0046495

Control Number: 111	**100 NPL Agreement/Change Control Form** __ Change ✔ Agreement __ Information Operable Unit(s): 100-BC-1	Date Submitted: January 8, 1997 Date Approved:

Document Number/Title: Close out of the 116-B-5 Crib	Date Document Last Issued: -
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Summary Discussion:

Remedial action was accomplished by excavating approximately 300 m^3 of soil from the 116-B-5 Crib and demolishing the concrete crib structure, leaving an open excavation of approximately 34 m x 8 m to a 5 m depth.

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Justification and Impact of Change:

Soils from cells C and D containing levels of tritium above the clean up standard were shipped to the Environmental Restoration Disposal Facility. Both excavated soils and residual soils were sampled and analyzed. The resultant data was evaluated against remedial action objectives stated in the Record of Decision for the 100-BC-1, 100-DR-1 and 100-HR-1 Operable Unit Interim Remedial Actions (EPA, September 1995) in accordance with the Remedial Design Report/Remedial Action Work Plan for the 100 Area (DOE/RL-96-17). The results of this evaluation, contained in the attached verification package, demonstrate attainment of the remedial action objectives. This form documents agreement among the parties listed below authorizing classification of the subject waste site from the TPA solid waste management unit listing as closed out and authorizing backfill of the waste site. Final removal from the NPL will occur at a future date.

V. R. Dronen BHI Project Manager	Nstor L Michael for V. Dronen	Date	1/7/97
N. A. Werdel DOE Project Manager	Nancy Werdel	Date	1/8/97
N/A - EPA Lead Site Ecology Project Manager		Date	
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Per Action Plan for Implementation of the Hanford Consent Order and Compliance Agreement Section 9.3.

3499

Clean Up Verification Package for the 116-B-5 Crib

December 1996

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this verification package is to demonstrate attainment of the remedial action objectives for the 116-B-5 Crib. An evaluation of data collected during remedial actions is presented in this package for deep zone verification, excavated soil, side slopes and overburden. The site is located within the 100-BC-1 Operable Unit.

1.2 REMEDIATION AUTHORITY

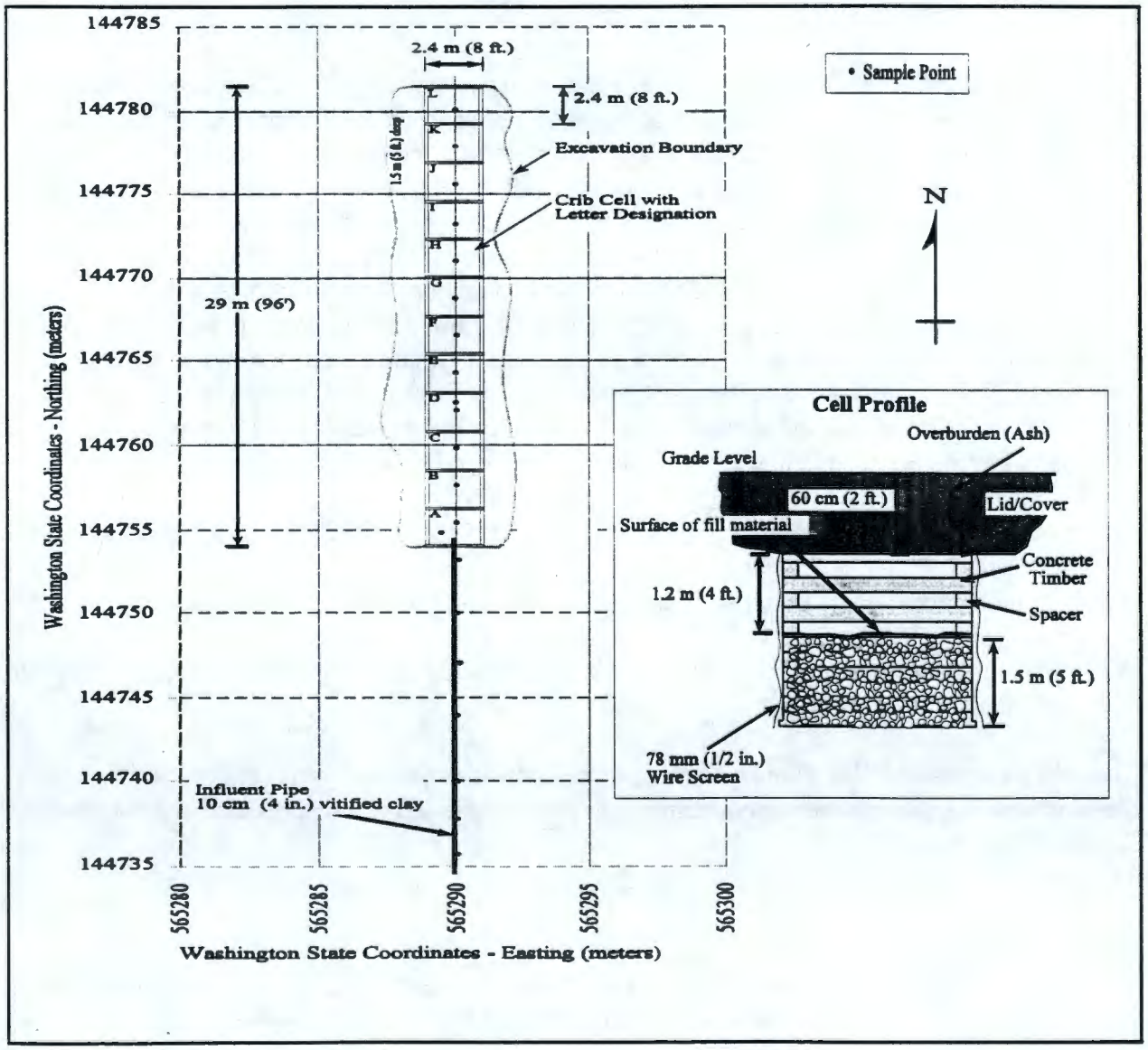
The 116-B-5 Crib remediation was performed under an expedited response action (ERA). An engineering evaluation/cost analysis was performed (DOE-RL 1995a) and released for public comment from May 15 to June 15, 1995. An action memorandum (EPA 1995a) was issued on June 28, 1995. The preferred remedy conveyed in the memorandum was excavation and storage of contaminated soil for eventual shipment to the Environmental Restoration Disposal Facility. Remedial action objectives for this site are presented in the Record of Decision (ROD) signed in September 1995 (EPA 1995b) and are discussed in sections 2 and 3 of this report. Methods for demonstration of attainment of remedial action objectives are presented in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (DOE/RL-96-17, Rev.0).

2.0 SITE DESCRIPTION

2.1 SITE HISTORY/DESCRIPTION

The 116-B-5 Crib received wastes generated from the 108-B Building P-10 Project. This project performed tritium (H-3) separations to derive product for the U.S. Nuclear Weapons Program. The crib was located at Washington State Plane coordinates E565288, N144768. The crib consisted of 12 rectangular cells approximately 2.4 m x 2.4 m and 2.7 m deep. The crib was constructed of concrete members supporting a concrete roof. The crib had no structural bottom and was filled with sandy gravel and ash approximately 1.5 m thick. A single clay inlet pipe was encountered. Figure 1 shows the construction of the crib.

Figure 1. 116-B-5 Crib Profile and Plan View.



Contaminants of concern identified in the *100-BC-1, 100-DR-1, and 100-HR-1 Sampling and Analysis Plan* (SAP)[1] (DOE-RL 1996b) are ^{60}Co, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{3}H, Ba and Hg. Split samples taken by Ecology were analyzed for ^{90}Sr, however all results were below detection limits. Contaminants encountered during remediation activities are provided in Section 3.0.

2.2 REMEDIAL ACTION DESCRIPTION

Excavation began on June 26, 1995, with the removal of 0.6 m of overburden material consisting of fly-ash material. Removal of the fly-ash material exposed the crib structure. The concrete roof was removed from the crib. In-situ measurements of contaminant levels were taken using a high-purity germanium detector lowered through 1.2 m of void space to the crib soils in each of the 12 cells. These readings, and analytical results from samples taken in the same locations, indicate radionuclide concentrations only slightly above background within the crib. The excavation continued until the entire crib structure was removed. The final excavation bottom dimensions measured approximately 34 m by 8 m by 5 m deep.

Initial sampling of the overburden began at a rate of one sample per 153 m^3 and were analyzed for radionuclides, Hg, Ba and semivolatile organics. After overburden removal, the concrete crib lids were removed from each of the twelve cells. Analytical samples from the first lift were then taken from the center of each cell (approximately 1.82 m depth below surface). After a review of the initial analytical results from each cell, which revealed no contaminants above cleanup criteria, it was determined by the Tri-Parties (U.S. Department of Energy, Washington State Department of Ecology [Ecology] and the U. S. Environmental Protection Agency [EPA]) to sample only selected cells at approximately 0.7 m lifts. Emphasis was placed on cells at the head end of the crib where contaminants were most likely to be found. Final sampling and analysis indicated only isolated cases of tritium concentrations above remedial action goals in two adjacent crib cells (cells C and D, see Figure 1). Soils from these cells were removed and disposed of at the Environmental Restoration Disposal Facility.

The inlet pipe was excavated and removed to B Avenue, approximately 18 m south of the crib. Samples were collected at the bottom of this excavation along a horizontal transect at 3 m intervals and showed no contamination present.

A summary of analytical results are provided in Attachment A and sample locations are provided in Attachment B.

The crib will be backfilled with soil from the site and fill as necessary to bring the site to grade. The concrete logs which are not contaminated will be separated and disposed of in a Hanford Site landfill.

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[1]Reference to the SAP herein refers to DOE/RL 1996b. The sampling strategy conducted during the ERA project was performed under an approved sampling and analysis plan as part of the *100-BC-1 Excavation Demonstration Project Plan* (DOE 1995c).

3.0 REMEDIAL ACTION OBJECTIVES AND CRITERIA

3.1 REMEDIAL ACTION GOALS

Remedial action goals for this site were developed consistent with the RDR/RAWP. Site specific cleanup standards are listed in Table 1. Remedial action goals for this site are:

1) meeting MTCA Method B standards for metals (includes soil and debris placed back in the crib).

2) for radionuclides, meeting 15 mrem/year dose standard above background cumulative from all radionuclide contaminants present. This is demonstrated using the results from a rural residential scenario at the time of clean up and the Residual Radioactivity (RESRAD) computer code.

3) meeting soil clean up goals that are protective of groundwater and surface water. This is demonstrated using the results from a rural residential scenario at the time of clean up and the Residual Radioactivity (RESRAD) computer code.

Table 1: 116-B-5 Clean Up Standards

Contaminant	MTCA B	Surface Water	Groundwater	Dose Exposure
Hg	24 mg/kg	0.012 µg/L	2 µg/L	n/a
Ba	5,600 mg/kg	2,000 µg/L	2,000 µg/L	n/a
Radioisotopes	n/a	4 mrem/year	4 mrem/year	15 mrem/year
Tritium[a]	n/a	20,000 pCi/L	20,000 pCi/L	included above

[a] MCL is shown for those radioisotopes with published MCLs, otherwise dose limit applies

3.2 SUMMARY STATISTICS

This remediation project was completed prior to the final publication of the ROD, RDR/RAWP, and the SAP (EPA 1995b; DOE-RL 1996a; and DOE-RL 1996b, respectively). Therefore, verification sampling was not performed in the same manner as outlined in the approved SAP (DOE-RL 1996b). Sampling was more intensive than was required by the SAP (DOE-RL 1996b) and suffices for site verification. Analysis of the data was performed consistent with the methods outlined in the SAP (DOE-RL 1996b).

Statistics to demonstrate achievement of the three remedial action objectives were calculated as follows:

1) for metals, the 95% upper confidence limit (UCL) for each contaminant was calculated on the arithmetic mean of soil samples (61 samples for Ba and 45 samples for Hg taken

between the surface and 4.6 m depths) from all cells (except cells C and D which were disposed of in ERDF), side slopes, overburden and excavated material. These results were compared to the MTCA Method B standards (see Table 1).

2) for radionuclide exposure, the 95% upper confidence limit (UCL) for each contaminant was calculated on the arithmetic mean of soil samples (67 samples [4 tritium samples] taken between the surface and 4.6 m depths) from all cells (except cells C and D which were disposed of in ERDF), side slopes, overburden and excavated material. These results were input into the RESRAD model in conjunction with the appropriate parameters for the rural residential scenario listed in Attachment C.

3) for groundwater protection, the 95% upper confidence limit (UCL) for each contaminant was calculated on the arithmetic mean of soil samples (75 samples [6 tritium samples] taken between the surface and 5.2 m depth) from all cells (except cells C and D which were disposed of in ERDF), side slopes, overburden and excavated material, and deep zone verification samples. These results were input into the RESRAD model in conjunction with the appropriate parameters for the rural residential scenario listed in Attachment C.

Table 2 shows the contaminants found, the 95% UCL for each contaminant calculated on the arithmetic mean and the Hanford Site background for each contaminant.

Table 2. Contaminants

Contaminants	Residual Contamination[a] (<4.6 m)	Groundwater Protection[a] (0 to 5.2 m)	Hanford Site Background[b]
^{60}Co	0.17 pCi/g	0.19 pCi/g	0
^{137}Cs	0.23 pCi/g	0.21 pCi/g	0.92 pCi/g
^{152}Eu	1.26 pCi/g	1.24 pCi/g	0
^{154}Eu	1.02 pCi/g	0.91 pCi/g	0
^{3}H	48.48 pCi/g	44.30 pCi/g	0
Hg	2.17 mg/kg	2.15 mg/kg	0.33 mg/kg
Ba	407.62 mg/kg	412.07 mg/kg	132 mg/kg

[a] Values listed above are 95% UCL on arithmetic mean (EPA 1986), see 1), 2), and 3) above for number of samples and sample depths.

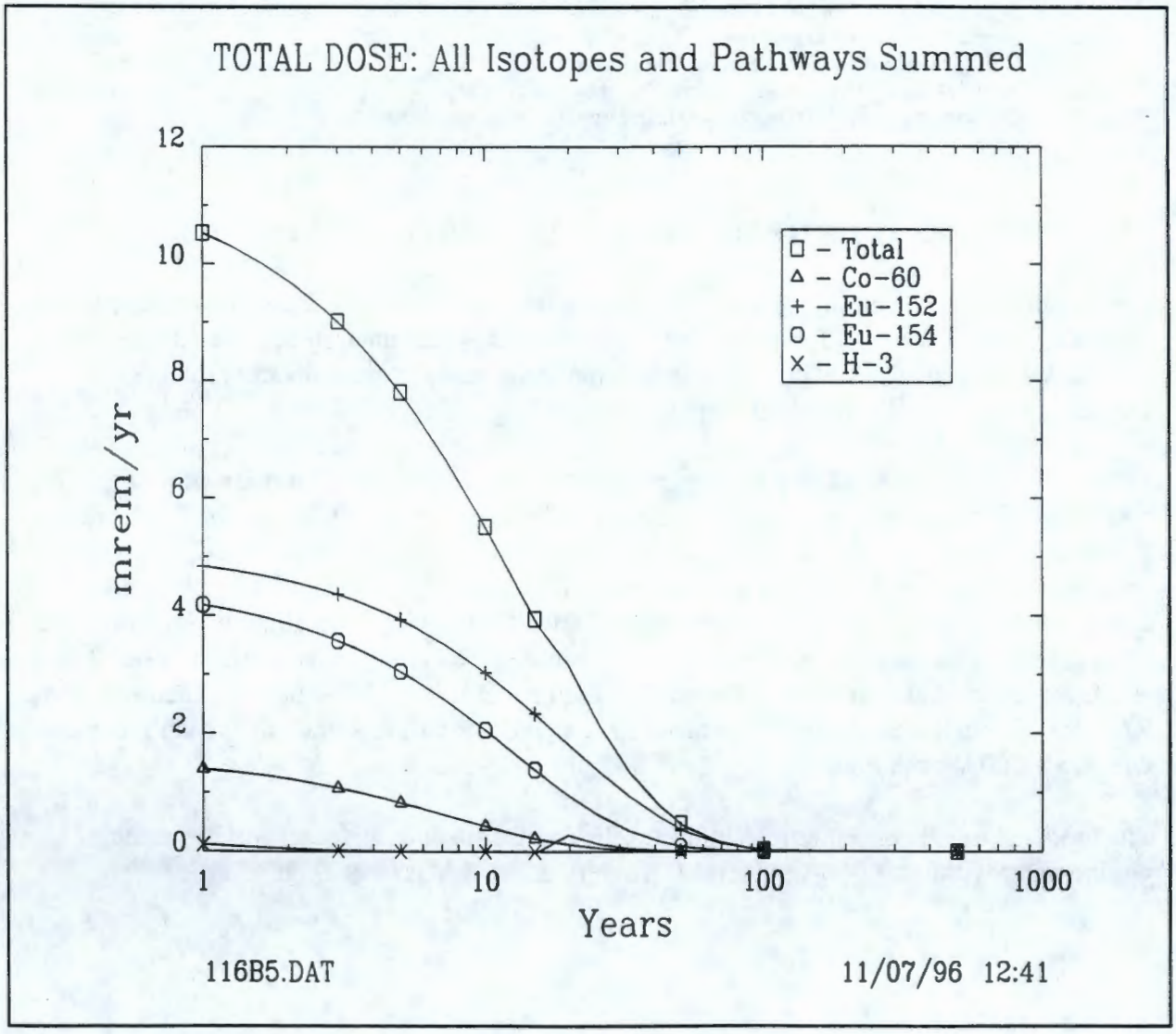
[b] Source: DOE-RL 1995e and 1996c.

3.3 ATTAINMENT OF RADIONUCLIDE SOIL CLEANUP STANDARDS

For radionuclide exposure verification, radionuclide concentrations in the soil (< 4.6 m depth) shown in Table 2 were converted to dose equivalent using the RESRAD computer code. The dose equivalent is then compared to the 15 mrem/year maximum above background dose level that is identified as the Remedial Action Goal (RAG). RESRAD parameters for the rural residential scenario used for verification are included in Attachment C.

Figure 2 illustrates the RESRAD results for the rural residential exposure scenario; as shown, the total estimated dose associated with radionuclide concentrations peaks at about 10.5 mrem/yr above background, and therefore meets the RAG for radionuclide soil cleanup standard.

Figure 2. RESRAD Results



3.4 ATTAINMENT OF MODEL TOXICS CONTROL ACT CLEANUP STANDARDS

Table 3 presents the results of site verification based on the MTCA B (WAC 173-340-740 [7e]) cleanup standards. The RAGs for MTCA B cleanup standards have all been met.

Table 3. Analytical Results.[a]

Contaminant	Cleanup Criteria (mg/kg)	95% UCL (mg/kg)[b]		Max. Detected (mg/kg)[c]		Total number of samples	Number exceeding Criteria	% samples exceeding Criteria[d]	
Hg[e]	24	2.15	✔	12.1	✔	52	0	0	✔
Ba	5,600	412.07	✔	1020	✔	68	0	0	✔

[a] ✓indicates MTCA B (WAC 173-340-740[7e]) criteria has been met.
[b] Criteria is comparison to the cleanup criteria.
[c] Criteria is no single detection can exceed 2 times the cleanup criteria.
[d] Criteria is no more than 10% of the samples can exceed the cleanup criteria.
[e] Analyses with detection limit of 100 mg/kg were disregarded (all were non-detect).

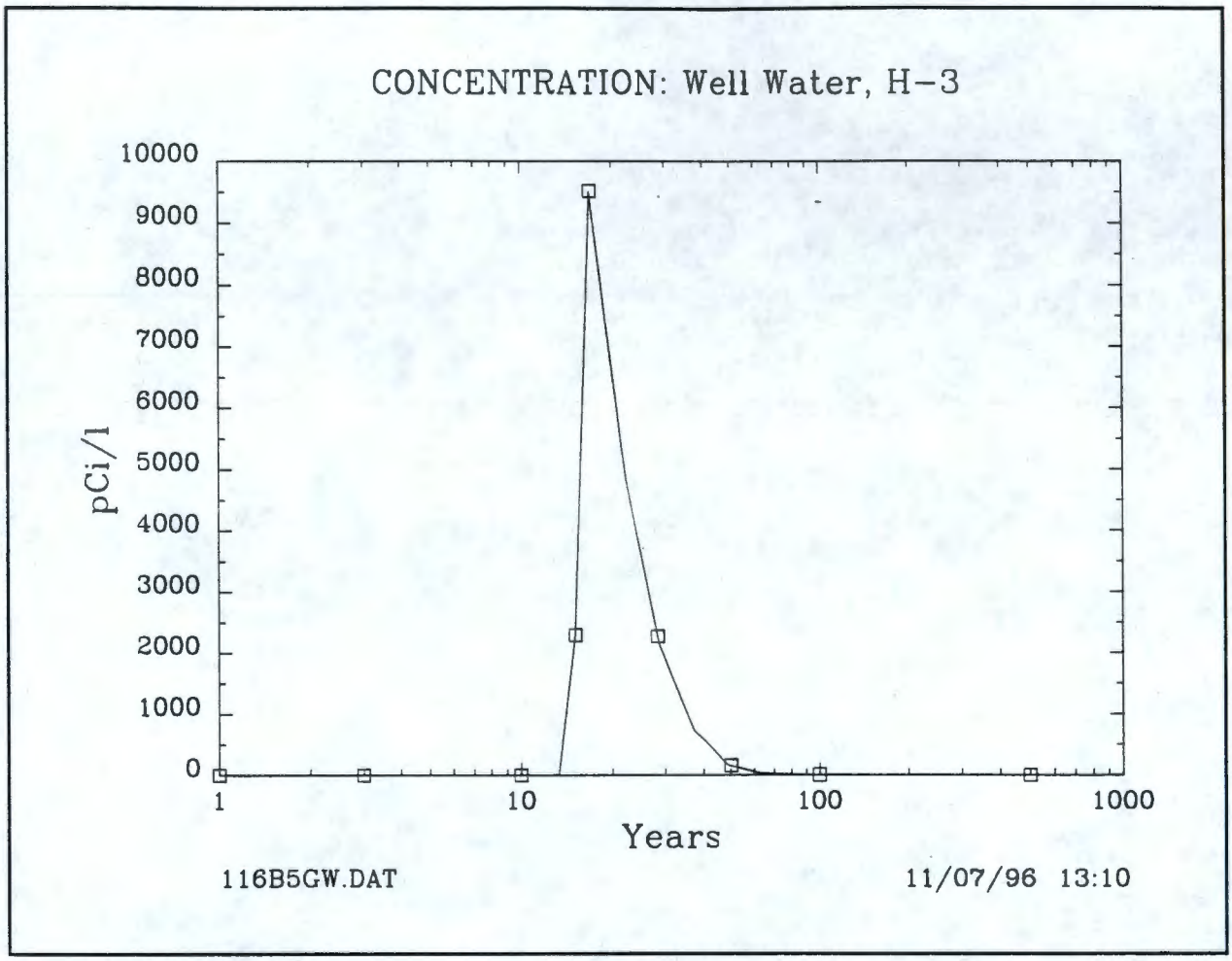
3.5 ATTAINMENT OF GROUNDWATER REMEDIAL ACTION GOALS

For groundwater protection, radionuclide and metal concentrations in the soil were calculated using the RESRAD model for comparison with the RAGs presented in Section 2.0 of the RDR/RAWP (DOE-RL 1996a). RESRAD parameters used for groundwater protection verification are included in Attachment C.

The RESRAD model predicts that only tritium may be transported to groundwater. It should be noted that tritium is currently present in the groundwater. Wells 199-B4-1, 199-B4-2, and 199-B4-3 surround the 116-B-5 Crib and have been monitoring the presence of tritium at approximately 3,500 pCi/L. The model predicts (Figure 3) the potential for a sharp spike in concentration in groundwater between years 15 and 30 following backfilling and the introduction of irrigation included in the rural residential scenario. The maximum concentrations of 9,500 pCi/L is predicted at year 18 and is much less than the RAG of 20,000 pCi/L. Therefore, the RAG for tritium has been met. The model shows no other radionuclides will reach groundwater within a 1,000-year period.

The modeled metal concentrations indicates the metal constituents found will not reach groundwater within a 1,000-year period. Therefore, the RAGs have been met.

Figure 3. Tritium Concentrations in Groundwater



3.6 ATTAINMENT OF SURFACE-WATER REMEDIAL ACTION GOALS

Attainment of surface-water RAGs is to verify protection of the Columbia River (DOE-RL 1996a). Radionuclide concentrations in the groundwater were calculated using the RESRAD model and multiplied by a calculated dilution/attenuation factor for comparison with the RAGs for surface water protection presented in Section 2.0 of the RDR/RAWP (DOE-RL 1996a).

The only constituent that the model predicted could be transported to groundwater was tritium. Thus, only tritium is required to be carried through the calculation for comparison to the RAG. The dilution/attenuation factor for tritium, with a distribution coefficient (K_d) of zero and a distance from the 116-B-5 Crib to the Columbia River of 400 m, calculates out to be 0.22 (DOE-RL 1996a, appendix D). Multiplying this factor by the maximum concentration modeled in groundwater (9,500 pCi/L) equates to a maximum concentration in surface water of 2,090 pCi/L, which is much less than the RAG of 20,000 pCi/L. Therefore, the RAG has been met.

4.0 SAMPLING AND ANALYTICAL RESULTS

4.1 SUMMARY OF FIELD SCREENING AND LABORATORY ANALYSIS

During the excavation and remediation of the 116-B-5 Crib, sampling and analyses activities were performed to characterize the soil as it was removed. All sampling and tool decontamination was performed in accordance with requirements in BHI-EE-01, Environmental Investigations Procedures. All samples were handled using Bechtel Hanford, Inc. chain-of-custody control procedures. The sampling process is detailed in Appendix D, of the *100-BC-1 Excavation Demonstration Project Plan* (DOE-RL 1995c). During remedial action of the 116-B-5 Crib, soil samples were collected and analyses performed according to the approved sampling plan (DOE-RL 1995c). A total of 132 soil samples (grab samples) were collected from all depths (0 to 5.2 m).

Initial sampling of the overburden began at a rate of one grab sample per 153 m^3 and were analyzed for radionuclides, Hg, Ba and semivolatile organics. After overburden removal, the concrete crib lids were removed from each of the twelve cells. Analytical samples from the first lift were then taken from the center of each cell (approximately 1.82 m depth below surface). After a review of the initial analytical results from each cell, which revealed no contaminants above cleanup criteria, it was determined by the Tri-Parties (U.S. Department of Energy, Washington State Department of Ecology [Ecology] and the U. S. Environmental Protection Agency [EPA]) to sample only selected cells at approximately 0.7 m lifts. Emphasis was placed on cells at the head end of the crib where contaminants were most likely to be found. Final sampling and analysis indicated only isolated cases of tritium concentrations above remedial action goals in two adjacent crib cells (cells C and D, see Figure 1). Soils from these cells were removed and disposed of at the Environmental Restoration Disposal Facility.

Field quality assurance/quality control (QA/QC) measures were used to assess sampling precision. QA/QC samples for this project included five field duplicate samples, four split samples, and one blank samples. In addition five split samples were collected and analyzed by a Washington Department of Ecology lab. Fixed-base laboratory data from one sample delivery group was validated to Level C procedures. Validation results are detailed in section 4.3.

4.2 DATA EVALUATION

Data evaluation was performed in several steps as follows:

1. A detailed inventory of the samples collected was developed. This information was recorded in the field logbooks and distributed as a sampling summary after the sampling event. These logbook records, borehole logs, and sampling summaries were used to prepare sample location maps.

2. The analytical data was compiled and reviewed as it was received to determine levels of contamination at specific locations in the remediation sites. Depending on contamination

levels, additional analyses could be requested. The analytical results from duplicate and split samples were also evaluated to determine the overall analytical precision.

3. Analytical results from blank samples were reviewed to determine if detections were due to sources other than the sampling locations. For common laboratory glassware cleaning contaminants (e.g., methylene chloride, acetone, toluene, 2-butanone, and phthalate esters), EPA's "10 times rule" was used. Detected concentrations of common laboratory contaminants had to be greater than 10 times the corresponding blank value to be considered valid. Other contaminants had to be greater than five times the sample blank value to be considered valid.

4.3 DATA VALIDATION

After sampling was completed, all of the fixed-base laboratory data from one sample delivery group was validated to Level C per BHI-EE-01, EIP 2.5. Level C validation procedures are specified in WHC (1992a and 1992b).

Under the level C validation procedure, the following were reviewed:

- Sample holding times
- Method blanks
- Matrix spike recovery
- Surrogate recovery
- Matrix spike/matrix spike duplicate results
- Data package completeness.

Sample delivery group W0613, which included samples B0G7G4, B0G7G5, B0G7M6, B0G7M7 B0G7M8, B0G7M9, B0G7N0, B0G7N5, B0G7N6, B0G7N7, B0G7N8, B0G7N9, B0G7P0, and B0G7P1, was validated. Volatiles, semi-volatiles, pesticide/polychlorinated byphenols, wet chemistry, inorganics, and radiochemistry results were validated. Results of the validation report are summarized in Sections 4.3.1 through 4.3.6.

4.3.1 Volatiles

Major deficiencies: None.

Minor deficiencies: Positive blank contamination was noted in all methylene chloride results, and all methylene chloride results were flagged "U" (analyte was not detected; value reported is the sample quantitation limit).

4.3.2 Semi-Volatiles

Major deficiencies: None.

Minor deficiencies: None.

4.3.3 Pesticide/Polychlorinated Byphenols

Major deficiencies: None.

Minor deficiencies: None.

4.3.4 Wet Chemistry

Major deficiencies: None.

Minor deficiencies: All pH sample results were qualified as estimates and flagged "J" due to holding times exceeding QC limits.

4.3.5 Inorganics

Major deficiencies: None.

Minor deficiencies: Because of minor matrix spike accuracy problems, antimony, iron, lead, mercury, and silver results for two samples were qualified as estimates. Due to minor laboratory duplicate precision problems, iron results in two samples were qualified as estimates. The associated results were qualified and flagged "J" (analyte was detected but due to QC deficiency, the associated quantitation limit is an estimate, however, the data are usable for decision-making purposes).

4.3.6 Radiochemistry

Major deficiencies: None.

Minor deficiencies: The laboratory analyzed for ^{238}U in two samples and ^{235}U in one. No documentation was present in the summary data package as to the reasoning for the differing analytes. Because there was no ^{235}U duplicate analysis, all ^{235}U sample results were qualified as estimates and flagged "J." Due to the lack of a blank analysis, all ^{235}U, ^{40}K, $^{224/226/228}Ra$, and ^{238}U results were qualified as estimates and flagged "J."

4.4 DATA INTERPRETATION

4.4.1 Environmental Analytical Laboratory:

Comparison between EAL results and those of "split" samples sent to the Quanterra and Ecology laboratories for Gamma Energy Analysis is not directly possible. Sample preparation procedures for soils varied significantly between the laboratories performing analyses for this project. Rejection of larger fractions (typically >2 mm) by the Quanterra and Ecology laboratories could result in a 50% or greater concentration of radionuclides relative to samples analyzed by the EAL (the EAL added no additional size rejection beyond initial sampling activities) because radionuclides tend to concentrate in the finer material. Additionally, analysis of EAL calibration

standards by Quanterra yielded approximately 15-20% higher measured activities for the isotopes of interest relative to reference values used by EAL. This may represent either erroneous preparation/documentation of the EAL standard (which would result in an EAL low bias for sample reporting) or matrix/geometry self-shielding differences between the EAL material and Quanterra calibration standards.

The values provided by EAL more closely represent actual in-situ concentrations of the soils because the entire sample is used in the analysis (no material screened out) but may be biased low. Evaluation of the effects of any potential low bias of the EAL does not alter conclusions arrived at using the data as reported.

Radionuclides: The isotopes with the shortest half lives, (^{60}Co, ^{152}Eu, ^{154}Eu) have decayed to levels too low to detect in most samples. The 95% UCL value derived for these isotopes is quite low due to the large number of sample results at detection limits compared to the few number of actual detects. The 95% UCL value derived for ^{137}Cs is less than the Hanford Site background concentration. Levels of ^{90}Sr were below detection limits based results from the Ecology analysis. The concentrations of tritium detected from points between the middle and the south end of 116-B-5 crib are presented in Table 4. The samples were analyzed using liquid scintillation counting at 222S labs.

Table 4. Tritium Analytical Results from 222S Laboratory.

Sample Number	Location by Cell	Depth Below Grade	Concentration in pCi/g
116-B5-007	Cell A	1.8 m	<50
116-B5-008	Cell A	1.8 m	61.79
HEIS Number BOG7N1	Cell A	4.0 m	< 50
HEIS Number BOG7N3 [a]	Cell C	4.0 m	552
HEIS Number BOG7N4 [a]	Cell D	4.0 m	680
HEIS Number BOG8Z4	Cell F	4.0 m	<50
HEIS Number BOG8Z5	Cell H	4.6 m	<50
HEIS Number BOG7N2	Cell B	5.2 m	<50

[a] - Material was removed and disposed.

Inorganics: As previously mentioned, Barium and Mercury levels encountered at the site did not exceed cleanup criteria. In addition, Toxic Characteristic Leaching Procedure (TCLP) results passed for both constituents. Six samples were analyzed by TCLP for Barium with results ranging from 0.23 mg/L to 0.70 mg./L. Nine samples (including 5 Ecology splits) were analyzed by TCLP for Mercury with all results below detection limits except one reported at 0.00024 mg/L.

5.0 STATEMENT OF PROTECTIVENESS

As has been demonstrated in this verification package the RAGs for direct exposure (15 mrem/year), MTCA B cleanup standards, groundwater protection, and surface water protection (protection of the Columbia River) have all been achieved. All materials contributing to direct exposure have all been excavated, sampled, analyzed, and where required removed and shipped to the ERDF. Materials contributing to the potential degradation of groundwater and the Columbia River have all been sampled, analyzed, and modeled to show that no remaining constituents pose an unacceptable threat to groundwater or the Columbia River. The 116-B-5 Crib is thus verified to be remediated and no longer pose an unacceptable threat to human health or the environment.

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ATTACHMENT A

SUMMARY OF 116-B-5 SOIL SAMPLING AND ANALYTICAL DATA

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
B0G7C2	FAST	East stock pile; material overlying crib; soil & ash.	0												1000 U	0.01 U
B0G7C3	EAL	East stock pile; material overlying crib; soil & ash.	0	0.251	+/- 0.108			0.123 U		0.884 U		0.321 U				
B0G7C4	FAST	West stock pile; material adjacent to crib; crushed gravel.	0												1000 U	0.01 U
B0G7C5	EAL	West stock pile; material adjacent to crib; crushed gravel.	0	0.120 U				0.095 U		0.778 U		0.384 U				
B0G7C6	FAST	East stock pile; material adjacent to crib; crushed gravel.	0												1000 U	0.01 U
B0G7C7	EAL	East stock pile; material adjacent to crib; crushed gravel.	0	0.116 U				0.131 U		0.645 U		0.308 U				
B0G7C7ND	SAS	Approx. 0.6 m (2 ft.) dia. of soil area from clean spoils pile on east side of excavation. Same location as sample B0G7C7was taken.	0	0.173 U				0.141 U		0.467 U		0.336 U				
B0G7G6	FAST	Influent pipe 1.2 m (4 ft.) south of crib; sand with rounded pebbles	1.21												1000 U	0.4
B0G7G7	EAL	Influent pipe 1.2 m (4 ft.) south of crib; sand with rounded pebbles	1.21	0.077 U				0.123 U		0.553 U		0.304 U				
B0G7G8	FAST	Influent pipe 4.2 m (14 ft.) south of crib; sand with rounded pebbles	1.21												1000 U	0.01 U
B0G7G9	EAL	Influent pipe 4.2 m (14 ft.) south of crib; sand with rounded pebbles	1.21	0.069 U				0.087 U		0.344 U		0.324 U				
B0G7H0	FAST	Influent pipe 7.3 m (24 ft.) south of crib	1.21												1000 U	0.01 U
B0G7H1	EAL	Influent pipe 7.3 m (24 ft.) south of crib	1.21	0.096 U				0.141	+/- 0.076	0.521 U		0.258 U				

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
B0G7H2	FAST	Influent pipe 10.3 m (34 ft.) south of crib	1.21												1000 U	0.01 U
B0G7H3	EAL	Influent pipe 10.3 m (34 ft.) south of crib	1.21	0.076 U				0.089 U		0.382 U		0.282 U				
B0G7H4	FAST	Influent pipe 14.3 m (47 ft.) south of crib; sand	1.21												1000 U	0.01 U
B0G7H5	EAL	Influent pipe 14.3 m (47 ft.) south of crib; sand	1.21	0.077 U				0.113 U		0.527 U		0.368 U				
B0G7H6	FAST	Influent pipe 16.5 m (54 ft.) south of crib; silty sand	1.21												1000 U	0.01 U
B0G7H7	EAL	Influent pipe 16.5 m (54 ft.) south of crib; silty sand	1.21	0.087 U				0.092 U		0.580 U		0.318 U				
B0G7H8	FAST	Influent pipe 18.6 m (61 ft.) south of crib	1.21												1000 U	0.01 U
B0G7H9	EAL	Influent pipe 18.6 m (61 ft.) south of crib	1.21	0.067 U				0.102 U		0.533 U		0.280 U				
B0G7N7	Quanterra	Scale from inside influent at 7.3 m (24 ft.) south of Crib	1.21												0.241	0.01 U
B0G7P1	Quanterra	Split sample of B0G7H8 and B0G7H9	1.21	0.006 U	+/- 0.009			0.055	+/- 0.021	0.096 J	+/- 0.026	0.024 U	+/- 0.035		57.3	0.11 U
B0G7C8	FAST	Upper most material cell L; sand	1.82												1000 U	0.01 U
B0G7C9	EAL	Upper most material cell L; sand	1.82	0.118 U				0.116 U		0.524 U		0.355 U				
B0G7D0	FAST	Upper most material cell K; sand	1.82												1000 U	0.01 U
B0G7D1	EAL	Upper most material cell K; sand	1.82	0.081 U				0.088 U		0.551 U		0.221 U				
B0G7D2	FAST	Upper most material cell J; sand	1.82												1000 U	0.01 U
B0G7D3	EAL	Upper most material cell J; sand	1.82	0.080 U				0.086 U		0.455 U		0.285 U				
B0G7D4	FAST	Upper most material cell I; sand	1.82												1000 U	0.01 U
B0G7D5	EAL	Upper most material cell I; sand	1.82	0.082 U				0.075 U		0.335 U		0.256 U				
B0G7D6	FAST	Upper most material cell H; sand	1.82												1000 U	0.01 U

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
B0G7D7	EAL	Upper most material cell H; sand	1.82	0.072 U				0.077 U		0.404 U		0.271 U				
B0G7D8	FAST	Upper most material cell G; sand	1.82												1000 U	0.01 U
B0G7D9	EAL	Upper most material cell G; sand	1.82	0.057 U				0.062 U		0.353 U		0.284 U				
B0G7F0	FAST	Upper most material cell F; sand	1.82												1000 U	0.01 U
B0G7F1	EAL	Upper most material cell F; sand	1.82	0.085 U				0.084 U		0.559 U		0.303 U				
B0G7F2	FAST	Upper most material cell E; sand	1.82												1000 U	0.01 U
B0G7F3	EAL	Upper most material cell E; sand	1.82	0.072 U				0.110 U		0.890 U		0.323 U				
B0G7F4	FAST	Upper most material cell D; sand	1.82												1000 U	0.01 U
B0G7F5	EAL	Upper most material cell D; sand	1.82	0.306	+/- 0.087			0.147	+/- 0.075	2.27	+/- 0.718	0.363 U				
B0G7F6	FAST	Upper most material cell C; sand	1.82												1000 U	1.2
B0G7F8	FAST	Duplicate sample of B0G7F6; sand	1.82												1000 U	2.4
B0G7N8	Quanterra	Split sample of B0G7F6 and B0G7F7; sand	1.82	0.264	+/- 0.035			0.145	+/- 0.031	2.87	+/- 0.115	0.391	+/- 0.066		1020	1.9 J
B0G7F7	EAL	Upper most material cell C; sand	1.82	0.187	+/- 0.092			0.196	+/- 0.101	2.58	+/- 0.810	0.486 U				
B0G7F9	EAL	Duplicate sample of B0G7F7; sand	1.82	0.167	+/- 0.107			0.147 U		2.71	+/- 0.785	0.445 U				
B0G7G0	FAST	Upper most material cell B; sand & ash	1.82												1000 U	0.2
B0G7G1	EAL	Upper most material cell B; sand & ash	1.82	0.135 U				0.109 U		0.8476	+/- 0.481	0.434 U				
B0G7G2	FAST	Upper most material cell A; sand	1.82												1000 U	12.1
B0G7G3	EAL	Upper most material cell A; sand	1.82	0.149 U				0.701	+/- 0.152	6.45	+/- 1.05	0.671	+/- 0.267			
B0G7N9	Quanterra	Split sample of B0G7G2 and B0G7G3; sand	1.82	0.027 J	+/- 0.023			0.783	+/- 0.045	6.12	+/- 0.128	0.723	+/- 0.098		218	8.5 J

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
116-B5-007	222S	Upper most material cell A; sand	1.82											50 U		
116-B5-008	222S	Upper most material cell A; sand	1.82											61.79		
116-B5C-6	FAST/EAL	Concrete at 2.1 m (7 ft.)	1.82	0.074 U				0.068 U		0.370 U		0.270 U			300 U	0.1 U
CELL8TOP	SAS	Entire cell through 1/2 section of missing concrete lid (broken). Cell 8 equivalent to Cell H using revised identification system.	1.82	0.187 U				0.131 U		0.488 U		0.2851 U				
CELLAPS1	SAS	Approx. 3/4 of cell with detector slightly north of dead center. Approx. 0.6 m (2 ft.) of ash covering east half of cell that slid in from east side of excavation.	1.82	0.245 U				0.188 U		0.925 U		0.538 U				
CELLAPS2	SAS	Approx. 3/4 of cell with detector in southwest quadrant of cell. Approx. 0.6 m (2 ft.) of ash covering east half of cell that slid in from east side of excavation.	1.82	0.267 U				0.320 U		1.600 U		0.497 U				
CELLBPS1	SAS	Approx. 3/4 of cell with detector dead center of cell. Approx. 0.6 m (2 ft.) of ash covering east half of cell that slid in from east side of excavation.	1.82	0.138 U				0.099 U		0.640 U		0.267 U				
116-B5A-10	FAST/EAL		3.04	0.086 U				0.064 U		0.460 U		0.280 U			300	100 U
116-B5B-10	FAST/EAL		3.04	0.063 U				0.094 U		0.460 U		0.200 U			1000 U	0.01 U
116-B5D-10	FAST/EAL		3.04	0.093 U				0.065 U		0.400 U		0.300 U			300 U	100 U
116-B5E-10	FAST/EAL		3.04	0.063 U				0.065 U		0.340 U		0.220 U			300	100 U
116-B5F-10	FAST/EAL		3.04	0.069 U				0.081 U		0.390 U		0.200 U			300 U	100 U
116-B5G-10	FAST/EAL		3.04	0.073 U				0.081 U		0.390 U		0.300 U			1000 U	0.01 U
116-B5H-10	FAST/EAL		3.04	0.046 U				0.067 U		0.450 U		0.230 U			300 U	100 U

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
116-B5I-10	FAST/EAL		3.04	0.060 U				0.073 U		0.390 U		0.190 U			300 U	100 U
116-B5I-D	FAST/EAL	Duplicate of 116-B5I-10	3.04	0.074 U				0.064 U		0.400 U		0.240 U			300 U	
116-B5A-12.5	FAST/EAL		3.81	0.097 U				0.079 U		0.320 U		0.28 U			300 U	100 U
116-B5B-12.5	FAST/EAL	Wet sample; gravel & clay	3.81	0.079 U				0.100 U		0.470 U		0.310 U			1000 U	0.01 U
116-B5D-12.5	FAST/EAL		3.81	0.070 U				0.100 U		0.430 U		0.300 U			300 U	100 U
116-B5E-12.5	FAST/EAL		3.81	0.078 U				0.080 U		0.430 U		0.210 U			300 U	100 U
116-B5F-12.5	FAST/EAL		3.81	0.070 U				0.086 U		0.370 U		0.240 U			300 U	100 U
116-B5G-12.5	FAST/EAL		3.81	0.065 U				0.065 U		0.350 U		0.270 U			1000 U	0.01 U
116-B5H-12.5	FAST/EAL		3.81	0.073 U				0.093 U		0.360 U		0.200 U			300 U	100 U
116-B5I-12.5	FAST/EAL		3.81	0.067 U				0.075 U		0.430 U		0.280 U			300 U	100 U
B0G7J8	FAST	Cell B	3.96												1000 U	9.4
B0G7J9	EAL	Cell B	3.96	1.82	+/- 0.182			1.02	+/- 0.15	7.32	+/- 0.933	0.629	+/- 0.209			
H95024	Ecology	Ecology split sample of B0G7J8 and B0G7J9	3.96	3.25		0.6 U		1.59		10.70		1.07			130	9
B0G7K4	FAST	Cell A	3.96												1000 U	4
B0G7K6	FAST	Duplicate sample of B0G7K4	3.96												1000 U	4.8
B0G7N6	Quanterra	Equipment blank of B0G7K4	3.96	-0.01 U	+/- 0.009			0.004 U	+/- 0.011	-0.004 U	+/- 0.021	-0.004 U	+/- 0.038		3.7 B	100 U
B0G7K5	EAL	Cell A	3.96	0.084 U				0.443	+/- 0.092	2.28	+/- 0.609	0.294 U				
B0G7K7	EAL	Duplicate sample of B0G7K5	3.96	0.085 U				0.269	+/- 0.083	2.18	+/- 0.540	0.30	+/- 0.158			
B0G7N5	Quanterra	Split sample of B0G7K4 and B0G7K5	3.96	0.026 U	+/- 0.024			1.04	+/- 0.061	4.63	+/- 0.139	0.554	+/- 0.114		96.7	2.9
H95023	Ecology	Ecology split sample of B0G7K4 and B0G7K5	3.96	0.060 U		0.6 U		0.457		3.11		0.270 U			130	3
B0G7N1	222S	Cell A	3.96											50 U		
B0G7K0	FAST	Cell C	3.96												1000 U	16
B0G7K1	EAL	Cell C	3.96	0.820	+/- 0.129			1.032	+/- 0.153	6.24	+/- 0.871	0.388	+/- 0.213			
H95026	Ecology	Ecology split sample of B0G7K0 and B0G7K1	3.96	1.53		0.59 U		1.56		8.96		0.898			180	12
B0G7N3	222S	Cell C	3.96											552		
B0G7N4	222S	Cell D	3.96											680		
B0G7J6	FAST	Cell D	3.96												1000 U	7.4
B0G7J7	EAL	Cell D	3.96	1.15	+/- 0.144			0.517	+/- 0.113	3.96	+/- 0.739	0.300 U				
H95027	Ecology	Ecology split sample B0G7J6 and B0G7J7	3.96	1.63		0.61 U		0.596		5.77		0.461			200	6
B0G7L6	FAST	Cell E	3.96												1000 U	0.01 U

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
B0G7L7	EAL	Cell E	3.96	0.082 U				0.076 U		0.469 U		0.218 U				
B0G7J4	FAST	Cell F	3.96												1000 U	0.6
B0G7J5	EAL	Cell F	3.96	0.063 U				0.061 U		0.342	+/- 0.178	0.239 U				
B0G8Z4	222S	Cell F	3.96											50 U		
B0G7J0	FAST	Cell H	3.96												1000 U	0.01 U
B0G7J1	EAL	Cell H	3.96	0.075 U				0.072 U		0.319 U		0.238 U				
116-B5A-14.5	FAST/EAL		4.41	0.076 U				0.064 U		0.350 U		0.230 U			300 U	100 U
116-B5B-14.5	FAST/EAL		4.41	0.085 U				0.072 U		0.510 U		0.300 U			1000 U	0.01 U
116-B5D-15	FAST/EAL		4.57	0.074 U				0.079 U		0.410 U		0.260 U			300 U	100 U
116-B5E-15	FAST/EAL	Very hard drilling at 4.0 m (13 ft.)	4.57	0.056 U				0.067 U		0.390 U		0.17 U			300 U	100 U
116-B5F-15	FAST/EAL	Moist to wet	4.57	0.074 U				0.088 U		0.350 U		0.250 U			300 U	100 U
116-B5G-15	FAST/EAL		4.57	0.076 U				0.083 U		0.480 U		0.340 U			1000 U	0.01 U
116-B5H-15	FAST/EAL		4.57	0.076 U				0.083 U		0.460 U		0.25 U			1000 U	0.01 U
116-B5I-15	FAST/EAL		4.57	0.070 U				0.050 U		0.310 U		0.200 U			300 U	0.1 U
B0G7L2	FAST	Cell A	4.57												1000 U	2.7
B0G7L3	EAL	Cell A	4.57	0.059 U				0.074	+/- 0.042	0.332 U		0.246 U				
B0G7K8	FAST	Cell C	4.57												1000 U	2.4
B0G7K9	EAL	Cell C	4.57	0.145 U				0.883	+/- 0.132	9.95	+/- 1.12	0.882	+/- 0.260			
B0G7L8	FAST	Cell E	4.57												1000 U	0.01 U
B0G7L9	EAL	Cell E	4.57	0.052 U				0.109 U		0.285 U		0.238 U				
B0G7M0	FAST	Cell E	4.57												1000 U	0.01 U
B0G7M1	EAL	Cell E	4.57	0.058 U				0.085 U		0.428 U		0.199 U				
B0G7M3	EAL	Cell E	4.57	0.285	+/- 0.083			0.730	+/- 0.119	7.46	+/- 1	0.864	+/- 0.223			
B0G7M5	EAL	Cell E	4.57	0.191	+/- 0.075			0.747	+/- 0.126	6.58	+/- 0.802	0.722 U				
B0G8Z5	222S	Cell H	4.57											50 U		
B0G7J2	FAST	Cell H	4.57												1000 U	0.5
B0G7J3	EAL	Cell H	4.57	0.070 U				0.091 U		0.390 U		0.241 U				
B0G7L4	FAST	Cell A	5.18												1000 U	2.8
B0G7L5	EAL	Cell A	5.18	0.067 U				0.086	+/- 0.050	0.284 U		0.180 U				
B0G7K2	FAST	Cell B	5.18												1000 U	2.8
B0G7K3	EAL	Cell B	5.18	0.077 U				0.492	+/- 0.098	1.95	+/- 0.495	0.337 U				
H95025	Ecology	Ecology split sample of B0G7K2 and B0G7K3	5.18	0.026 U		0.6 U		0.545		1.80		0.165			160	1.9
B0G7N2	222S	Cell B	5.18											50 U		
B0G7L0	FAST	Cell C	5.18												1000 U	1.6
B0G7L1	EAL	Cell C	5.18	0.08 U				0.94	+/- 0.126	2.24	+/- 0.512	0.237 U				

Table A-1. Summary of 116-B-5 Soil Sampling and Analytical Data

Sample Number	Lab	Description	Depth Below Surface (meter)	pCi/g											mg/Kg	
				Cesium-137		Strontium-90		Cobalt-60		Europium-152		Europium-154		Tritium	Barium	Mercury
				Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Counting error	Result	Result	Result
B0G7M2	FAST	Cell E	5.18												1000 U	1.4
B0G7M4	FAST	Cell E	5.18												1000 U	1.4
A_BTM	SAS	1.8 m (6 ft.) dia. area in bottom of cell A. Ash, soil, rock mixture with approx. 0.3 m (1 ft.) section of broken feed pipe.	5.18	0.12 U				0.08 U		0.80	+/- 0.213	0.22 U				
A_PILE	SAS	Approx. 0.6 m (2 ft.) dia area in pile removed from Cell A. Diameter of pile at base ~1.8 m (6 ft.) Large amount of ash mixed in.	5.18	0.11 U				0.08 U		0.680 U		0.188 U				
B_BTM	SAS	0.9-1.2 m (3-4 ft.) diameter area in bottom of cell B. Little ash.	5.18	0.209 U				0.304	+/- 0.066	1.83	+/- 0.439	0.198	+/- 0.098			
PIPELCA	SAS	Approx. 1.2 m (4 ft.) dia. area of soil in feed pipe trench near paved road. Piece of feed pipe within viewing range of detector. Lab designation for this location is "A".	5.18	0.155 U				0.125 U		0.480 U		0.297 U				
PIPELCB	SAS	Approx. 0.9 m (3 ft.) diameter area of soil just north of PIPELCA locations. Area composed mostly of broken segments of feed pipe. Lab designation for this a rea is location "B".	5.18	0.074 U				0.060 U		0.216 U		0.151 U				

U = Undetected at specified detection level.
B = This sample result has an associated laboratory reagent blank result that is non-U.
J = The result value is an estimate. No U qualifier has been assigned and the result is below the RDL.
m = meters (feet x .3048)

ATTACHMENT B

SAMPLE LOCATIONS

Figure B-1. 116-B-5 Sample Locations - Plan View.

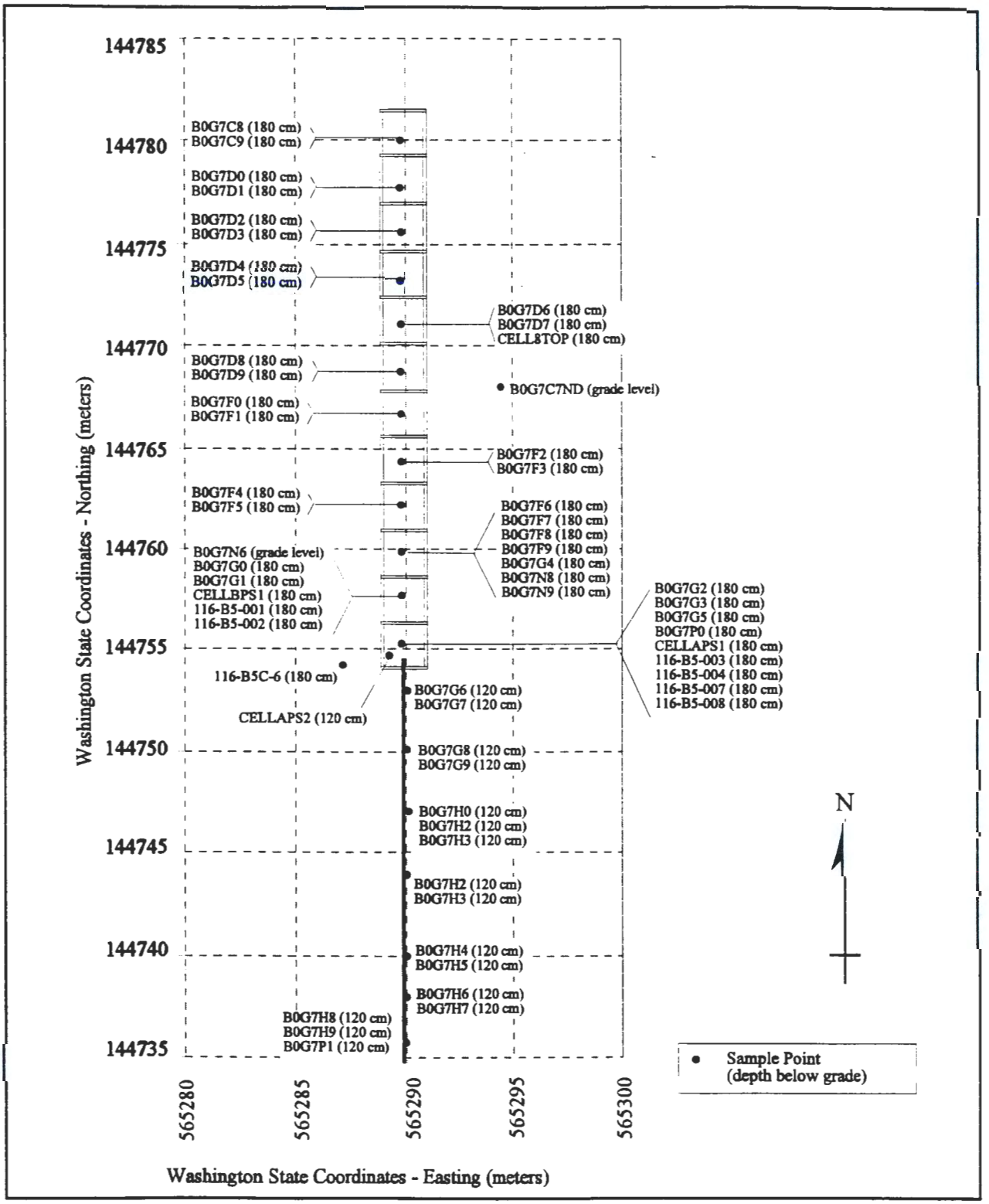


Figure B-2. 116-B-5 Sample Locations at Elevations 139 to 141.2 m.

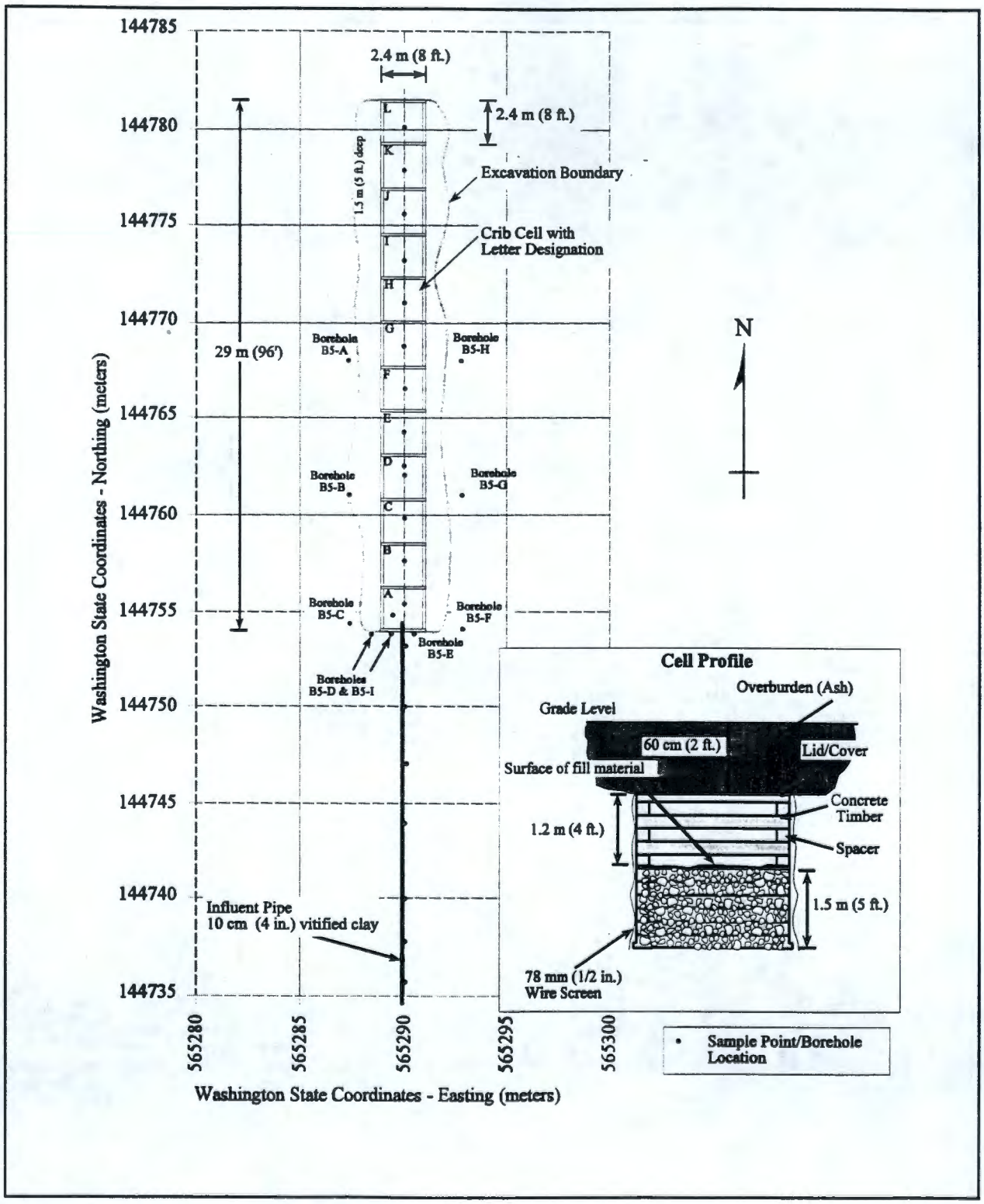


Figure B-3. 116-B-5 Sample Locations at Elevations 137 to 138.9 m.

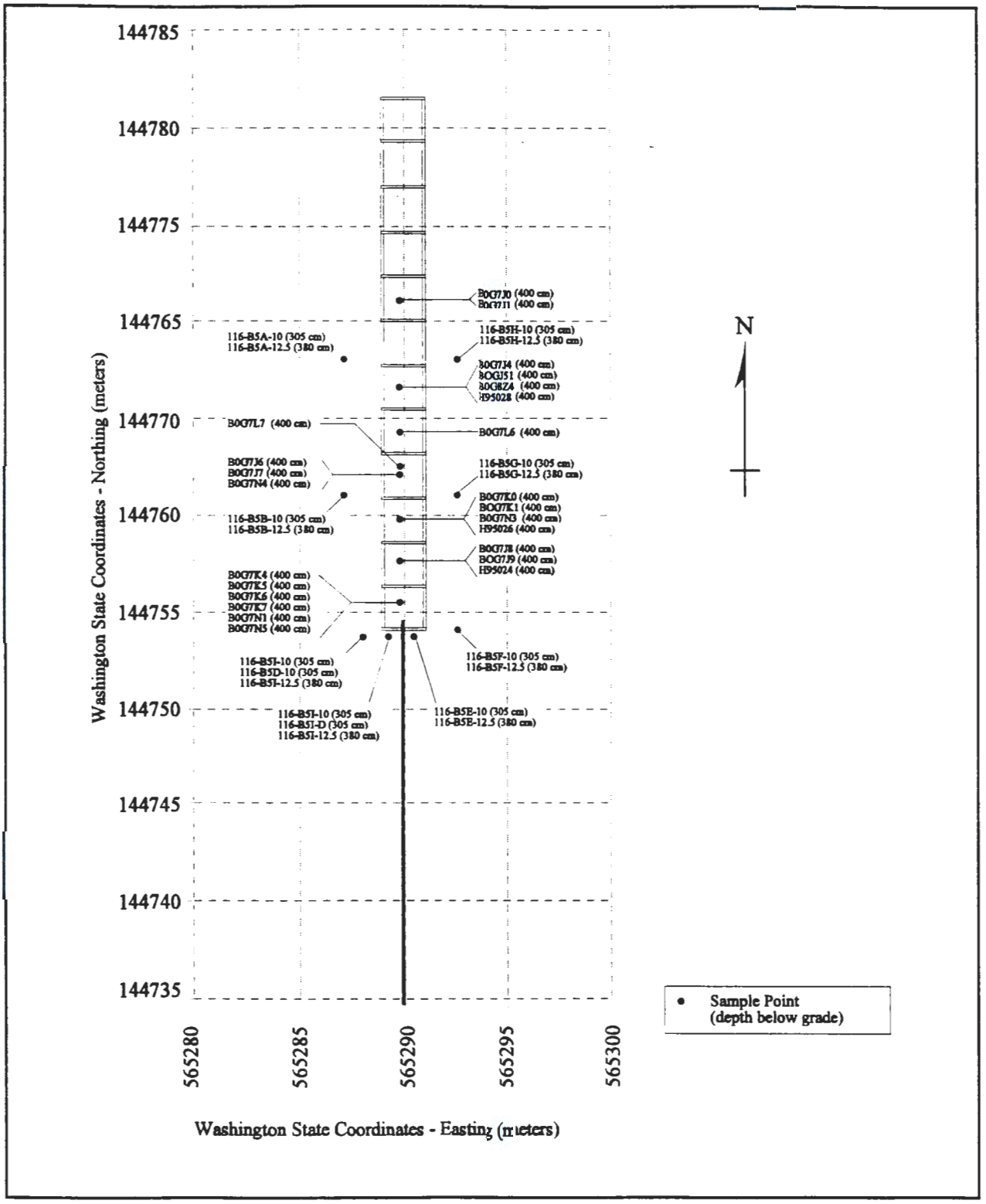


Figure B-4. 116-B-5 Sample Locations at Elevations 136 to 136.9 m.

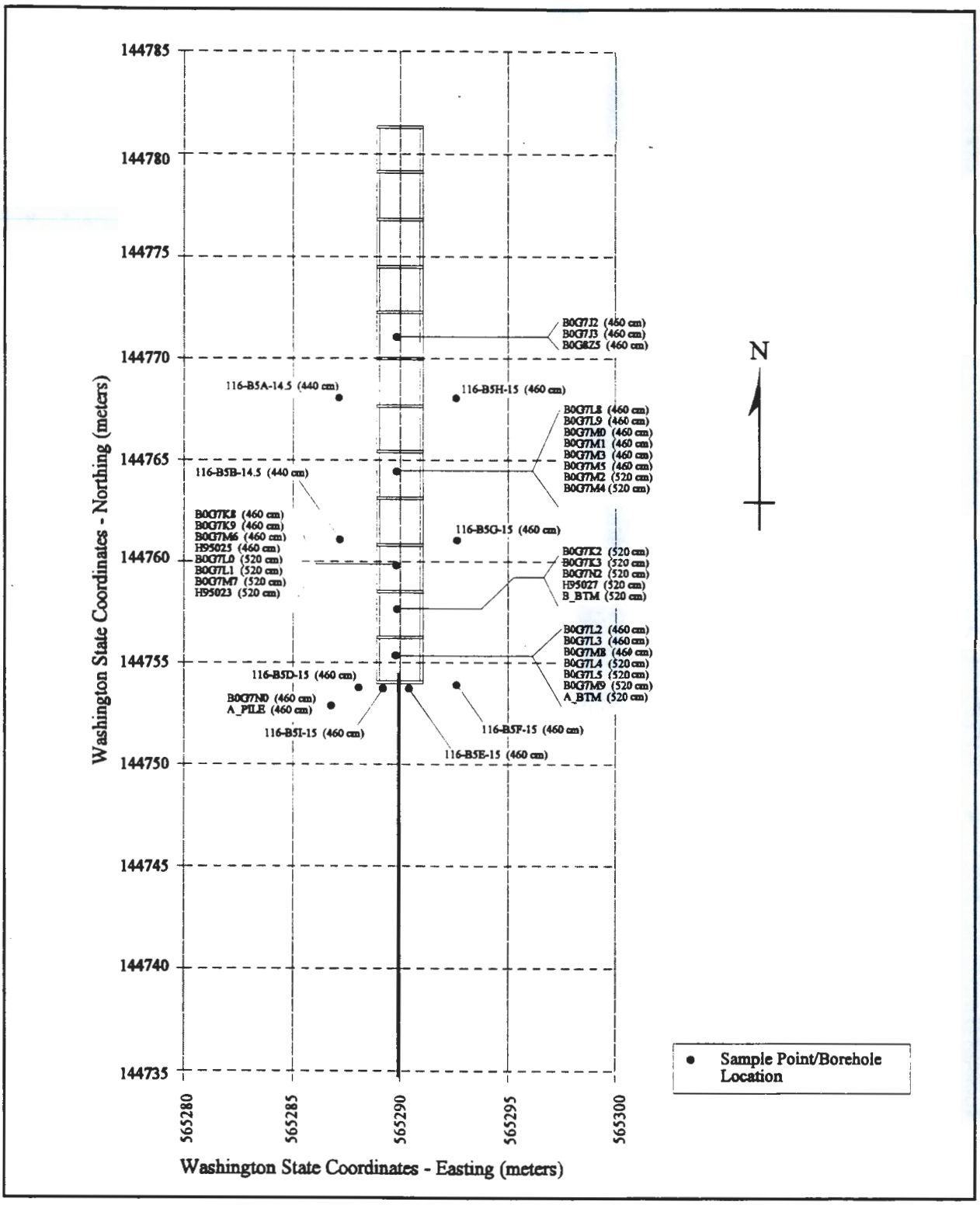
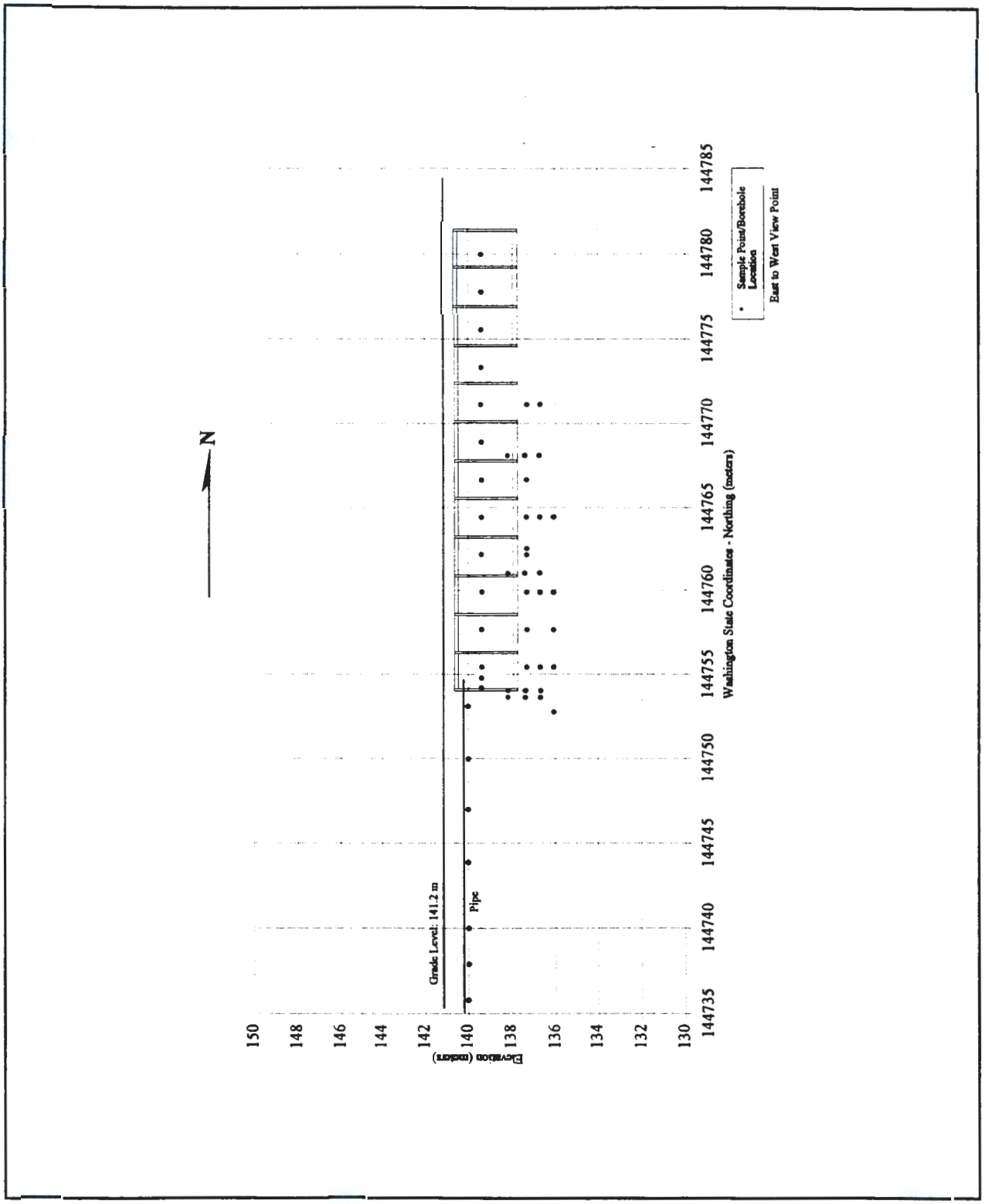


Figure B-5. 116-B-5 Profile View.



ATTACHMENT C

RESRAD Parameters for Verification of the 116-B-5 Crib

Parameter	Direct Exposure	Groundwater Protection	Citation	Rationale
Area of contaminated zone (m^2)	272	272		116-B-5 specific
Thickness of contaminated zone (m)	4.6	5.2		116-B-5 specific
Length parallel to aquifer flow (m)	34	34		116-B-5 specific
Radiation dose limit (mrem/yr)	15	4	ROD	
Elapsed time of waste placement (yr)	0	0	ROD	
Cover depth (m)	0	0		excavated material used as backfill.
Density of cover material (g/cm^3)	Not used	Not used	DOE-RL 90-07	Soils from the area will be used for fill (density = 1.6 g/cm^3)
Cover depth erosion rate (m/yr)	Not used	Not used		excavated material used as backfill.
Density of contaminated zone (g/cm^3)	1.6	1.6	DOE-RL 90-07	Hanford 100 Area site-specific data
Contaminated zone erosion rate (m/yr)	0.001	0.001		Default
Contaminated zone total porosity	0.4	0.4	WDOH	
Contaminated zone effective porosity	0.25	0.25	WDOH	
Contaminated zone hydraulic conductivity (m/yr)	250	250	DOE-RL 96-11 DOE-RL 93-37	100 Area site-specific data
Contaminated zone b parameter	5.3	5.3		Default
Humidity in air (g/m^3)	8	8		Default
Evapotranspiration coefficient	0.91	0.91	EPA	Letter From EPA
Precipitation (m/yr)	0.16	0.16	DOE-RL 90-07	Based on 16 cm (6.3 in) year rainfall.
Irrigation (m/yr)	0.76	0.76	EPA	Assumes 30 inches
Irrigation Mode	Overhead	Overhead		Default
Runoff Coefficient	0.2	0.2		Default
Watershed area (m^2)	1,000,000	1,000,000		Default
Accuracy for water/soil computations	0.001	0.001		Default
Density of saturated zone (g/cm^3)	1.6	1.6	DOE-RL 90-07	Hanford 100 Area site-specific data
Saturated zone total porosity	0.4	0.4	WDOH	
Saturated zone effective porosity	0.25	0.25	WDOH	
Saturated zone hydraulic conductivity (m/yr)	5530	5530	DOE-RL 96-11 DOE-RL 93-37	Hanford 100 Area site specific data
Saturated zone hydraulic gradient	0.00125	0.00125	DOE-RL 94-136	Based on GW velocity = 27.8 m/yr, hydraulic conductivity = 5530 m/yr, porosity= 0.25
Saturated zone b parameter	5.3	5.3		Default
Water table drop rate (m/yr)	0.001	0.001		Default
Well pump intake depth (m below water table)	4.6	4.6		Typical RCRA screen length
Nondispersion or Mass-Balance	ND	ND		Default
Well pumping rate (m^3/yr)	250	250		Default
Number of unsaturated zone strata	1	1		116-B-5 site specific
Unsat. zone 1, thickness (m)	9.2	8.6		116-B-5 site specific
Unsat. zone 1, soil density (g/cm^3)	1.6	1.6	DOE-RL-90-07	Hanford 100 Area site specific data
Unsat. zone 1, total porosity	0.4	0.4	WDOH	
Unsat. zone 1, effective porosity	0.25	0.25	WDOH	

RESRAD Parameters for Verification of the 116-B-5 Crib

Parameter	Direct Exposure	Groundwater Protection	Citation	Rationale
Unsat. zone 1, soil-specific b parameter	5.3	5.3	WDOH	
Unsat. zone 1, hydraulic conductivity (m/yr)	250	250	DOE-RL-96-11 DOE-RL-93-37	Hanford 100 Area site specific
Inhalation rate (m/yr)	7300	Not used	WDOH	
Mass loading for inhalation (g/m^3)	0.0001	Not used	WDOH	
Dilution length for airborne dust, inhalation (m)	3	Not used		Default
Exposure duration	30	30		Default
Shielding factor, inhalation	0.4	Not used		Default
Shielding factor, external gamma	0.8	Not used	WDOH	
Fraction of time spent indoors	0.6	Not used	WDOH	
Fraction of time spent outdoors (on site)	0.2	Not used	WDOH	
Shape factor flag, external gamma	1	Not used		Default
Fruits, vegetables and grain consumption (kg/yr)	110	Not used	WDOH	
Leafy vegetable consumption (kg/yr)	3	Not used	WDOH	
Milk consumption (L/yr)	100	Not used	WDOH	
Meat and poultry consumption (kg/yr)	36	Not used	WDOH	
Fish consumption (kg/yr)	Not used	Not used		
Other seafood consumption (kg/yr)	Not used	Not used		
Soil ingestion rate (g/yr)	36	Not used	WDOH	
Drinking water intake (L/yr)	510	510		Default
Drinking water fraction from ground water	1	1		Default
Household water fraction from ground water	1	1		Default
Livestock water contamination fraction		Not used		Default
Irrigation water contamination fraction	1	Not used		Default
Aquatic food contamination fraction	Not used	Not used		
Plant food contamination fraction	-1	Not used		Default
Meat contamination fraction	-1	Not used		Default
Milk contamination fraction	-1	Not used		Default
Livestock fodder intake for meat (kg/d)	68	Not used		Default
Livestock fodder intake for milk (kg/d)	55	Not used		Default
Livestock water intake for milk (L/d)	50	Not used		Default
Livestock water intake for meat (L/d)	160	Not used		Default
Livestock intake of soil (kg/d)	0.5	Not used		Default
Mass loading for foliar deposition (g/m^3)	0.0001	Not used		Default
Depth of soil mixing layer (m)	0.15	Not used		Default
Depth of roots (m)	0.9	Not used		Default
Groundwater fractional usage - drinking water	1	1		Default
Groundwater fractional usage - household usage	1	1		Default
Groundwater fractional usage - livestock water	1	Not used		Default
Groundwater usage - irrigation	1	Not used		Default