	10.0		8/04/88	< 10.0
	2-picoline	PPB	10.0		8/04/88	< 10.0
	2-propyn-1-ol	PPB	10000.0		6/22/87	< 3000.0
	2-sec-butyl-4,6-dinitrophenol	PPB	10.0		8/04/88	< 10.0
	3,3'-Dichlorobenzidine	PPB	10.0		8/04/88	< 20.0
	3,3'-dimethoxybenzidine	PPB	10.0		8/04/88	< 10.0
	3,3'-dimethylbenzidine	PPB	10.0		8/04/88	< 10.0
	3-chloropropionitrile	PPB	10000.0		6/22/87	< 3000.0
	3-methylcholanthrene	PPB	10.0		8/04/88	< 10.0
	4,4'-methylenebis(2-chloroanil	PPB	10.0		8/04/88	< 10.0
	4,6-dinitro-o-cresol and salts	PPB	10.0		8/04/88	< 10.0
	4-aminobiphenyl	PPB	10.0		8/04/88	< 10.0
	4-bromophenyl phenyl ether	PPB	10.0		8/04/88	< 10.0
	5-(aminomethyl)-3-isoxazolol	PPB	10.0		8/04/88	< 10.0
	5-nitro-o-toluidine	PPB	10.0		8/04/88	< 10.0
	7,12-dimethylbenz(a)anthracene	PPB	10.0		8/04/88	< 10.0
	7H-dibenzo[c,g]carbazole	PPB	10.0		8/04/88	< 10.0
Acetonitrile	PPB	10.0		6/22/87	< 3000.0	
				8/04/88	< 3000.0	
Acetophenone	PPB	10.0		8/04/88	< 10.0	
Acrolein	PPB	10.0		8/24/87	< 10.0	

Figure 5A-5. Water Quality Data. (sheet 5 of 24)

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WELL	CONSTITUENT				RESULT			
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value	
6-S31-1	Acrolein	PPB	10.0			8/04/88	< 10.0	
	Acrylamide	PPB	10000.0			6/22/87	< 3000.0	
	Acrylonitrile	PPB	10.0			8/24/87	< 10.0	
						8/04/88	< 10.0	
	Aldrin	PPB	.1			8/04/88	< .1	
	Alkalinity			20000.0			6/22/87	89300.0
							8/24/87	91100.0
							8/04/88	94200.0
							12/20/91	97.0
	Allyl alcohol	PPB	10000.0				6/22/87	< 3000.0
	Alpha,alpha-dimethylphenethyla	PPB	10.0				8/04/88	< 10.0
	Alpha-BHC	PPB	.1		4.0		10/17/85	< 1.0
							7/18/86	< 1.0
							8/04/88	< .1
	Aluminum	PPB	150.0		50.0		10/17/85	< 150.0
							8/04/88	< 150.0
	Aluminum, filtered	PPB	150.0		50.0		6/22/87	< 150.0
							8/24/87	< 150.0
							8/04/88	< 150.0
	Amitrole	PPB	10.0				8/04/88	< 10.0
	Ammonium ion	PPB	50.0				6/22/87	70.0
							8/24/87	< 50.0
							8/04/88	< 50.0
	Aniline	PPB	10.0				8/04/88	< 10.0
	Antimony	PPB	100.0				10/17/85	< 100.0
							8/04/88	< 100.0
	Antimony, filtered	PPB	100.0				6/22/87	< 100.0
							8/24/87	< 100.0
							8/04/88	< 100.0
							12/20/91	U 200.0
	Aramite	PPB	10.0				8/04/88	< 10.0
	Arochlor 1016	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1221	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1232	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1242	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1248	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1254	PPB	1.0		.5		8/04/88	< 1.0
	Arochlor 1260	PPB	1.0		.5		8/04/88	< 1.0
	Arsenic	PPB	5.0		50.0		10/17/85	< 5.0
							8/04/88	6.0
Arsenic, filtered	PPB	5.0		50.0		6/22/87	< 5.0	
						8/24/87	6.0	
						8/04/88	6.0	
Auramine	PPB	10.0				8/04/88	< 10.0	

Figure 5A-5. Water Quality Data. (sheet 6 of 24)

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HPADS Groundwater Data

WELL		CONSTITUENT			RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	Barium	PPB	6.0	1000.0	10/17/85	12.0
	Barium, filtered	PPB	6.0	1000.0	8/04/88	12.0
					6/22/87	19.0
					8/24/87	19.0
					8/04/88	< 6.0
	Benz[a]anthracene	PPB	10.0		12/20/91	U 20.0
					8/04/88	< 10.0
	Benz[c]acridine	PPB	10.0		8/04/88	< 10.0
	Benzene	PPB	5.0	5.0	7/18/86	< 10.0
					8/24/87	< 10.0
					8/04/88	< 5.0
	Benzene, dichloromethyl	PPB	10.0		8/04/88	< 10.0
	Benzenethoil	PPB	10.0		8/04/88	< 10.0
	Benidine	PPB	10.0		8/04/88	< 10.0
	Benzo[a]pyrene	PPB	10.0		8/04/88	< 10.0
	Benzo[b]fluoranthene	PPB	10.0		8/04/88	< 10.0
	Benzo[j]fluoranthene	PPB	10.0		8/04/88	< 10.0
	Benzyl chloride	PPB	10.0		8/04/88	< 10.0
	Beryllium	PPB	5.0		8/04/88	< 5.0
					6/22/87	< 5.0
					8/24/87	< 5.0
	Beta-BHC	PPB	.1	4.0	12/20/91	U 3.0
					10/17/85	< 1.0
					7/18/86	< 1.0
	Bis(2-chloroethoxy) methane	PPB	10.0		8/04/88	< .1
					8/04/88	< 10.0
					8/04/88	< 10.0
	Bis(2-chloroethyl) ether	PPB	10.0		8/04/88	< 10.0
	Bis(2-chloroisopropyl) ether	PPB	10.0		8/04/88	< 10.0
	Bis(2-ethylhexyl) phthalate	PPB	10.0		7/18/86	22.0
					8/04/88	< 10.0
	Bis(chloromethyl) ether	PPB	5.0		8/24/87	< 10.0
8/04/88					< 10.0	
Bismuth	PPB	5.0		8/24/87	< 5.0	
Bromide	PPB	1000.0		12/20/91	U 500.0	
Bromoacetone	PPB	5.0		8/24/87	< 10.0	
Bromoform	PPB	5.0	100.0	8/04/88	< 10.0	
				8/24/87	< 10.0	
Butyl benzyl phthalate	PPB	10.0		8/04/88	< 10.0	
Cadmium	PPB	2.0	10.0	10/17/85	< 2.0	
Cadmium, filtered	PPB	2.0	10.0	8/04/88	< 2.0	
				6/22/87	< 2.0	
				8/24/87	< 2.0	

Figure 5A-5. Water Quality Data. (sheet 7 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1		Cadmium, filtered	PPB	2.0	10.0	8/04/88	< 2.0
						12/20/91	U 10.0
		Calcium	PPB	50.0		8/04/88	28000.0
		Calcium, filtered	PPB	50.0		6/22/87	27400.0
						8/24/87	22700.0
						8/04/88	29100.0
						12/20/91	29000.0
		Carbon Tetrachloride by GC/MS	PPB	5.0	5.0	7/18/86	< 10.0
						6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 5.0
		Carbon disulfide	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Carbophenothion	PPB	2.0		8/04/88	< 2.0
		Chemical sodium by AA	MG/L	1.0		3/01/59	27.0
						4/01/59	27.0
						7/01/59	27.0
		Chloral	PPB	3000.0		6/22/87	< 3000.0
		Chlordane	PPB	1.0	2.0	8/04/88	< 1.0
		Chloride	PPB	500.0	250000.0	10/17/85	4680.0
						6/22/87	5540.0
						8/24/87	5330.0
						8/04/88	5120.0
						12/20/91	5200.0
		Chlornaphazine	PPB	10.0		8/04/88	< 10.0
		Chloroacetaldehyde	PPB	16000.0		6/22/87	< 3000.0
		Chloroalkyl ethers	PPB	10.0		8/04/88	< 10.0
		Chlorobenzene	PPB	5.0	100.0	8/24/87	< 10.0
						8/04/88	< 10.0
		Chlorobenzilate	PPB	300.0		10/17/85	< 100.0
						8/04/88	< 30.0
		Chloroform	PPB	5.0	100.0	6/22/87	< 10.0
						8/24/87	< 10.0
					8/04/88	< 5.0	
	Chloromethyl methyl ether	PPB	10.0		8/24/87	< 10.0	
					8/04/88	< 10.0	
	Chromium	PPB	10.0	50.0	10/17/85	< 10.0	
					8/04/88	< 10.0	
	Chromium, filtered	PPB	10.0	50.0	6/22/87	< 10.0	
					8/24/87	< 10.0	
					8/04/88	< 10.0	
					12/20/91	U 20.0	
	Chrysene	PPB	10.0		8/04/88	< 10.0	
	Cobalt, filtered	PPB	20.0		12/20/91	U 20.0	

Figure 5A-5. Water Quality Data. (sheet 8 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1		Cobalt-60	PCI/L	22.5	100.0	11/27/84	- .6
		Coliform bacteria	MPN	2.2	1.0	10/17/85	< 3.0
		Conductivity, Laboratory	UMHO	1.0	700.0	12/20/91	250.0
		Copper	PPB	10.0	1000.0	10/17/85	< 10.0
						8/04/88	< 10.0
		Copper, filtered	PPB	10.0	1000.0	6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 10.0
						12/20/91	U 20.0
		Cresols	PPB	10.0		8/04/88	< 10.0
		Crotonaldehyde	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Cyanide	PPB	10.0		6/22/87	< 10.0
						8/24/87	< 10.0
		Cyanogen	PPB	3000.0		6/22/87	< 3000.0
		Cyanogen bromide	PPB	3000.0		6/22/87	< 3000.0
		Cyanogen chloride	PPB	3000.0		6/22/87	< 3000.0
		DDD	PPB	.1		8/04/88	< .1
		DDE	PPB	.1		8/04/88	< .1
		DDT	PPB	.1		8/04/88	< .1
		Delta-BHC	PPB	.1	4.0	10/17/85	< 1.0
						7/18/86	< 1.0
						8/04/88	< .1
		Di-n-butyl phthalate	PPB	10.0		8/04/88	< 10.0
		Di-n-octyl phthalate	PPB	10.0		8/04/88	< 10.0
		Di-n-propylnitrosamine	PPB	10.0		8/04/88	< 10.0
		Dibenz[a,h]acridine	PPB	10.0		8/04/88	< 10.0
		Dibenz[a,h]anthracene	PPB	10.0		8/04/88	< 10.0
		Dibenz[a,j]acridine	PPB	10.0		8/04/88	< 10.0
		Dibenzo[a,e]pyrene	PPB	10.0		8/04/88	< 10.0
		Dibenzo[a,h]pyrene	PPB	10.0		8/04/88	< 10.0
		Dibenzo[a,i]pyrene	PPB	10.0		8/04/88	< 10.0
		Dibromomethane	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Dichlorodifluoromethane	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Dichloropropanol	PPB	3000.0		6/22/87	< 3000.0
		Dieldrin	PPB	.1		8/04/88	< .1
		Diethyl phthalate	PPB	10.0		8/04/88	< 10.0
		Diethylarsine	PPB	10.0		8/24/87	< 10.0
					8/04/88	< 10.0	
	Dihydrosafrole	PPB	10.0		8/04/88	< 10.0	
	Dimethoate	PPB	2.0		8/04/88	< 2.0	
	Dimethyl phthalate	PPB	10.0		8/04/88	< 10.0	

Figure 5A-5. Water Quality Data. (sheet 9 of 24)

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HPADS Groundwater Data

WELL		CONSTITUENT			RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value	
6-S31-1	Dinitrobenzene	PPB	10.0		8/04/88	< 10.0	
	Dioxane	PPB	500.0		7/18/86	< 500.0	
					8/24/87	< 500.0	
					8/04/88	< 500.0	
					8/04/88	< 10.0	
	Diphenylamine	PPB	10.0		8/04/88	< 10.0	
	Disulfoton	PPB	2.0		8/04/88	< 2.0	
	Endosulfan I	PPB	.1		8/04/88	< .1	
	Endosulfan II	PPB	.1		8/04/88	< .1	
	Endrin	PPB			.2	10/17/85	< 1.0
						7/18/86	< 1.0
						8/04/88	< .1
	Ethyl carbamate	PPB	10000.0			6/22/87	< 3000.0
	Ethyl cyanide	PPB	10000.0			6/22/87	< 3000.0
	Ethyl methacrylate	PPB	10.0			8/24/87	< 10.0
						8/04/88	< 10.0
	Ethyl methanesulfonate	PPB	10.0			8/04/88	< 10.0
	Ethylene glycol	PPB	10000.0			8/04/88	< 10000.0
	Ethylene oxide	PPB	10.0			6/22/87	< 3000.0
						8/04/88	< 3000.0
	Ethyleneimine	PPB	10.0			8/04/88	< 10.0
	Fluoranthene	PPB	10.0			8/04/88	< 10.0
	Fluoride	PPB	500.0		4000.0	10/17/85	< 500.0
						6/22/87	< 500.0
						8/24/87	< 500.0
						8/04/88	< 500.0
						12/20/91	200.0
	Fluoride, Low Detection Level	PPB	20.0		4000.0	8/24/87	250.0
	Fluoroacetic acid	PPB	3000.0			6/22/87	< 3000.0
	Formalin	PPB	500.0			7/18/86	< 500.0
						8/24/87	< 500.0
						8/04/88	< 500.0
Gamma-BHC	PPB			4.0	10/17/85	< 1.0	
					7/18/86	< 1.0	
					8/04/88	< .1	
Glycidylaldehyde	PPB	3000.0			6/22/87	< 3000.0	
Gross alpha	PCI/L		4.0	15.0	10/17/85	1.2	
					6/22/87	< .7	
					8/24/87	< .2	
Gross beta	PCI/L		8.0	50.0	11/01/51	4.2	
					1/01/52	8.0	
					2/01/52	24.0	
					3/01/52	23.0	
					4/01/52	13.0	
					9/01/52	.4	

Figure 5A-5. Water Quality Data. (sheet 10 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1		Iodomethane	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Iron	PPB	30.0	300.0	10/17/85	146.0
						8/04/88	169.0
		Iron, filtered	PPB	30.0	300.0	6/22/87	< 50.0
						8/24/87	< 50.0
						8/04/88	< 30.0
						12/20/91	U 20.0
		Isobutyl alcohol	PPB	10000.0		6/22/87	< 3000.0
		Isosafrole	PPB	10.0		8/04/88	< 10.0
		Kerosene	PPB	10000.0		7/18/86	< 10000.0
						6/22/87	< 10000.0
						8/24/87	< 10000.0
						8/04/88	< 10000.0
		Lead	PPB	30.0		10/17/85	< 30.0
		Lead (graphite furnace)	PPB	5.0	50.0	8/04/88	< 5.0
		Lead, filtered	PPB	5.0	50.0	6/22/87	< 5.0
						8/24/87	< 5.0
						8/04/88	< 5.0
		Magnesium	PPB	50.0		8/04/88	6260.0
		Magnesium, filtered	PPB	50.0		6/22/87	6200.0
						8/24/87	5830.0
						8/04/88	5990.0
						12/20/91	6100.0
		Maleic hydride	PPB	500.0		8/04/88	< 500.0
		Malononitrile	PPB	10.0		8/04/88	< 10.0
		Manganese	PPB	5.0	50.0	10/17/85	5.0
						8/04/88	< 5.0
		Manganese, filtered	PPB	5.0	50.0	6/22/87	< 5.0
						8/24/87	< 5.0
						8/04/88	< 5.0
						12/20/91	U 10.0
		Melphalan	PPB	10.0		8/04/88	< 10.0
	Mercury	PPB	.1	2.0	10/17/85	< .1	
					8/04/88	< .1	
	Mercury, filtered	PPB	.1	2.0	6/22/87	< .1	
					8/24/87	< .1	
					8/04/88	< .1	
	Methacrylonitrile	PPB	10.0		8/24/87	< 10.0	
					8/04/88	< 10.0	
	Methanethiol	PPB	10.0		8/24/87	< 10.0	
					8/04/88	< 10.0	
	Methapyrilene	PPB	10.0		8/04/88	< 10.0	
	Metholonyl	PPB	10.0		8/04/88	< 10.0	

Figure 5A-5. Water Quality Data. (sheet 12 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	Methoxychlor	PPB	3.0	100.0	10/17/85	< 1.0
					7/18/86	< 1.0
					8/04/88	< 3.0
	Methyl Isobutyl Ketone	PPB	10.0		8/04/88	< 10.0
	Methyl bromide	PPB	10.0		8/24/87	< 10.0
					8/04/88	< 10.0
	Methyl chloride	PPB	10.0		8/24/87	< 10.0
					8/04/88	< 10.0
	Methyl ethyl ketone	PPB	10.0		7/18/86	< 10.0
					6/22/87	< 10.0
					8/24/87	< 10.0
					8/04/88	< 10.0
	Methyl hydrazine	PPB	3000.0		6/22/87	< 3000.0
	Methyl methacrylate	PPB	10.0		8/24/87	< 10.0
					8/04/88	< 10.0
	Methyl methanesulfonate	PPB	10.0		8/04/88	< 10.0
	Methyl parathion	PPB	2.0		8/04/88	< 2.0
	Methylene Chloride	PPB	5.0		6/22/87	44.0
					8/24/87	< 10.0
					8/04/88	< 10.0
	Methylthiouracil	PPB	10.0		8/04/88	< 10.0
	N,N-diethylhydrazine	PPB	10.0		8/24/87	< 10.0
					8/04/88	< 10.0
	N-nitroso-N-methylurethane	PPB	10.0		8/04/88	< 10.0
	N-nitrosodi-n-butylamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosodiethanolamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosodiethylamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosodimethylamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosomethylethylamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosomethylvinylamine	PPB	10.0		8/04/88	< 10.0
	N-nitrosomorpholine	PPB	10.0		8/04/88	< 10.0
	N-nitrosornicotine	PPB	10.0		8/04/88	< 10.0
	N-nitrosopiperidine	PPB	10.0		8/04/88	< 10.0
N-propylamine	PPB	10000.0		6/22/87	< 3000.0	
Naphthalene	PPB	10.0		7/18/86	< 10.0	
				6/22/87	< 10.0	
				8/24/87	< 10.0	
				8/04/88	< 10.0	
Nickel	PPB	10.0		10/17/85	< 10.0	
				8/04/88	< 10.0	
Nickel, filtered	PPB	10.0		6/22/87	< 10.0	
				8/24/87	< 10.0	
				8/04/88	< 10.0	
				12/20/91	U 30.0	

Figure 5A-5. Water Quality Data. (sheet 13 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT			
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value	
6-S31-1	Nicotinic acid	PPB	100.0			8/04/88	< 100.0	
	Nitrate	PPB	500.0		45000.0	10/17/85	2860.0	
						6/22/87	3430.0	
						8/24/87	3480.0	
						8/04/88	3620.0	
						12/20/91	900.0	
		Nitrate, Phenodisulfonic Acid	MG/L	.5		45.0	10/28/57	1.0
							1/09/58	1.0
							2/12/58	1.0
							3/11/58	1.0
							4/09/58	1.0
							5/07/58	1.0
							12/11/58	1.0
							3/01/59	1.0
							4/01/59	1.0
							7/01/59	1.0
							5/18/61	.1
							8/17/61	.3
							12/21/61	.1
							2/07/62	.1
							8/02/62	5.0
							8/05/63	.1
							5/14/69	.2
							7/17/69	1.9
							10/28/69	.5
							6/06/72	4.3
							4/02/73	3.8
						8/30/73	.5	
						2/28/74	25.0	
						9/09/74	17.0	
						1/03/75	.5	
						5/01/75	.5	
						7/01/75	.5	
						11/04/75	3.7	
						1/05/76	.5	
						5/03/76	.5	
						6/29/76	.5	
						10/26/76	.5	
						2/01/77	.5	
						4/25/77	.5	
						6/24/81	.5	
						12/30/81	1.9	
	Nitrate-Ion	MG/L	.5		45.0	11/27/84	32.0	
	Nitrite	PPB	1000.0		3300.0	12/20/91	U 200.0	

Figure 5A-5. Water Quality Data. (sheet 14 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1		Nitrobenzine	PPB	10.0		8/04/88	< 10.0
		Nitrosopyrrolidine	PPB	10.0		8/04/88	< 10.0
		O,O,O-triethyl phosphorothioat	PPB	10.0		8/04/88	< 10.0
		O-toluidine hydrochloride	PPB	10.0		8/04/88	< 10.0
		Osmium, filtered	PPB	300.0		6/22/87	< 300.0
						8/24/87	< 300.0
		P benzoquinone	PPB	10.0		8/04/88	< 10.0
		P-chloro-m-cresol	PPB	10.0		8/04/88	< 10.0
		P-chloroaniline	PPB	10.0		8/04/88	< 10.0
		P-dimethylaminoazobenzene	PPB	10.0		8/04/88	< 10.0
		P-nitroaniline	PPB	10.0		8/04/88	< 50.0
		Paraldehyde	PPB	10000.0		6/22/87	< 3000.0
		Parathion	PPB	2.0		8/04/88	< 2.0
		Pentachlorobenzene	PPB	10.0		7/18/86	< 10.0
						6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 10.0
		Pentachloroethane	PPB	10.0		8/24/87	< 10.0
						8/04/88	< 10.0
		Pentachloronitrobenzene	PPB	10.0		8/04/88	< 10.0
		Pentachlorophenol	PPB	50.0	200.0	8/04/88	< 50.0
		Phenacetin	PPB	10.0		8/04/88	< 10.0
		Phenol	PPB	10.0		7/18/86	< 10.0
						6/22/87	< 10.0
						8/24/87	< 10.0
						8/04/88	< 10.0
		Phenylenediamine	PPB	10.0		8/04/88	< 10.0
		Phosphate	PPB	1000.0		10/17/85	< 1000.0
						6/22/87	< 1000.0
						8/24/87	< 1000.0
						8/04/88	< 1000.0
						12/20/91	U 400.0
		Phthalic acid esters	PPB	10.0		8/04/88	< 10.0
	Potassium	PPB	100.0		10/17/85	3730.0	
					8/04/88	4040.0	
	Potassium, filtered	PPB	100.0		6/22/87	4280.0	
					8/24/87	4110.0	
					8/04/88	4350.0	
					12/20/91	4000.0	
	Pronamide	PPB	10.0		8/04/88	< 10.0	
	Pyridine	PPB	500.0		7/18/86	< 500.0	
					8/24/87	< 500.0	
					8/04/88	< 500.0	
	Radium	PCI/L	1.0	5.0	10/17/85	< -.1	

Figure 5A-5. Water Quality Data. (sheet 15 of 24)

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HPADS Groundwater Data

WELL		CONSTITUENT			RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	Radium	PCI/L	1.0	5.0	6/22/87	< .1
	Reserpine	PPB	10.0		8/04/88	< 10.0
	Resorcinol	PPB	10.0		8/04/88	< 10.0
	Safrol	PPB	10.0		8/04/88	< 10.0
	Selenium	PPB	5.0	10.0	10/17/85	< 5.0
					8/04/88	< 5.0
	Selenium, filtered	PPB	5.0	10.0	6/22/87	< 5.0
					8/24/87	< 5.0
					8/04/88	< 5.0
	Silver	PPB	10.0	50.0	10/17/85	< 10.0
					8/04/88	< 10.0
	Silver, filtered	PPB	10.0	50.0	6/22/87	< 10.0
					8/24/87	< 10.0
					8/04/88	< 10.0
					12/20/91	U 20.0
	Sodium	PPB	200.0		10/17/85	8580.0
					8/04/88	9440.0
	Sodium, filtered	PPB	200.0		6/22/87	8990.0
					8/24/87	8500.0
					8/04/88	9060.0
					12/20/91	8900.0
	Specific conductance	UMHO	1.0	700.0	10/17/85	235.0
					6/22/87	220.0
					8/24/87	197.0
					8/04/88	220.0
	Strontium	PPB	10.0		8/04/88	128.0
	Strontium, filtered	PPB	10.0		6/22/87	< 300.0
					8/24/87	< 300.0
					8/04/88	110.0
	Strontium-90	PCI/L	5.0	8.0	11/01/60	14.0
Strychnine	PPB	50.0		8/04/88	< 50.0	
Sulfate	PPB	500.0	250000.0	10/17/85	16500.0	
				6/22/87	17700.0	
				8/24/87	16600.0	
				8/04/88	17200.0	
				12/20/91	17000.0	
Sym-trinitrobenzene	PPB	10.0		8/04/88	< 10.0	
Tetrachloroethylene	PPB	5.0	5.0	7/18/86	< 10.0	
				6/22/87	< 10.0	
				8/24/87	< 10.0	
				8/04/88	< 5.0	
Tetraethylpyrophosphate	PPB	2.0		8/04/88	< 2.0	
Thallium	PPB	5.0		8/04/88	< 5.0	
Thallium, filtered	PPB	5.0		8/04/88	< 5.0	

Figure 5A-5. Water Quality Data. (sheet 16 of 24)

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HPADS Groundwater Data

WELL		CONSTITUENT			RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	Thiofanox	PPB	10.0		8/04/88	< 10.0
	Thiuram	PPB	10.0		8/04/88	< 10.0
	Tin, filtered	PPB	30.0		12/20/91	U 100.0
	Toluene	PPB	5.0	2000.0	7/18/86	< 10.0
					8/24/87	< 10.0
					8/04/88	< 5.0
	Toluenediamine	PPB	10.0		8/04/88	< 10.0
	Total Organic Halogen, Low Det	PPB	10.0		6/22/87	60.8
					8/24/87	< 5.6
					8/04/88	< .9
	Total carbon	PPB	1000.0		8/24/87	37100.0
					8/04/88	20900.0
	Total organic carbon	PPB	1000.0		10/17/85	1500.0
					7/18/86	1000.0
					6/22/87	1380.0
					8/24/87	1190.0
					8/04/88	< 301.0
	Total organic halogen	PPB	100.0		10/17/85	< 2.7
					7/18/86	< .8
	Toxaphene	PPB	1.0	5.0	10/17/85	< 1.0
					7/18/86	< 1.0
					8/04/88	< 1.0
	Trans-1,2-dichloroethene	PPB	5.0	70.0	8/24/87	< 10.0
					8/04/88	< 10.0
	Tributylphosphoric Acid	PPB	10.0		8/04/88	< 10.0
	Trichloroethylene	PPB	5.0	5.0	7/18/86	< 10.0
					6/22/87	< 10.0
					8/24/87	< 10.0
					8/04/88	< 5.0
	Trichloromethanethiol	PPB	10.0		8/24/87	< 10.0
				8/04/88	< 10.0	
Trichloromonofluoromethane	PPB	10.0		8/24/87	< 10.0	
				8/04/88	< 10.0	
Trichloropropane	PPB	10.0		8/24/87	< 10.0	
				8/04/88	< 10.0	
Tris(2,3-dibromopropyl) phosph	PPB	10.0		8/04/88	< 10.0	
Tritium	PCI/L	500.0	20000.0	9/27/66	3400.0	
				12/14/66	2300.0	
				6/15/67	3200.0	
				9/08/67	2300.0	
				12/04/67	1700.0	
				2/05/69	490.0	
				5/14/69	540.0	
				1/03/75	700.0	

Figure 5A-5. Water Quality Data. (sheet 17 of 24)

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HPADS Groundwater Data

WELL		CONSTITUENT			RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	Tritium	PCI/L	500.0	20000.0	5/01/75	740.0
					7/01/75	480.0
					11/04/75	1100.0
					1/05/76	950.0
					5/03/76	900.0
					6/29/76	910.0
					10/26/76	1100.0
					2/01/77	570.0
					4/25/77	1500.0
					6/24/81	2400.0
					12/30/81	710.0
					11/27/84	670.0
					8/04/88	< -13.6
					12/20/91	U -74.3
					Uranium, chemical	UG/L
	Vanadium	PPB	5.0		10/17/85	12.0
					8/04/88	7.0
	Vanadium, filtered	PPB	5.0		6/22/87	15.0
					8/24/87	14.0
					8/04/88	< 5.0
					12/20/91	U 30.0
	Vinyl chloride	PPB	10.0	2.0	8/24/87	< 10.0
					8/04/88	< 10.0
	Warfarin	PPB	10.0		8/04/88	< 10.0
	Xylene-m	PPB	5.0	10000.0	7/18/86	< 10.0
					6/22/87	< 10.0
					8/24/87	< 10.0
					8/04/88	< 5.0
	Xylene-o,p	PPB	5.0	10000.0	7/18/86	< 10.0
					6/22/87	< 10.0
					8/24/87	< 10.0
					8/04/88	< 5.0
	Zinc	PPB	5.0	5000.0	8/04/88	< 5.0
Zinc, filtered	PPB	5.0	5000.0	6/22/87	< 5.0	
				8/24/87	< 5.0	
				8/04/88	< 5.0	
				12/20/91	U 10.0	
p-Dichlorobenzene	PPB	10.0	750.0	7/18/86	< 10.0	
				6/22/87	< 10.0	
				8/24/87	< 10.0	
				8/04/88	< 10.0	
p-Nitrophenol	PPB	10.0		8/04/88	< 50.0	
pH, Field Measurement			.1	8.5	10/17/85	7.7
				6/22/87	7.3	

Figure 5A-5. Water Quality Data. (sheet 18 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT			RESULT		
	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1	pH, Field Measurement--		.1	8.5	8/24/87	7.3
					8/04/88	7.7
	pH, Laboratory Measurement		.0	8.5	6/22/87	7.8
					8/24/87	7.9
					8/04/88	8.1
				12/20/91	8.0	
6-S31-1P	1,1,1-trichloroethane	PPB	5.0	200.0	5/14/90	< 5.0
	1,1,2-trichloroethane	PPB	5.0		5/14/90	< 5.0
	1,1-dichloroethane	PPB	5.0		5/14/90	< 5.0
	1,2-dichloroethane	PPB	5.0	5.0	5/14/90	< 5.0
	Acetone by VOA	PPB	10.0		5/14/90	< 10.0
	Benzene	PPB	5.0	5.0	5/14/90	< 5.0
					2/01/77	180.0
	Bicarbonate	MG/L	1.0		12/04/78	150.0
					12/01/80	130.0
					1/03/83	70.0
					12/12/83	82.0
					2/01/77	.1
	Boron (Colorimetric by curcumi	UG/L	.0		12/01/80	.2
					1/03/83	.1
					12/12/83	.2
	Carbon Tetrachloride by GC/MS	PPB	5.0	5.0	5/14/90	< 5.0
					2/01/77	0.0
	Carbonate	MG/L	1.0		12/04/78	2.5
					12/01/80	1.8
					1/03/83	1.3
					12/12/83	1.6
					2/01/77	26.0
	Chemical calcium by AA	MG/L	.5		12/04/78	35.0
					12/01/80	22.0
					1/03/83	30.0
					12/12/83	25.0
					2/01/77	31.0
	Chemical sodium by AA	MG/L	1.0		12/04/78	33.0
					12/01/80	32.0
					1/03/83	9.3
					12/12/83	7.6
					2/01/77	4.3
Chloride by chemical analysis	MG/L	.1	250.0	12/04/78	13.0	
				12/01/80	4.8	
				1/03/83	6.0	
				12/12/83	4.9	
				5/14/90	< 5.0	
Chloroform	PPB	5.0	100.0			

Figure 5A-5. Water Quality Data. (sheet 19 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P	Gross alpha		PCI/L	4.0	15.0	2/19/88	1.2
						8/04/88	.9
	Gross beta		PCI/L	8.0	50.0	1/20/89	< .6
						1/25/67	220.0
						2/15/67	880.0
						3/21/67	19000.0
						4/11/67	150.0
						5/03/67	6000.0
						6/15/67	270.0
						7/12/67	140.0
						10/03/67	160.0
						10/30/67	480.0
						12/04/67	140.0
						2/05/68	4.0
						3/04/68	43.0
						3/08/68	110.0
						3/26/68	13.0
						5/06/68	7.0
						6/05/68	450.0
						6/12/68	150.0
						7/19/68	110.0
						8/05/68	74.0
	9/17/68	46.0					
	9/30/68	170.0					
	11/04/68	150.0					
	12/16/68	150.0					
	1/28/69	160.0					
2/05/69	150.0						
3/03/69	180.0						
4/15/69	150.0						
5/14/69	150.0						
6/03/69	150.0						
7/17/69	150.0						
7/28/69	160.0						
10/28/69	150.0						
						2/19/88	4.4
						8/04/88	3.7
						1/20/89	< 1.3
	Hardness		MG/L			1/03/83	83.0
	Magnesium by chemical analysis		MG/L	.3		2/01/77	9.3
						12/04/78	10.0
						12/01/80	9.3
						1/03/83	6.9
						12/12/83	7.6

Figure 5A-5. Water Quality Data. (sheet 20 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P	Methyl Isobutyl Ketone	PPB	10.0			5/14/90	< 10.0
	Methyl ethyl ketone	PPB	10.0			5/14/90	< 10.0
	Methylene Chloride	PPB	5.0			5/14/90	< 5.0
	Nitrate	PPB	500.0		45000.0	8/13/86	3450.0
						11/20/86	3220.0
	Nitrate, High Detection Level	PPB	2500.0		45000.0	2/19/88	3230.0
						8/04/88	3020.0
						1/20/89	4000.0
						5/14/90	2500.0
	Nitrate, Phenodisulfonic Acid	MG/L	.5		45.0	12/04/67	1.0
						1/05/68	.2
						3/26/68	.1
						8/05/68	.6
						11/04/68	1.7
						2/05/69	.1
						5/14/69	.2
						7/17/69	1.9
						10/28/69	.5
						1/03/75	.5
						5/01/75	.5
						7/01/75	.5
						11/04/75	3.7
						1/05/76	.5
					5/03/76	.5	
					6/29/76	.5	
					10/26/76	.5	
					2/01/77	.5	
					4/25/77	.5	
					7/28/77	.5	
					10/31/77	.5	
					1/11/78	.5	
					3/21/78	.5	
					6/22/78	.5	
					9/15/78	1.0	
					1/09/79	.5	
					6/12/79	.5	
					9/05/79	.5	
					1/04/80	.5	
					6/09/80	.5	
					9/12/80	.5	
					1/06/81	.5	
					3/26/81	2.2	
					3/22/82	1.2	
					6/23/82	1.4	

Figure 5A-5. Water Quality Data. (sheet 21 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	9/16/82	.9
					1/03/83	1.6
					3/15/83	1.7
					6/06/83	1.6
					8/31/83	1.6
	Nitrate-Ion	MG/L	.5	45.0	12/12/83	1.7
					4/13/84	4.5
					6/29/84	4.4
					9/28/84	4.9
					2/04/85	7.4
					7/18/85	14.0
					10/17/85	11.0
					11/26/85	36.0
					2/24/86	13.0
					6/17/86	9.2
	Specific conductance	UMHO	1.0	700.0	2/01/77	.3
					12/04/78	350.0
					12/01/80	340.0
					1/03/83	220.0
					12/12/83	210.0
	Sulphate	MG/L	5.0	250.0	5/14/90	315.0
					2/01/77	1.5
					12/04/78	3.8
					12/01/80	2.0
	Technetium-99	PCI/L	15.0	900.0	12/12/83	16.0
					2/19/88	< 1.2
					8/04/88	< 4.8
	Tetrachloroethylene	PPB	5.0	5.0	1/20/89	< -2.2
					5/14/90	< 5.0
	Tetrahydrofuran	PPB	10.0		5/14/90	< 10.0
Toluene	PPB	5.0	2000.0	5/14/90	< 5.0	
Total dissolved solids	MG/L	5.0	500.0	2/01/77	190.0	
				12/04/78	170.0	
				1/03/83	140.0	
				12/12/83	130.0	
Total potassium	MG/L	.3		12/01/80	7.4	
				1/03/83	4.2	
				12/12/83	4.2	
Trans-1,2-dichloroethene	PPB	5.0	70.0	5/14/90	< 5.0	
Trichloroethylene	PPB	5.0	5.0	5/14/90	< 5.0	
Tritium	PCI/L	500.0	20000.0	3/21/67	1900.0	
				6/15/67	2500.0	
				12/04/67	1700.0	
				1/05/68	1800.0	

Figure 5A-5. Water Quality Data. (sheet 22 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT			RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date
6-S31-1P	Tritium	PCI/L	500.0	20000.0	3/26/68	4000.0
					8/05/68	1000.0
					11/04/68	1000.0
					2/05/69	490.0
					5/14/69	540.0
					1/03/75	70.0
					5/01/75	740.0
					7/01/75	480.0
					11/04/75	1100.0
					1/05/76	950.0
					5/03/76	900.0
					6/29/76	910.0
					10/26/76	1100.0
					2/01/77	570.0
					4/25/77	1500.0
					7/28/77	1000.0
					10/31/77	1100.0
					1/11/78	1200.0
					3/21/78	930.0
					6/22/78	470.0
					9/15/78	1200.0
					1/09/79	790.0
					6/12/79	670.0
					9/05/79	640.0
					1/04/80	670.0
					6/09/80	500.0
					9/12/80	1200.0
					1/06/81	480.0
					3/26/81	500.0
					3/22/82	370.0
6/23/82	540.0					
9/16/82	370.0					
1/03/83	400.0					
3/15/83	-160.0					
6/06/83	-420.0					
8/31/83	-190.0					
12/12/83	-250.0					
4/13/84	72.0					
6/29/84	-190.0					
9/28/84	-250.0					
2/04/85	-150.0					
7/18/85	-430.0					
10/17/85	390.0					
11/26/85	230.0					

Figure 5A-5. Water Quality Data. (sheet 23 of 24)

8/05/92

Geosciences Group PARADOX Database

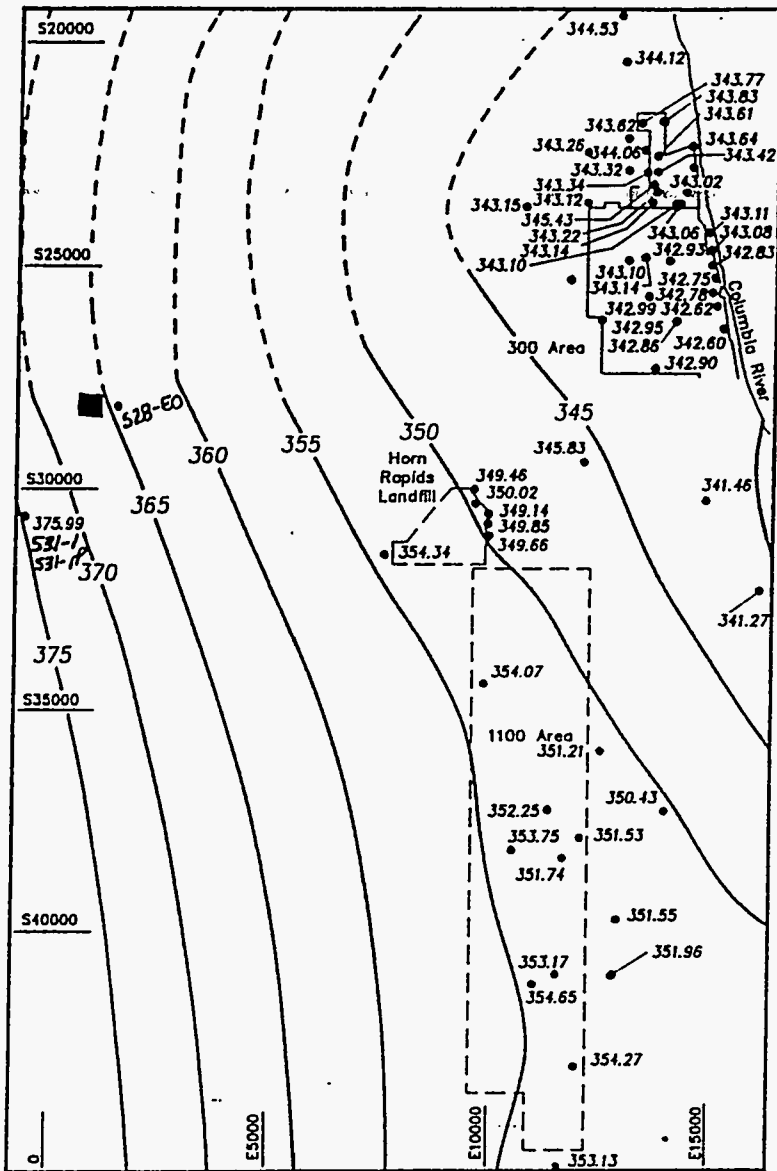
Page 24

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
	Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P		Tritium	PCI/L	500.0	20000.0	2/24/86	< 380.0
						6/17/86	< -280.0
						8/13/86	420.0
						11/20/86	< -130.0
						6/22/87	< -67.8
						8/24/87	< -192.0
						10/28/87	< -53.7
						2/19/88	< 231.0
						8/04/88	< -87.4
						1/20/89	< -95.0
		Vinyl chloride	PPB	10.0	2.0	5/14/90	< 10.0
		Xylene-m	PPB	5.0	10000.0	5/14/90	< 5.0
		Xylene-o,p	PPB	5.0	10000.0	5/14/90	< 5.0
		p-Dichlorobenzene	PPB	5.0	750.0	5/14/90	< 5.0
		pH, Field Measurement			.1	8.5	2/01/77
						12/04/78	8.2
						12/01/80	8.2
						1/03/83	8.2
						12/12/83	8.3
						5/14/90	8.3

Figure 5A-5. Water Quality Data. (sheet 24 of 24)



**300/1100 Area
Water Table Map
December 1991**

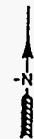
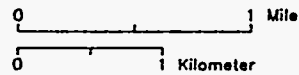
345.23 Water table elevation (feet above mean sea level)
300 Water table contours in feet above mean sea level
Contour interval = 5 ft

The 300 Area water table map has been prepared by the Geosciences Group, Environmental Division, of Westinghouse Hanford Company.

Note: To convert to metric, multiply elevation (ft) by 0.3048 to obtain elevation (m).

From: Kasza, et al., 1991

■ HANFORD PATROL ACADEMY



GEOSCI\122091-F...

Figure 5A-6. Water Table Map.

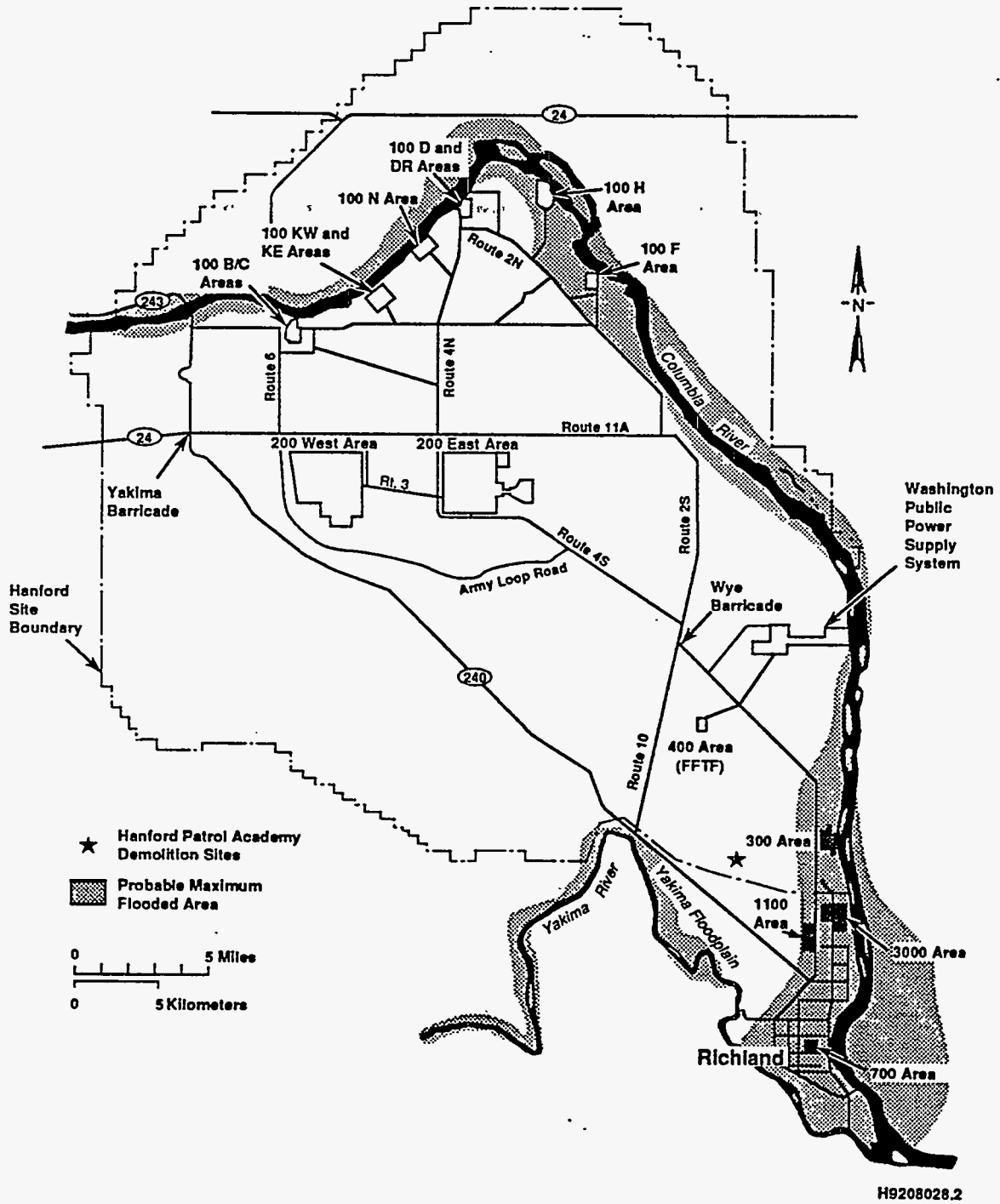


Figure 5A-7. 100-Year Flood Event.

1

APPENDIX 7A

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**QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND ANALYSIS
FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES**

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1 **7A.0 QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND ANALYSIS**
2 **FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES**

3
4
5 This appendix provides the quality assurance and quality control
6 information to ensure that HPADS closure activities (Chapter 7.0) provide
7 suitable closure data.
8
9

10 **7A.1 PROJECT DESCRIPTION**

11
12 This quality assurance project plan (QAPJP) has been prepared for
13 regulatory review with the HPADS closure plan in support of proposed sampling
14 and analysis activities.
15

16 Between August 1983 and October 1991, discarded explosive chemical
17 products, consisting predominantly of organic compounds and metal salts, were
18 demolished at the HPADS. This treatment unit will undergo closure consistent
19 with WAC 173-303 regulations. One or more rounds of soil sampling and
20 analysis are proposed in the closure plan (Chapter 7.0) to identify and
21 characterize soil contaminants of concern at the site.
22
23

24 **7A.1.1 Project Objectives**

25
26 The principal objective of Phase I investigative sampling will be for
27 RCRA clean closure of the site by verifying that the concentration of all
28 contaminants associated with operation of the TSD are at or below action
29 levels. Action levels are defined as levels above the Hanford Site soil
30 background and MTCA Method B levels. If soil contaminants are discovered
31 above action levels, a Phase II sampling will be initiated. Twenty-nine
32 samples were collected in closure areas #1 and #2. The samples will be
33 analyzed at an offsite contract laboratory.
34

35 If any soil is removed from the HPADS to facilitate closure, an
36 additional round of sampling and analysis (verification sampling) would be
37 performed to demonstrate that soil removal objectives had been achieved (i.e.,
38 that residual contamination levels were below the proposed cleanup values).
39
40

41 **7A.1.2 Applicability and Relationship to the Onsite Contractor's**
42 **Quality Assurance Program**

43
44 This QAPJP applies specifically to field activities and laboratory
45 analyses to be performed in support of closure of HPADS. This QAPJP has been
46 prepared in compliance with the *Environmental Engineering, Geotechnology, and*
47 *Permitting Function Quality Assurance Program Plan* (WHC 1990a) and *Interim*
48 *Guidelines for Preparing Quality Assurance Project Plans* (EPA 1980). This
49 QAPJP describes the means selected to implement quality assurance program
50 requirements, defined in the *Quality Assurance Manual* (WHC 1988b), as the
51 requirements apply to environmental investigations, while accommodating the
52 specific requirements for project plan format and content agreed on in the

1 Tri-Party Agreement. The project plan contains a matrix of procedural
2 resources from *Environmental Engineering, Geotechnology, and Permitting*
3 *Function Quality Assurance Program Plan* (WHC 1990a) and *Environmental*
4 *Investigations and Site Characterization Manual* (WHC 1988a). This QAPJP is
5 subject to mandatory review and revision in advance of initiation of field
6 sampling activities. Distribution and revision control of this plan will be
7 carried out in compliance with QR 6.0, "Document Control," and QI 6.1,
8 "Quality Assurance Document Control" (WHC 1988b). All plans and procedures
9 referenced in this QAPJP are available for regulatory review.

10 11 12 **7A.2 PROJECT ORGANIZATION AND RESPONSIBILITIES**

13
14 Organization responsibilities are discussed in the following sections.

15 16 17 **7A.2.1 Project Management Responsibilities**

18
19 The operations contractor's Regulatory Support organization and the
20 Environmental Restoration Engineering Function have primary responsibilities
21 for conducting this investigation. An organizational chart is included as
22 Figure 7A-1. The responsibilities of key test personnel and organizations are
23 described in the following.

- 24
25 • **Dangerous Waste Closure Plan Lead (Regulatory Support Organization)--**
26 The Dangerous Waste Closure Plan Lead is responsible for the overall
27 organization of the closure plan and will interface with the
28 regulatory agencies and the U.S. Department of Energy.
- 29
30 • **Technical Lead--**The Technical Lead is responsible for overall
31 direction of sampling and testing activities; responsibilities include
32 the planning and authorization of all work and management of any
33 subcontracted activities, as well as overall technical schedule and
34 budgetary performance.
- 35
36 • **Quality Assurance Officer--**The Quality Assurance Officer is
37 responsible for coordination and/or oversight of performance to the
38 QAPJP requirements by means of internal auditing and surveillance
39 techniques. The Quality Assurance Officer retains the necessary
40 organizational independence and authority to identify conditions
41 adverse to quality and to inform the Technical Lead of needs for
42 corrective action.
- 43
44 • **Health and Safety Officer (Environmental Division/Environmental Field**
45 **Services)--**The Health and Safety Officer is responsible for
46 determining potential health and safety hazards from volatile and/or
47 toxic compounds during sample handling and sampling decontamination
48 activities. The Health and Safety Officer has the responsibility and
49 authority to halt field activities because of unacceptable health and
50 safety concerns.

- 1 • **Health Physics Technician**--The health physics technician is
2 responsible for ensuring that all monitoring and protection procedures
3 are being followed as required in the dangerous waste operations plan.
4 The health physics technician has the authority to take whatever steps
5 might be necessary to carry out this function.
6
- 7 • **Field Team Leader**--The Field Team Leader is responsible for onsite
8 direction of sampling technicians in compliance with the requirements
9 of the sampling plan (Chapter 7.0, Section 7.2), this QAPjP, and
10 implementing all EISs.
11
- 12 • **Sample Management Organization**--The sample management organization is
13 responsible for procurement and coordination of analytical support
14 services, sample tracking through the laboratories, and receipt and
15 validation of analytical data as discussed in Section 7A.8.
16

17 18 **7A.2.2 Analytical Laboratories**

19
20 The field sampling team will be responsible for screening all samples for
21 gross alpha and beta/gamma radioactivity and for separating samples for
22 further analysis. Samples with levels exceeding 200 picocuries per gram
23 (total activity) or 60 picocuries per gram (alpha) will be routed to a Hanford
24 Site or participating contractor laboratory qualified to handle analysis of
25 radioactive samples. Samples exceeding 200 picocuries per gram (total
26 activity) or 60 picocuries per gram (alpha) are not expected for this
27 investigation. Samples with lower levels of radioactivity will be routed in
28 accordance with the procedures identified below for chemical samples.
29

30 Samples will be routed to an offsite contract laboratory, who will be
31 responsible for performing the analyses identified in the sampling and
32 analysis plan in Appendix 7C.
33

34 35 **7A.2.3 Other Support Contractors**

36
37 Support contractors could be assigned project responsibilities at the
38 direction of the Technical Lead. Such services will be in compliance with
39 standard Hanford Site procurement procedure requirements as discussed in
40 Section 7A.4.1.2. All work will be performed in compliance with approved
41 quality assurance plans and/or procedures, subject to controls of QI 7.3,
42 "Source Surveillance and Inspection" (WHC 1988b).
43

44 45 **7A.3 DATA QUALITY OBJECTIVES FOR MEASUREMENTS**

46
47 Data quality objectives for a given data collection activity describe the
48 overall level of uncertainty that decision makers are prepared to accept in
49 the analytical results deriving from the activity. The agreements from the
50 DQO process are summarized in the SAP (Appendix 7C). Data quality
51 requirements generally are defined in terms of specific objectives for

1 precision, accuracy, representativeness, comparability, and completeness.
2 Objectives for soil sampling at HPADS Closure Areas #1 and #2 are described in
3 this section.
4

5 Precision typically is calculated either as a range (R) (for duplicate
6 measurements) or a standard deviation (σ). Precision also can be expressed as
7 a relative range (RR) (for duplicates) or a relative standard deviation (RSD).
8 When the precision for a method is not constant over the concentration range
9 of interest, the reported range or standard deviation will describe the
10 concentration dependence. The dependence alternatively could be described in
11 terms of a slope and intercept for a linear relationship, an indicated
12 function for a nonlinear relationship, or a tabulated set of precision values
13 for specific indicated concentrations.
14

15 Accuracy usually is expressed as percent recovery (P) or as percent bias
16 (P-100). When accuracy is observed to be significantly concentration
17 dependent, it could be reported in terms of a linear relationship, an
18 alternative functional relationship, or as a table of measured values.
19

20 The method detection limit is the minimum concentration of a chemical
21 constituent that can be measured reliably (i.e., it can be reported with
22 99 percent confidence that the analyte concentration is greater than zero).
23 The method detection limit is determined from a minimum of three replicate
24 analyses of samples of a given matrix type (water, soil, etc.) spiked with the
25 analyte of interest. The method detection limit is the standard deviation of
26 the replicate measurements (reported in concentration units) multiplied by the
27 appropriate Student's t value for the number of replicates taken for a one-
28 tailed test at the 99 percent level of confidence. Practical quantitation
29 limit is defined in SW-846 (EPA 1990) as the lowest concentration level that
30 can be determined reliably within specified limits of precision and accuracy
31 during routine laboratory operating conditions. Practical quantitation limit
32 values are tabulated in SW-846 for various EPA approved analytical methods for
33 evaluating solid waste. Practical quantitation limit values are matrix-
34 dependent and method-dependent. Typically, practical quantitation limits are
35 listed as multiples of the method detection limits for specified methods and
36 matrix types.
37

38 The performance of the analytical laboratory shall be subject to method-
39 and analyte-specific quantitation limits and minimum requirements for
40 precision, accuracy, and completeness as follows:
41

- 42 • Precision: The agreement among a set of replicate measurements
43 without assumption of knowledge of the true value. Precision is
44 estimated by means of duplicate/replicate analyses. These samples

1 should contain concentrations of analyte above method detection limit,
2 and may involve the use of matrix spikes. The most commonly used
3 estimates of precision are the relative standard deviation (RSD) or
4 the coefficient of variation (CV),
5

$$\text{RSD} = 100\text{CV} = 100\left(\frac{s}{\bar{x}}\right)$$

6 where:
7

8 \bar{x} = the arithmetic mean of x_i measurements, and s = standard
9 deviation. The relative percent difference (RPD) when only two
10 samples is available is:
11
12

$$\text{RPD} = 100 [(x_1 - x_2) / \{(x_1 + x_2) / 2\}]$$

13 (EPA 1990).
14

- 15 • Accuracy: The closeness of agreement between an observed value and an
16 accepted reference value. When applied to a set of observed values,
17 accuracy will be a combination of random component and of a common
18 systematic error (or bias) component (EPA 1990).
19
- 20 • Completeness: Requirements for precision and accuracy will be met for
21 at least 95 percent of the total number of determinations on routine
22 and quality control samples.
23
24

25 More stringent requirements for precision and accuracy could be specified
26 in procedures for individual laboratory methods. In that event, the more
27 stringent requirements also will apply as data quality objectives for this
28 project.
29

30 Goals for data representativeness for soil sampling are addressed
31 qualitatively by the specification of sample locations and intervals in the
32 soil sampling and analysis plan. Sample data should be comparable with other
33 measurement data for similar samples and sample conditions. Comparability
34 will be achieved qualitatively by using standard techniques to collect and
35 analyze representative samples and by reporting analytical results in
36 appropriate units.
37

38 Approved analytical procedures will require adherence to reporting
39 techniques and units that are consistent with EPA reference methods to
40 facilitate the comparability of data sets in terms of precision and accuracy.

1 Actual achieved and/or used detection limits, and values for precision,
2 accuracy, and completeness will be provided in all summary reports of
3 analyses.
4

5 Failure to conform to these criteria will be documented in data summary
6 reports as described in Section 7A.8.1, and will be evaluated in the
7 validation process discussed in Section 7A.8.2. Corrective actions will be
8 initiated by the Technical Lead as appropriate, as noted in Section 7A.13, in
9 the event that the criteria initially are not achieved.

10
11 For any soil sampling activities that are to occur at the HPADS
12 subsequent to investigative sampling, the SAP (Appendix 7C) will be updated to
13 reflect current constituents of concern and DQOs as project requirements.
14

15 16 **7A.4 PROCEDURES**

17
18 The following sections discuss sampling procedures to be used and the
19 approvals and control of these procedures.
20

21 22 **7A.4.1 Procedure Approvals and Controls**

23
24 The following sections describe the procedures referenced to support soil
25 sampling and analysis activities.
26

27 **7A.4.1.1 Hanford Site Procedures.** The Hanford Site procedures that have been
28 referenced to support soil sampling and analysis activities for HPADS Closure
29 Areas No. 1 and No. 2 are listed in the quality assurance program index in the
30 *Environmental Engineering, Geotechnology, and Permitting Function Quality*
31 *Assurance Program Plan* (WHC 1990a). Referenced procedures include EIIs
32 (WHC 1988a), and quality requirements (QR) and quality instructions (QI)
33 (WHC 1988b). Requirements relating to approval, revision, and distribution
34 control of EIIs are addressed in EII 1.2, "Preparation and Revision of
35 Environmental Investigation Instructions"; requirements applicable to QIs and
36 QRs are addressed in QR 5.0, "Instructions, Procedures, and Drawings"; QI 5.1,
37 "Preparation of Quality Assurance Documents"; QR 6.0, "Document Control"; and
38 QI 6.1, "Quality Assurance Document Control". Other controlling documents
39 that apply to preparation, review, and revision of Hanford Site analytical
40 laboratory procedures and sample management procedures are identified under
41 Criteria 5.00 and 6.00 in the *Environmental Engineering, Geotechnology, and*
42 *Permitting Function Quality Assurance Program Plan* (WHC 1990a). All of the
43 aforementioned procedures will be available on request for regulatory review.
44

45 **7A.4.1.2 Participating Contractor and/or Subcontractor Procedures.** As noted
46 in Section 7A.2.1, participating contractor and/or subcontractor services may
47 be procured at the direction of the Technical Lead. All such procurements
48 will be subject to the applicable requirements of QR 4.0, "Procurement
49 Document Control"; QI 4.1, "Procurement Document Control"; QI 4.2, "External
50 Services Control"; QR 7.0, "Control of Purchased Items and Services"; QI 7.1,
51 "Preprocurement Planning and Proposal Evaluation"; and/or QI 7.2, "Supplier
52 Evaluation" (WHC 1988b). Whenever such services require procedural controls,

1 conformance to onsite procedures, or submittal of contractor procedures for
2 onsite review and approval before implementation, the requirement(s) will be
3 identified in the procurement document or work order, as applicable.
4 Analytical laboratories will be required to submit their analytical procedures
5 as well as the current version of their internal quality assurance program
6 plans for review and approval. The subject plans and procedures will be
7 reviewed and approved by operations contractor's quality assurance, sample
8 management, and analytical laboratories organization personnel, and/or other
9 qualified personnel as determined by the Technical Lead. As necessary, all
10 reviewers will be qualified per the requirements of EII 1.7, "Indoctrination,
11 Training, and Qualification" (WHC 1988a). All approved participating
12 contractor or subcontractor procedures, plans, and/or manuals will be retained
13 as project quality records in compliance with the *Document Control and Records*
14 *Management Manual*, Section 9 (WHC 1989a); QR 17.0, "Quality Assurance
15 Records"; and QI 17.1, "Quality Assurance Records Control" (WHC 1988b). All
16 such documents will be available on request for regulatory review.
17
18

19 7A.4.2 Sampling Procedures

20
21 Soil samples for analysis by an offsite contractor laboratory will be
22 collected in compliance with EII 5.2, "Soil and Sediment Sampling"
23 (WHC 1988a). Sample numbers will be assigned as indicated in EII 5.10,
24 "Obtaining Sample Identification Numbers and Accessing HEIS Data" (WHC 1988a).
25 Sampling activities will be carried out in conformance with the sample
26 identification, container type, preparation, and preservation requirements of
27 EII 5.11, "Sample Packaging and Shipping" (WHC 1988a).
28
29

30 7A.4.3 Procedure Additions and Changes

31
32 Additional EIIs or modifications to existing EIIs that might be required
33 as a consequence of sampling plan requirements will be developed in compliance
34 with EII 1.2, "Preparation and Revision of Environmental Investigations
35 Instructions" (WHC 1988a). Should deviations from established EIIs be
36 required to accommodate unforeseen field situations, the Field Team Leader can
37 authorize such deviations consistent with provisions and requirements in
38 EII 1.4, "Deviation from Environmental Investigations Instructions"
39 (WHC 1988a). Deviations are documented, reviewed, and dispositioned by means
40 of instruction change authorization forms, as required by EII 1.4. Other
41 types of document change requests will be completed as required by the
42 procedures governing their preparation and revision.
43
44

45 7A.5 SAMPLE CUSTODY

46
47 All samples obtained during the course of this investigation will be
48 controlled from the point of origin to the analytical laboratory as stipulated
49 in EII 5.1, "Chain of Custody" (WHC 1988a). Chain-of-custody documentation
50 also will be maintained for the return of residual sample materials from the
51 laboratory. Requirements and procedures will be defined in procurement
52 documentation to subcontractor or participant contractor laboratories for the

1 return of residual sample materials after completion of analysis. Laboratory
2 chain-of-custody procedures will ensure that sample integrity and
3 identification are maintained throughout the analytical process and will be
4 reviewed and approved in advance as required by onsite procurement control
5 procedures, as noted in Section 7A.4.1.2.
6

7 Results of analyses will be traceable to the original samples through a
8 unique code or identifier, as specified in Section 7A.4. All analytical
9 results will be controlled as permanent project quality records as required by
10 QR 17.0, "Quality Assurance Records" (WHC 1988b) and EII 1.6, "Records
11 Management" (WHC 1988a).
12

13 Sample and/or data flow will be coordinated by Analytical Services (AS)
14 the sample management organization. AS will be responsible for tracking,
15 controlling, and verification of in-process samples and data per Section 1.0,
16 "Sample Tracking"; Section 1.3, "Data Package Control", and Section 1.1,
17 "Data Package Verification" (WHC 1990b).
18

19 All soil samples will be screened in the field for beta/gamma and gross
20 alpha radioactivity in compliance with approved Hanford Site health physics
21 procedures (WHC 1988c). Samples must be released for offsite shipment by
22 health physics technicians before the samples can be transported to offsite
23 laboratories for analysis of dangerous constituents.
24
25

26 **7A.6 CALIBRATION PROCEDURES**

27
28 Calibration of contractor laboratory analytical equipment will be
29 performed per applicable standard methods, subject to review and approval.
30
31

32 **7A.7 ANALYTICAL PROCEDURES**

33
34 Specific analytical methods or procedures will be reviewed and approved
35 before use in compliance with the procedures and procurement control
36 requirements noted in the SAP (Appendix 7C).
37
38

39 **7A.8 DATA REDUCTION, VALIDATION, AND REPORTING**

40
41 Data reduction, validation of completed laboratory data packages,
42 reporting requirements, and review and records management are discussed in the
43 following sections.
44
45

46 **7A.8.1 Data Reduction and Data Package Preparation**

47
48 On completion of each group of analyses, the analytical laboratory will
49 be responsible for preparing a report summarizing the analytical results. The
50 analytical laboratory also will prepare a detailed data package that will
51 include all information necessary to perform data validation to the extent
52 indicated by the minimum applicable requirements of Section 7A.8.2. Data

summary report format and data package content will be defined in procurement documentation subject to review and approval as noted in Section 7A.4.1. As a minimum, laboratory data packages will include the following:

- Sample receipt and tracking documentation (including identification of the organization and individuals performing the analysis, the names and signatures of the responsible analysts, sample holding time requirements, references to applicable chain-of-custody procedures, and the dates of sample receipt, extraction, and analysis)
- Instrument calibration documentation, including equipment type and model, with continuing calibration data for the time period in which the analyses were performed
- Quality control data, as appropriate for the methods used, including matrix-spike/matrix-spike duplicate data, recovery percentages, precision data, laboratory blank data, and identification of any nonconformances that might have affected the laboratory's measurement system during the time in which the analyses were performed
- The analytical results or data deliverables, including reduced data, reduction formulas or algorithms, and identification of data outliers and/or deficiencies.

Other supporting information, such as initial calibration data, reconstructed ion chromatographs, spectrograms, traffic reports, and raw data, need not be included in submittal of individual data packages. All sample data, however, will be retained by the analytical laboratory and made available for systems or program audit purposes upon the request of the operations contractor, DOE-RL, or regulatory agency representatives (Section 7A.10.0). Such data will be retained by the analytical laboratory through the duration of the contractual statement of work, at which time the data will be transmitted for archiving.

A completed data package will be reviewed and approved by the analytical laboratory quality assurance manager before the package is submitted to the sample management organization for validation.

The requirements of this section will be included in procurement documents and/or work orders, as appropriate, in compliance with the procurement control procedures identified in Section 7A.4.1.

7A.8.2 Validation

Validation of completed laboratory data packages will be performed by the sample management organization. Data validation and reporting will be performed in conformance with requirements and procedures identified in *Sample Management and Administrative Manual* (WHC 1990b) and *Data Validation Procedures for Chemical Analyses* (WHC 1993).

1 Data validators will perform a number of tasks on each sample delivery
2 group in response to general and specific requirements identified in the data
3 validation procedures (WHC 1993). A sample delivery group is defined as a
4 group of samples (usually 20 or fewer) reported within a single laboratory
5 data package. These tasks are summarized as follows:
6

- 7 • Take delivery of the data package, stamp the receipt date on the
8 package, and make duplicate copies of the sample concentration
9 reports or report forms
- 10
- 11 • Organize and review the data package for completeness as described in
12 the data validation procedures Section 3.0 through Section 9.0
13 (WHC 1993) and document the completeness review on the applicable data
14 validation checklist
- 15
- 16 • Validate the data package and qualify sample results according to the
17 procedures and criteria described in the data validation procedures
18 Section 3.0 through Section 10.0 (WHC 1993). Data that are rejected
19 at any point during validation will be eliminated from further review
20 or consideration
- 21
- 22 • Check for calculation and transcription errors, applying the frequency
23 guidelines identified below
- 24
- 25 • Resolve any discrepancies identified during the review of the data
26 package, including any missing data, with the laboratory
- 27
- 28 • After the data have been validated, prepare a narrative summary of the
29 acceptability of the data, and prepare a summary of the validated
30 results in tabular and electronic formats
- 31
- 32 • Submit the data validation report, with the narrative summary, an
33 electronic media copy of the data, checklists, summary forms, and the
34 qualified laboratory concentration reports to the Technical Lead
35 within 21 days after receipt of the data package from the laboratory.
36

37 For this sampling and analysis project, the following frequencies will be
38 used to check for calculation and transcription errors.
39

- 40 • **Investigative samples and verification samples taken following soil**
41 **removal--**All reported laboratory results for at least 20 percent of
42 the samples contained in the sample delivery group and 100 percent of
43 the reported quality control samples (duplicates, matrix spikes, field
44 blanks and any performance audit samples) will be recalculated and
45 verified against the instrument printouts and bench sheet records (raw
46 data). If possible, at least one-half of the samples selected for
47 recalculation should contain positive results for the compounds
48 analyzed.

- 1 • **Confirmatory samples**--All reported laboratory results for 100 percent
2 of the samples contained in the sample delivery group and 100 percent
3 of the reported quality control samples (duplicates, matrix spikes,
4 field blanks and any performance audit samples) will be calculated and
5 verified against the raw data.
6

7 Reporting requirements for validation of data produced by routine and
8 special analytical methods other than EPA reference methods (EPA 1990) will be
9 established within applicable procedures for the individual methods, subject
10 to review and approval as discussed in Section 7A.4.1. The reporting
11 requirements will be in general compliance with the guidelines provided
12 previously in this section.
13

14 **7A.8.3 Final Review and Records Management Considerations**

15 All validation reports and supporting analytical data packages will be
16 subjected to a final technical review by a qualified reviewer at the direction
17 of the Technical Lead before submittal to regulatory agencies or inclusion in
18 reports or technical memoranda. All validation reports, data packages, and
19 review comments will be retained as permanent project quality records in
20 compliance with *Document Control and Records Management Manual*, Section 9
21 (WHC 1989a) and QR 17.0, "Quality Assurance Records" (WHC 1988b).
22
23
24
25

26 **7A.9 INTERNAL QUALITY CONTROL**

27 All analytical samples will be subject to in-process quality control
28 measures both in the field and in the laboratory. The following types of
29 control samples are specified in the sampling and analysis plan for the
30 purpose of maintaining internal quality control.
31
32

- 33 • **Duplicate Samples**--Field duplicate samples are samples retrieved from
34 a single sampling location using the same equipment and sampling
35 technique, but analyzed independently. Laboratory duplicate samples
36 are samples taken successively from the same bulb. Duplicate samples
37 generally are used to verify the repeatability or reproducibility of
38 the analytical data.
39
- 40 • **Trip Blanks**--A trip blank for soil sampling consists of a sample
41 container of pure silica sand that is prepared in the laboratory,
42 transported to the sampling site, and returned unopened for analysis
43 with the actual soil samples. Analysis of the trip blank will
44 eliminate false positive results for the actual samples arising from
45 contamination during shipment.
46
- 47 • **Equipment Blanks**--An equipment blank for soil sampling consists of
48 pure silica sand that is drawn through decontaminated sampling
49 equipment and placed in a container identical to those used for the
50 actual field samples. Equipment blanks are used to verify the
51 adequacy decontamination procedures for sampling equipment in
52 addition to the uses cited for field blanks.

1 Additional quality control checks will be performed by the analytical
2 laboratories as follows.

- 3
- 4 • Matrix-Spiked and Matrix-Spiked Duplicate Samples--A known quantity of
5 a representative analyte of interest is added to an aliquot (or a
6 replicate) of an actual sample as a measure of recovery percentage.
7 Spike compound selection, quantities, and concentrations will be
8 described in the laboratory's analytical procedures.
- 9
- 10 • Quality Control Reference Samples--A quality control reference sample
11 is prepared from an independent standard at a concentration other than
12 that used for calibration, but within the calibration range.
13 Reference samples provide an independent check on analytical technique
14 and methodology.
- 15

16 The numbers and/or frequencies of quality control samples to be submitted
17 and analyzed with each group of soil samples are specified in the soil
18 sampling and analysis plan presented in Section 7.0 of the closure plan. The
19 numbers of quality control samples proposed in the sampling plan have been
20 determined based on guidance presented in SW-846 (EPA 1990).

21

22 Detailed descriptions of internal quality control requirements for
23 participating contractor or subcontractor laboratories will be provided in
24 procurement documents or work orders in compliance with standard procedures
25 noted in Section 7A.4.1.

26

27

28 **7A.10 PERFORMANCE AND SYSTEM AUDITS**

29

30 Performance, system, and program audits will begin early in the execution
31 of this sampling plan and continue through completion of activities.
32 Collectively, the audits will address quality affecting activities that
33 include, but are not limited to, measurement accuracy; intramural and
34 extramural analytical laboratory services; field activities; and data
35 collection, processing, validation, and management.

36

37 Regarding offsite contractor laboratory analyses of confirmatory soil
38 samples, performance audits of analytical accuracy will be implemented through
39 the use of quality assurance and quality control samples.

40

41 System audit requirements will be implemented in accordance with QI 10.4,
42 "Surveillance" (WHC 1988b). Surveillances will be performed regularly
43 throughout the course of sampling activities. Additional performance and
44 system 'surveillances' might be scheduled as a consequence of corrective
45 action requirements or might be performed on request. All quality affecting
46 activities will be subject to surveillance.

47

48 Sampling plan activities could be evaluated as part of environmental
49 restoration program-wide quality assurance audits under procedural
50 requirements (WHC 1988b). Program audits will be conducted in accordance with

1 QR 18.0, "Audits"; QI 18.1, "Audit Programming and Scheduling"; and QI 18.2,
2 "Planning, Performing, Reporting, and Follow-up of Quality Audits". Program
3 audits will be performed by qualified auditors in compliance with QI 2.5,
4 "Qualification of Quality Assurance Program Audit Personnel" (WHC 1988b).
5
6

7 **7A.11 PREVENTIVE MAINTENANCE**

8
9 All measurement and testing equipment used in the field and the
10 laboratory that directly affect the quality of analytical data will be subject
11 to preventive maintenance measures that ensure minimization of measurement
12 system downtime. Preventive maintenance instructions for field equipment will
13 be as stipulated in approved operating procedures for the equipment.
14 Laboratories will be responsible for performing or managing the maintenance of
15 assigned analytical equipment. Maintenance requirements, spare parts lists,
16 and preventive maintenance instructions will be included in individual
17 laboratory procedures or in laboratory quality assurance plans, subject to
18 review and approval. When samples are to be analyzed by a contractor or
19 subcontractor laboratory, preventive maintenance requirements for laboratory
20 analytical equipment will be as defined in the contractor laboratory's quality
21 assurance plan(s).
22
23

24 **7A.12 DATA ASSESSMENT**

25
26 Analytical data will be compiled and summarized by the laboratory and
27 forwarded to the sample management organization for validation as described in
28 Section 7A.8.2 before the data can be used in any assessment activities.
29 Assessments could include various statistical and probabilistic techniques to
30 compare and/or analyze data. The statistical methodologies and assumptions
31 that are to be used to evaluate data will be identified in written
32 instructions that are to be signed, dated, and retained as project quality
33 records in compliance with EII 1.6, "Records Management" (WHC 1988a) and
34 QR 17.0, "Quality Assurance Records" (WHC 1988b). These instructions will be
35 documented in the final report for each sampling and analysis project.
36
37

38 **7A.13 CORRECTIVE ACTION**

39
40 Corrective actions required as a result of surveillance reports,
41 nonconformance reports, or audit activities will be documented and
42 dispositioned as required by QR 16.0, "Corrective Action"; QI 16.1,
43 "Trending/Trend Analysis"; and QI 16.2, "Corrective Action Reporting"
44 (WHC 1988b). Primary responsibilities for corrective action resolution will
45 be assigned to the Technical Lead and the quality assurance coordinator.
46 Other needs for corrections to measurement systems, procedures, or plans that
47 are identified as a result of routine review processes will be resolved as
48 stipulated in applicable procedures or referred to the Technical Lead for
49 resolution. Copies of all surveillance, nonconformance, audit, and corrective
50 action documentation will be retained as project quality assurance records.
51
52

1 **7A.14 QUALITY ASSURANCE REPORTS**
2

3 As indicated in Sections 7A.10 and 7A.13, project activities will be
4 assessed regularly by audit and surveillance processes. At the conclusion of
5 a given sampling and analysis project, all related field and laboratory data,
6 raw data, reports, surveillance reports, nonconformance reports, audit
7 reports, and corrective action documentation will be transferred for archival
8 to the Hanford Site Records Holding Area (if documentation has not been
9 transmitted previously). In the event that original quality-affecting
10 documents are to be retained and/or controlled by others, legible copies will
11 be transmitted to the Records Holding Area for inclusion in the project record
12 file.

1

APPENDIX 7B

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TRAINING COURSE DESCRIPTIONS

APPENDIX 7B

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This appendix contains a training matrix and brief course descriptions.

Environmental and Hazardous Material Safety Training Matrix.

Employee category	Course title (length/frequency)													Total hours	
	Hazardous Communication and Waste Orientation (1 hour)	Generator Hazards Safety Training (4 hours)	Hazardous Materials Waste Job-Specific Training (length varies with each TSD unit)	Radiation Worker Training (8 hours)	Waste Site Basic (16 hours)	Scott SKA-PAK Training (2 hours)	Cardiopulmonary Resuscitation (4 hours)	Fire Extinguisher Safety (1 hour)	Waste Site Advanced (24 hours)	Waste Site Field Experience (24 hours)	Hazardous Waste Shipment Certification (24 hours)	Certification of Hazardous Material Shipments (8 hours)	Hazardous Waste Site Supervisor/Manager (8 hours)		Compliance Category**
1. All employees	X													1	
2. General worker		X	X											1	5 + unit-specific training
3. General supervisor/manager		X	X											1	5 + unit-specific training
4. General nonradiological shipper		X	X							X				1,2	29 + unit-specific training
5. General hazardous material shipper		X	X								X			1,2	13 + unit-specific training
6a. Hazardous waste worker (known hazards)		X	X	X	X									1,3	28 + unit-specific training + field experience
6b. Hazardous waste worker (unknown hazards)		X	X	X	X	X			X	X				1,4	44 + unit-specific training + field experience
7. Hazardous waste supervisor/manager		X	X	X	X	X			X	X			X	1,5	52 + unit-specific training + field experience
8. Hazardous waste shipper		X	X	X	X	X			X	X			X	1,2,4	76 + unit-specific training + field experience

* Scott SKA-PAK is a trademark of Figgie International, Incorporated.

** Compliance categories:

- 1 WAC 173-303, 29 CFR 1910.1200
- 2 49 CFR 173
- 3 29 CFR 1910.120 (24-hour requirement)
- 4 29 CFR 1910.120 (40-hour requirement)
- 5 29 CFR 1910.120 (40-hour plus 8-hour requirement).

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ENVIRONMENTAL AND HAZARDOUS MATERIAL SAFETY TRAINING		
	Course name	Description
1.	Hazard Communication and Waste Orientation	Course provides an overview of the federal and applicable hazard communication programs and hazardous and/or dangerous waste disposal programs.
2.	Generator Hazards Safety Training	Course provides the hazardous and/or dangerous material/waste worker with the fundamentals for use and disposal of hazardous and/or dangerous materials.
3.	Hazardous Materials/Waste Job-Specific Training	Course provides specific information on hazardous and/or dangerous chemicals and waste management at the employees' TSD unit.
4.	Initial Radiation Worker Training	Course provides radiation workers with the fundamentals of radiation protection and the proper procedures for maintaining exposures ALARA.
5.	Waste Site Basics	Course provides required information for the safe operation of hazardous and/or dangerous waste TSD units regulated under 40 CFR 264 and 265 pursuant to RCRA and WAC 173-303.
6.	Scott 'SKA-PAK' ¹ Training-SKA	Course instructs employees in the proper use of the Scott 'SKA-PAK' for entry, exit, or work in conditions 'immediately dangerous to life and health' and instructs employees to recognize and handle emergencies.
7.	Cardiopulmonary Resuscitation	Course of the American Heart Association that provides certification in cardiopulmonary resuscitation for the single rescuer (Heartsaver Course).

¹Scott SKA-PAK is a trademark of Figgie International, Incorporated.

	Course name	Description
8.	Fire Extinguisher Safety	Course provides videocassette presentation that covers types of portable fire extinguishers and the proper usage for each.
9.	Waste Site-Advanced	Course provides environmental safety information for RCRA and/or CERCLA operations and sites. Topics include regulations and acronyms, occupational health and safety, chemical hazard information, toxicology, personal protective equipment and respirators, site safety, decontamination, and chemical monitoring instrumentation.
10.	Waste Site Field Experience	Course is a 3-day field experience under the direct supervision of a trained, experienced supervisor.
11.	Hazardous Waste Shipment Certification	Course provides an indepth look at federal, state, and Hanford Site requirements for nonradioactive hazardous and/or dangerous waste management and transportation.
12.	Certification of Hazardous Material Shipments	Course provides training in dangerous material regulation of the U.S. Department of Transportation, as required by law, to those who certify the compliance of Hanford Site hazardous and/or dangerous material shipments. The main focus is on the proper preparation and release of radioactive material shipments.
13.	Hazardous Waste Site Supervisor/Manager	Course provides specialized training to operations and site management in the following programs: safety and health, employee training, personal protective equipment, spill containment, and health hazard monitoring procedures and techniques.

1

APPENDIX 7C

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SAMPLING AND ANALYSIS PLAN

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ATTACHMENT

1	Metric Conversion Chart	Att-1
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FIGURES

1	Hanford Patrol Academy Demolition Site	2
2	Soil Sampling Locations/Depth Closure Area No. 1	3
3	Soil Sampling Locations/Depth Closure Area No. 2	4

HANFORD PATROL ACADEMY DEMOLITION SITES SAMPLING ANALYSIS PLAN

1.0 PURPOSE

This document provides guidance for sampling and analysis activities associated with the proposed *Resource Conservation and Recovery Act of 1976* (RCRA) clean closure of the Hanford Patrol Academy Demolition Sites (HPADS) (Figure 1). This document is a supplement to *Hanford Patrol Academy Demolition Sites Closure Plan* (DOE-RL 1992), and should be used in conjunction with the *Environmental Investigations and Site Characterization Manual* (WHC 1988) for specific procedures. The samples will be collected by environmental field services and shipped offsite for analysis.

A metric conversion chart is provided as a tool to aid in conversion (Attachment 1).

2.0 OBJECTIVE

Several soil samples will be taken from specific locations in Closure Areas No. 1 and 2 (Figure 1). The objective of this soil sampling event is to facilitate a RCRA clean closure of the HPADS by verifying that the concentrations of all detonation activity contaminants are below action levels. Action levels are defined as levels above the Hanford Site soil background levels identified in *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 1993) and *Model Toxic Control Act* (WAC 173-340) residential levels. If analysis determines that levels are above both guidelines, a phase two investigation will be developed. This is not anticipated because of the efficiency of detonation reactions and exposure to the environment.

2.1 CLOSURE AREA NO. 1

Twelve soil samples will be taken from specific locations (Figure 2) within Closure Area No. 1. Closure Area No. 1 is immediately south of the known distance target range at the bottom of the slope and measures approximately 35 by 114 feet. Closure Area No. 1 consists of two distinct regions, A and B. Region A is where the actual detonation events occurred. Five soil samples will be collected in Region A (Figure 2). Region B is where any explosive chemical products would have been dispersed after subsequent grading activities. Seven samples will be collected in Region B (Figure 2).

2.2 CLOSURE AREA NO. 2

Closure Area No. 2 consists of a detonation pit measuring approximately 10 feet in diameter and 1.5 feet deep. Fifteen soil samples will be taken from specific locations (Figure 3) within a 15-foot radius centered about the detonation pit.

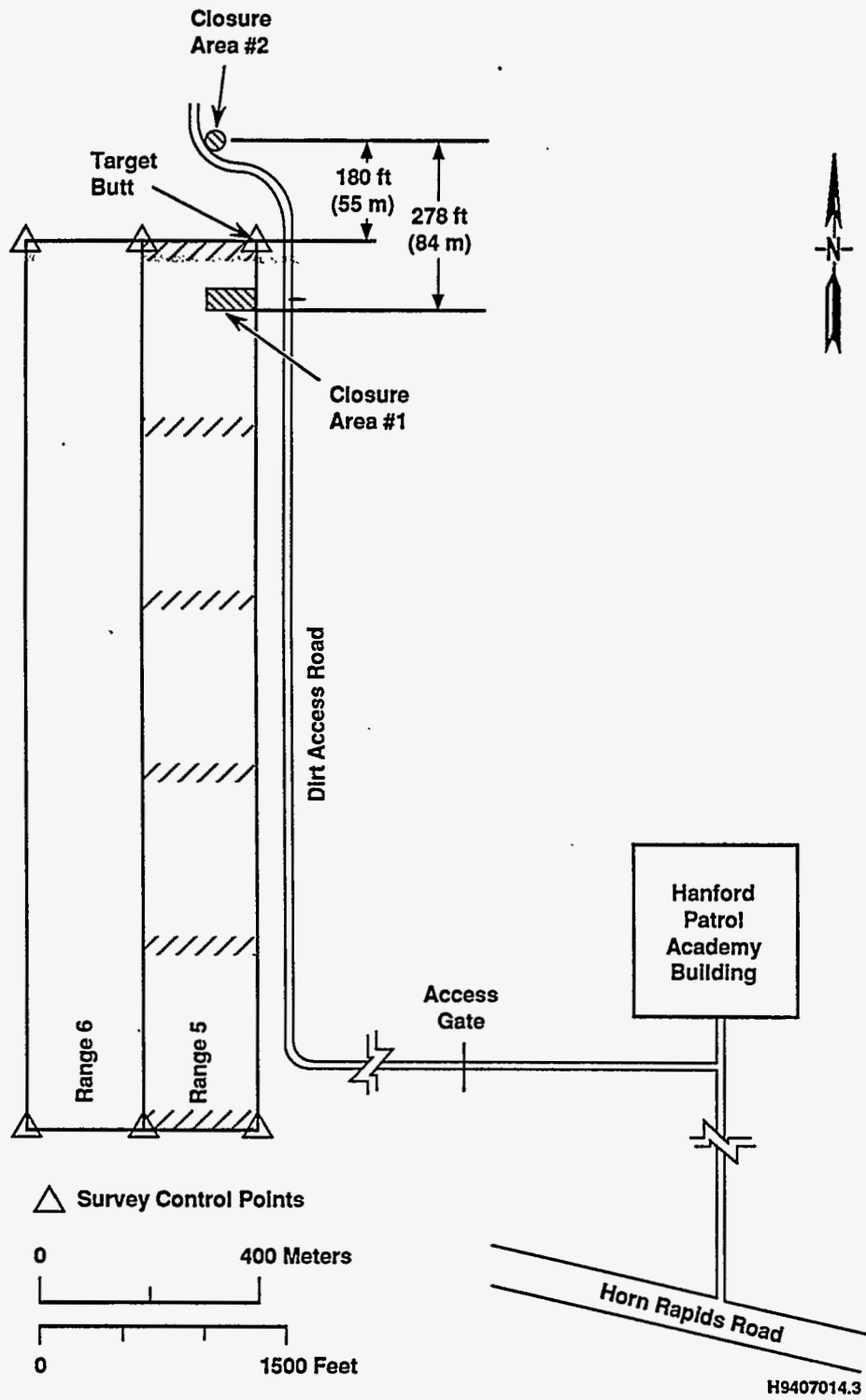


Figure 1. Hanford Patrol Academy Demolition Sites.

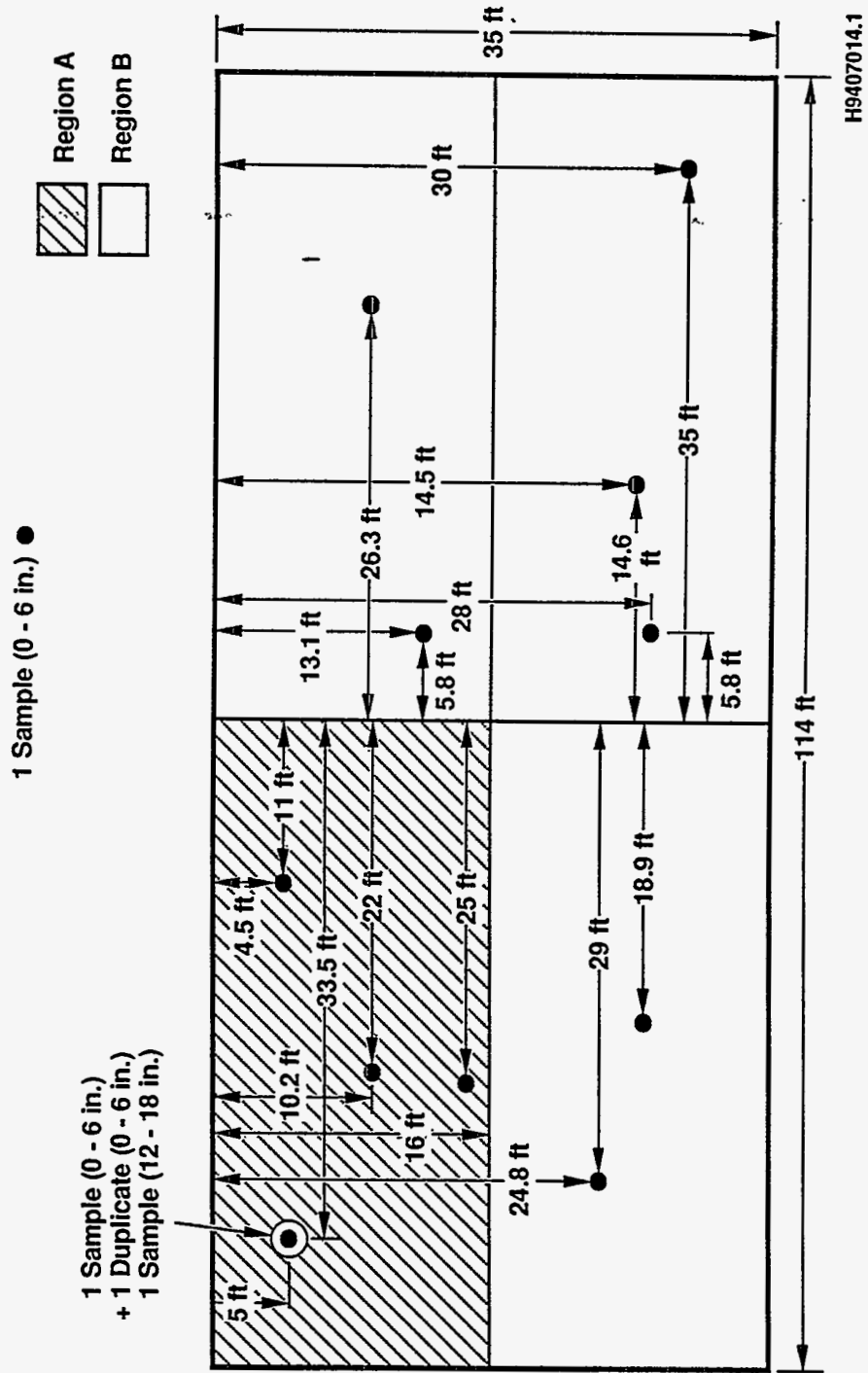


Figure 2. Soil Sampling Locations/Depth Closure Area No. 1.

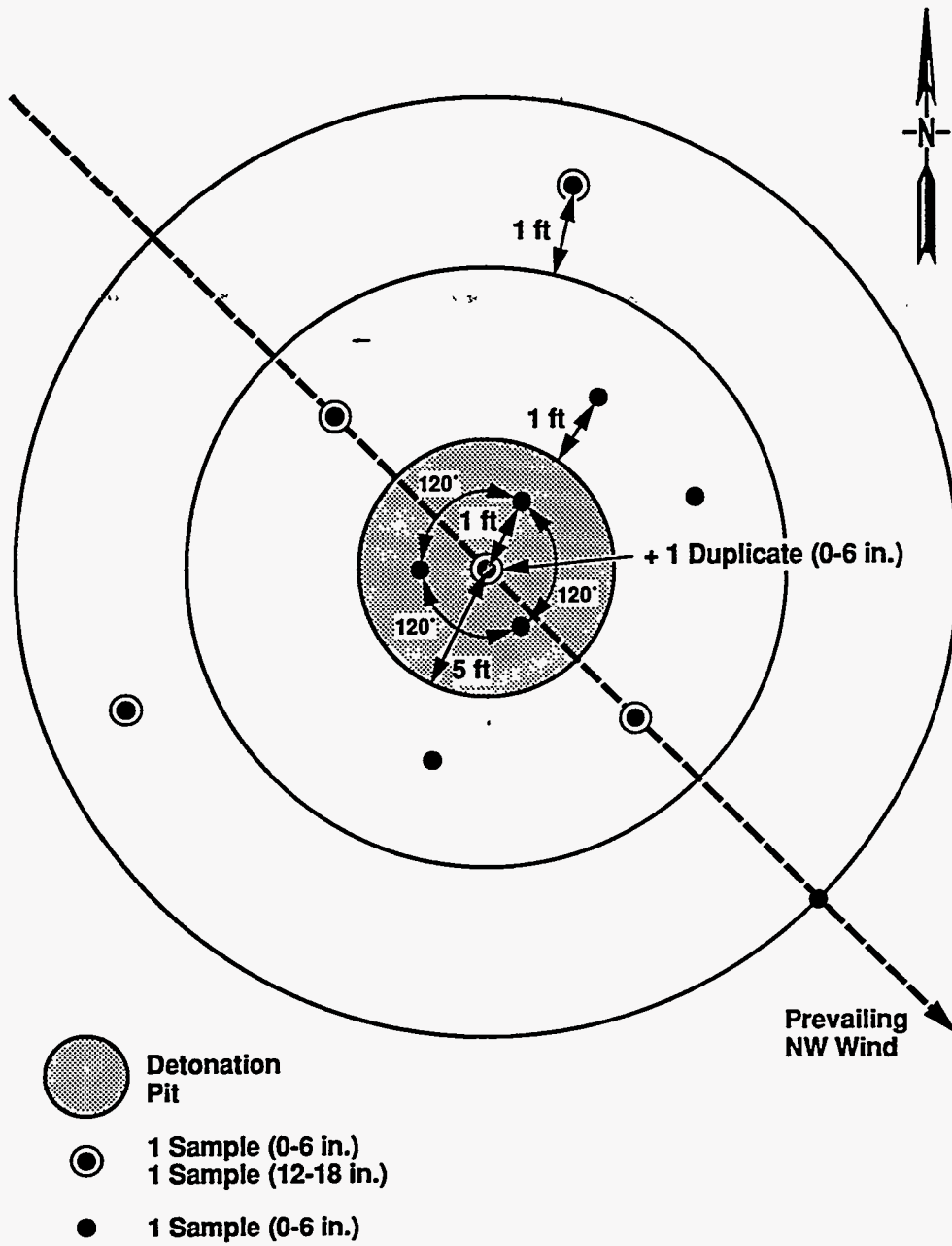


Figure 3. Soil Sampling Locations/Depth Closure Area No. 2.

3.0 SITE DESCRIPTION/BACKGROUND

The HPADS are about 2 miles southwest of the 300 Area and about 0.5 mile north of Horn Rapids Road. The HPADS consist of Closure Areas No. 1 and 2, which were used for the demolition of discarded explosive and shock-sensitive chemicals. Closure Area No. 1 was used from 1975 through 1984 and Closure Area No. 2 was used from 1984 through 1991. During the detonation events at Closure Area No. 1, the individual chemical containers were placed on the ground near the invert of the target butt. The containers were then detonated using M14 rifle fire. Closure Area No. 2 is a crater 10 feet in diameter and approximately 1.5 feet deep. Onsite personnel placed the individual containers in the detonation pit. The City of Richland Bomb Squad then wrapped detonation cord around the containers and initiated the detonation with electric blasting caps. Both closure areas are currently roped off and marked with signs that read "dangerous waste".

4.0 SCOPE OF WORK

Twenty-seven soil characterization samples will be taken by hand from locations at the HPADS (Figures 2 and 3).

All sampling activities will be conducted in accordance with the following environmental investigations instructions (EII) procedures (WHC 1988):

- EII 1.1, Hazardous Waste Site Entry Requirements
- EII 1.13, Environmental Readiness Review
- EII 1.5, Field Logbooks
- EII 5.1, Chain of Custody
- EII 5.2, Soil and Sediment Sampling
- EII 5.5, 1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment
- EII 5.10, Obtaining Sample Identification Numbers and Accessing HEIS Data
- EII 5.11, Sample Packaging and Shipping
- EII 14.1, Analytical Laboratory Data Management.

5.0 SAMPLING AND FIELD ACTIVITIES

This section discusses Task 1, Sampling of the HPADS.

5.1 SUBTASK 1A - SAMPLE LOCATION DETERMINATIONS

5.1.1 Closure Area No. 1

The sampling surface in Closure Area No. 1 will be cleaned of windblown sand and foreign debris. The 12 sampling locations in Closure Area No. 1 will be appropriately marked (Figure 2).

5.1.2 Closure Area No. 2

The blasting surface in Closure Area No. 2 will be reconstructed by removing windblown sand and foreign debris. The 17 sampling locations will be appropriately marked (Figure 3). Sample depths within Closure Area No. 2 (Figure 3, shaded area) are based upon the reconstructed crater.

5.2 SUBTASK 1B - SAMPLING

Engineering support personnel will use hand tools to obtain soil samples in accordance with information provided in Figures 2 and 3. All samples will be packaged, handled, and shipped in accordance with WHC (1988).

6.0 LABORATORY ANALYSIS

Samples collected for chemical analysis will be analyzed using SW-846 methods (EPA 1986) and approved U.S. Environmental Protection Agency (EPA) 300 series methods (EPA 1983). The contaminants of concern and the methods used for testing are:

- Volatile organic analysis, EPA Method 8240
- Semivolatile organic analysis, EPA Method 8270
- Detonation residue, EPA Method 8330
- Anions, EPA Method 300.0
- Metals, EPA Method 6010
- Total nitrogen, EPA Method 353.1-2.

7.0 REGULATORY AND HANFORD SITE COMPLIANCE

Field quality control samples will be collected by the sampling scientist and documented in the sampling logbook in accordance with EII 1.5, "Field Logbooks" (WHC 1988). The following are the field quality control samples to be collected:

- One duplicate sample in Region A of Closure Area No. 1 (0 to 6-inch depth) for full analysis
- One duplicate sample at center of pit in Closure Area No. 2 (0 to 6-inch depth) for full analysis
- One equipment blank (clean silica sand) for full analysis
- One trip blank (clean silica sand) for volatile organic analysis only.

8.0 REFERENCES

DOE-RL, 1992, *Hanford Patrol Academy Demolition Sites Closure Plan*, DOE/RL-92-39, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1993, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, DOE/RL-92-24, Rev. 1, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1983, *Methods for Chemical Analysis of Water and Waste*, 600/4-79-020, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1986, as amended, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, 3rd Edition, U.S. Environmental Protection Agency, Washington, D.C.

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WAC 173-340, *Model Toxics Control Act Cleanup Regulations*, as amended, Washington State Department of Ecology, Olympia, Washington.

Resource Conservation and Recovery Act of 1976, 42 USC 6901 et seq.

Comprehensive Environmental Response, Compensation, and Recovery Act of 1980, 42 USC 9601 et seq.

METRIC CONVERSION CHART

Into metric units

Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.