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JUL 18 1989 48

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 106863

2. To: (Receiving Organization) See Signature Block	3. From: (Originating Organization) Decommissioning Engineering
5. Proj/Prog/Dept/Div: 80423	6. Cog/Proj Engr: D. B. Encke

4. Related EDT No: N/A

7. Purchase Order No: N/A

9. Equip/Component No: N/A

10. System/Bldg/Facility: N/A

12. Major Assm Dwg No: N/A

13. Permit/Permit Application No: N/A

14. Required Response Date:

8. Originator Remarks:

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1	SD-DD-TI-011		0	Final Dose Assessment of In Situ Burial of the 1608-H Lift Station	3	1		

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 see MRP 5.43 and EP-1.7	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

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1	/	Cog./Proj. Eng. Mgr. D. R. Speer			R2-77						
1	/	QA R. G. Dieffenbacher		6-23-89	H4-16						
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SUPPORTING DOCUMENT

1 Page 1 of 76

2 Title
Final Dose Assessment for the In Situ Burial of the 1608-H Lift Station

3 Number
SD-DD-TI-011

4 Rev. No.
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5 Key Words

6. Author
D. B. Encke
Name (Type or Print)
D. B. Encke
Signature
80423
Organization Code

7 Abstract This document describes the radiological characterization, and final dose assessment for the decommissioning of the 1608-H facility utilizing the ARCL methodology. The 1608-H facility was a reinforced concrete structure which functioned as a lift station to pump liquid effluents fromt he 105-H Reactor facility to the 116-H-2 (1608-H crib) and 107-H Retention Basins. The facility consisted of an equipment room, accumulation sump, and three pump sumps. Following an initial survey, sampling strata were identified and samples were thaken throughout the facility that would enable the total source term to be estimated for the radiological analyses. The analysis results were then utilized to perform a dose assessment of the facility. The dose assessment was performed utilizing the Allowable Residual Contamination Level (ARCL) method. The worst case dose assessment indicatedthat the 1608-H facility could contribute 0.026 mrem/yr whole body dose to an individual living on the site at zero years post decommissioning (upon immediate release). Based on a dose limit of 25 mrem/yr and future decommissioning activities, this was judged to be an acceptable value and that th in situ demolition of the facility should proceed. the total dose within the hectare surrounding the 1608-H site was based on the soe contribution for the 116-H Stack and th 117-H Filter Building, both previously decommissioned utilizing the ARCLmethodology.

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DOSE ASSESSMENT OF IN SITU BURIAL OF THE 1608-H LIFT STATION

Author: _____ Date 5-31-89
J. F. Beckstrom, Lead Engineer
Decommissioning Engineering

Reviewed by: _____ Date 6/9/89
Pacific Northwest Laboratories

Approved by: _____ Date 6-13-89
R. G. Dieffenbacher, Principal QA Engineer
N-Reactor Quality Assurance

Approved by: _____ Date 6-21-89
K. A. Gano, Manager
Environmental Protection - 100 Areas

Approved by: for _____ Date 6-22-89
D. R. Speer, Manager
Decommissioning Engineering

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1.0 INTRODUCTION

The decommissioning of a facility on the Hanford Site requires that a dose assessment be performed utilizing the Allowable Residual Contamination Method (Reference 1 & 2). A Department of Energy letter dated July 3, 1984, from the Manager, DOE-RL, (Reference 3) specifies that the annual whole body dose or organ dose to a member of the public living at the decommissioning site at the time the site is released to the public, will be less that 25 mrem/yr. The established goal of decommissioning on the Hanford Site is to strive to meet the 25 mrem/yr limit at the time of decommissioning. If it is not possible to meet this goal because of extensive cost or exposure to personnel, the limit will be met at time = 100 years post-decommissioning.

The purpose of this report is to document the estimated dose impact to the maximally-exposed individual resulting from this decommissioning method and to show that the annual dose at the site will be less than 25 mrem per year to the whole body or any organ. The selected method of decommissioning the 1608-H Lift Station was to demolish the facility and bury the resulting rubble in situ.

2.0 FACILITY LOCATION AND DESCRIPTION

The 1608-H Lift Station Site is located in the 100-H Area within the Hanford Site on the southwest bank of the Columbia River in southcentral Washington State (Figure 1). Within the 100-H Area, the 1608-H Lift Station Site is located approximately 30 ft southwest of the 105-H Reactor Building Fuel Storage Basin (Figure 2 & 3).

The 1608-H Facility functioned as a lift station to pump effluents collected from various systems to the 107-H retention basins. The facility was constructed of reinforced concrete with a concrete block superstructure, and consisted of a main equipment room floor measuring approximately 30 sq ft, an accumulation sump, and three pump sumps (Figure 4 & 5). Two of the pump sumps utilized electric motor-driven pumps, and the third sump utilized a steam-driven pump. Steel distribution gates were utilized to distribute liquid from the accumulation sump to the pump sumps. All three pumps discharged to effluent lines leading to the 107 retention basins via two 12-in. diameter pipes or the 116-H-2 (1608-H Crib).

3.0 RADIOLOGICAL CHARACTERIZATION

3.1 Initial Survey

Prior to collecting samples for analysis, an initial survey of the 1608-H Facility was conducted, utilizing a P-11 ("pancake" type) Geiger Muller probe and an Eberline BNW-1 count rate meter.

A survey of the wall, ceiling, and floor areas of the main floor equipment room indicated that general surface contamination levels were less than 200 cpm direct beta-gamma contamination. In addition, contamination was detected around the equipment pedestals on the lower-level floor.

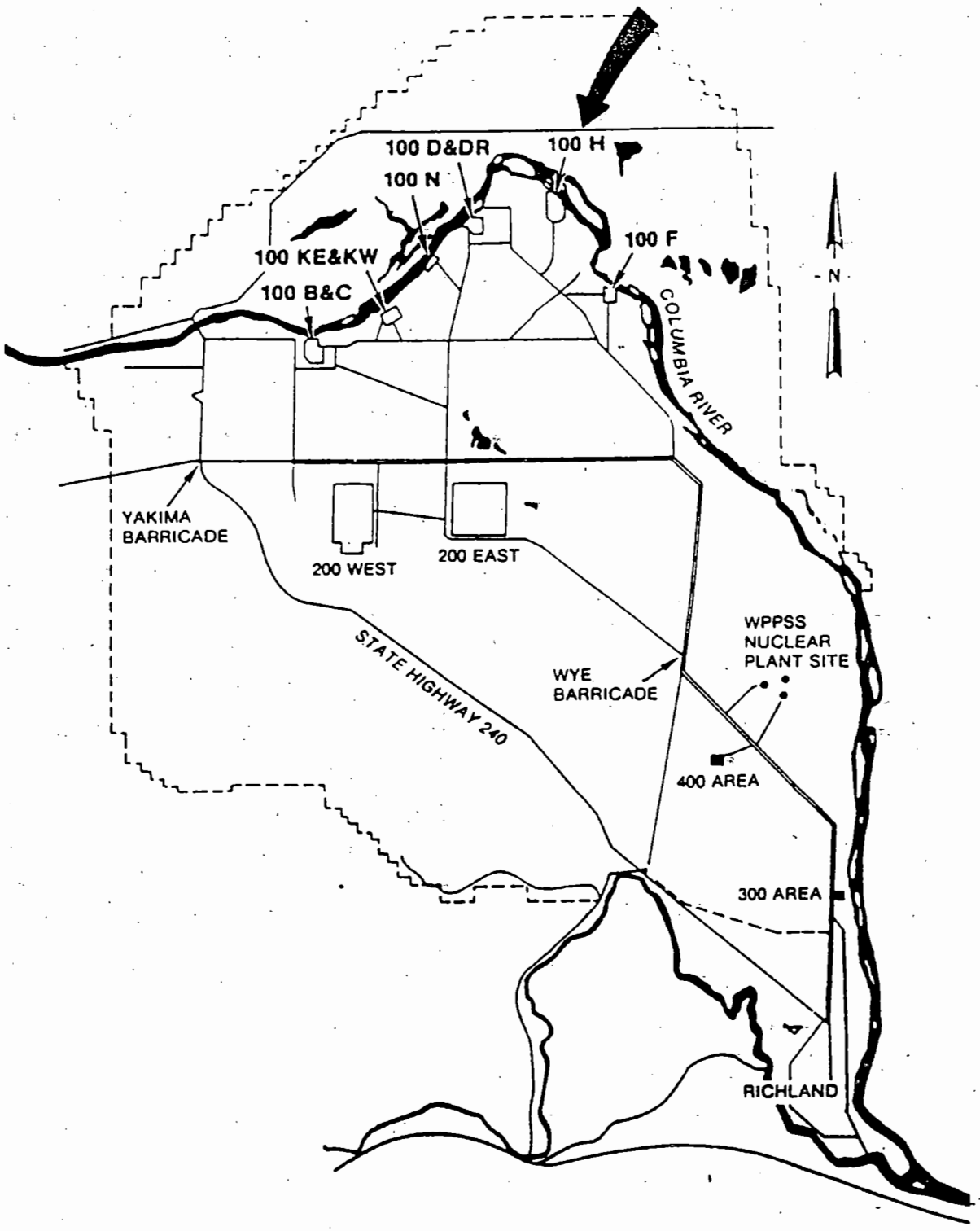


Figure 1. Hanford 100 Area Site Map.

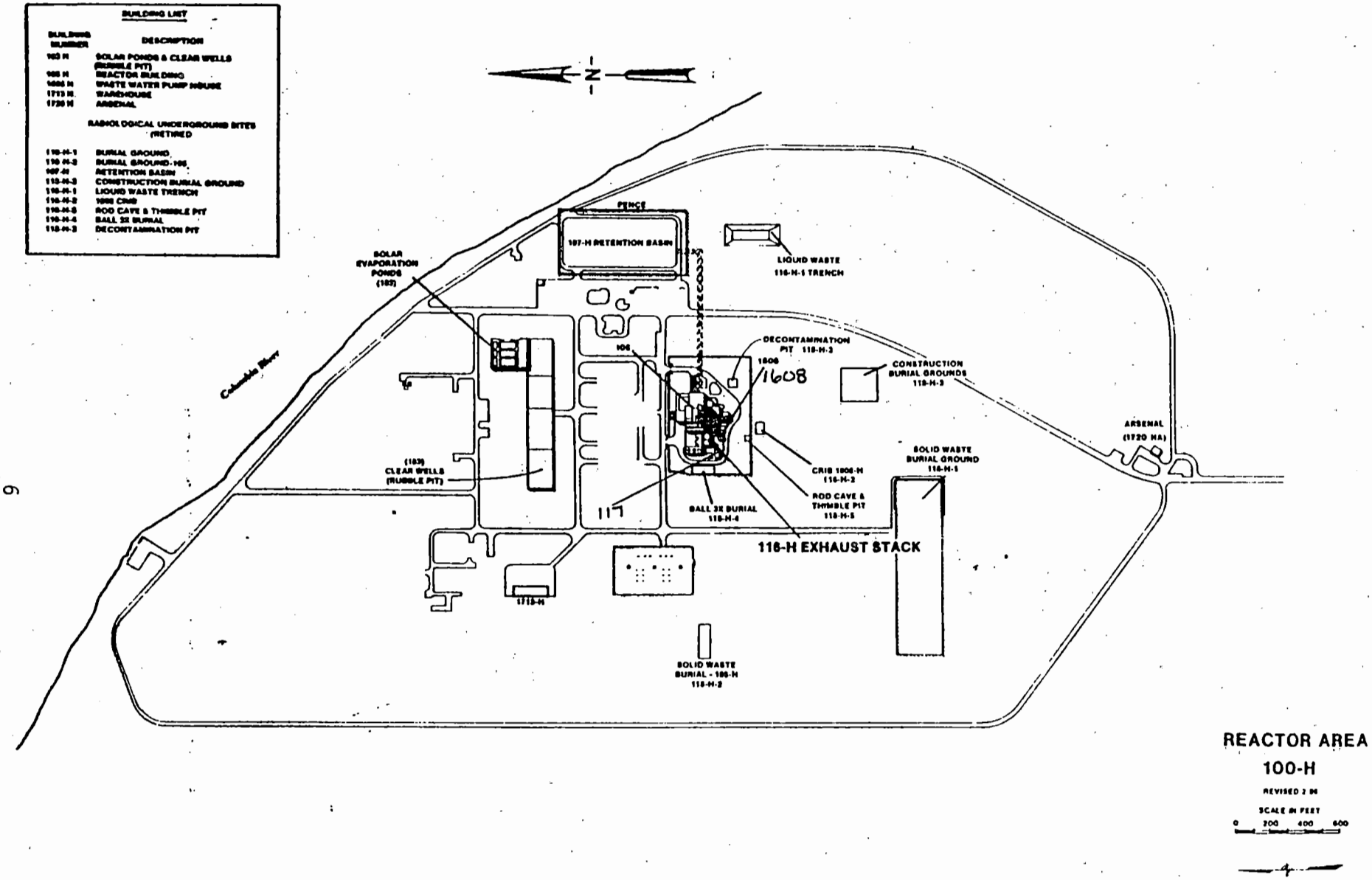


Figure 2. 100-H Reactor Area and 117-H and 1608-H

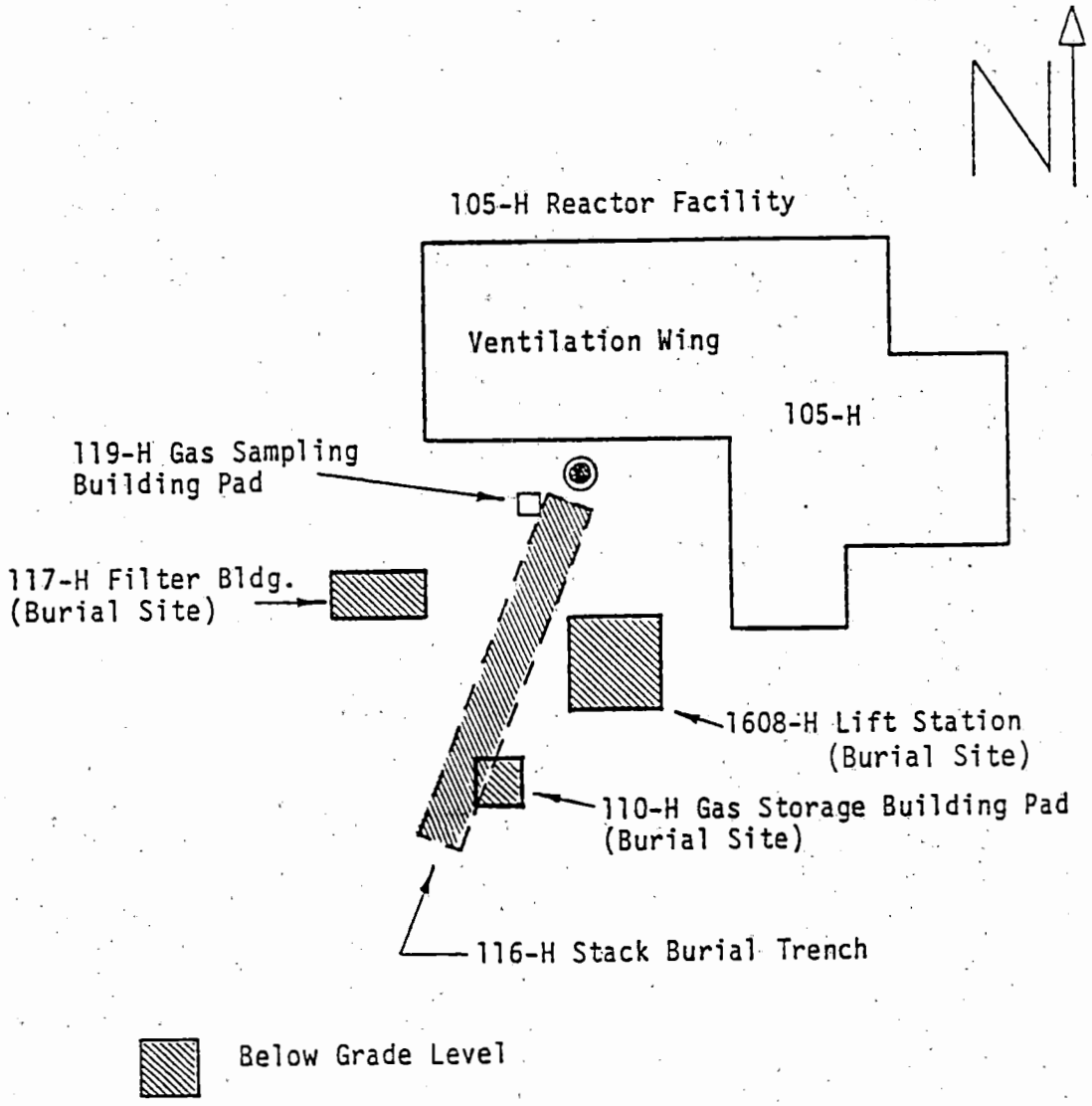


Figure 3: 105-H Reactor Facility Showing 1608-H, 117-H and 116-H Demolition Sites.

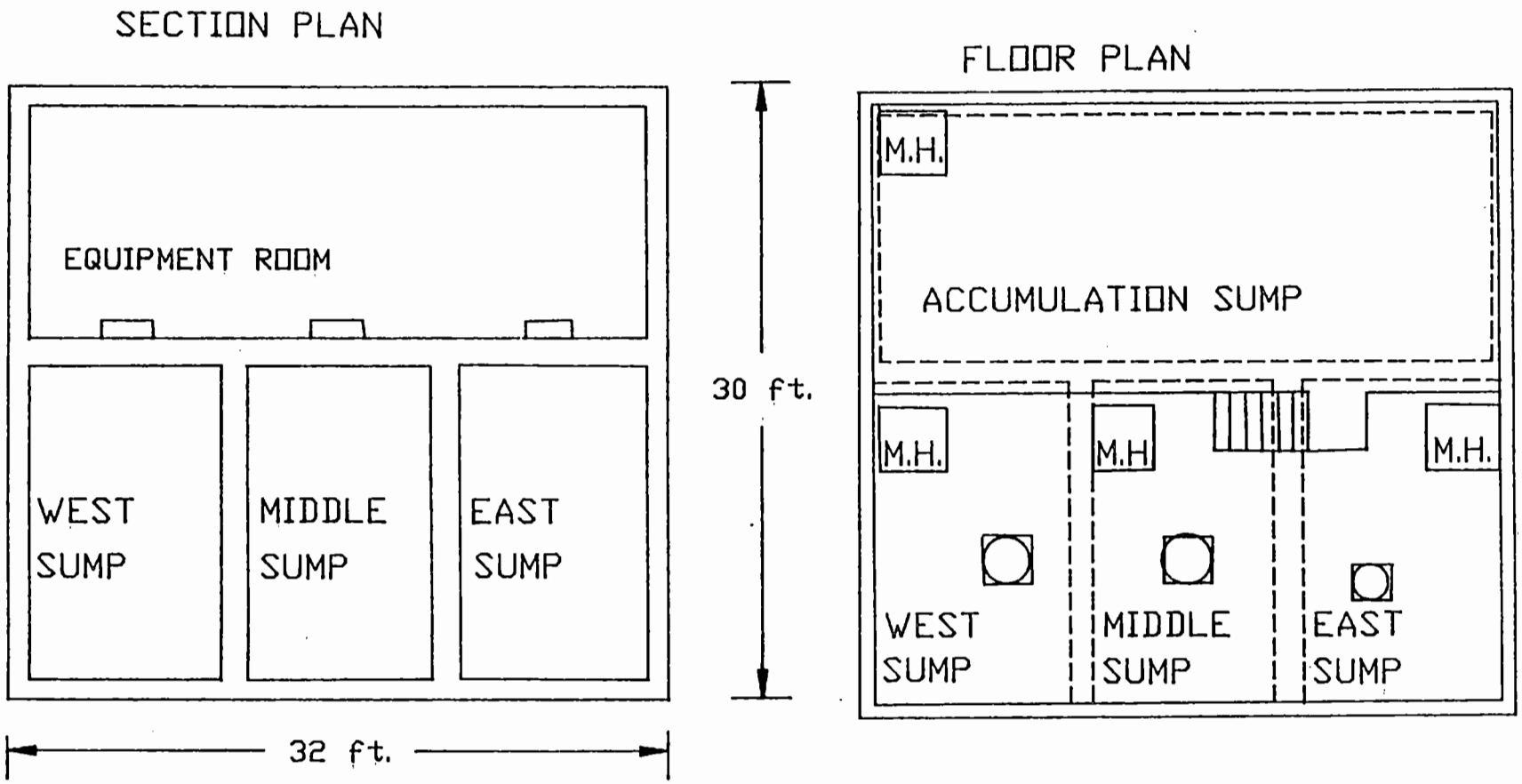
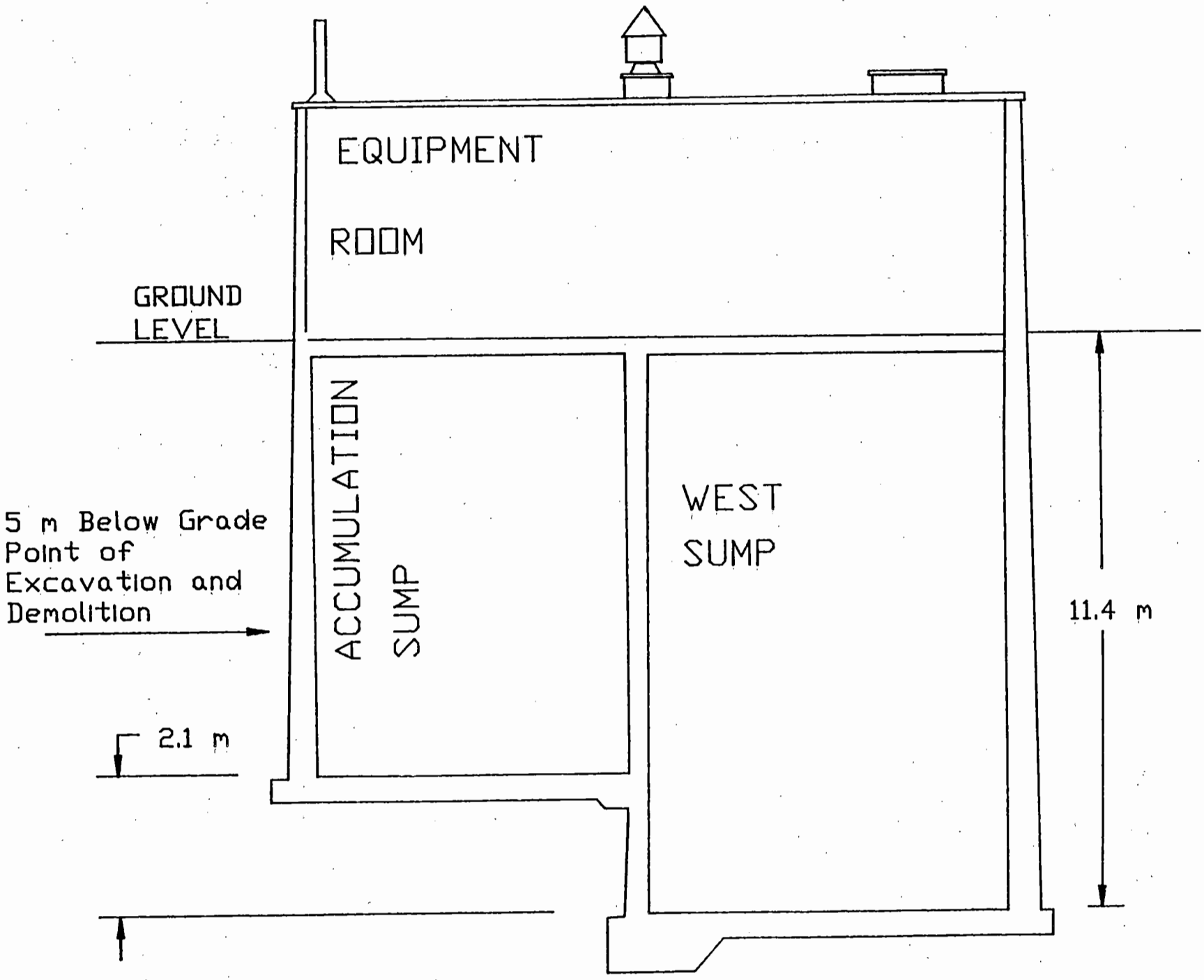


FIGURE 4. 1608-H FLOOR AND SECTION PLAN


EQUIPMENT
ROOM
GROUND
LEVEL
ACCUMULATION
SUMP
WEST
SUMP
5 m Below Grade
Point of
Excavation and
Demolition
2.1 m
11.4 m

The majority of this area contained contamination levels in the range of 300-500 cpm direct. However, one small area contained contamination levels in the range of 1,000 - 3,500 cpm direct.

Surveys of the three pump sumps and the accumulation sump indicated general concrete floor surface contamination levels in the range of 10,000 - 60,000 cpm beta-gamma direct. Surveys of the below water line concrete surfaces indicated general contamination levels of 2,000 - 5,000 cpm beta-gamma direct. Surveys of above water line concrete surfaces indicate general contamination levels of 200 - 1,000 cpm beta-gamma direct.

Surveys of below water line metal surfaces (i.e., distribution gates, vent/overflow pipes) indicated that the rust scale covering these surfaces yielded readings of 3,000 - 5,000 cpm beta-gamma direct. Alpha contamination was not detected with portable radiation survey meters.

3.2 Sampling

Based on the initial survey, ten strata corresponding to the different contamination levels found in the 1608-H Facility were identified. Following identification, samples were taken from each of these ten strata. The following list describes the ten strata and the samples taken from each.

Stratum #1: Sump Floors
This stratum included the accumulation sump and the east and west sump floors. A total of 6 samples were taken from this stratum. All samples were taken to a depth of 0.5 cm.

Stratum #2: Middle Sump Floor
This stratum consists of 2 samples from the middle sump floor. These samples were taken to a depth of 1.0 cm. One concrete core sample was taken from the center of the Middle Sump (See Section 3.3).

Stratum #3: Sump Walls Below Water Line
This stratum includes the accumulation sump and the east and west sump walls that were below the water line. A total of 6 concrete samples were taken from this stratum. All samples were taken to a depth of 0.5 cm.

Stratum #4: Sump Walls Above Water Line
This stratum consists of 2 samples from the middle sump area above the water line. These samples were taken to a depth of 1.0 cm.

Stratum #5: Sump Ceilings and Walls Above Water Line
This stratum includes the ceilings and walls of the accumulation sump and the east, west, and middle sumps that were above the water line. A total of 6 concrete samples were taken from this stratum. All samples were taken to a depth of 0.5 cm.

Stratum #6: Middle Sump Ceiling and Walls Above Water Line
This stratum consists of 2 samples from the middle sump area above the water line. These samples were taken to a depth of 1.0 cm.

Stratum #7: Lower Equipment Room Floor
This stratum includes all floor surfaces on the lower-level equipment room floor. To ensure a conservative estimate of the inventory in this stratum, all samples were taken from the contaminated areas identified in Section 3.1. A total of three samples were taken to a depth of 1.0 cm.

Stratum #8: Upper Equipment Room Floor
This stratum includes all floor surfaces on the upper-level equipment floor. A total of 2 samples were taken to a depth of 1.0 cm.

Stratum #9: Equipment Room Walls and Ceiling
This stratum includes all equipment room walls and ceiling surfaces. A total of 4 samples were taken to a depth of 1.0 cm.

Stratum #10: Rust Scale
This stratum includes all metal surfaces below the sumps water line that showed detectable contamination levels. Two samples of rust scale were taken from ladder rungs and one sample was taken from the west sump distribution gate. All samples were collected by scraping all of the scale from a 100 sq cm area.

3.3 Sample Analysis Results

The sample analysis results are listed in Appendix C by individual stratum, along with the dose assessment calculations. Sub-location codes for identifying individual samples are listed in Table 1.

Table 1, Data Base Sub-location Codes

Sub-location One Codes	Sub-location Two Codes
AS = Accumulation Sump	A = Above Water Line
ES = East Sump	B = Below Water Line
MS = Middle Sump	EW = East Wall
WS = West Sump	NW = North Wall
ERL = Lower Equipment Room	WW = West Wall
ERU = Upper Equipment Room	SW = South Wall
	F = Floor
	DG = Distribution Gate
	LR = Ladder Rungs

Since samples collected from the middle sump were taken at a different depth than in the other sumps, all analysis results for the middle sump concrete were put in a seperate stratum. Although insignificant to the dose assessment, C-14 and H-3 analysis were performed on 4 concrete samples from the sump floors to yield a "worst case" type of concentration estimate.

In addition, because of the significant gross alpha activity (100-400 pCi/g) observed for the concrete samples taken from the sump floors, specific analyses for transuranic (TRU) isotopes were performed. The results of these analyses are listed in Table 2.

Table 2, TRU Analytical Results

Sample Number	Units	Pu-239/240	Am-241	Cm-244	Gross Alpha
87-81	pCi/g	231	86.9	27.3	379
87-88	pCi/g	228	105	60.8	334
87-122	pCi/g	504	156	39.0	376
87-128	pCi/g	9.3	15.4	7.6	63.3

The gross alpha activity levels yielded a reasonable estimate of the total TRU concentrations. As a result, specific TRU analysis for all samples were not warranted. Gross alpha activities were utilized to estimate the total TRU isotope concentrations for all samples. The gross alpha values were used in the ARCL calculations and were assumed to be Pu-239/240.

One concrete core sample was removed from the floor of the middle sump. The core was sent to the Pacific Northwest Laboratory (PNL) for analysis and to determine the depth of radionuclide penetration into the concrete. Table 3 shows the results of the core analysis.

Table 3, Radiochemical Analysis of Concrete Core HE-7

Sub-sample Number	Thickness Wafer (cm)	CO-60	Sr-90	CS-137	Eu-152
Surface	0.021	714±30	603±18	2271±66	2381±78
HE-7A	1.10	29±22	5.8±1.7	49±23	<35
HE-7B	0.85	<18	<1.95	<19	<31
HE-7C	1.05	<19	<1.31	<19	<33

The surface of the core was removed using a dremel tool. The core was then sawed with a diamond blade so that 3 wafers of about 1 cm thick were attained. The wafers were individually ground, counted and analyzed. Figure 6 shows a graphic representation of the sample preparation method. This analytical data is consistent with the results obtained from concrete samples from all previous decommissioned facilities in the 100 Areas where the ARCL methodology was utilized for performing the dose assessments.

3.4 Survey and Analytical Instrumentation

Laboratory measurements were made using instruments in the Decommissioning Health Physics Laboratory located in the 183-KE Building.

Isotopic Analysis	Tracor Northern Multi-Channel Analyzer (MCA) Model TN-4000
Gross Bet-Gamma	Canberra Gas Proportional Counter Model 2400 (Low Background)
Strontium-90, Tritium, Carbon-14	Pacific Northwest Laboratories Hanford 300 Area

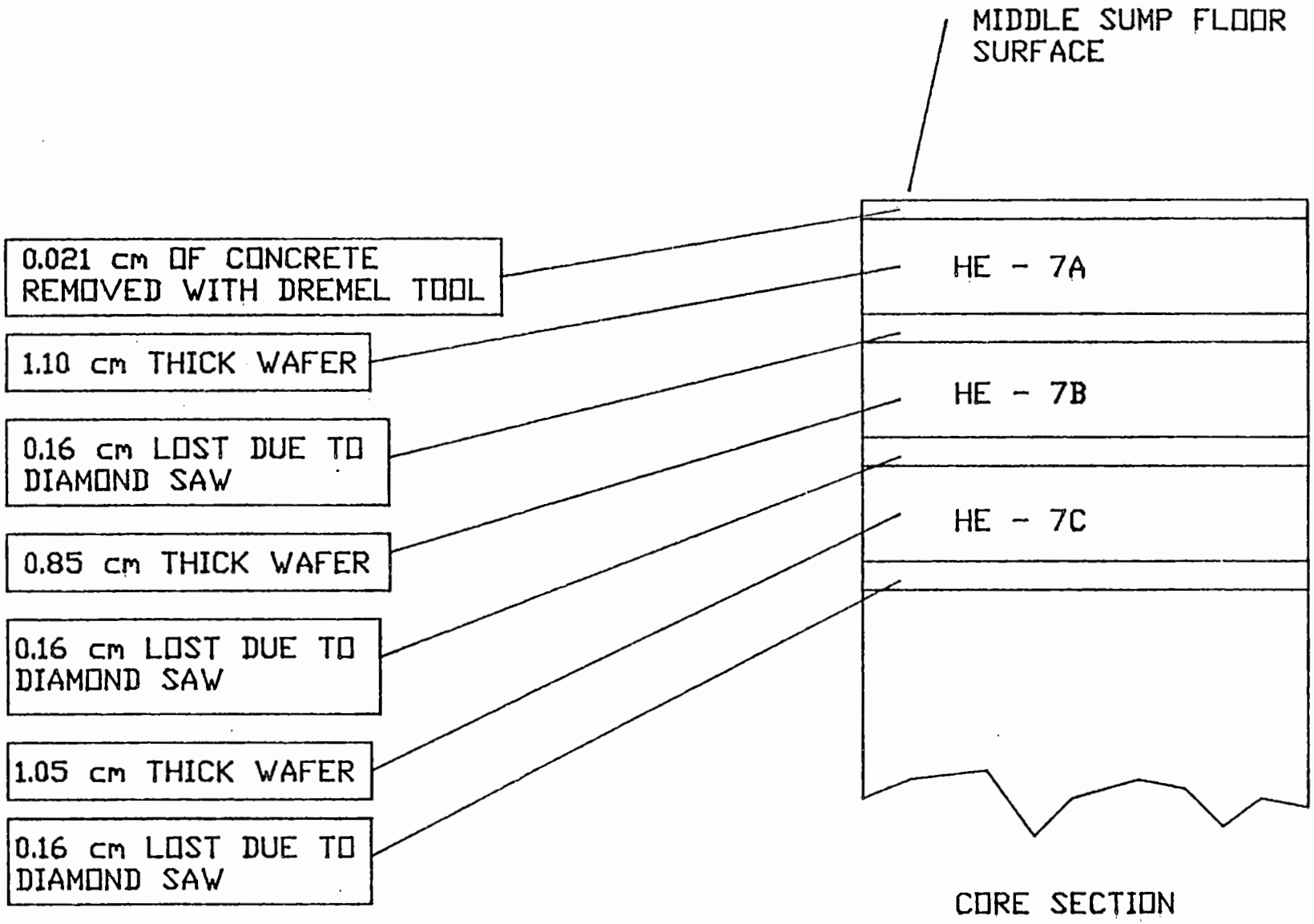


FIGURE 6. GRAPHIC ILLUSTRATION OF HE-7 CONCRETE CORE SAMPLE ANALYSIS

Portable survey instruments were maintained and calibrated by the Instrument Calibration and Evaluation Section, Pacific Northwest Laboratories located in the Hanford 300 Area.

Direct Beta-Gamma	Eberline Instrument Corp. Model BNW-1 with P-11 "Pancake" Probe
Direct Alpha	PAM Portable Alpha Meter

4.0 DOSE ASSESSMENT

4.1 Scope

Prior to decommissioning the 1608-H Lift Station, approximately 80,000 gallons of water was found in the facility. The water was pumped out and transported by tractor trailer to the 1325-N Crib, 100-N Area, for disposal. The residual sludge in the facility sumps was removed and packaged into 55 gallon drums. The drums of sludge were disposed of as mixed waste. This dose assessment is based on estimates of the source term present in the concrete surfaces and on the miscellaneous below-water-line metal surfaces within the 1608-H facility. Dose estimates for the 117-H Filter Building and 116-H Stack have been included in this report in order to provide a current estimate for the hectare dose.

The pumps, pump shafts, and discharge piping were removed from the facility and are, therefore, not included in this dose assessment. All drain piping terminates at the point where they entered the facility. All drain piping has been sealed at this point and is not included in this dose assessment.

4.2 Assumptions

The contamination present within the 10 strata identified in Section 3.0 is randomly distributed in each stratum.

All of the source term within the scope of this dose assessment is located within the 10 stratum identified in Section 3.0.

Concrete contamination in all applicable strata extends to a depth of 1.0 cm into the concrete (See Section 3.3).

C-14 and H-3 contamination is insignificant. However, the source term computed for the sump floors will include these isotopes.

All concrete surfaces are contaminated.

The quantity of rust scale present on the below-water-line metal surfaces was calculated assuming 1 gram of rust scale per sq cm of metal surface area. This was determined empirically from the samples collected from the diversion gate and ladder rungs.

The rubble resulting from the demolition of the equipment room walls and ceiling, and the equipment floors/sumps ceilings were evenly distributed between the three pump sumps and the accumulation sump. The resulting rubble was located approximately 6.7 meters below grade. During demolition, the ground around the facility was excavated to a depth of 5 meters below grade and the walls above the minus 5 meter elevation were demolished into the sump areas.

4.3 Dose Calculations and Results

All calculations were performed utilizing the methodology outlined in the Manual for Applying the Allowable Residual Contamination Level Method for Decommissioning Facilities on the Hanford Site (Reference 2), and utilizing a Dose Calculation computer code to compute the source terms, summary statistics, etc. (Reference 6).

The total mass of contaminated material for each stratum was calculated based on the surface area of each individual stratum (Appendix A). Because concrete samples were collected at a different depth in the middle sump, the analytical data for this sump was considered separately from the other two sumps and then split into three strata for the purpose of performing the dose assessment.

The dose assessment methodology for the 1608-H Lift Station considers only one scenario applicable to this facility, the Agricultural (AG) Scenario. Since all of the rubble from the structure was buried at least five meters below grade, the Residential/Home Garden Scenario was not applicable to this site. The AG Scenario is defined to account for the potential impacts to an individual from ingestion of agricultural products whose roots penetrated into the buried radioactive rubble. The maximally-exposed individual is assumed to obtain 25% of is fruit and vegetable diet from this food source. Since the calculations for the AG scenario are depth dependent, the fraction of each applicable stratum was calculated to account for the various depth (Appendix B).

The deepest portions of the 1608-H Lift Station are the three pump sumps and the accumulation sump. The water line in the sumps was found to be 6.7 m below grade. The floor surface of the three sumps was located 11.4 m below grade and the floor of the accumulation sump was located 9.3 m below grade. The East and West sump floors represent 55% of the surface area, radionuclide inventory and dose from stratum #1, and the accumulation sump floor represents 45% of the same.

Table 4 summarizes the results of the dose assessment calculations for the 1608-H Facility and includes the relevant data for the 117-H Filter Building and 116-H Stack. The total dose for the three facilities represent the total hectare dose based on the known contributors within the hectare. The dose assessment values were calculated assuming immediate site release (t=0 years). Detailed calculations for the 1608-H and 117-H facilities are contained in Appendices C and D respectively. The dose value for the 116-H Stack was obtained from Reference 5.

TABLAE 4. DOSE SUMMARY FOR THE 1608-H LIFT STATION AND SURROUNDING HECTARE AT THE 90% UCL
(t = 0 years)

FACILITY Stratum Depth	Depth	SCENARIO AG rem/yr	VARIANCE (rem/yr)2	RHG rem/yr
1608-H LIFT STATION				
1 SUMP FLOORS	(11.4 m)	2.21E-09	1.13E-19	
	(9.3 m)	1.66E-09	6.99E-20	
2 MIDDLE SUMP FLOORS	(11.4 m)	1.28E-10	2.79E-21	
3 SUMP WALLS BELOW WATER LINE	(6.7 m)	1.68E-06	7.16E-14	
4 MIDDLE SUMP WALLS BELOW WATER LINE	(6.7 m)	7.21E-08	8.90E-16	
5 SUMP CEILING & WALLS ABOVE WATER LINE	(5 m)	1.49E-05	5.51E-11	
6 MIDDLE SUMP CEILING & WALLS ABOVE WATER LINE	(5 m)	7.38E-08	8.22E-20	
7 LOWER EQUIPMENT ROOM FLOOR	(5 m)	2.58E-10	2.04E-21	
8 UPPER EQUIPMENT ROOM FLOOR	(5 m)	1.73E-10	5.66E-22	
9 EQUIPMENT ROOM WALLS	(5 m)	1.95E-09	7.73E-19	
TOTALS		1.67E-05	5.52E-11	
TOTAL DOSE FOR 1608-H AT UCL OF DOSE		2.63E-05		
117-H FILTER BLDG				
1 Concrete Inlet Duct	(3.35 m)	6.77E-06	2.34E-11	
2 Inlet Seal Pits	(10 m)	7.69E-09	2.21E-17	
3 Filter Cells	(8 m)	1.70E-07	9.34E-15	
4 Outlet Seal Pits	(10 m)	7.15E-09	7.50E-18	
5 Concrete Outlet Duct	(3.35 m)	8.15E-06	4.77E-11	
TOTALS		1.51E-05	7.11E-11	
TOTAL DOSE FOR 117-H FILTER BLDG AT UCL OF DOSE		2.59E-05		
TOTAL AG DOSE AT UCL OF DOSE		5.22E-05		
116-H STACK				
1 STACK INTERIOR	(3 m)			4.80E+00

HECTARE DOSE FOR THE THREE FACILITIES = 4.85 mrem/year

AG = Agricultural
RHG = Residential/Home Garden

ARCL dose calculations for the 117-H Filter Building were completed in 1984, and documented in Reference 4 (Section 6.0). The ARCL value for the 117-H Filter Building was calculated for the RHG scenario and was based on radionuclide concentration and not dose. Therefore, the dose contribution from the 117-H Filter Building required recalculation utilizing the revised methodology documented in Reference 2. Since the majority of the 117-H building was greater than five meters below grade, the recalculation was based on the AG scenario.

Of the three facilities considered for the overall hectare dose, the only site where a resident could encounter contaminated rubble during the excavation of a home foundation was the 116-H Stack burial site. Therefore, in order to establish a reasonable estimate for the total hectare dose the following assumptions were made:

1. Only the 116-H, 117-H and the 1608-H facilities contribute to the total hectare dose.

2. Only one residence would be constructed in the hectare.

3. The residence would be constructed over the 116-H burial site.

The total hectare dose is therefore, based on the RHG scenario for the 116-H Stack site, and the AG scenario for the 117-H Filter Building and 1608-H Lift Station.

5.0 CONCLUSION

The 1608-H Lift Station was decommissioned and demolished in situ utilizing the ARCL methodology. According to the ARCL methodology, the final site dose assessment value shall be based on the source term contained within the surrounding hectare. Since the source term for the existing structures and burial grounds that lie within the hectare surrounding the 1608-H site are not known, the final site dose assessment cannot be calculated at this time. However, the radiological contribution to the site dose from 117-H and 116-H burial sites, in addition to the 1608-H site, can be accounted for. This is accomplished by summing all estimated dose from each scenario and site. DOE guidelines state that the annual whole body or organ dose to an individual living on the site at the time the site is released shall be less than 25 mrem/yr. Therefore, the final dose assessment for the hectare must be less than this limiting value at the time the site is released.

The results of the dose assessment for the 1608-H facility represents a "worst case" contribution of the source term at this site. Therefore, the dose to a maximally exposed individual from the 1608-H burial site was estimated to be 0.026 mrem/yr assuming immediate release (time=0). This exposure rate is well below the 25 mrem/yr limit, therefore, no source term reduction was warranted and the facility met the criteria for in situ burial. The total dose for the hectare surrounding the 1608-H Lift Station is 4.85 mrem/yr. This exposure rate is essentially the estimated value for the 116-H Stack, the contributions from the 117-H and 1608-H facilities being negligible.

6.0 REFERENCES

1. Kennedy, W. E., Jr. and B. A. Napier, Allowable Residual Contamination Levels for Decommissioning Facilities in the 100 Areas of the Hanford Site, PNL-4722/UNI-2522, Pacific Northwest Laboratory, Richland, WA. 1983.

2. PNL-6348, B. A Napier, G. F. Piepel, W. E. Kennedy, Jr., R. G. Schreckhise, A Manual For Applying the Allowable Residual Contamination Level Method for Decommissioning Facilities on the Hanford Site, Pacific Northwest Laboratory, Richland, WA. June 1988.

3. Lawrence, M. L., "Radiological Release Criteria for Surplus Contaminated Facilities on the Hanford Site", DOE-RL Letter to Hanford Site Contractors, July 3, 1984.

4. Beckstrom, J. F., ARCL Calculations for Decommissioning the 117-H Filter Building, UNI-3001, UNC Nuclear Industries, Richland, WA. 1984.

5. Beckstrom, J. F., ARCL Calculations for Decommissioning the 116-H Stack.

6. Carlson, B. J., Allowable Residual Contamination Level Dose Calculation Program, SD-DD-TI-020, November 3, 1987.

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APPENDIX A

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APPENDIX A

Stratum Area/Mass Calculations REF: Drawing P-1239, P-2089

Stratum #1 - Sump Floors

Accumulation Sump:

Surface Area = 405 ft^2

West Sump:

Surface Area = 159 ft^2

East Sump:

Surface Area = 159 ft^2

Total Surface Area = 723 ft^2
Mass of Contamination Concrete = 1.61 E+6 grams

Stratum #2 - Middle Sump Floor

Surface Area = 156 ft^2
Mass of Contaminated Concrete = 3.48 E+5 grams

Stratum #3 - Sump Walls Below Water Line

Accumulation Sump:

Surface Area = 737 ft^2

West Sump:

Surface Area = 793 ft^2

East Sump:

Surface Area = 793 ft^2

Total Surface Area = 2323 ft^2
Mass of Contaminated Concrete = 5.18 E+6 grams

Stratum #4 - Middle Sump Walls Below Water Line

Surface Area = 792 ft^2
Mass of Contaminated Concrete = 1.77 E+6 grams

Stratum #5 - Sump Ceilings and Walls Above Water Line

Accumulation Sump:

Surface Area = 2192 ft^2

West Sump:

Surface Area = 939 ft^2

East Sump:

Surface Area = 939 ft^2

Total Surface Area = 4070 ft^2
Mass of Contaminated Concrete = 9.07 E+6 grams

Stratum #6 - Middle Sump Ceiling and Walls Above Water Line

Surface Area = 939 ft^2
Mass of Contaminated Concrete = 2.09 E+6 grams

Stratum #7 - Lower Equipment Room Floor

Surface Area = 485 ft^2
Mass of Contaminated Concrete = 1.08 Ed+6 grams

Stratum #8 - Upper Equipment Room Floor

Surface Area = 475 ft^2
Mass of Contaminated Concrete = 1.06 E+6 gram

Stratum #9 - Equipment Room Walls and Ceilings

Upper and Lower Equipment Room Ceilings
Surface Area = 960 ft^2

Outside Equipment Room Walls
Surface Area = 1816 ft^2

Upper/Lower Level Equipment Room Wall
Surface Area = 160 ft^2

Total Surface Area = 2936 ft^2
Mass of Contaminated Concrete = 6.55 E+6 grams

Stratum #10 - Contaminated Iron Surfaces

Ladder Rungs:
Surface Area = 3308 in^2

Sluice Gates:
Surface Area = 1536 in^2

Total Surface Area = 4844 in^2
Mass of Rust/Scale = 3.13 E+4 grams

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APPENDIX B

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APPENDIX B

Agricultural Scenario Depth/Stratum — Fraction Calculations

Stratum #1 - Sump Floors
Depth = 9.1 M

Accumulation Sump:
Surface Area = 405 ft^2
Stratum Fraction = 0.56

Depth = 11.3 M

East and West Sumps:
Surface Area = 318 ft^2
Stratum Fraction = 0.44

Stratum #2 - Middle Sump Floors
Depth = 11.3 M

Stratum Fraction = 1.0

Stratum #3 - Sump Walls Below Water Line
Depth = 6.7 M

Stratum Fraction = 1.0

Accumulation Sump:

East and West Sumps:

Stratum #4 - Middle Sump Walls Below Water Line
Depth = 6.7 M

Stratum Fraction = 1.0

Stratum #5 - Sump Ceilings and Walls Above Water Line
Depth = 5 M

Stratum Fraction = 1.0

Stratum #6 - Middle Sump Ceiling and Walls Above Water Line
Depth = 5 M

Stratum Fraction = 1.0

Stratum #7 - Lower Equipment Room Floor
Depth = 5 M

Stratum Fraction = 1.0

Stratum #8 - Upper Equipment Room Floor
Depth = 5 M

Stratum Fraction = 1.0

Stratum #9 - Equipment Room Walls and Ceiling
Depth = 5 M

Stratum Fraction = 1.0

Stratum #10 - Contaminated Iron Surface
Depth = 6.7 M

Ladder Rungs:
Surface Area = 3308 in^2
Stratum Fraction = .68

Depth = 9 M

Distribution Gates:
Surface Area = 1536 in^2
Stratum Fraction = 0.32

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APPENDIX C

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LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STRATUM NAME IS SUMP FLOORS
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-82	04/03/87	1608H	AS	SW-B	CS0-.5C	pCi/gm	4.83E+2	291	1.61E+3	4.92E+2	6.51E+1	36.24	* *	
87-83	04/03/87	1608H	AS	NW-B	CS0-.5C	pCi/gm	7.58E+2	345	1.19E+3	2.04E+2	*	21.23	* *	
87-90	04/07/87	1608H	WS	EW-B	CS0-.5C	pCi/gm	3.95E+2	140	1.56E+2	2.75E+2	5.04E+1	27.23	* *	
87-91	04/07/87	1608H	WS	WW-B	CS0-.5C	pCi/gm	4.76E+2	349	1.75E+3	2.49E+2	4.21E+1	36.24	* *	
87-124	04/09/87	1608H	ES	EW-B	CS0-.5C	pCi/gm	3.44E+2	155	1.64E+3	1.69E+2	*	36.24	* *	
87-125	04/09/87	1608H	ES	WW-B	CS0-.5C	pCi/gm	3.04E+2	410	1.85E+3	2.78E+2	4.01E+1	39.24	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS SUMP FLOORS
WEB,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +1.61E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+4.60E+02	+1.62E+02	+6.62E+01	6	+7.41E+08	+1.07E+08
C-14	+2.82E+02	+1.11E+02	+4.52E+01	6	+4.53E+08	+7.27E+07
CO-60	+1.37E+03	+6.34E+02	+2.59E+02	6	+2.20E+09	+4.17E+08
SR-90	+2.78E+02	+1.13E+02	+4.62E+01	6	+4.47E+08	+7.44E+07
CS-137	+4.97E+01	+1.18E+01	+5.91E+00	4	+8.00E+07	+9.52E+06
EU-152	+3.27E+01	+6.95E+00	+2.84E+00	6	+5.27E+07	+4.57E+06
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS.

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14	+4.31E+03	6
H-3	CO-60	-1.39E+04	6
H-3	SR-90	-9.51E+02	6
H-3	CS-137	+5.68E+02	4
H-3	EU-152	-8.71E+02	6
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+4.32E+04	6
C-14	SR-90	+1.92E+03	6
C-14	CS-137	-5.63E+02	4
C-14	EU-152	+1.42E+02	6
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	+5.57E+03	6
CO-60	CS-137	-1.47E+03	4
CO-60	EU-152	+3.00E+03	6
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	+1.24E+03	4
SR-90	EU-152	+2.27E+02	6
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	-1.18E+01	4
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS SUMP FLOORS
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +1.14E+01 METERS(+3.74E+01 Ft)
DEPTH CORRECTION FACTOR IS +2.79E-05
AREA OF THE LOCATION/FACILITY SITE IS +6.72E-03 HECTARE(+7.23E+02 Ft², +6.72E+01M²)
AREA CORRECTION FACTOR IS +1.60E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = .56

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+5.26E-20	+5.60E-02	+1.00E+00	+3.89E-11	+5.61E-12	+4.61E-11
C-14	+2.10E-14	+5.26E-20	+1.20E-04	+1.00E+00	+2.38E-11	+3.82E-12	+2.87E-11
CO-60	+6.70E-15	+1.68E-20	+1.30E-01	+1.00E+00	+3.69E-11	+6.99E-12	+4.59E-11
SR-90	+1.80E-12	+4.51E-18	+2.40E-02	+1.00E+00	+2.02E-09	+3.35E-10	+2.45E-09
CS-137	+6.70E-15	+1.68E-20	+2.30E-02	+1.00E+00	+1.34E-12	+1.60E-13	+1.55E-12
EU-152	+1.20E-15	+3.00E-21	+5.20E-02	+1.00E+00	+1.56E-13	+1.37E-14	+1.76E-13
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +2.12E-09 rem/yr
VARIANCE DOSE TERM IS +1.12E-19 (rem/yr)²
COVARIANCE DOSE TERM IS +7.20E-22 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +1.13E-19 (rem/yr)²
UCL OF TOTAL DOSE IS +2.55E-09 rem/yr

LOCATION NAME IS BUMP FLOORS
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +1.14E+01 METERS(+3.74E+01 Ft)
DEPTH CORRECTION FACTOR IS +2.79E-05
AREA OF THE LOCATION/FACILITY SITE IS +6.72E-03 HECTARE(+7.23E+02 Ft², +6.72E+01M²)
AREA CORRECTION FACTOR IS +1.60E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = .44

ISOTOPE		DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3		+2.10E-14	+4.13E-20	+5.60E-02	+1.00E+00	+3.06E-11	+4.41E-12	+3.62E-11
C-14		+2.10E-14	+4.13E-20	+1.20E-04	+1.00E+00	+1.87E-11	+3.00E-12	+2.26E-11
CO-60		+6.70E-15	+1.32E-20	+1.30E-01	+1.00E+00	+2.90E-11	+5.50E-12	+3.60E-11
SR-90		+1.80E-12	+3.54E-18	+2.40E-02	+1.00E+00	+1.38E-09	+2.63E-10	+1.92E-09
CS-137		+6.70E-15	+1.32E-20	+2.30E-02	+1.00E+00	+1.05E-12	+1.25E-13	+1.22E-12
EU-152		-1.20E-15	+2.36E-21	+5.20E-02	+1.00E+00	+1.24E-13	+1.06E-14	+1.38E-13
EU-154		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS	ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.66E-09 rem/yr
VARIANCE DOSE TERM IS +6.54E-20 (rem/yr)²
COVARIANCE DOSE TERM IS +4.45E-22 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +6.99E-20 (rem/yr)²
UCL OF TOTAL DOSE IS +2.00E-09 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STRATUM NAME IS MIDDLE SUMP FLOORS
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-132	04/10/87	1608H	MS	NW-B	CSO-1.0C	pCi/gm	4.75E+1	55.9	5.55E+2	3.46E+1	4.51E0	6.21	* *	
87-133	04/10/87	1608H	MS	SW-B	CSO-1.0C	pCi/gm	9.20E+1	91	9.21E+2	8.58E+1	1.80E+1	27.23	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS MIDDLE SUMP FLOORS
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +3.46E-05 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+6.98E+01	+3.13E+01	+2.22E+01	2	+2.43E+07	+7.74E+06
C-14	+7.35E+01	+2.48E+01	+1.75E-01	2	+2.56E+07	+6.11E+06
CO-60	+7.38E+02	+2.59E+02	+1.83E+02	2	+2.57E+08	+6.37E+07
SR-90	+6.02E+01	+3.62E+01	+2.56E+01	2	+2.09E+07	+8.91E+06
CS-137	+1.13E+01	+9.54E+00	+6.75E+00	2	+3.92E+06	+2.35E+06
EU-152	+1.67E+01	+1.49E+01	+1.05E+01	2	+5.82E+06	+3.66E+06
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14	+7.81E+02	2
H-3	CO-60	+8.14E+03	2
H-3	SR-90	+1.14E+03	2
H-3	CS-137	+3.00E+02	2
H-3	EU-152	+4.68E+02	2
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+6.42E+03	2
C-14	SR-90	+8.99E+02	2
C-14	CS-137	+2.37E+02	2
C-14	EU-152	+3.69E+02	2
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	+9.37E+03	2
CO-60	CS-137	+2.47E+03	2
CO-60	EU-152	+3.85E+03	2
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	+3.45E+02	2
SR-90	EU-152	+5.38E+02	2
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	+1.42E+02	2
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS MIDDLE SUMP FLOORS
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +1.14E+01 METERS(+3.74E+01 Ft)
DEPTH CORRECTION FACTOR IS +2.79E-05
AREA OF THE LOCATION/FACILITY SITE IS +1.45E-03 HECTARE(+1.56E+02 Ft², +1.45E+01M²)
AREA CORRECTION FACTOR IS +1.13E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+6.62E-20	+5.60E-02	+1.00E+00	+1.61E-12	+5.12E-13	+2.26E-12
C-14	+2.10E-14	+6.62E-20	+1.20E-04	+1.00E+00	+1.69E-12	+4.04E-13	+2.21E-12
CD-60	+6.70E-15	+2.11E-20	+1.30E-01	+1.00E+00	+5.42E-12	+1.34E-12	+7.14E-12
SR-90	+1.80E-12	+5.67E-18	+2.40E-02	+1.00E+00	+1.19E-10	+5.05E-11	+1.34E-10
CS-137	+6.70E-15	+2.11E-20	+2.30E-02	+1.00E+00	+8.27E-14	+4.95E-14	+1.46E-13
EU-152	+1.20E-15	+3.78E-21	+5.20E-02	+1.00E+00	+2.20E-14	+1.38E-14	+3.97E-14
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.25E-10 rem/yr
VARIANCE DOSE TERM IS +2.55E-21 (rem/yr)²
COVARIANCE DOSE TERM IS +2.38E-22 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +2.79E-21 (rem/yr)²
UCL OF TOTAL DOSE IS +1.95E-10 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STATION NAME IS SUMP WALLS BELOW WATER LINE
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-82	04/03/87	1608H	AS	SW-B	CS0-.5C	pCi/gm	4.83E+2	291	1.61E+3	4.92E+2	6.61E+1	36.24	* *	
87-83	04/03/87	1608H	AS	NW-B	CS0-.5C	pCi/gm	7.58E+2	345	1.19E+3	2.04E+2	*	21.23	* *	
87-90	04/07/87	1608H	WS	EW-B	CS0-.5C	pCi/gm	3.75E+2	140	1.56E+2	2.75E+2	5.04E+1	27.23	* *	
87-91	04/07/87	1608H	WS	NW-B	CS0-.5C	pCi/gm	4.76E+2	349	1.75E+3	2.49E+2	4.21E+1	36.24	* *	
87-124	04/09/87	1608H	ES	EW-B	CS0-.5C	pCi/gm	3.44E+2	155	1.64E+3	1.69E+2	*	36.24	* *	
87-125	04/09/87	1608H	ES	NW-B	CS0-.5C	pCi/gm	3.04E+2	410	1.85E+3	2.78E+2	4.01E+1	39.24	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS SUMP WALLS BELOW WATER LINE
WEIGHT OF CONTAMINATED MATERIAL IN STRATUM IS +5.15E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+4.60E+02	+1.62E+02	+6.62E+01	6	+2.38E+09	+3.43E+08
C-14	+2.32E+02	+1.11E+02	+4.52E+01	6	+1.46E+09	+2.34E+08
CO-60	+1.37E+03	+6.34E+02	+2.59E+02	6	+7.08E+09	+1.34E+09
SR-90	+2.78E+02	+1.13E+02	+4.62E+01	6	+1.44E+09	+2.39E+08
CS-137	+4.97E+01	+1.18E+01	+5.91E+00	4	+2.57E+08	+3.06E+07
EU-152	+3.27E+01	+6.95E+00	+2.84E+00	6	+1.70E+08	+1.47E+07
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14	+4.81E+03	6
H-3	CO-60	-1.39E+04	6
H-3	SR-90	-9.51E+02	6
H-3	CS-137	+5.68E+02	4
H-3	EU-152	-8.71E+02	6
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+4.32E+04	6
C-14	SR-90	+1.92E+03	6
C-14	CS-137	-5.63E+02	4
C-14	EU-152	+1.42E+02	6
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	+5.57E+03	6
CO-60	CS-137	-1.47E+03	4
CO-60	EU-152	+3.00E+03	6
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	+1.24E+03	4
SR-90	EU-152	+2.27E+02	6
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	-1.18E+01	4
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS SUMP WALLS BELOW WATER LINE
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +6.70E+00 METERS(+2.20E+01 Ft)
DEPTH CORRECTION FACTOR IS +2.19E-03
AREA OF THE LOCATION/FACILITY SITE IS +2.16E-02 HECTARE(+2.32E+03 Ft², +2.16E+02M²)
AREA CORRECTION FACTOR IS +2.94E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year^{-1})	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+1.30E-17	+5.60E-02	+1.00E+00	+3.10E-08	+4.46E-09	+3.67E-08
C-14	+2.10E-14	+1.30E-17	+1.20E-04	+1.00E+00	+1.90E-08	+3.04E-09	+2.29E-08
CO-60	+6.70E-15	+4.15E-18	+1.30E-01	+1.00E+00	+2.93E-08	+5.56E-09	+3.65E-08
SR-90	+1.80E-12	+1.11E-15	+2.40E-02	+1.00E+00	+1.60E-06	+2.67E-07	+1.95E-06
CS-137	+6.70E-15	+4.15E-18	+2.30E-02	+1.00E+00	+1.07E-09	+1.27E-10	+1.23E-09
EU-152	+1.20E-15	+7.43E-19	+5.20E-02	+1.00E+00	+1.26E-10	+1.09E-11	+1.40E-10
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.32E-06 rem/yr
VARIANCE DOSE TERM IS +7.11E-14 (rem/yr)²
COVARIANCE DOSE TERM IS +4.56E-16 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +7.16E-14 (rem/yr)²
UCL OF TOTAL DOSE IS +2.03E-06 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STATION NAME IS MIDDLE SUMP WALLS BELOW WATER LINE
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-132	04/10/87	1608H	MS	NW-B	CS0-1.0C	pCi/gm	4.75E+1	55.9	5.55E+2	3.46E+1	4.51E0	6.21	* *	
87-133	04/10/87	1608H	MS	SW-B	CS0-1.0C	pCi/gm	9.20E+1	91	9.21E+2	8.58E+1	1.30E+1	27.23	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS MIDDLE SUMP WALLS BELOW WATER LINE
TOTAL VOLUME OF CONTAMINATED MATERIAL IN STRATUM IS +1.77E-06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+6.98E+01	+3.15E+01	+2.23E+01	2	+1.23E+08	+3.94E+07
C-14	+7.35E+01	+2.48E+01	+1.75E+01	2	+1.30E+08	+3.11E+07
CO-60	+7.38E+02	+2.59E+02	+1.83E+02	2	+1.31E+09	+3.24E+08
SR-90	+6.02E+01	+3.62E+01	+2.56E+01	2	+1.07E+08	+4.53E+07
CS-137	+1.13E+01	+9.54E+00	+6.75E+00	2	+1.99E+07	+1.19E+07
EU-152	+1.67E+01	+1.49E+01	+1.05E+01	2	+2.96E+07	+1.86E+07
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14	+7.81E+02	2
H-3	CO-60	+8.14E+03	2
H-3	SR-90	+1.14E+03	2
H-3	CS-137	+3.00E+02	2
H-3	EU-152	+4.68E+02	2
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+6.42E+03	2
C-14	SR-90	+8.99E+02	2
C-14	CS-137	+2.37E+02	2
C-14	EU-152	+3.69E+02	2
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	+9.37E+03	2
CO-60	CS-137	+2.47E+03	2
CO-60	EU-152	+3.85E+03	2
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	+3.45E+02	2
SR-90	EU-152	+5.38E+02	2
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	+1.42E+02	2
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS MIDDLE SUMP WALLS BELOW WATER LINE
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +6.70E+00 METERS(+2.20E+01 Ft)
DEPTH CORRECTION FACTOR IS +2.10E-03
AREA OF THE LOCATION/FACILITY SITE IS +7.36E-03 HECTARE(+7.92E+02 Ft², +7.36E+01M²)
AREA CORRECTION FACTOR IS +1.66E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+7.34E-18	+5.60E-02	+1.00E+00	+9.07E-10	+2.89E-10	+1.28E-09
C-14	+2.10E-14	+7.34E-18	+1.20E-04	+1.00E+00	+9.55E-10	+2.28E-10	+1.25E-09
CO-60	+6.70E-15	+2.34E-18	+1.30E-01	+1.00E+00	+3.06E-09	+7.59E-10	+4.03E-09
SR-90	+1.80E-12	+6.29E-16	+2.40E-02	+1.00E+00	+6.71E-08	+2.85E-08	+1.04E-07
CS-137	+6.70E-15	+2.34E-18	+2.30E-02	+1.00E+00	+4.67E-11	+2.30E-11	+8.25E-11
EU-152	-1.20E-15	+4.20E-19	+5.20E-02	+1.00E+00	+1.24E-11	+7.81E-12	+2.24E-11
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +7.21E-09 rem/yr
VARIANCE DOSE TERM IS +8.14E-16 (rem/yr)²
COVARIANCE DOSE TERM IS +7.59E-17 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +8.90E-16 (rem/yr)²
UCL OF TOTAL DOSE IS +1.10E-07 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STATION NAME IS SUMP CEILING AND WALLS ABOVE WATER LINE
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-65	04/03/87	1608H	AS	NW-A	CSO-.5C	pCi/gm	4.82E0	29.1	1.79E+2	3.16E+1	*	6.21	* *	
87-86	04/03/87	1608H	AS	NW-A	CSO-.5C	pCi/gm	9.79E0	35	3.67E+2	4.21E+1	7.42E0	12.22	* *	
87-92	04/07/87	1608H	WS	EW-A	CSO-.5C	pCi/gm	1.24E+3	594	1.12E+3	6.67E+2	1.26E+2	54.26	* *	
87-93	04/07/87	1608H	WS	NW-A	CSO-.5C	pCi/gm	6.59E+1	31.8	3.50E+2	1.20E+2	1.73E+1	72.28	* *	
87-126	04/09/87	1608H	ES	EW-A	CSO-.5C	pCi/gm	1.23E+2	103	4.54E+2	2.49E+2	*	27.23	* *	
87-127	04/09/87	1608H	ES	EW-A	CSO-.5C	pCi/gm	1.30E+2	301	1.40E+2	8.84E+1	*	48.25	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS DUMP CEILING AND WALLS ABOVE WATER LINE
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +9.07E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+2.12E+02	+4.62E+02	+1.97E+02	6	+2.38E+09	+1.78E+09
C-14	+1.82E+02	+2.27E+02	+9.27E+01	6	+1.65E+09	+8.41E+08
CO-60	+4.35E+02	+3.56E+02	+1.45E+02	6	+3.95E+09	+1.32E+09
SR-90	+2.00E+02	+2.42E+02	+9.88E+01	6	+1.81E+09	+8.96E+08
CS-137	+5.02E+01	+6.58E+01	+3.80E+01	3	+4.56E+08	+3.45E+08
EU-152	+3.67E+01	+2.58E+01	+1.05E+01	6	+3.33E+08	+9.55E+07
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14	+1.01E+05	6
H-3	CO-60	+1.61E+05	6
H-3	SR-90	+1.12E+05	6
H-3	CS-137	+4.57E+04	3
H-3	EU-152	+4.80E+03	6
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+6.15E+04	6
C-14	SR-90	+4.72E+04	6
C-14	CS-137	+2.12E+04	3
C-14	EU-152	+2.45E+03	6
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	-3.29E+04	6
CO-60	CS-137	+2.88E+04	3
CO-60	EU-152	+2.99E+03	6
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	+2.24E+04	3
SR-90	EU-152	+2.52E+03	6
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	+6.03E+02	3
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS SUMP CEILING AND WALLS ABOVE WATER LINE
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +5.00E+00 METERS(+1.64E+01 Ft)
DEPTH CORRECTION FACTOR IS -1.01E-02
AREA OF THE LOCATION/FACILITY SITE IS +3.78E-02 HECTARE(+4.07E+03 Ft², +3.78E+02M²)
AREA CORRECTION FACTOR IS +4.40E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+9.29E-17	+5.60E-02	+1.00E+00	+2.21E-07	+1.66E-07	+4.34E-07
C-14	+2.10E-14	+9.29E-17	+1.20E-04	+1.00E+00	+1.54E-07	+7.81E-08	+2.54E-07
CO-60	+6.70E-15	+2.97E-17	+1.30E-01	+1.00E+00	+1.17E-07	+3.91E-08	+1.67E-07
SR-90	+1.30E-12	+7.97E-15	+2.40E-02	+1.00E+00	+1.44E-05	+7.14E-06	+2.36E-05
CS-137	+6.70E-15	+2.97E-17	+2.30E-02	+1.00E+00	+1.35E-08	+1.02E-08	+2.66E-08
EU-152	+1.20E-15	+5.31E-18	+5.20E-02	+1.00E+00	+1.77E-09	+5.07E-10	+2.42E-09
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.49E-05 rem/yr
VARIANCE DOSE TERM IS +5.10E-11 (rem/yr)²
COVARIANCE DOSE TERM IS +4.13E-12 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +5.51E-11 (rem/yr)²
UCL OF TOTAL DOSE IS +2.45E-05 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STATION NAME IS MIDDLE SUMP CEILING AND WALLS ABOVE WATER LINE
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-134	04/10/87	1608H	MS	WW-A	CSO-1.0C	pCi/gm	2.80E0	8.51	1.25E+1	1.08E+1	*	.21	* *	
87-135	04/10/87	1608H	MS	WW-A	CSO-1.0C	pCi/gm	*	4.22	2.05E0	*	*	6.21	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS MIDDLE SUMP CEILING AND WALLS ABOVE WATER LINE
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +2.09E+06 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		+2.50E+00	+0.00E+00	+0.00E+00	1	+5.35E+06	+0.00E+00
C-14		+6.37E+00	+3.03E+00	+2.15E+00	2	+1.33E+07	+4.48E+06
CO-60		+7.22E+00	+7.39E+00	+5.23E+00	2	+1.52E+07	+1.09E+07
SR-90		+1.08E+01	+0.00E+00	+0.00E+00	1	+2.26E+07	+0.00E+00
CS-137		NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
EU-152		+3.21E+00	+4.24E+00	+3.00E+00	2	+6.71E+06	+6.27E+06
EU-154		NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS	ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

*H-3 STATISTICAL VALUES ARE ESTIMATED BY ASSUMING THAT THE S.D.=0.00*MEAN AND 1 DEGREE OF FREEDOM
*SR-90 STATISTICAL VALUES ARE ESTIMATED BY ASSUMING THAT THE S.D.=0.00*MEAN AND 1 DEGREE OF FREEDOM

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14		NA-INSUFFICIENT DATA	1
H-3	CO-60		NA-INSUFFICIENT DATA	1
H-3	SR-90		NA-INSUFFICIENT DATA	1
H-3	CS-137		NA-INSUFFICIENT DATA	0
H-3	EU-152		NA-INSUFFICIENT DATA	1
H-3	EU-154		NA-INSUFFICIENT DATA	0
H-3	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60		+2.24E+01	2
C-14	SR-90		NA-INSUFFICIENT DATA	1
C-14	CS-137		NA-INSUFFICIENT DATA	0
C-14	EU-152		-1.29E+01	2
C-14	EU-154		NA-INSUFFICIENT DATA	0
C-14	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90		NA-INSUFFICIENT DATA	1
CO-60	CS-137		NA-INSUFFICIENT DATA	0
CO-60	EU-152		-3.14E+01	2
CO-60	EU-154		NA-INSUFFICIENT DATA	0
CO-60	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137		NA-INSUFFICIENT DATA	0
SR-90	EU-152		NA-INSUFFICIENT DATA	1
SR-90	EU-154		NA-INSUFFICIENT DATA	0
SR-90	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152		NA-INSUFFICIENT DATA	0
CS-137	EU-154		NA-INSUFFICIENT DATA	0
CS-137	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154		NA-INSUFFICIENT DATA	0
EU-152	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS	ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS MIDDLE BUMP CEILING AND WALLS ABOVE WATER LINE
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +5.00E+00 METERS(+1.64E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-02
AREA OF THE LOCATION/FACILITY SITE IS +8.72E-03 HECTARE(+9.39E+02 Ft², +8.72E+01M²)
AREA CORRECTION FACTOR IS +1.79E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+3.77E-17	+5.60E-02	+1.00E+00	+2.21E-10	+0.00E+00	+2.21E-10
C-14	+2.10E-14	+3.77E-17	+1.20E-04	+1.00E+00	+5.01E-10	+1.69E-10	+7.18E-10
CO-60	+6.70E-15	+1.20E-17	+1.30E-01	+1.00E+00	+1.83E-10	+1.31E-10	+3.51E-10
SR-90	+1.80E-12	+3.23E-15	+2.40E-02	+1.00E+00	+7.29E-08	+0.00E+00	+7.29E-08
CS-137	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
EU-152	+1.20E-15	+2.15E-18	+5.20E-02	+1.00E+00	+1.44E-11	+1.35E-11	+3.18E-11
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +7.38E-08 rem/yr
VARIANCE DOSE TERM IS +4.60E-20 (rem/yr)²
COVARIANCE DOSE TERM IS +3.62E-20 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +8.22E-20 (rem/yr)²
UCL OF TOTAL DOSE IS +7.42E-08 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STRATUM NAME IS LOWER EQUIPMENT ROOM FLOOR
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-136	04/10/87	1608H	ERL	F	CS0-1.0C	pCi/gm	3.32E0	1.83	1.29E0	*	*	3.21	* *	
87-137	04/10/87	1608H	ERL	F	CS0-1.0C	pCi/gm	4.00E0	2.79	1.09E+1	*	*	*ND	* *	
87-138	04/10/87	1608H	ERL	F	CS0-1.0C	pCi/gm	2.19E0	2.84	7.50E0	*	*	6.21	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS LOWER EQUIPMENT ROOM FLOOR
TOTAL VOLUME OF CONTAMINATED MATERIAL IN STRATUM IS +1.08E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+3.19E+00	+9.20E-01	+5.31E-01	3	+3.45E+06	+5.74E+05
C-14	+2.19E+00	+5.69E-01	+3.29E-01	3	+2.69E+06	+3.55E+05
CO-60	+6.56E+00	+4.87E+00	+2.81E+00	3	+7.09E+06	+3.04E+06
SR-90	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
CS-137	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
EU-152	+4.71E+00	+2.12E+00	+1.50E+00	2	+5.09E+06	+1.62E+06
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14	-1.16E-01	3
H-3	CO-60	+7.87E-01	3
H-3	SR-90	NA-INSUFFICIENT DATA	0
H-3	CS-137	NA-INSUFFICIENT DATA	0
H-3	EU-152	-1.79E+00	2
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	+2.55E+00	3
C-14	SR-90	NA-INSUFFICIENT DATA	0
C-14	CS-137	NA-INSUFFICIENT DATA	0
C-14	EU-152	+1.51E+00	2
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	NA-INSUFFICIENT DATA	0
CO-60	CS-137	NA-INSUFFICIENT DATA	0
CO-60	EU-152	+9.32E+00	2
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	NA-INSUFFICIENT DATA	0
SR-90	EU-152	NA-INSUFFICIENT DATA	0
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	NA-INSUFFICIENT DATA	0
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS LOWER EQUIPMENT ROOM FLOOR
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS -5.00E+00 METERS(+1.64E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-02
AREA OF THE LOCATION/FACILITY SITE IS +4.51E-03 HECTARE(+4.85E+02 Ft², +4.51E+01M²)
AREA CORRECTION FACTOR IS +1.41E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year^{-1})	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+2.97E-17	+5.60E-02	+1.00E+00	+1.02E-10	+1.70E-11	+1.24E-10
C-14	+2.10E-14	+2.97E-17	+1.20E-04	+1.00E+00	+7.97E-11	+1.05E-11	+9.32E-11
CO-60	+6.70E-15	+9.47E-18	+1.30E-01	+1.00E+00	+6.71E-11	+2.85E-11	+1.04E-10
SR-90	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
CS-137	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
EU-152	+1.20E-15	+1.70E-18	+5.20E-02	+1.00E+00	+8.62E-12	+2.75E-12	+1.21E-11
EU-154	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +2.59E-10 rem/yr
VARIANCE DOSE TERM IS +1.24E-21 (rem/yr)²
COVARIANCE DOSE TERM IS +8.09E-22 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +2.04E-21 (rem/yr)²
UCL OF TOTAL DOSE IS +3.15E-10 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STRATUM NAME IS UPPER EQUIPMENT ROOM FLOOR
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-139	04/10/87	1608H	ERU	F	CSO-1.0C	pCi/gm	3.52E0	.75	*ND	*	*	9.21	* *	
87-140	04/13/87	1608H	ERU	F	CSO-1.0C	pCi/gm	1.21E0	1.71	4.73E0	*	*	6.21	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS UPPER EQUIPMENT ROOM FLOOR
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +1.00E+06 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		-2.37E+00	+1.63E+00	+1.16E+00	2	+2.51E+06	+1.22E+06
C-14		+1.22E+00	+6.75E-01	+4.80E-01	2	+1.30E+06	+5.09E+05
*CO-60		+4.77E+00	+0.00E+00	+0.00E+00	1	+5.01E+06	+0.00E+00
SR-90		NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
CS-137		NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
EU-152		+7.71E+00	+2.12E+00	+1.50E+00	2	+8.17E+06	+1.59E+06
EU-154		NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS	ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

*CO-60 STATISTICAL VALUES ARE ESTIMATED BY ASSUMING THAT THE S.D.=0.00*MEAN AND 1 DEGREE OF FREEDOM

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14		-1.11E+00	2
H-3	CO-60		NA-INSUFFICIENT DATA	1
H-3	SR-90		NA-INSUFFICIENT DATA	0
H-3	CS-137		NA-INSUFFICIENT DATA	0
H-3	EU-152		+3.47E+00	2
H-3	EU-154		NA-INSUFFICIENT DATA	0
H-3	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60		NA-INSUFFICIENT DATA	1
C-14	SR-90		NA-INSUFFICIENT DATA	0
C-14	CS-137		NA-INSUFFICIENT DATA	0
C-14	EU-152		-1.44E+00	2
C-14	EU-154		NA-INSUFFICIENT DATA	0
C-14	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90		NA-INSUFFICIENT DATA	0
CO-60	CS-137		NA-INSUFFICIENT DATA	0
CO-60	EU-152		NA-INSUFFICIENT DATA	1
CO-60	EU-154		NA-INSUFFICIENT DATA	0
CO-60	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137		NA-INSUFFICIENT DATA	0
SR-90	EU-152		NA-INSUFFICIENT DATA	0
SR-90	EU-154		NA-INSUFFICIENT DATA	0
SR-90	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152		NA-INSUFFICIENT DATA	0
CS-137	EU-154		NA-INSUFFICIENT DATA	0
CS-137	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154		NA-INSUFFICIENT DATA	0
EU-152	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS	ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS UPPER EQUIPMENT ROOM FLOOR
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +5.00E+00 METERS(+1.64E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-02
AREA OF THE LOCATION/FACILITY SITE IS +4.41E-03 HECTARE(+4.75E+02 Ft², +4.41E+01M²)
AREA CORRECTION FACTOR IS +1.40E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE		DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3		+2.10E-14	+2.95E-17	+5.60E-02	+1.00E+00	+7.39E-11	+3.61E-11	+1.20E-10
C-14		+2.10E-14	+2.95E-17	+1.20E-04	+1.00E+00	+3.85E-11	+1.50E-11	+5.77E-11
CO-60		+6.70E-15	+9.41E-18	+1.30E-01	+1.00E+00	+4.72E-11	+0.00E+00	+4.72E-11
SR-90		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
CS-137		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
EU-152		-1.20E-15	+1.69E-18	+5.20E-02	+1.00E+00	+1.38E-11	+2.68E-12	+1.72E-11
EU-154		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS	ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.73E-10 rem/yr
VARIANCE DOSE TERM IS +1.54E-21 (rem/yr)²
COVARIANCE DOSE TERM IS -9.71E-22 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +5.66E-22 (rem/yr)²
UCL OF TOTAL DOSE IS +2.04E-10 rem/yr

LOCATION/FACILITY NAME IS 1608-H LIFT STATION
STRATUM NAME IS EQUIPMENT ROOM WALLS AND CEILING
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	EU-154	GROSS ALPHA
87-141	04/13/87	1608H	ERL	EW	CSO-1.0C	pCi/gm	*	1.04	*ND	*	*	9.21	* *	
87-142	04/13/87	1608H	ERL	SW	CSO-1.0C	pCi/gm	*	*	*	*	*	*	* *	
87-144	04/13/87	1608H	ERL	NW	CSO-1.0C	pCi/gm	*	1.64	*ND	*	*	24.23	* *	
87-145	04/13/87	1608H	ERL	NW	CSO-1.0C	pCi/gm	*	1.14	*ND	*	*	114.32	* *	

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS EQUIPMENT ROOM WALLS AND CEILING
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +6.55E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
C-14	+1.27E+00	+3.21E-01	+1.86E-01	3	+8.34E+06	+1.22E+06
CO-60	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
SR-90	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
CS-137	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
EU-152	+4.93E+01	+5.68E+01	+3.28E+01	3	+3.23E+08	+2.15E+08
EU-154	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					
GROSS ALPHA	NA-NO DATA VALUES AVAILABLE FOR THIS ISOTOPE					

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14	NA-INSUFFICIENT DATA	0
H-3	CO-60	NA-INSUFFICIENT DATA	0
H-3	SR-90	NA-INSUFFICIENT DATA	0
H-3	CS-137	NA-INSUFFICIENT DATA	0
H-3	EU-152	NA-INSUFFICIENT DATA	0
H-3	EU-154	NA-INSUFFICIENT DATA	0
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	0
C-14	CO-60	NA-INSUFFICIENT DATA	0
C-14	SR-90	NA-INSUFFICIENT DATA	0
C-14	CS-137	NA-INSUFFICIENT DATA	0
C-14	EU-152	-4.25E+00	3
C-14	EU-154	NA-INSUFFICIENT DATA	0
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CO-60	SR-90	NA-INSUFFICIENT DATA	0
CO-60	CS-137	NA-INSUFFICIENT DATA	0
CO-60	EU-152	NA-INSUFFICIENT DATA	0
CO-60	EU-154	NA-INSUFFICIENT DATA	0
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	0
SR-90	CS-137	NA-INSUFFICIENT DATA	0
SR-90	EU-152	NA-INSUFFICIENT DATA	0
SR-90	EU-154	NA-INSUFFICIENT DATA	0
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152	NA-INSUFFICIENT DATA	0
CS-137	EU-154	NA-INSUFFICIENT DATA	0
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-152	EU-154	NA-INSUFFICIENT DATA	0
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	0
EU-154	GROSS ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS EQUIPMENT ROOM WALLS AND CEILING
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +5.00E+00 METERS(+1.64E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-02
AREA OF THE LOCATION/FACILITY SITE IS +2.73E-02 HECTARE(+2.94E+03 Ft², +2.73E+02M²)
AREA CORRECTION FACTOR IS +3.45E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE		DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
C-14		+2.10E-14	+7.29E-17	+1.20E-04	+1.00E+00	+6.08E-10	+8.87E-11	+7.22E-10
CO-60		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
SR-90		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
CS-137		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
EU-152		-1.20E-15	+4.17E-18	+5.20E-02	+1.00E+00	+1.34E-09	+8.96E-10	+2.49E-09
EU-154		-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						
GROSS	ALPHA	-NA NO DATA VALUES EXIST FOR THIS ISOTOPE						

TOTAL DOSE IS +1.95E-09 rem/yr
VARIANCE DOSE TERM IS +8.10E-19 (rem/yr)²
COVARIANCE DOSE TERM IS -3.70E-20 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +7.73E-19 (rem/yr)²
UCL OF TOTAL DOSE IS +3.08E-09 rem/yr

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APPENDIX D

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LOCATION/FACILITY NAME IS 117-H FILTER BUILDING
STRATUM NAME IS CONCRETE INLET DUCT
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	GROSS ALPHA
84-001	/ /	117H	ID	IT-1	PA	pCi/g	17	3	2	*	15	*ND	*
84-002	/ /	117H	ID	IT-13	PA	pCi/g	17	3	4	*	15	2	*
84-003	/ /	117H	ID	IT-19	PA	pCi/g	17	3	4	*	10	4	*
84-004	/ /	117H	ID	IT-31	PA	pCi/g	17	3	1	*	1	*ND	8
84-005	/ /	117H	ID	IT-72	PA	pCi/g	17	3	*ND	*	11	*ND	2
84-006	/ /	117H	ID	IT-81	PA	pCi/g	17	3	8	13.5	27	*ND	*
84-007	/ /	117H	ID	I T108	PA	pCi/g	17	3	4	*	13	*ND	5
84-008	/ /	117H	ID	I T114	PA	pCi/g	17	3	*ND	*	11	5	*
84-009	/ /	117H	ID	I T-138	PA	pCi/g	17	3	3	2	21	*ND	*
84-010	/ /	117H	ID	I T-147	PA	pCi/g	17	3	3	*	12	*ND	*

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS CONCRETE INLET DUCT
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +1.46E+07 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		+1.70E+01	+0.00E+00	+0.00E+00	10	+2.48E+08	+0.00E+00
C-14		+3.00E+00	+0.00E+00	+0.00E+00	10	+4.38E+07	+0.00E+00
CO-60		+3.63E+00	+2.07E+00	+7.30E-01	8	+5.29E+07	+1.07E+07
SR-90		+7.75E+00	+8.13E+00	+5.75E+00	2	+1.13E+08	+8.40E+07
CS-137		+1.36E+01	+6.88E+00	+2.18E+00	10	+1.99E+08	+3.18E+07
EU-152		+3.67E+00	+1.53E+00	+8.82E-01	3	+5.35E+07	+1.29E+07
GROSS	ALPHA	+5.00E+00	+3.00E+00	+1.73E+00	3	+7.30E+07	+2.53E+07

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14		+0.00E+00	10
H-3	CO-60		+0.00E+00	8
H-3	SR-90		+0.00E+00	2
H-3	CS-137		+0.00E+00	10
H-3	EU-152		+0.00E+00	3
H-3	GROSS	ALPHA	+0.00E+00	3
C-14	CO-60		+0.00E+00	8
C-14	SR-90		+0.00E+00	2
C-14	CS-137		+0.00E+00	10
C-14	EU-152		+0.00E+00	3
C-14	GROSS	ALPHA	+0.00E+00	3
CO-60	SR-90		+2.28E+01	2
CO-60	CS-137		+1.21E+01	8
CO-60	EU-152		+0.00E+00	2
CO-60	GROSS	ALPHA	-4.50E+00	2
SR-90	CS-137		+3.45E+01	2
SR-90	EU-152		NA-INSUFFICIENT DATA	0
SR-90	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152		-3.50E+00	3
CS-137	GROSS	ALPHA	-1.50E+01	3
EU-152	GROSS	ALPHA	NA-INSUFFICIENT DATA	0

STRATUM NAME IS CONCRETE INLET DUCT
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +3.35E+00 METERS(+1.10E+01 Ft)
DEPTH CORRECTION FACTOR IS +4.59E-02
AREA OF THE LOCATION/FACILITY SITE IS +6.62E-02 HECTARE(+7.13E+03 Ft², +6.62E+02M²)
AREA CORRECTION FACTOR IS +6.96E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+6.70E-16	+5.60E-02	+1.00E+00	+1.66E-07	+0.00E+00	+1.66E-07
C-14	+2.10E-14	+6.70E-16	+1.20E-04	+1.00E+00	+2.94E-08	+0.00E+00	+2.94E-08
CO-60	+6.70E-15	+2.14E-16	+1.30E-01	+1.30E+00	+1.13E-08	+2.28E-09	+1.42E-08
SR-90	+1.80E-12	+5.74E-14	+2.40E-02	+1.00E+00	+6.50E-06	+4.82E-06	+1.27E-05
CS-137	+6.70E-15	+2.14E-16	+2.30E-02	+1.00E+00	+4.25E-08	+6.80E-09	+5.12E-08
EU-152	+1.20E-15	+3.83E-17	+5.20E-02	+1.00E+00	+2.05E-09	+4.93E-10	+2.68E-09
GROSS ALPHA	+7.10E-15	+2.27E-16	+2.90E-05	+1.00E+00	+1.65E-08	+5.73E-09	+2.39E-08

TOTAL DOSE IS +6.77E-06 rem/yr
VARIANCE DOSE TERM IS +2.33E-11 (rem/yr)²
COVARIANCE DOSE TERM IS +1.65E-13 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +2.34E-11 (rem/yr)²
UCL OF TOTAL DOSE IS +1.30E-05 rem/yr

LOCATION/FACILITY NAME IS 117-H FILTER BUILDING
STRATUM NAME IS CONCRETE INLET SEAL PITS A AND B
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	GROSS ALPHA
84-011	/ /	117H	ISPA	W-1	PA	pCi/g	17	3	8	6	30	8	*
84-012	/ /	117H	ISPA	F-2	PA	pCi/g	17	39	15	*	33	20	2
84-013	/ /	117H	ISPB	F-1	PA	pCi/g	17	3	282	1	477	136	*
84-014	/ /	117H	ISPB	W-2	PA	pCi/g	17	3	15	30	59	10	23

* -NO DATA VALUES AVAILABLE

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STRATUM NAME IS CONCRETE INLET SEAL PITS A AND B
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +7.81E+06 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		-1.70E+01	+0.00E+00	+0.00E+00	4	+1.33E+08	+0.00E+00
C-14		+1.20E+01	+1.80E+01	+9.00E+00	4	+9.37E+07	+7.03E+07
CO-60		+8.00E+01	+1.35E+02	+6.74E+01	4	+6.25E+08	+5.26E+08
SR-90		+1.23E+01	+1.55E+01	+8.95E+00	3	+9.63E+07	+6.99E+07
CS-137		+1.50E+02	+2.19E+02	+1.09E+02	4	+1.17E+09	+8.53E+08
EU-152		+4.35E+01	+6.19E+01	+3.09E+01	4	+3.40E+08	+2.42E+08
GROSS	ALPHA	+1.25E+01	+1.48E+01	+1.05E+01	2	+9.76E+07	+8.20E+07

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14		+0.00E+00	4
H-3	CO-60		+0.00E+00	4
H-3	SR-90		+0.00E+00	3
H-3	CS-137		+0.00E+00	4
H-3	EU-152		+0.00E+00	4
H-3	GROSS	ALPHA	+0.00E+00	2
C-14	CO-60		-7.80E+02	4
C-14	SR-90		+0.00E+00	3
C-14	CS-137		-1.40E+03	4
C-14	EU-152		-2.82E+02	4
C-14	GROSS	ALPHA	-3.78E+02	2
CO-60	SR-90		-1.49E+03	3
CO-60	CS-137		+2.94E+04	4
CO-60	EU-152		+8.32E+03	4
CO-60	GROSS	ALPHA	+0.00E+00	2
SR-90	CS-137		-2.28E+03	3
SR-90	EU-152		-7.08E+02	3
SR-90	GROSS	ALPHA	NA-INSUFFICIENT DATA	1
CS-137	EU-152		+1.34E+04	4
CS-137	GROSS	ALPHA	+2.73E+02	2
EU-152	GROSS	ALPHA	-1.05E+02	2

STRATUM NAME IS CONCRETE INLET SEAL PITS A AND B
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +1.00E+01 METERS(+3.28E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-04
AREA OF THE LOCATION/FACILITY SITE IS +3.26E-02 HECTARE(+3.51E+03 Ft², +3.26E+02M²)
AREA CORRECTION FACTOR IS +3.93E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE		DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3		+2.10E-14	+8.35E-19	+5.60E-02	+1.00E+00	+1.11E-10	+0.00E+00	+1.11E-10
C-14		+2.10E-14	+8.35E-19	+1.20E-04	+1.00E+00	+7.82E-11	+5.87E-11	+1.53E-10
CO-60		+6.70E-15	+2.66E-19	+1.30E-01	+1.00E+00	+1.66E-10	+1.40E-10	+3.46E-10
SR-90		+1.80E-12	+7.15E-17	+2.40E-02	+1.00E+00	+6.89E-09	+5.00E-09	+1.33E-08
CS-137		+6.70E-15	+2.66E-19	+2.30E-02	+1.00E+00	+3.11E-10	+2.27E-10	+6.03E-10
EU-152		+1.20E-15	+4.77E-20	+5.20E-02	+1.00E+00	+1.62E-11	+1.15E-11	+3.10E-11
GROSS	ALPHA	+7.10E-15	+2.82E-19	+2.90E-05	+1.00E+00	+2.76E-11	+2.31E-11	+5.72E-11

TOTAL DOSE IS +7.60E-09 rem/yr
VARIANCE DOSE TERM IS +2.51E-17 (rem/yr)²
COVARIANCE DOSE TERM IS -2.96E-18 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +2.21E-17 (rem/yr)²
UCL OF TOTAL DOSE IS +1.36E-08 rem/yr

LOCATION/FACILITY NAME IS 117-H FILTER BUILDING
STRATUM NAME IS CONCRETE FILTER CELLS A AND B
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	GROSS ALPHA
84-015	/ /	117H	FCA	F-1	PA	pCi/g	17	3	2	2	4	1	*
84-016	/ /	117H	FCA	W-1	PA	pCi/g	17	3	*ND	13	25	* ND	29
84-017	/ /	117H	FCA	W-2	PA	pCi/g	*	*	*ND	*	22	* ND	14
84-018	/ /	117H	FCB	F-1	PA	pCi/g	17	3	56	45	89	63	2
84-019	/ /	117H	FCB	F-1	PA	pCi/g	17	3	4	7	9	6	*
84-020	/ /	117H	FCB	W-2	PA	pCi/g	17	3	1	*	11	* ND	7

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS CONCRETE FILTER CELLS A AND B
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +1.39E+07 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		+1.70E+01	+0.00E+00	+0.00E+00	5	+2.36E+08	+0.00E+00
C-14		+3.00E+00	+0.00E+00	+0.00E+00	5	+4.17E+07	+0.00E+00
CO-60		+1.58E+01	+2.69E+01	+1.34E+01	4	+2.19E+08	+1.87E+08
SR-90		+1.68E+01	+1.94E+01	+9.68E+00	4	+2.33E+08	+1.35E+08
CS-137		+2.67E+01	+3.16E+01	+1.29E+01	6	+3.71E+08	+1.79E+08
EU-152		+2.33E+01	+3.44E+01	+1.99E+01	3	+3.24E+08	+2.76E+08
GROSS	ALPHA	+1.30E+01	+1.17E+01	+5.87E+00	4	+1.81E+08	+8.16E+07

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)^2	NUMBER OF SAMPLES
H-3	C-14		+0.00E+00	5
H-3	CO-60		+0.00E+00	4
H-3	SR-90		+0.00E+00	4
H-3	CS-137		+0.00E+00	5
H-3	EU-152		+0.00E+00	3
H-3	GROSS	ALPHA	+0.00E+00	3
C-14	CO-60		+0.00E+00	4
C-14	SR-90		+0.00E+00	4
C-14	CS-137		+0.00E+00	5
C-14	EU-152		+0.00E+00	3
C-14	GROSS	ALPHA	+0.00E+00	3
CO-60	SR-90		+7.13E+02	3
CO-60	CS-137		+1.09E+03	4
CO-60	EU-152		+1.05E+03	3
CO-60	GROSS	ALPHA	-1.38E+02	2
SR-90	CS-137		+7.58E+02	4
SR-90	EU-152		+8.09E+02	3
SR-90	GROSS	ALPHA	-4.32E+02	2
CS-137	EU-152		+1.64E+03	3
CS-137	GROSS	ALPHA	-2.08E+02	4
EU-152	GROSS	ALPHA	NA-INSUFFICIENT DATA	1

STRATUM NAME IS CONCRETE FILTER CELLS A AND B
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +8.00E+00 METERS(+2.62E+01 Ft)
DEPTH CORRECTION FACTOR IS +6.36E-04
AREA OF THE LOCATION/FACILITY SITE IS +5.79E-02 HECTARE(+6.23E+03 Ft², +5.79E+02M²)
AREA CORRECTION FACTOR IS +6.21E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+8.30E-18	+5.60E-02	+1.00E+00	+1.96E-09	+0.00E+00	+1.96E-09
C-14	+2.10E-14	+8.30E-18	+1.20E-04	+1.00E+00	+3.46E-10	+0.00E+00	+3.46E-10
CO-60	+6.70E-15	+2.65E-18	+1.30E-01	+1.00E+00	+5.80E-10	+4.94E-10	+1.21E-09
SR-90	+1.80E-12	+7.11E-16	+2.40E-02	+1.00E+00	+1.66E-07	+9.57E-08	+2.88E-07
CS-137	+6.70E-15	+2.65E-18	+2.30E-02	+1.00E+00	+9.81E-10	+4.74E-10	+1.59E-09
EU-152	+1.20E-15	+4.74E-19	+5.20E-02	+1.00E+00	+1.54E-10	+1.31E-10	+3.22E-10
GROSS ALPHA	+7.10E-15	+2.81E-19	+2.90E-05	+1.00E+00	+5.07E-10	+2.29E-10	+8.01E-10

TOTAL DOSE IS +1.70E-07 rem/yr
VARIANCE DOSE TERM IS +9.16E-15 (rem/yr)²
COVARIANCE DOSE TERM IS +1.81E-16 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +9.34E-15 (rem/yr)²
UCL OF TOTAL DOSE IS +2.94E-07 rem/yr

LOCATION/FACILITY NAME IS 117-H FILTER BUILDING
STRATUM NAME IS CONCRETE OUTLET SEAL PITS A AND B
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	GROSS ALPHA
84-021	/ /	117H	OSPA	W-2	PA	pCi/g	17	3	2	6	7	2	*
84-022	/ /	117H	OSPA	W-2	PA	pCi/g	17	3	6	22	22	4	*
84-023	/ /	117H	OSPB	F-1	PA	pCi/g	17	3	8	9	82	11	11
84-024	/ /	117H	OSPB	W-2	PA	pCi/g	17	3	18	*	56	14	*

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS CONCRETE OUTLET SEAL PITS A AND B
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +7.61E+06 gm

ISOTOPE	AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3	+1.70E+01	+0.00E+00	+0.00E+00	4	+1.33E+08	+0.00E+00
C-14	+3.00E+00	+0.00E+00	+0.00E+00	4	+2.34E+07	+0.00E+00
CO-60	+8.50E+00	+6.81E+00	+3.40E+00	4	+6.64E+07	+2.66E+07
SR-90	+1.23E+01	+8.50E+00	+4.91E+00	3	+9.63E+07	+3.83E+07
CS-137	+4.18E+01	+3.38E+01	+1.69E+01	4	+3.26E+08	+1.32E+08
EU-152	+7.75E+00	+5.68E+00	+2.84E+00	4	+6.05E+07	+2.22E+07
*GROSS ALPHA	+1.10E+01	+0.00E+00	+0.00E+00	1	+8.59E+07	+0.00E+00

*GROSS ALPHA STATISTICAL VALUES ARE ESTIMATED BY ASSUMING THAT THE S.D.=0.00*MEAN AND 1 DEGREE OF FREEDOM

COVARIANCE TERMS

ISOTOPE	ISOTOPE	C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14	+0.00E+00	4
H-3	CO-60	+0.00E+00	4
H-3	SR-90	+0.00E+00	3
H-3	CS-137	+0.00E+00	4
H-3	EU-152	+0.00E+00	4
H-3	GROSS ALPHA	NA-INSUFFICIENT DATA	1
C-14	CO-60	+0.00E+00	4
C-14	SR-90	+0.00E+00	3
C-14	CS-137	+0.00E+00	4
C-14	EU-152	+0.00E+00	4
C-14	GROSS ALPHA	NA-INSUFFICIENT DATA	1
CO-60	SR-90	+9.33E+00	3
CO-60	CS-137	+1.30E+02	4
CO-60	EU-152	+3.48E+01	4
CO-60	GROSS ALPHA	NA-INSUFFICIENT DATA	1
SR-90	CS-137	-5.25E+01	3
SR-90	EU-152	-5.33E+00	3
SR-90	GROSS ALPHA	NA-INSUFFICIENT DATA	1
CS-137	EU-152	+1.65E+02	4
CS-137	GROSS ALPHA	NA-INSUFFICIENT DATA	1
EU-152	GROSS ALPHA	NA-INSUFFICIENT DATA	1

STRATUM NAME IS CONCRETE OUTLET SEAL PITS A AND B
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +1.00E+01 METERS(+3.28E+01 Ft)
DEPTH CORRECTION FACTOR IS +1.01E-04
AREA OF THE LOCATION/FACILITY SITE IS +3.26E-02 HECTARE(+3.51E+03 Ft², +3.26E+02M²)
AREA CORRECTION FACTOR IS +3.93E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE	DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3	+2.10E-14	+8.35E-19	+5.60E-02	+1.00E+00	+1.11E-10	+0.00E+00	+1.11E-10
C-14	+2.10E-14	+8.35E-19	+1.20E-04	+1.00E+00	+1.96E-11	+0.00E+00	+1.96E-11
CO-60	+6.70E-15	+2.66E-19	+1.30E-01	+1.00E+00	+1.77E-11	+7.08E-12	+2.68E-11
SR-90	+1.80E-12	+7.15E-17	+2.40E-02	+1.00E+00	+6.89E-09	+2.74E-09	+1.04E-08
CS-137	+6.70E-15	+2.66E-19	+2.30E-02	+1.00E+00	+8.68E-11	+3.51E-11	+1.32E-10
EU-152	+1.20E-15	+4.77E-20	+5.20E-02	+1.00E+00	+2.89E-12	+1.06E-12	+4.24E-12
GROSS ALPHA	+7.10E-15	+2.82E-19	+2.90E-05	+1.00E+00	+2.42E-11	+0.00E+00	+2.42E-11

TOTAL DOSE IS +7.15E-09 rem/yr
VARIANCE DOSE TERM IS +7.53E-18 (rem/yr)²
COVARIANCE DOSE TERM IS -3.38E-20 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +7.50E-18 (rem/yr)²
UCL OF TOTAL DOSE IS +1.07E-08 rem/yr

LOCATION/FACILITY NAME IS 117-H FILTER BUILDING
STRATUM NAME IS CONCRET OUTLET DUCT
DATA VALUES ARE

SAMPLE NUMBER	SAMPLE DATE	LOCATION	SUB-LOC-1	SUB-LOC-2	SAMPLE TYPE	UNITS	H-3	C-14	CO-60	SR-90	CS-137	EU-152	GROSS ALPHA
84-025	/ /	117H	OD	W-1	PA	pCi/g	17	3	8	*	15	*ND	*
84-026	/ /	117H	OD	W-2	PA	pCi/g	17	3	11	*	5	*ND	*
84-027	/ /	117H	OD	W-3	PA	pCi/g	17	3	*ND	*	3	*ND	5
84-028	/ /	117H	OD	F-1	PA	pCi/g	*	*	4	1	6	*ND	*
84-029	/ /	117H	OD	F-2	PA	pCi/g	*	*	3	*	9	*ND	3
84-030	/ /	117H	OD	W-4	PA	pCi/g	*	*	7	15	29	*ND	*
84-031	/ /	117H	OD	W-5	PA	pCi/g	*	*	2	*	9	3	2
84-032	/ /	117H	OD	W-6	PA	pCi/g	*	*	3	*	10	*ND	*
84-033	/ /	117H	OD	W-7	PA	pCi/g	*	*	1	*	11	*ND	*
84-034	/ /	117H	OD	W-60	PA	pCi/g	*	*	9	*	22	7	*

* -NO DATA VALUES AVAILABLE

STRATUM NAME IS CONCRET OUTLET DUCT
MASS,VOL,ETC OF CONTAMINATED MATERIAL IN STRATUM IS +1.63E+07 gm

ISOTOPE		AVG. CONC.(pCi/gm)	S.D.(pCi/gm)	S.D. AVG.(pCi/gm)	NO. OF SAMPLES	SOURCE TERM(pCi)	S.D. SOURCE TERM(pCi)
H-3		+1.70E+01	+0.00E+00	+0.00E+00	3	+2.81E+08	+0.00E+00
C-14		+3.00E+00	+0.00E+00	+0.00E+00	3	+4.95E+07	+0.00E+00
CO-60		+5.33E+00	+3.50E+00	+1.17E+00	9	+8.80E+07	+1.93E+07
SR-90		+8.00E+00	+9.90E+00	+7.00E+00	2	+1.32E+08	+1.15E+08
CS-137		+1.19E+01	+8.08E+00	+2.55E+00	10	+1.96E+08	+4.21E+07
EU-152		+5.00E+00	+2.83E+00	+2.00E+00	2	+8.25E+07	+3.30E+07
GROSS	ALPHA	+3.33E+00	+1.53E+00	+8.82E-01	3	+5.50E+07	+1.46E+07

COVARIANCE TERMS

ISOTOPE	ISOTOPE		C.V. CONC(pCi/gm)²	NUMBER OF SAMPLES
H-3	C-14		+0.00E+00	3
H-3	CO-60		+0.00E+00	2
H-3	SR-90		NA-INSUFFICIENT DATA	0
H-3	CS-137		+0.00E+00	3
H-3	EU-152		NA-INSUFFICIENT DATA	0
H-3	GROSS	ALPHA	NA-INSUFFICIENT DATA	1
C-14	CO-60		+0.00E+00	2
C-14	SR-90		NA-INSUFFICIENT DATA	0
C-14	CS-137		+0.00E+00	3
C-14	EU-152		NA-INSUFFICIENT DATA	0
C-14	GROSS	ALPHA	NA-INSUFFICIENT DATA	1
CO-60	SR-90		+3.10E+01	2
CO-60	CS-137		+8.42E+00	9
CO-60	EU-152		+1.40E+01	2
CO-60	GROSS	ALPHA	+5.00E-01	2
SR-90	CS-137		+1.61E+02	2
SR-90	EU-152		NA-INSUFFICIENT DATA	0
SR-90	GROSS	ALPHA	NA-INSUFFICIENT DATA	0
CS-137	EU-152		+2.60E+01	2
CS-137	GROSS	ALPHA	-5.00E+00	3
EU-152	GROSS	ALPHA	NA-INSUFFICIENT DATA	1

STRATUM NAME IS CONCRET OUTLET DUCT
SCENARIO = AGRICULTURAL
DOSE IS CALC. AT T = 0 YEARS
DEPTH OF STRATUM IS +3.35E+00 METERS(+1.10E+01 Ft)
DEPTH CORRECTION FACTOR IS +4.59E-02
AREA OF THE LOCATION/FACILITY SITE IS +6.88E-02 HECTARE(+7.41E+03 Ft², +6.88E+02M²)
AREA CORRECTION FACTOR IS +7.19E-01
DOSE FACTOR CORRECTION FACTOR IS 1
FRACTION OF STRATUM USED IN SCENARIO = 1

ISOTOPE		DOSE FACTOR (rem/yr/pci)	CORRECTED DOSE FACTOR	DECAY CONST.(year⁻¹)	DECAY FACTOR	EST. DOSE(rem/yr)	S.D. DOSE(rem/yr)	UCL DOSE(rem/yr)
H-3		+2.10E-14	+6.93E-16	+5.60E-02	+1.00E+00	+1.94E-07	+0.00E+00	+1.94E-07
C-14		+2.10E-14	+6.93E-16	+1.20E-04	+1.00E+00	+3.43E-08	+0.00E+00	+3.43E-08
CO-60		+6.70E-15	+2.21E-16	+1.30E-01	+1.00E+00	+1.94E-08	+4.25E-09	+2.49E-08
SR-90		+1.80E-12	+5.94E-14	+2.40E-02	+1.00E+00	+7.84E-06	+6.86E-06	+1.66E-05
CS-137		+6.70E-15	+2.21E-16	+2.30E-02	+1.00E+00	+4.34E-08	+9.31E-09	+5.53E-08
EU-152		+1.20E-15	+3.96E-17	+5.20E-02	+1.00E+00	+3.27E-09	+1.31E-09	+4.94E-09
GROSS	ALPHA	+7.10E-15	+2.34E-16	+2.90E-05	+1.00E+00	+1.29E-08	+3.41E-09	+1.73E-08

TOTAL DOSE IS +8.15E-06 rem/yr
VARIANCE DOSE TERM IS +4.70E-11 (rem/yr)²
COVARIANCE DOSE TERM IS +6.50E-13 (rem/yr)²
TOTAL VARIANCE OF DOSE IS +4.77E-11 (rem/yr)²
UCL OF TOTAL DOSE IS +1.70E-05 rem/yr