START

0022052

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 148556
Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Supersedure ☐ Discovery ☐ Cancel/Void ☐	N.R. Kerr, Environmental Project Safety Documentation, N1-75 6-6824 W29550	5/4/92
	5. Project Title/No./Work Order No. Safety Assessment for 200-BP-1, Task 4 PB3JA	6. Bldg./Sys./Fac. No. 200 East Area
		7. Impact Level 2 ESQ
	8. Document Number Affected (include rev. and sheet no.) WHC-SD-EN-HC-004 Rev. 0	9. Related ECN No(s). N/A
		10. Related PO No. N/A

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
☐ Yes (fill out Blk. 11b) ☒ No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

The operational safety limits (OSL) and prudent actions for 200-BP-1, Task 4 (Section 4.0) were deleted. The OSLs and prudent actions were revised to include provisions for 200-BP-1, Task 2; these are provided in Attachment 8, "Safety Assessment for 200-BP-1 Task 2." Minor editorial changes were made to the references (Section 5.0).

13a. Justification (mark one)	13b. Justification Details
Criteria Change ☐ Design Improvement ☐ Environmental ☒ As-Found ☐ Facilitate Const. ☐ Const. Error/Omission ☐ Design Error/Omission ☐	See block 12.

14. Distribution (include name, MSIN, and no. of copies) [SEE ATTACHED DIST.]

*M.R. Adams	A3-01 (1)	* A.R. Schade	B1-35 (1)
M.A. Buckmaster	H4-55 (1)	W.E. Taylor	N1-75 (1)
R.A. Carlson	H4-55 (1)	W.S. Thompson	N3-05 (1)
T.A. Demitruk	A3-11 (1)	J.J. Zimmer	N1-83 (1)
J.J. Dorian	B2-16 (1)	Subcouncil	(1)
D.G. Farwick	H4-16 (1)	EDMC 200-BP-1 Admin. Rec.	H4-22 (1)
D.O. Hess	L6-57 (1)		
E.G. Hess	R3-09 (1)	EPSD File	N1-75 (1)
N.R. Kerr	N1-75 (3)		

RELEASE STAMP

OFFICIAL RELEASE BY WHC DATE JUL 08 1992 Sta. 21

A-7900-013 (11/88)

9218216.1132

SUPPORTING DOCUMENT

1. Total Pages 117

2. Title
Safety Assessment for 200-BP-1 Task 4

3. Number
WHC-SD-EN-HC-004

4. Rev No.
0A

5. Key Words
Environmental Remediation/Investigation
Hazards
200 East Area
216-B Cribs
Safety Assessment

APPROVED FOR PUBLIC RELEASE
7/2/92 M. Dolis

6. Author
Name: N.R. Kerr
Signature
Organization/Charge Code 29550/ PB3JA

7. Abstract

This revised document presents an assessment of the potential hazards and consequences associated with the removal of contaminated soil from the 216-B cribs in the 200 East Area of the Hanford Site. The activities were found to present a low hazard. The document also presents safety functions to be considered in the project and recommendations regarding appropriate controls to be employed in the project activities.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy, Field Office, Richland, WA.

DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

9. Impact Level 2ESQ

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE JUL 08 1992
Sta. 21

9212.5113

RECORD OF REVISION	(1) Document Number WHC-SD-EN-HC-004	Pages ii ~~iii,~~ ~~30,31,32,~~ ~~33~~

(2) Title
Safety Assessment for 200-BP-1, Task 4

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
	EDT-129404	(5) Cog. Engr.	(6) Cog. Mgr. Date
0A RS	(7) Revisions have been made to pages iii, 30, 31, 32, and 33. Sections 4.1, 4.2, and 4.3 have been deleted; these sections have been replaced with Attachment 8 (Section 4.0). Minor editorial changes were made to the references (Section 5.0) and the Table of Contents. Attachment 8 has been added that provides a safety assessment for 200-BP-1 Task 2.	M.A. Buckmaster 6/24/92	R.A. Carlson R A Carlson 6/24/92

CONTENTS

used. The assessment considered the release of the entire fraction over a 2-h to 8-h period. The radiological consequences release is summarized below.

Radiological Consequences

Receptor Hazard Range	EDE (rem)		Low
Onsite	8E-3	≥1E-1	<5E+0

Consequences to an individual at the site boundary would be negligible or insignificant based on hazard screening values.

The screening evaluation can be found in Attachment 6. The conservatively derived assessment finds the potential unmitigated accident consequences acceptable.

3.5.6 Assessment Conclusions

The safety assessment determined that the proposed characterization and investigation segments, drilling/sampling, sample preparation and interim storage are low hazard activities. The exposures and dose concentrations can be managed within acceptable limits onsite and offsite by providing radiological and hazardous substance survey and monitoring. The large distance between the activities and the nearest point of public access, combined with the low inventories, ensure the public is unaffected by 200-BP-1 characterization activities. Additional prudent actions invoked by EPA, Ecology, DOE, OSHA and Westinghouse Hanford will further control and manage spills and assure the appropriate ALARA practices. The required controls and prudent actions are discussed in the following section.

4.0 SAFETY FUNCTIONS AND CONTROLS

The required safety function provided for the characterization and investigation activities for 200-BP-1, Tasks 2 and 4, is administrative survey and monitoring to control radiological exposures within occupational requirements. Occupational control will ensure onsite and public protection considering the distance between activities and the nearest point of access, combined with the low inventories anticipated.

The occupational safety limits and prudent actions for Tasks 2 and 4 will ensure that the intrinsic hazards (mechanical relocation of potentially contaminated soils, packaging of soil samples and accumulation of potentially hazardous materials) comply with the intent of DOE orders regarding appropriate and necessary controls of low-hazard activities. Industrial and occupational safety issues will be addressed in the project specific HWOP and RWP.

The OSLs and prudent actions established for Tasks 2 and 4 are

provided in Attachment 8.

5.0 REFERENCES

1. *Westinghouse Hanford Company Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland Washington.

2. *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit*, DOE-RL 88-32, U.S. Department of Energy, Richland Field Office, Richland, Washington.

3. *Environmental Investigations and Site Characterizations Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

4. *Radiation Protection Manual*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.

5. *Minimum Standards for Construction and Maintenance of Water Wells*, WAC-173-160, Washington State Department of Ecology, Olympia, Washington.

6. *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46, Westinghouse Hanford Company, Richland, Washington.

7. *Implementation Guideline for Hazard Documentation*, WHC-SD-GN-ER-301, Westinghouse Hanford Company, Richland, Washington, September 1990.

8. "Pocket Guide to Chemical Hazards," NIOSH-90, U.S. Department of Health and Human Services, Washington D.C., June 1990.

9. *Industrial Safety Manual*, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.

10. *Hazardous Waste Management*, WHC-CM-5-16, Westinghouse Hanford Company, Richland, Washington.

11. "Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards," UCRL-15910, June 1990.

12. *Dangerous Waste Regulations*, WAC-173-303, Washington State Department of Ecology, Olympia, Washington.

13. "Rules and Regulations," 55 FR 240, *Federal Register*, Vol. 54, No. 240, December 15, 1989, Washington D.C.

14. *Health Physics Manual*, WHC-CM-4-12, Westinghouse Hanford Company, Richland, Washington.

15. *Safety Analysis and Review System*, Chapter 1, "Basic Requirements," DOE Order, 5481.1B, U.S. Department of Energy, Washington D.C.

ATTACHMENT 8
SAFETY ASSESSMENT OF 200-BP-1 TASK 2

CONTENTS

TABLES:

1.0 INTRODUCTION

This document provides an assessment of 200-BP-1 Task 2. This assessment includes an evaluation of the hazards identified for 200-BP-1 Task 4 (WHC 1991) relative to the inventories for 200-BP-1 Task 2. The evaluation concludes that the characterization and investigation work planned for Tasks 2 and 4 is low hazard. Task 2 also provides a hazards inventory that will be accumulative with the inventories of Task 4.

The U. S. Environmental Protection Agency (EPA) has taken action to include the 200 Areas located at the Hanford Site on the National Priorities List under the Comprehensive Environmental Response and Compensation and Liability Act (CERCLA) of 1980. The 200-BP-1 is one of several CERCLA operable units identified within the 200 East Area. Westinghouse Hanford Company (Westinghouse Hanford) is providing characterization activities in the operable unit for the U.S. Department of Energy (DOE) with agreement of the EPA and the Washington State Department of Ecology (Ecology). A description of the work plan for the 200-BP-1 operable unit is provided in *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit, Hanford Site, Richland, Washington* (DOE 1989).

1.1 WORK DESCRIPTION

Task 2 of 200-BP-1 provides soils characterization of the 216-B cribs and possibly, additional background characterization. The cable tool drilling methods will be used to obtain the soil samples. A detailed description of the sample methods is provided by Westinghouse Hanford (1991). The sample boreholes for Task 2 will be relatively shallow, approximately 10 ft (3 m) below the gravel infiltration layer of each crib. Two shallow sample boreholes will be installed in each of the cribs: 216-B-43, -49, and -57. Three sample boreholes will be installed in each of the cribs: 216-B-44, -45, -46, -47, -48, and -50. Three additional 25 ft (7.6 m) deep sample boreholes are considered to be drilled to obtain background samples from the vadose zone of the operable unit. Additional details for Task 2 are provided by DOE (1989).

The work plan for the 200-BP-1 operable unit (DOE 1989) provides the inventory basis that was discharged to the 216-B cribs. The basis used to determine the worst case inventories considered for the 216-B cribs is provided in Westinghouse Hanford (1991, Attachment). The worst case concentrations (uCi/cm^3) of radionuclides considered are summarized in Table 1.

Table 1. 200-BP-1 Worst Case Radionuclide Concentrations for Tasks 2 and 4 (uCi/cm^3).

Radionuclide	^{60}Co	^{90}Sr	^{137}Cs	^{239}Pu	^{240}Pu	^{238}U
216-B-43[T4]	1.10E-4	4.44E+0	1.0E+0	2.0E-4	5.42E-5	3.21E-5
216-B-44	5.97E-4	9.22E+0	2.37E+0	6.03E-3	1.63E-3	5.35E-6
216-B-45	6.33E-4	9.08E+0	5.12E+0	4.02E-3	1.08E-3	1.60E-5
216-B-46	6.33E-4	4.87E+0	6.82E-1	8.03E-3	2.17E-3	4.48E-4
216-B-47	1.26E-4	2.01E+0	5.12E-1	2.0E-3	5.39E-4	1.60E-5
216-B-48	1.26E-4	4.22E+0	1.53E+0	2.0E-3	5.42E-4	5.35E-6
216-B-49[T4]	6.33E-4	8.73E+0	1.39E+0	6.03E-3	1.63E-3	7.18E-4
216-B-50	1.99E-4	2.62E-2	3.93E-1	9.58E-5	2.59E-5	7.04E-7
216-B-57[T4]	8.65E-5	1.18E-2	1.45E+0	6.23E-5	1.69E-5	1.70E-6

[T4] Cribs assessed in 200-BP-1 Task 4

The postulated radiological concentrations of Task 2, while similar to those evaluated for Task 4, are slightly higher. The Task 4 characterization activities for crib 216-B-49 contain the worst case potential radionuclide concentrations. The 216-B-46 crib has higher potential concentrations of alpha-bearing isotopes than were postulated for any crib in Task 4. Crib 216-B-45 has potentially higher concentrations of beta-gamma isotopes than postulated for Task 4. Consequently, the external radiation doses involved with the contact handling work procedures could be slightly greater than those evaluated for Task 4. The consequences of the potential accidents or upsets could result in slightly higher doses. Table 2 summarizes the postulated worst case concentrations (uCi/cm^3) anticipated for Tasks 4 and 2. Included in Table 2 is a factor derived from the ratio of worst case radionuclide concentrations of crib 216-B-49 (Task 4), and the worst case beta-gamma concentrations of 216-B-45 (Task 2), and the worst case alpha concentrations of crib 216-B-46.

Table 2. Worst Case Beta-Gamma and Alpha Concentrations (uCi/cm^3).

Radionuclide	Task 4 216-B-49	Task 2 216-B-45	Task 2 216-B-46	Tasks 2 and 4 Factor
Beta-Gamma				
^{60}Co	6.33E-4	6.33E-4		1.0
^{90}Sr	8.73E+0	9.08E+0		1.04
^{137}Cs	1.39E+0	5.12E+0		3.7
Alpha				
^{239}Pu	6.03E-3		8.03E-3	1.33
^{240}Pu	1.63E-3		1.27E-3	1.33
^{238}U	7.18E-5		4.48E-4	6.24

The inventory considered is the accumulative inventory of potentially contaminated soil extracted from the characterization activities of Tasks 2 and 4. The worst case radiological inventory of Task 2 is based on a drive barrel with a nominal dia of 10 in.(25 cm) and is derived from the methodology used in *Safety Assessment for 200-BP-1, Task 4* (WHC 1991). Table 3 provides a summary of the radiological inventory assessed for Task 2 and the postulated factorial increase of each radionuclide.

Table 3. Radiological Storage Accumulation (uCi).

Radionuclide	Task 4	Task 2	Accumulative	Acc/Task 4 Factor
Beta-Gamma				
^{60}Co	7.70E+1	8.0E+2	8.77E+2	11.4
^{90}Sr	1.22E+6	1.06E+7	1.18E+7	9.7
^{137}Cs	3.56E+5	3.82E+6	4.18E+6	11.7
Subtotals	1.58E+6 (1.6 Ci)	1.44E+7 (14.4 Ci)	1.60E+7 (16.0 Ci)	
^{239}Pu	5.84E+2	7.91E+3	8.49E+3	14.5
^{240Pu}	1.58E+2	1.85E+3	2.01E+3	12.7
^{238}U	9.73E+0	2.76E+2	2.86E+2	29.4
Subtotals	7.52E+2 (0.0008 Ci)	1.0E+4 (0.01Ci)	1.08E+4 (0.01 Ci)	

2.0 HAZARD ASSESSMENT

The first step is consideration of the review and authorization requirements for the determination of hazard classification (DOE 1986). The method is the same used in the screening evaluations for Task 4.

This simplified method uses total radiological inventories of different groupings of radionuclides. Two groups of radionuclides apply in this assessment.

Group 1: Long-lived alpha emitters (^{239}Pu, ^{240}Pu, and ^{238}U)
Group 2: Beta emitters, fission products and activation products.

The dispersable characteristics are dispersable operations with radioactive liquids, powders, or particulate solids that can result in fractional releases of radioactive materials (0.001). This method assumes worst case meteorology, unmitigated dispersion, and assumes an onsite distance of 330 ft (100 m) and a public distance of 4,950 ft (1,500 m). Review and authorization consequences are determined using an inventory of the radionuclide groupings and the dispersion characteristics in the order of magnitude consequences. Table 4 summarizes the accumulative inventory of Tasks 2 and 4 against the hazard classification values.

Table 4. Hazard Class Inventory.

Group	Inventory at Surface	Low Hazard Ceiling
1	1.08E-2 Ci	< E+01 Ci
2	1.6E+1 Ci	< E+03 Ci

Using the above method, the accumulative inventories of Tasks 2 and 4 represent a low hazard classification. No change to the review and authorization plans are required by the addition of Task 2 inventories to those of Task 4.

The above method assures public consequences are negligible (<0.01 rem); however, it does not assure that onsite doses are within Westinghouse Hanford guidelines for onsite personnel (<5.0 rem; WHC 1990).

The onsite dose for Task 4 is determined to be approximately 8 mrem (WHC 1991, Attachment 6). The potential consequence to an onsite individual (inhalation) can be determined by factoring the increase in inventory. The factors used are taken from Table 3. Table 5 summarizes the potential fractional release of radiological inventories of Tasks 2 and 4. The potential consequence to the uninvolved onsite individual is "minor."

Table 5. The 330 ft (100 m) Consequence From Fraction Release (Inhalation).

Radionuclide	330 ft (100 m)(rem) Task 4	Task 4/Acc Factor	330 ft (100 m) (rem) Tasks 2 and 4
^{60}Co	6.40E-8	11.4	7.30E-7
^{90}Sr	5.08E-3	9.7	4.93E-2
^{137}Cs	4.24E-5	11.7	4.96E-4
^{239}Pu	2.43E-5	14.5	3.52E-2
^{240}Pu	6.58E-4	12.7	8.36E-3
^{238}U	4.05E-5	29.4	1.19E-3
Approximate total = 8 mrem			9.45E-2 (95 mrem)

The second step is consideration for the site worker. The controlling consequences concerning the site worker are potential spills of contaminated soil in the sample preparation trailer (WHC 1991). The postulated airborne concentrations from vigorous uncontrolled sweeping of the spilled material were determined to be approximately 3 rem. The concentration factors for the alpha and beta-gamma increase (Table 2) are used to determine the worst case potential consequences to the site worker in the confines of the sample preparation trailer. Table 6 provides a summary of the consequences to the site worker. The consequences from worst case potential accident exposures to the site worker are approximately the same for Tasks 2 and 4.

Table 6. Limited Space Worker Exposure (Inhalation).

Radionuclide	Task 4 (EDE rem)	Tasks 4 and 2 Factor	Task 2 (EDE rem)
^{60}Co*			
^{90}Sr	1.36E+0	1.04	1.41E+0
^{137}Cs	6.20E-3	3.7	2.30E-2
^{239}Pu	9.45E-1	1.33	1.26E+0
^{240}Pu	2.55E-1	1.33	3.40E-1
^{238}U	1.12E-3	6.24	6.99E-3
Total	2.56E+0		3.04E+0
Approximate total = 3 rem			3 rem

*^{60}Co was not included because of the insignificant concentration postulated.

A screening of the nonradiological substances discharged to the cribs (DOE-RL 1989; Appendix A) found that controlling concentrations were assessed (WHC 1991). Ammonium nitrate is a recorded discharge unique to crib 216-B-50. The low concentration of ammonium nitrate combined with the unstable nature of the ammonium nitrate solution leads to the conclusion that the ammonium nitrate has complexed to form a more stable compound. The nonradiological hazards of Tasks 2 and 4 are anticipated to be as discussed in Westinghouse Hanford (1991).

3.0 ASSESSMENT SUMMARY

The 200-BP-1 work site inventory (the fenced area around the 216-B cribs) includes the borehole cuttings from Tasks 2 and 4. The potentially higher concentrations of radionuclides in cribs 200-B-45 (beta-gamma) and 200-B-46 (alpha) are insignificant when compared to the dose consequences from inhalation as determined for Task 4. The accumulative inventories of Tasks 2 and 4 provide a basis to postulate slightly increased accident consequences but are still classified as low hazard.

External dose calculations (Attachment) were performed to determine the appropriate changes to the approved operational safety limits (OSL) established in Westinghouse Hanford (1991). The results indicated that the OSLs controlling contact work procedures are appropriately modified to account for the postulated increases of radiological inventories of Task 2. The following are revised safety functions and controls based upon the anticipated radiological inventories assessed for Task 2.

4.0 LIMITS AND PRUDENT CONTROLS

The safety function required for the characterization and investigation activities of the 216-B cribs is to administratively survey and monitor the spoils to control radiological exposures within occupational requirements. Occupational control will assure onsite and public protection, considering the distance between activities, the nearest point of public access, and the low inventories anticipated.

The following OSLs and prudent actions will assure that the intrinsic hazards (mechanical relocation of potentially contaminated soils, packaging of soil samples, and accumulation of potentially hazardous materials) comply with the intent of DOE Orders regarding appropriate and necessary controls of low hazard activities. Industrial and occupational safety issues will be addressed in the project specific Hazardous Waste Operations Permit (HWOP) and Radiation Work Procedure.

4.1 OPERATIONAL SAFETY LIMITS

This OSL was established for the characterization activities of 200-BP-1 Tasks 2 and 4. The contact handling procedures are bounded by the worst case radiological inventories assessed for Task 2 and the worst case nonradiological inventories assessed for Task 4 (WHC 1991).

Operational Safety Limit 1

1.0 **OSL** - Limit the radiological content of soil materials to levels appropriate for contact handling work procedures.

1.1 **Applicability** - This limit applies to the drill cuttings and sample materials extracted from the characterization boreholes (mechanical relocation) from radiologically contaminated or potentially contaminated zones.

1.2 **Objective** - To assure that surface inventories are safe for contact handling conditions that will also assure onsite and offsite safety.

1.3 **Requirements** -

a. A health physics technician will be provided at all times during borehole operations in contaminated or potentially contaminated zones.

b. Measured dose rates of extracted cores shall not exceed 580 mR/h at contact (window closed CP).

c. Surface measurements of drilling equipment or tools shall not exceed an alpha reading of 259,000 dpm/100 cm^2.

1.4 **Surveillance** - An auditable survey log of the drilling equipment and tools extracted from the borehole will be maintained.

1.5 **Recovery** - In the event of instrument readings higher then allowed (1.3 above), the drilling equipment or tools containing the source shall be returned to the borehole. The work will stop until a recovery work plan by line management has been approved by Safety and Quality Assurance.

1.6 **Basis** - The limits specified in the requirements are based on the maximum concentrations assessed in the Attachment. The maximum concentration of beta-gamma contamination is based on the postulated concentrations for crib 216-B-45 (Attachment). The maximum anticipated concentration of alpha contamination is based on the postulated concentrations for crib 216-B-46, as described in Table 2.

Work procedures would accept higher limits based on occupational safety alone (WHC 1991). Onsite and offsite safety consequence assessments are based on the worst case anticipated inventories of the 216-B cribs. Additional analysis and assessment in accordance with DOE 5481.1B (Chapter 1) may determine that the higher occupational limits are appropriate operational controls for onsite and offsite safety concerns (DOE 1986).

Operational Safety Limit 2

2.0 **OSL** - Limit the drilling and sampling activities when volatile organics are detected.

2.1 **Applicability** - This limit applies to the sampling boreholes (characterization and investigation) through the 216-B-43 through 216-B-50, 216-B-57, and 216-B-61 cribs in the 200-BP-1 operable unit (DOE-RL 1989).

2.2 **Objective** - To assure that drilling and sampling operations are curtailed when volatile organics are detected in the boreholes as specified in 4.2.3.

2.3 **Requirements** - Routine combustible gas analysis (CGA) and portable gas analysis (PGA) monitoring will be conducted on an a.m./p.m. basis. If action levels are exceeded (≥10% flammability), monitoring will be taken at increased frequency at the discretion of the site supervision with concurrence of the site safety representative.

Cutting and welding is not allowed if combustible gas levels are ≥10% at the well or borehole head. A 30 min fire watch is required after hot work. The PGA monitoring will be conducted to check the borehole prior to any activity that may produce a spark or flame if CGA readings indicate the presence of organic vapors.

2.4 **Surveillance** - An auditable site log of the borehole gas monitoring will be maintained at the work site.

Instruments will be checked, tested and calibrated according to the Site Safety Plan, HWOP, and the actions recorded in the site log.

2.5 **Recovery** - In the event of instrument readings higher than allowed (2.3 above), welding, cutting or other spark producing activities will not be permitted. The borehole will be purged in compliance with EII 6.7 (WHC 1988). If concentrations are still higher than allowed after purging, all drilling and sampling work will cease until a recovery work plan by line management has been approved by Safety and Quality Assurance.

2.6 **Basis** - The volatile concentrations are based on potential gases that may be encountered but cannot be qualitatively predicted at this time. The concentration limits are conservatively set to provide a safety margin between detection and potential deflagration and/or detonation.

4.2 PRUDENT ACTIONS

The prescriptive requirements of the EPA, Ecology, DOE, and Westinghouse Hanford that govern the work procedures provide the core of prudent actions that assure the potential exposures will be managed to as low as reasonably achievable (ALARA) practices (WHC 1991). Interactive discussions between safety personnel and project personnel have lead the line organization adoption of additional prudent actions. The following are prudent actions adopted by Environmental Engineering Management to enhance ALARA

considerations and to assure that the operations are maintained within the bounds of the analysis.

1. Restrict acid solution from the 200-BP-1 work site as a precaution to prevent potentially volatilizing substances bound in the soils.

2. Restrict work area access to only those site personnel that are required to perform the characterization and investigation activities.

3. Minimize combustible inventories within the drilling/sampling, sample preparation and interim storage areas.

5.0 REFERENCES

DOE, 1986, *Safety Analysis and Review System*, DOE 5481.1B, U.S. Department of Energy, Washington D.C.

DOE-RL, 1989, *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit, Hanford Site, Richland, Washington*, DOE-RL 88-32, Rev. 1, U.S. Department of Energy, Richland Field Office, Richland, Washington, March 1989.

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Volume 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *Implementation Guideline for Hazard Documentation*, WHC-SD-GN-ER-301, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991, *Safety Assessment for 200-BP-1, Task 4*, WHC-SD-EN-HC-004, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT
ESTIMATE OF DOSE RATES FOR 200-BP-1 TASK 2 SAMPLING

DON'T SAY IT -- Write It!

June 25, 1991

To: Mark A. Buckmaster
H4-55 6-1792

From: Paul D. Rittmann
H4-14 6-8715

Subject: Estimate of Dose Rates for 200-BP-1 Task 2 Sampling

Using the method given in the internal memo of March 1, 1991 (25320-91-020), I calculated the external dose rates which could be experienced from cores taken through each of the cribs in the 200-BP-1 area. Resulting dose rates are shown below. These dose rates include the effects of the beta rays. The estimated instrument readings are at a distance of 2 inches from the outside of the source. The contamination under cribs B-43 to B-50 is assumed to be uniformly distributed over a cylinder 40 feet in diameter and 4 feet thick. The activity in Crib B-57 is assumed to be distributed over a slab 15 feet wide, 100 feet long, and 4 feet thick. Resulting soil concentrations are shown on the next page.

Estimated CP Readings - Window Open, mrad/hr

Crib ID	2' 5"	1' 4"	250 ml	55 gal
216-B-43	1000	700	88	260
216-B-44	2200	1500	190	610
216-B-45	2400	1700	230	1300
216-B-46	1100	740	89	180
216-B-47	470	320	41	130
216-B-48	1000	710	93	390
216-B-49	1900	1300	160	370
216-B-50	49	31	6.9	98
216-B-57	160	100	24	360

Estimated CP Readings - Window Closed, mrad/hr

Crib ID	2' 5"	1' 4"	250 ml	55 gal
216-B-43	140	95	18	260
216-B-44	330	220	41	610
216-B-45	580	380	79	1300
216-B-46	120	80	14	180
216-B-47	71	47	8.9	130
216-B-48	190	130	25	390
216-B-49	230	150	27	370
216-B-50	37	24	5.5	98
216-B-57	140	87	20	360

Table Headings:
2' 5" = 5 inch diameter cylinder of soil, 2 feet long
1' 4" = 4 inch diameter cylinder of soil, 1 foot long
250 ml = 250 ml sample bottle full of soil, 2" diameter, 5" tall
55 gal = 55 gallon drum filled with soil

Additional Notes:
(1) The assumed soil density is 1.6 g/cc in all cases. Higher densities give lower exposure rates.
(2) The 4" and 5" cylinders are unshielded.
(3) The 250 ml bottle has a 0.1 cm thick plastic wall.
(4) The 55 gallon drum has a 1/16" thick steel wall.
(5) The activity was decayed to April 1, 1986.

Total Activity (Curies) in Soil Samples from Each Crib

Crib ID	2' by 5" Diameter Sr-90	2' by 5" Diameter Cs-137	250 ml Sample Sr-90	250 ml Sample Cs-137	55 Gallon Drum Sr-90	55 Gallon Drum Cs-137
216-B-43	3.4E-02	7.7E-03	1.1E-03	2.5E-04	9.2E-01	2.1E-01
216-B-44	7.1E-02	1.8E-02	2.3E-03	5.9E-04	1.9E+00	4.9E-01
216-B-45	7.0E-02	3.9E-02	2.3E-03	1.3E-03	1.9E+00	1.1E+00
216-B-46	3.8E-02	5.3E-03	1.2E-03	1.7E-04	1.0E+00	1.4E-01
216-B-47	1.6E-02	3.9E-03	5.0E-04	1.3E-04	4.2E-01	1.1E-01
216-B-48	3.3E-02	1.2E-02	1.1E-03	3.8E-04	8.7E-01	3.2E-01
216-B-49	6.7E-02	1.1E-02	2.2E-03	3.5E-04	1.8E+00	2.9E-01
216-B-50	2.0E-04	3.0E-03	6.5E-06	9.8E-05	5.4E-03	8.1E-02
216-B-57	9.1E-05	1.1E-02	3.0E-06	3.6E-04	2.4E-03	3.0E-01

Operable Unit 200-BP-1 Assumed Soil Concentrations, uCi/cc

Crib ID	Sr-90	Cs-137
216-B-43	4.4	1.0
216-B-44	9.2	2.4
216-B-45	9.1	5.1
216-B-46	4.9	0.68
216-B-47	2.0	0.51
216-B-48	4.2	1.5
216-B-49	8.7	1.4
216-B-50	0.026	0.39
216-B-57	0.012	1.5

Date Received: 6/24/92 MK

INFORMATION RELEASE REQUEST

Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose

- [ ] Speech or Presentation
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
  - (Check only one suffix)
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [ ] Reference
- [x] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [ ] Software/Database
- [ ] Controlled Document
- [ ] Other

ID Number (include revision, volume, etc.): WHC-SD-EN-HC-004, Rev. OA

List attachments.: Attachments 1 through 8

Date Release Required: May 11, 1992

Title: Safety Assessment for 200-BP-1, Task 4

Unclassified Category: UC-

Impact Level: 2 ESQ

New or novel (patentable) subject matter? [X] No [ ] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[ ] No [ ] Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
[X] No [ ] Yes (Identify)

Copyrights? [X] No [ ] Yes
If "Yes", has written permission been granted?
[ ] No [ ] Yes (Attach Permission)

Trademarks?
[X] No [ ] Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting: N/A

Group or Society Sponsoring

Date(s) of Conference or Meeting

City/State

Will proceedings be published? [ ] Yes [ ] No
Will material be handed out? [ ] Yes [ ] No

Title of Journal

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval: Name (printed) / Signature / Date
Classification/Unclassified Controlled Nuclear Information	[ ]	[x]	
Patent - General Counsel	[x]	[ ]	SWOBERG Jay Swoberg 6/29/92
Legal - General Counsel	[x]	[ ]	
Applied Technology/Export Controlled Information or International Program	[ ]	[x]	
WHC Program/Project	[ ]	[x]	
Communications	[ ]	[x]	
RL Program/Project	[ ]	[x]	
Publication Services	[x]	[ ]	L. Hermann Cl Rvw Only Linda Hermann 7/2/92
Other Program/Project	[ ]	[x]	

Information conforms to all applicable requirements. The above information is certified to be correct.

	Yes	No
References Available to Intended Audience	[x]	[ ]
Transmit to DOE-HQ/Office of Scientific and Technical Information	[ ]	[x]

Author/Requestor (Printed/Signature) Date: N.R. Kerr MK May 5, 1992

Intended Audience: [ ] Internal [ ] Sponsor [X] External

Responsible Manager (Printed/Signature) Date: N.R. Kerr MK May 5, 1992

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

APPROVED FOR RELEASE OFFICIAL DOCUMENT AUS Date 7/2/92

Date Cancelled | Date Disapproved

9212646111 21

DISTRIBUTION SHEET

To: Distribution

From: N.R. Kerr

Date: May 4, 1992

Project Title/Work Order:

Safety Assessment for 200-BP-1 Task 4

EDT No.:

ECN No.: 148556

Name	MSIN	With Attachment	EDT/ECN & Comment	EDT/ECN Only
M.R. Adams	A3-01	0		
M.A. Buckmaster	H4-55	1		
R.A. Carlson	H4-55	1		
T.A. Demitruk	A3-11	1		
J.J. Dorian	B2-16	1		
D.G. Farwick	H4-16	1		
D.O. Hess	L6-57	1		
E.G. Hess	R3-09	1		
N.R. Kerr (3)	N1-75	1		
A.R. Schade	B1-35	0		
W.E. Taylor	N1-75	1		
W.S. Thompson	N3-05	1		
J.J. Zimmer	N1-83	1		
EDMC-200-BP-1 Admin. Rec.	H4-22	1		
EPSD File (3)	N1-75	1		
Central Files	L8-04	2		
IRA Clearance	H4-17	1		