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July 25, 2003

Docket 50-62

Document Control Desk
United States Nuclear Regulatory Commission
Mail Stop O12-G13
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2783

Attention: Mr. Daniel E. Hughes, Project Manager
Operating Reactor Improvements Program

Subject: Transmittal of University of Virginia Reactor Decommissioning Project Continuing Characterization Summaries: Reactor Pool Soil Areas; Reactor Pool Interior; Plant Stack; Laboratory Rooms M008 and M005; Demineralizer Room; Hot Cell Room; Heat Exchanger Room; Source Room; Beamport Area; Impacted Drain Lines and Piping; Mezzanine Crawl Space; and Pond Sediment

References: 1. Amendment No. 26 to Amended Facility Operating License No. R-66 for the University of Virginia Research Reactor
2. Docket 50-62
3. Transmittal R. U. Mulder to D. E. Hughes, "Transmittal of the University of Virginia Reactor Decommissioning Project Master Final Status Plan, UVA-FS-002, Rev 0, March 2003" dated April 4, 2003

Dear Mr. Hughes,

The referenced amendment which approves the decommissioning plan for the University of Virginia Research Reactor calls for the licensee to submit a report of any characterization surveys performed that were not part of the license amendment application. Appendix A – *Summary of Characterization Results* from the University of Virginia Reactor Decommissioning Plan identified 15 locations or areas that required further investigation and evaluation to determine the appropriate decommissioning activities to be performed. Those investigations are complete and documented by the summaries.

A020

We are pleased to transmit for your information three copies (enclosed) of the Continuing Characterization Summaries, prepared for the University of Virginia by CH2M HILL and its subcontractor, Safety and Ecology Corporation. They are: Reactor Pool Soil Areas; Reactor Pool Interior; Plant Stack; Laboratory Rooms M008 and M005; Demineralizer Room; Hot Cell Room; Heat Exchanger Room; Source Room; Beamport Area; Impacted Drain Lines and Piping; Mezzanine Crawl Space; and Pond Sediment. This transmittal is the entire set of Characterization Summaries for the University of Virginia Decommissioning Plan.

The Table "Continuing Characterization Document Crosswalk" contains a crosswalk between the fifteen "areas" and the Characterization Summary describing the results of the investigations or other documents, indicated by (v), that will complete the resolution.

Table 1-- Continuing Characterization Document Crosswalk

Item No.	Appendix A "Area" Description	Summary or other document (v)
1	Reactor Room Wall & Floor Drains	Reactor Pool Soil Areas + (v) Addendum 004: Interior Structure Surfaces
2	Reactor Pool	Reactor Pool Interior
3	Reactor Stack Exhaust	Reactor Plant Stack +(v) Addendum 006: Exterior Structure Surfaces
4	Laboratory Sink	Laboratory Rooms M008 and M005
5	Demineralizer Equipment surface	Demineralizer Room
6	CAVALIER	(v) Evaluation of Radiological Characterization Results Relative to Termination of NRC License R-123
7	Hot Cell surfaces	Hot Cell Room
8	Heat Exchanger Sump	Heat Exchanger Room
9	Ground Floor Walls	Source Room +(v) Addendum 004: Interior Structure Surfaces
10	Beam Ports	Beamport area
11	UST blockhouse	(v) Addendum 001: Underground Waste Tank Excavation
12	Hot Cell Tank & Piping	(v) Addendum 001: Underground Waste Tank Excavation
13	Pond Sediments	Impacted Drain Lines and Piping Mezzanine Crawl Space Pond Sediment
14	Pond Bank	(v) Addendum 001: Underground Waste Tank Excavation
15	Storm Drain	Reactor Pool Soil

(v) = documents that provide verification that the condition to be investigated is resolved.

If you have any questions regarding this transmittal, please contact me at (434) 243-8821.

Sincerely,

Paul E Benneche

I declare under penalty of perjury that the foregoing is true and correct.

Paul E Benneche
July 25, 2003

Paul Benneche
Reactor Supervisor
University of Virginia

Enclosures:

1. UVAP Continuing Characterization: Reactor Pool Soil Areas Summary
2. UVAP Continuing Characterization: Reactor Pool Interior Summary
3. UVAP Continuing Characterization: Reactor Plant Stack Summary
4. UVAP Continuing Characterization: Laboratory Rooms M008 and M005 Summary
5. UVAP Continuing Characterization: Demineralizer Room Summary
6. UVAP Continuing Characterization: Hot Cell Room Summary
7. UVAP Continuing Characterization: Heat Exchanger Room Summary
8. UVAP Continuing Characterization: Source Room Summary
9. UVAP Continuing Characterization: Beamport Area Summary
10. UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary
11. UVAP Continuing Characterization: Mezzanine Crawl Space Summary
12. UVAP Continuing Characterization: Pond Sediment Summary

c: Ralph Allen, Chair Reactor Decommissioning Committee
Stephen Holmes, NRC

UVAP Continuing Characterization: Reactor Pool Soil Areas

The Reactor Containment building housed the former UVA Research Reactor located on the first floor. The steel re-enforced concrete reactor pool is approximately four meters wide, ten meters long and nine meters in depth. The pool is separated into two halves by a concrete buttress that housed the reactor pool gate. The pool is oriented slightly off from true North to South. The Reactor Room floor elevation was near the top of the original pool structure, while the facility ground floor is about two feet above the bottom of the reactor pool. The space between the base of the pool and the Reactor Room floor and the Reactor Room sidewall was backfilled with site soil before the floor slab was poured. An exhaustive soil-sampling program was used to evaluate potential contamination levels in the materials used to backfill this space. Leakage from separated reactor room floor drain piping and other potential leakage paths from the reactor pool potentially affected some of these areas.

The soils around the reactor pool structure have been accessed at 36 locations. Nineteen bore holes were cored in the 8 inch thick concrete reactor room floor, seven bore holes were cored through the 18 inch thick reactor pool wall, seven bore holes cored through the 12 inch concrete reactor pool floor, one bore hole cored horizontally in the 12 inch thick concrete wall between the heat exchanger room and the reactor pool room and two horizontal bore holes cored in the 12 inch thick demineralizer room wall (Figures 1, 2, and 3). All soil samples from these holes were below the DCGL of 3.8pCi/g for Co-60 and 11.0 pCi/g for Cs-137, with the exception of the "I" core and one reactor pool floor sample. See Tables 1 thru 8 for sample analyses results.

Reactor room "I" core (Figure 1) soil results (Table 1) ranged from non-detectable to 85.5 pCi/g Co-60. To determine the extent of the "I" core soil contamination, seven bore holes were cored in the reactor pool wall (Figure 2) to determine contamination migration from " I" core. Samples were obtained to a horizontal depth of 4.5-feet or refusal and showed no Co-60 activity. (Table 2). Three boreholes were cored around " I" core. North "IC" and east "IB" of "I" at a distance of 10-feet, and to the south "IA" at a distance of 4-feet (Figure 1). Surface samples from these core holes indicated no Co-60 activity (Table 1, UVA-SL-050 thru 052). The activity in core bore "I" was limited to an area of 1.5-foot across by 1.5-foot deep, and 3-feet in length adjacent to the pool south east wing wall and east pool wall. This soil was removed. Samples taken after soil remediation indicated soil results (Table 1, UVA-SL-126 thru 129) ranged from non-detectable to 1.4 pCi/g Co-60.

The initial through the pool floor core sample #9 (Figure 2) taken on 12/18/02 indicated activity of 4.72 pCi/g at a depth of 42 to 54 inches. This elevated activity is believed to have resulted from cross contamination, from the beam port concrete removal operation, which had been performed directly above the sample #9 location. The original 4-inch core was over cored with an 18-inch core for access. Two additional sample locations were selected adjacent to #9 sample and labeled PF1 and PF1A. Reactor pool core bore PF1 surface soil sample indicates activity for Co-60 at 3.7 pCi/gram. Analysis of auger samples from PF1 and PF1A denotes no activity from licensed material above DCGL from the soil surface below the Reactor Room concrete floor to the depth of 90 inches. See Table 7 for results.

Soil samples were obtained from the west wall in the demineralizer room and heat exchanger area to a horizontal depth of 78-inches and 66-inches, respectively. These samples indicated no activity above DCGL's. See Tables 4 and 5 for results.

UVAP Continuing Characterization: Reactor Pool Soil Areas

Soil samples were obtained from twelve locations on the ground floor, from the heat exchanger room sump and though other concrete floor openings in the heat exchanger room and room G020 (Figure 3). All soil samples from these holes were below the DCGL of 3.8pCi/g for Co-60 and 11.0 pCi/g for Cs-137. See Table 6 for results.

Table 8 contains background sample results from Ragged Mountain Reservoir sediment samples, sediment on the UVAP site upstream from the pond bed sediment, UVAP site fill soil, and the UVAP rock face (in the upper parking lot) for comparison. The Ragged Mountain Reservoir is located approximately 5 miles west of the UVAP site and was designated as a background location in the GTS Characterization report. The Ragged Mountain reservoir rock formation is not the same geological formation as at UVAP, and contains rock with lower concentrations of naturally occurring radioactive elements.

Two samples from the floor core samples, UVA-PSL-002-5 and UVA-PSL-003-4 and a composite of the 4" concrete core samples, UVA-PCC-001 were sent to the offsite laboratory for Part 61 "hard to detect" isotope analysis. See Table 9 for results.

During Final Status Survey soil sampling, three 6-inch surface samples and one composite sample were found to be above DCGL criteria for Co-60. One sample from "M" core area, UVA-SLFS-047 indicated activity of 9.7 pCi/g, Two samples from "B" core area, UVA-SLFS-032 and 052 indicated activity of 9.5 pCi/g and 18.8 pCi/g, respectively. The "M" core elevated area was delineated to a discreet location of 6-inches by 6-inches by 6-inches deep just under the piping junction of "L" pipe and the "M" core main floor drain header piping. This junction had been removed during D & D operations. This elevated soil was removed and follow-up samples were below DCGL criteria. The elevated area in "B" core was delineated and found to be limited to the "B" drain piping and the main floor drain header piping junction that was removed during D & D operations. This elevated soil was removed and follow-up samples were below DCGL criteria.

CONCLUSIONS:

Based on results of the initial surveys and surveys after D&D evolutions, no further remediation is required. The reactor pool soil areas are ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 1 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Reactor Pool Soil Areas

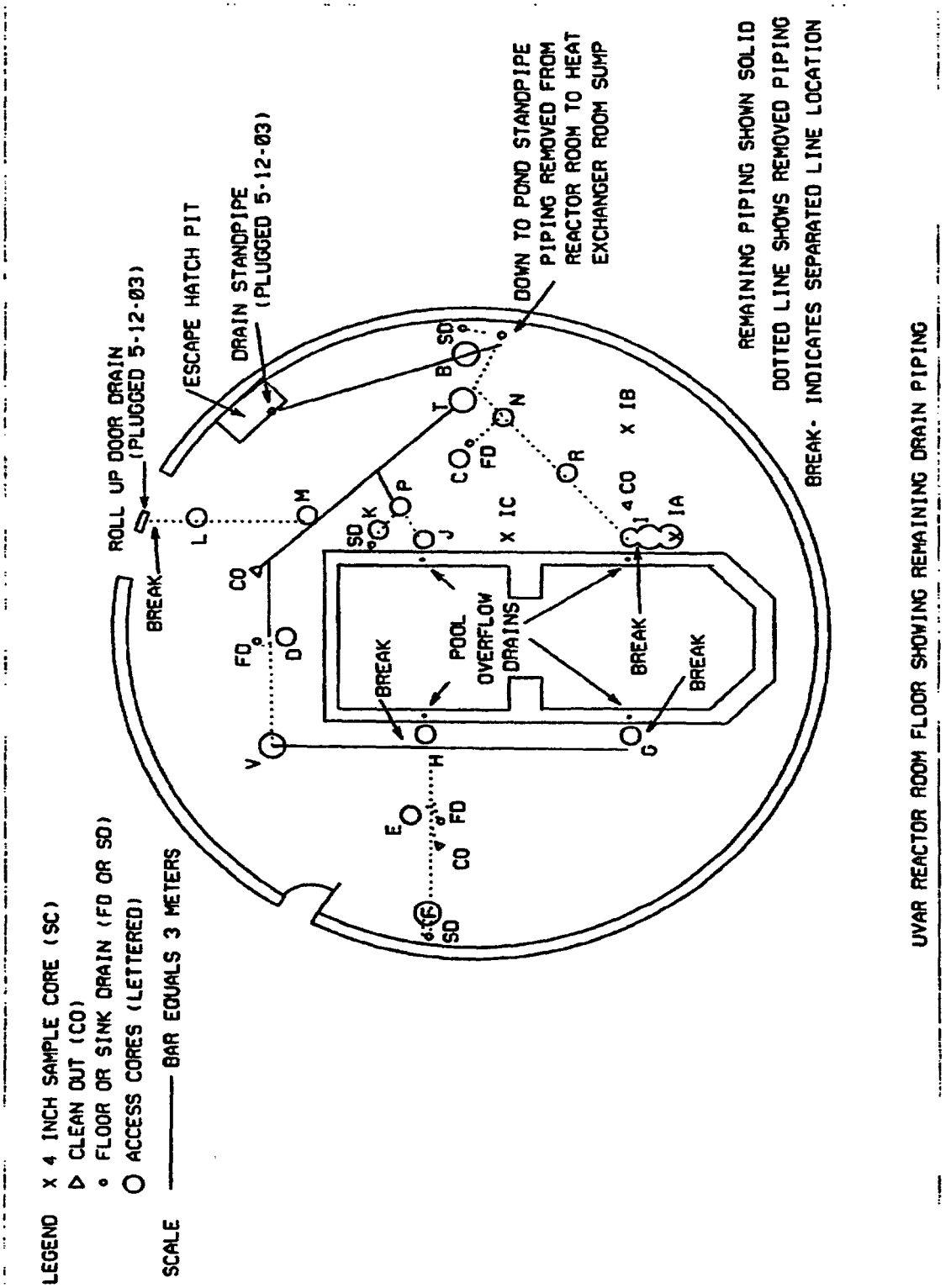

Figure 1

UVAP Continuing Characterization:
Reactor Pool Soil Areas

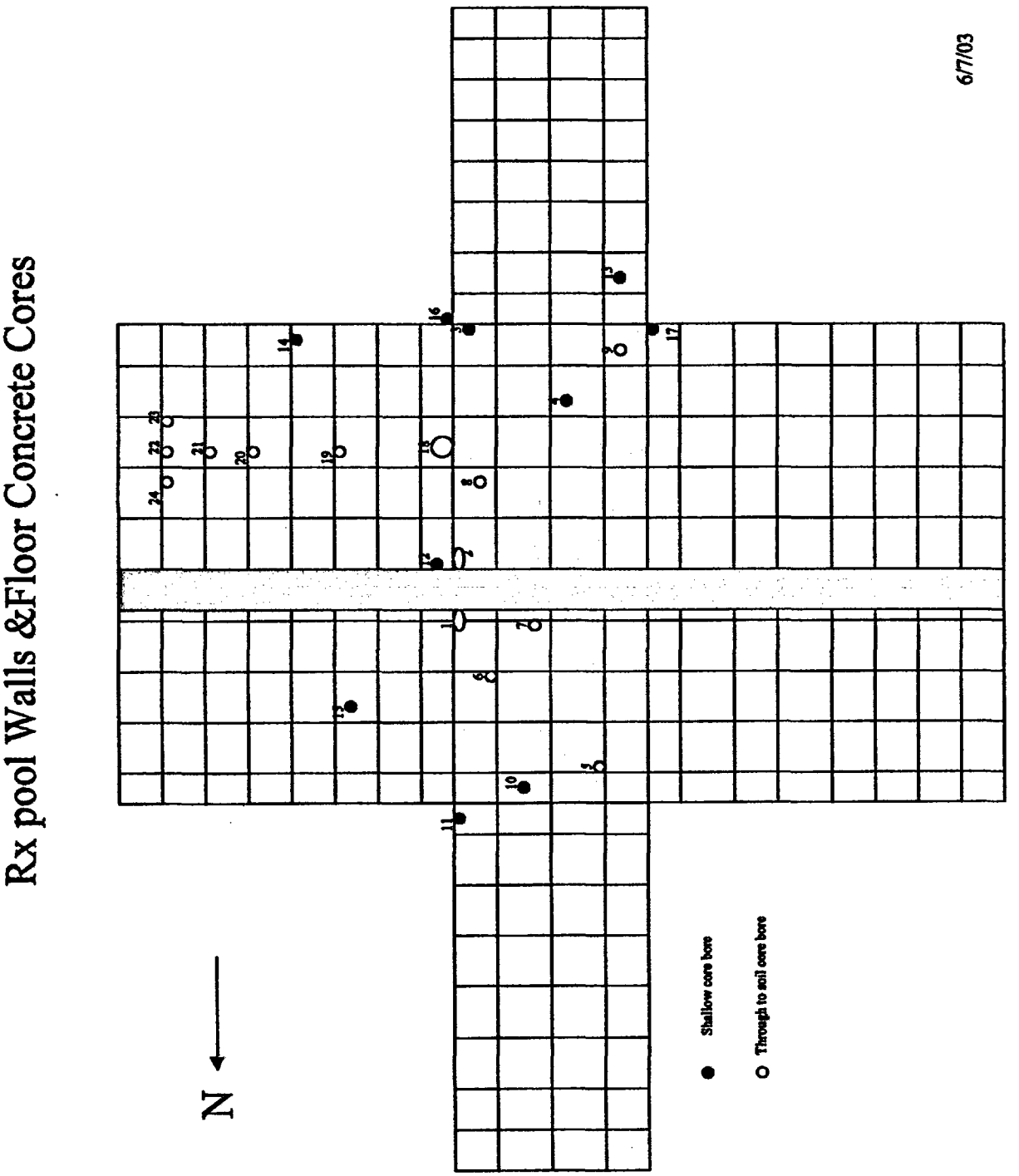

Figure 2

UVAP Continuing Characterization: Reactor Pool Soil Areas

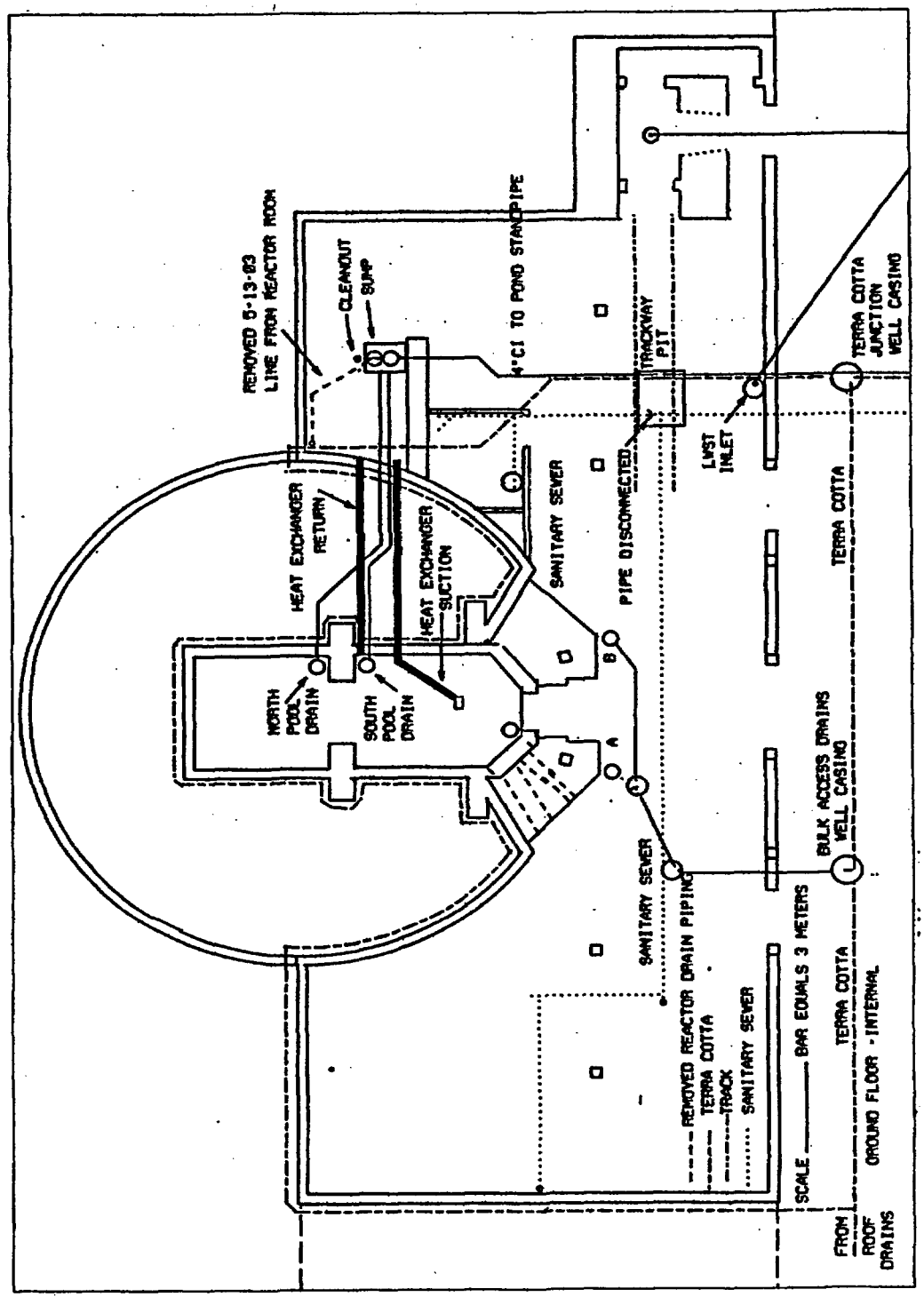

Figure 3

UVAP Continuing Characterization:
Reactor Pool Soil Areas

"I " Core Soil Samples
Table 1 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
		44-2	44-9	K-40	Co-57	Co-60	Ag-108m	Cs-137	Eu152	Pb-212	Pb-214
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-SL-021	Surface	N/A	N/A	15.4	0.3	85.5	1.7	1.2	8.4	0.3	
UVA-SL-031-1	0 to 6	N/A	92	13.3	Non-det	4.5	Non-det	0.2	Non-det	0.8	0.6
UVA-SL-031-2	6 to 18	N/A	103	14.5	Non-det	6.9	Non-det	Non-det	Non-det	1.2	0.5
UVA-SL-031-3	18 to 30	N/A	113	16.0	0.1	1.76	Non-det	Non-det	Non-det	1.3	0.7
UVA-SL-031-4	30 to 42	N/A	124	20.0	Non-det	2.5	Non-det	Non-det	Non-det	1.7	1.0
UVA-SL-031-5	42 to 54	N/A	123	20.1	Non-det	1.2	Non-det	Non-det	Non-det	1.8	1.2
UVA-SL-031-6	54 to 66	N/A	118	18.7	Non-det	3.7	Non-det	Non-det	Non-det	1.7	0.9
UVA-SL-038	Surface	N/A	N/A	22.5	0.6	45.5	1.1	1.0	3.5	1.4	
UVA-SL-039	Surface	N/A	112	12.7	Non-det	Non-det	Non-det	Non-det	Non-det	1.0	0.7
UVA-SL-040	Surface	N/A	122	28.7	Non-det	Non-det	Non-det	Non-det	Non-det	2.5	1.8
UVA-SL-041	Surface	N/A	110	23.3	Non-det	Non-det	Non-det	Non-det	Non-det	1.7	1.2
UVA-SL-050	0 to 6	11950	N/A	15.2	Non-det	Non-det	Non-det	Non-det	Non-det	0.8	0.4
UVA-SL-051	0 to 6	11818	N/A	14.4	Non-det	Non-det	Non-det	Non-det	Non-det	1.1	0.6
UVA-SL-052	0 to 6	11514	N/A	25.4	Non-det	Non-det	Non-det	Non-det	Non-det	1.6	1.1
UVA-SL-055	Surface	N/A	132	18.3	Non-det	5.5	Non-det	Non-det	Non-det	1.3	0.7
UVA-SL-056	0 to 6	57943	140	22.4	0.2	19.2	0.4	0.3	3.0	1.4	0.7
UVA-SL-057	0 to 6	43712	179	16.7	Non-det	0.6	1.3	1.2	7.1	0.4	
UVA-SL-058	0 to 6	25302	106	25.7	Non-det	1.0	Non-det	Non-det	Non-det	1.5	
UVA-SL-113	Surface	N/A	312	25.3	Non-det	8.9	50.1	Non-det	Non-det	1.4	
UVA-SL-113A	Particle	N/A	N/A	22.0	Non-det	13.9	Non-det	Non-det	0.7	1.6	1.3
UVA-SL-116	0 to 6	N/A	90	23.2	Non-det	2.9	Non-det	Non-det	Non-det	1.5	0.8
UVA-SL-119	0 to 6	N/A	69	18.8	Non-det	3.0	Non-det	Non-det	Non-det	1.3	0.7
UVA-SL-120	0 to 6	N/A	96	19.4	Non-det	0.4	Non-det	Non-det	Non-det	1.2	0.7
UVA-SL-121	0 to 6	N/A	143	16.7	Non-det	33.0	0.5	0.4	3.0	1.0	
UVA-SL-130	B-25 Grab	N/A	N/A	16.1	Non-det	11.9	Non-det	0.3	Non-det	1.03	0.6
Soil Samples After "I" core soil decontamination											
UVA-SL-126	0 to 6	N/A	N/A	10.5	Non-det	1.4	0.2	Non-det	Non-det	0.7	0.5
UVA-SL-127	0 to 6	N/A	N/A	18.0	Non-det	Non-det	Non-det	Non-det	Non-det	1.6	1.0
UVA-SL-128	0 to 6	N/A	N/A	19.7	Non-det	Non-det	Non-det	Non-det	Non-det	1.2	0.7
UVA-SL-129	0 to 6	N/A	N/A	20.4	Non-det	Non-det	Non-det	Non-det	Non-det	1.6	1.0

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

"I " Core Soil Samples, Pool East Wall
Table 2 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-043-1	0 to 18	N/A	N/A	9.0	Non-det	Non-det	0.6	0.6	Core #18
UVA-SL-043-2	18 to 30	N/A	76	19.1	Non-det	Non-det	2.3	1.1	
UVA-SL-043-3	30 to 36	N/A	88	18.8	Non-det	Non-det	2.8	1.0	
UVA-SL-044-1	0 to 6	N/A	60	12.0	Non-det	Non-det	1.5	1.0	Core #19
UVA-SL-044-2	6 to 18	N/A	92	15.5	Non-det	Non-det	1.7	1.1	
UVA-SL-044-3	18 to 30	N/A	72	16.2	Non-det	Non-det	1.8	0.9	
UVA-SL-044-4	30 to 42	N/A	55	10.9	Non-det	Non-det	1.7	1.0	
UVA-SL-044-5	42 to 48	N/A	80	17.2	Non-det	Non-det	2.0	1.1	
UVA-SL-045-1	0 to 6	N/A	82	20.1	Non-det	Non-det	1.6	1.0	Core #20
UVA-SL-045-2	6 to 18	N/A	93	20.8	Non-det	Non-det	1.7	1.0	
UVA-SL-045-3	18 to 30	N/A	71	19.7	Non-det	Non-det	1.9	0.9	
UVA-SL-045-4	30 to 42	N/A	70	20.8	Non-det	Non-det	1.7	1.0	
UVA-SL-045-5	42 to 54	N/A	71	21.6	Non-det	Non-det	1.6	0.8	
UVA-SL-046-1	0 to 6	N/A	96	25.9	Non-det	Non-det	1.9	1.4	Core #21
UVA-SL-046-2	6 to 18	N/A	110	27.6	Non-det	Non-det	2.4	1.3	
UVA-SL-046-3	18 to 30	N/A	83	26.8	Non-det	Non-det	2.4	1.4	
UVA-SL-046-4	30 to 42	N/A	105	30.0	Non-det	Non-det	2.1	1.3	
UVA-SL-046-5	42 to 54	N/A	86	23.9	Non-det	Non-det	1.9	1.3	
UVA-SL-047-1	0 to 6	N/A	102	24.0	Non-det	Non-det	2.0	1.2	Core # 22
UVA-SL-047-2	6 to 18	N/A	78	21.5	Non-det	Non-det	2.0	1.1	
UVA-SL-047-3	18 to 30	N/A	96	22.7	Non-det	Non-det	2.1	1.3	
UVA-SL-047-4	30 to 42	N/A	86	20.0	Non-det	Non-det	1.9	1.0	
UVA-SL-047-5	42 to 54	N/A	82	23.4	Non-det	Non-det	2.0	1.1	
UVA-SL-048-1	0 to 6	N/A	95	16.0	Non-det	Non-det	1.2	0.9	Core #23
UVA-SL-048-2	6 to 18	N/A	91	15.7	Non-det	Non-det	1.2	0.7	
UVA-SL-048-3	18 to 30	N/A	87	22.1	Non-det	Non-det	1.5	0.8	
UVA-SL-048-4	30 to 42	N/A	105	26.3	Non-det	Non-det	1.7	1.1	
UVA-SL-048-5	42 to 54	N/A	103	25.4	Non-det	Non-det	1.7	0.9	
UVA-SL-049-1	0 to 6	N/A	97	14.6	Non-det	Non-det	1.0	0.6	Core #24
UVA-SL-049-2	6 to 18	N/A	88	19.6	Non-det	Non-det	1.5	0.9	
UVA-SL-049-3	18 to 30	N/A	79	25.8	Non-det	Non-det	1.8	1.0	
UVA-SL-049-4	30 to 42	N/A	100	25.5	Non-det	Non-det	1.9	1.1	
UVA-SL-049-5	42 to 54	N/A	80	21.7	Non-det	Non-det	1.8	0.9	

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Reactor Room Core Soil Samples
Table 3 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-023	Grab	N/A	N/A	17.9	Non-det	Non-det	0.3	0.5	Core H
UVA-SL-023	Grab	N/A	N/A	19.5	Non-det	0.4	0.9	0.3	Core G
UVA-SL-027-1	0 to 6	6652	87	20.0	Non-det	Non-det	1.2	0.7	Core H
UVA-SL-027-2	6 to 18	6435	112	20.0	Non-det	Non-det	1.4	0.8	Core H
UVA-SL-027-3	18 to 30	5806	128	20.0	Non-det	Non-det	0.7	0.6	Core H
UVA-SL-027-4	30 to 42	5367	89	22.4	Non-det	Non-det	1.5	0.7	Core H
UVA-SL-028-1	0 to 6	5241	98	16.0	Non-det	Non-det	0.9	0.6	Core G
UVA-SL-028-2	6 to 18	5858	86	22.0	Non-det	Non-det	1.4	0.8	Core G
UVA-SL-028-3	18 to 30	6001	102	21.0	Non-det	Non-det	1.5	0.7	Core G
UVA-SL-028-4	30 to 42	6357	117	23.3	Non-det	Non-det	1.3	0.8	Core G
UVA-SL-028-5	42 to 54	6750	124	26.0	Non-det	Non-det	1.3	0.9	Core G
UVA-SL-028-6	54 to 60	6300	98	21.8	Non-det	Non-det	1.8	0.8	Core G
UVA-SL-059-1	Surface	N/A	95	24.6	Non-det	Non-det	1.6	0.6	Core J
UVA-SL-060-1	Surface	N/A	98	21.0	Non-det	Non-det	1.3	0.5	Core M
UVA-SL-061-1	Surface	N/A	97	18.4	Non-det	Non-det	1.4	0.5	Core N
UVA-SL-064	Grab	N/A	N/A	20.0	Non-det	Non-det	1.4	0.8	Soil Removed From Core N
UVA-SL-065	Grab	N/A	N/A	23.6	Non-det	Non-det	1.2	0.7	Soil Removed From Core J
UVA-SL-066	Grab	N/A	N/A	20.0	Non-det	Non-det	1.1	0.7	Soil Removed From Core H
UVA-SL-067	Grab	N/A	N/A	24.0	Non-det	Non-det	1.6	0.9	Soil Removed From Core M
UVA-SL-107	Grab	N/A	86	23.0	Non-det	Non-det	1.6	0.7	Soil Removed From Core E
UVA-SL-108	Grab	N/A	87	23.1	Non-det	Non-det	1.3	0.6	Soil Removed From Core D
UVA-SL-109	Grab	N/A	85	19.2	Non-det	Non-det	1.2	0.7	Soil Removed From Core R
UVA-SL-110	Grab	N/A	98	20.0	Non-det	Non-det	1.3	0.8	Soil Removed From Core T
UVA-SL-111	Grab	N/A	81	22.4	Non-det	Non-det	1.4	0.8	Soil Removed From Core B
UVA-S-112	Grab	N/A	103	27.0	Non-det	Non-det	2.0	1.2	Soil Removed From Core L
UVA-SL-114	0 to 6	N/A	105	23.7	Non-det	Non-det	2.0	1.1	Core L Location A
UVA-SL-115	0 to 6	N/A	96	24.2	Non-det	Non-det	2.0	1.1	Core L Location B
UVA-SL-123	0 to 6	N/A	N/A	23.0	Non-det	Non-det	2.0	1.0	Core L Location C
UVA-SL-124	0 to 6	N/A	N/A	26.0	Non-det	Non-det	1.9	1.0	Core L Location D

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Demineralizer Room Wall Core Soil Samples Initial
Table 4 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-012-1	0 to 6	N/A	87	26.6	Non-det	Non-det	1.5	0.6	4-in core placed in
UVA-SL-012-2	6 to 18	N/A	96	27.7	Non-det	Non-det	1.7	0.7	West wall to access reactor
UVA-SL-012-3	18 to 30	N/A	83	32.1	Non-det	Non-det	1.8	0.7	Pool fill
UVA-SL-012-4	30 to 42	N/A	87	28.0	Non-det	Non-det	1.5	0.8	
UVA-SL-012-5	42 to 54	N/A	78	27.7	Non-det	Non-det	1.6	0.7	
UVA-SL-012-6	54 to 66	N/A	94	26.8	Non-det	Non-det	1.4	0.4	
UVA-SL-012-7	66 to 78	N/A	100	26.0	Non-det	Non-det	1.3	0.7	

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

Heat Exchanger Wall Core Soil Samples
Table 5 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-011-1	0 to 6	N/A	78	31.0	Non-det	Non-det	5.3	2.6	4-in core placed in
UVA-SL-011-2	6 to 18	N/A	109	31.0	Non-det	Non-det	4.0	1.5	West wall to access reactor
UVA-SL-011-3	18 to 24	N/A	145	27.9	Non-det	Non-det	2.0	0.9	Pool fill
UVA-SL-011-4	24 to 30	N/A	74	24.8	Non-det	Non-det	0.9	0.3	
UVA-SL-011-5	30 to 42	N/A	92	26.0	Non-det	Non-det	0.9	0.2	
UVA-SL-011-6	42 to 54	N/A	93	26.2	Non-det	Non-det	0.8	0.3	
UVA-SL-011-7	54 to 66	N/A	81	21.2	Non-det	Non-det	0.8	0.2	

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Ground Floor Core Hole Soil Samples
Table 6 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-10	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-026	Grab	N/A	N/A	14.4	Non-det	Non-det	1.2	0.5	Core A
UVA-SL-030	Grab	N/A	N/A	7.0	Non-det	Non-det	Non-det	Non-det	Gravel, Heat exch. sump
UVA-SL-032	Grab	N/A	N/A	33.9	Non-det	Non-det	1.9	0.9	Soil, Heat exch. sump
UVA-SL-034	Grab	N/A	N/A	5.3	Non-det	Non-det	Non-det	Non-det	Hot Cell Core
UVA-SL-053-1	0 to 6	18934	61	6.7	Non-det	Non-det	0.3	Non-det	Core E Initial, Gravel
UVA-SL-053-2	6 to 18	N/A	113	27.4	Non-det	Non-det	2.2	0.8	Core E Initial, Soil
UVA-SL-054-1	0 to 6	25296	120	24.7	Non-det	Non-det	1.8	0.9	Hot cell , outside roadway
UVA-SL-062-1	0 to 6	8795	72	7.0	Non-det	Non-det	Non-det	0.2	Core E , Trackway
UVA-SL-062-2	6 to 18	10021	142	31.5	Non-det	Non-det	2.1	0.9	Excavation
UVA-SL-062-3	18 to 30	10551	145	33.9	Non-det	Non-det	2.3	0.7	"
UVA-SL-062-4	30 to 36	10832	133	31.3	Non-det	Non-det	2.5	0.9	"
UVA-SL-063-1	0 to 6	N/A	84	8.6	Non-det	Non-det	0.3	0.4	"
UVA-SL-063-2	6 to 18	N/A	125	32.4	Non-det	Non-det	2.9	1.4	"
UVA-SL-063-3	18 to 30	N/A	120	33.1	Non-det	Non-det	2.5	1.2	"
UVA-SL-063-4	30 to 34	N/A	140	30.7	Non-det	Non-det	2.8	1.2	"
UVA-SL-064	Grab	N/A	93	19.5	Non-det	Non-det	1.4	0.8	"
UVA-SL-065	Grab	N/A	101	23.6	Non-det	Non-det	1.2	0.7	"
UVA-SL-066	Grab	N/A	71	19.6	Non-det	Non-det	1.1	0.7	Core E , Trackway
UVA-SL-067	Grab	N/A	122	24.0	Non-det	Non-det	1.6	0.9	Soil Stock pile
UVA-SL-068	Grab	N/A	118	29.7	Non-det	Non-det	2.2	0.9	"
UVA-SL-069	Grab	N/A	130	30.5	Non-det	Non-det	2.2	1.0	"
UVA-SL-070	Grab	N/A	112	29.3	Non-det	Non-det	2.4	1.0	"
UVA-SL-071	Grab	N/A	125	27.2	Non-det	Non-det	2.1	0.9	"
UVA-SL-072	Grab	N/A	108	30.5	Non-det	Non-det	2.3	1.0	"
UVA-SL-073	Grab	N/A	120	32.2	Non-det	Non-det	2.2	0.9	"
UVA-SL-074	Grab	N/A	135	30.8	Non-det	Non-det	2.3	0.8	"
UVA-SL-075	Grab	N/A	123	31.6	Non-det	Non-det	2.5	1.0	"
UVA-SL-076	Grab	N/A	86	10.9	Non-det	Non-det	0.4	0.2	"
UVA-SL-077	0 to 6	N/A	112	33.1	1.0	Non-det	2.4	0.9	Trackway Excavation,
UVA-SL-078	0 to 6	N/A	103	31.1	Non-det	Non-det	2.1	0.8	Sampling refusal at 6"
UVA-SL-079	0 to 6	103141	117	30.9	Non-det	Non-det	2.2	1.0	Trackway Excavation
UVA-SL-080	6 to 18	10823	121	28.5	Non-det	Non-det	2.6	1.0	"

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Ground Floor Core Hole Soil Samples
Table 6 cont. (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-081	18 to 30	10516	137	33.0	Non-det	Non-det	3.0	1.0	Trackway Excavation
UVA-SL-082	0 to 6	10721	121	23.4	Non-det	Non-det	2.3	1.0	"
UVA-SL-083	6 to 18	10634	147	29.4	Non-det	Non-det	2.6	1.0	"
UVA-SL-084	18 to 30	11184	121	35.8	Non-det	Non-det	3.0	1.0	"
UVA-SL-085	0 to 6	10318	127	30.0	Non-det	Non-det	2.1	0.7	"
UVA-SL-086	6 to 18	10466	114	33.1	Non-det	Non-det	2.4	0.9	"
UVA-SL-087	18 to 30	10214	141	34.9	Non-det	Non-det	2.0	0.6	"
UVA-SL-088	Grab	N/A	N/A	24.0	Non-det	Non-det	2.0	1.0	Hot cell outfall, soil pile
UVA-SL-089	Grab	N/A	N/A	26.1	Non-det	Non-det	2.1	0.8	Hot cell outfall, soil pile
UVA-SL-104	0 to 6	N/A	N/A	16.6	Non-det	Non-det	0.8	0.8	LWST Core
UVA-SL-105	0 to 6	N/A	N/A	18.4	Non-det	Non-det	0.9	0.6	LWST Core
UVA-SL-106	0 to 6	N/A	N/A	25.0	1.2	Non-det	2.3	0.9	Soil inside Terracotta pipe
UVA-SL-117	Surface	N/A	129	26.9	Non-det	Non-det	2.3	1.1	Sanitary line core
UVA-SL-118	Surface	N/A	143	26.2	Non-det	Non-det	2.4	1.0	A and B Header core
UVA-SL-122	Grab	N/A	109	21.4	Non-det	Non-det	1.4	0.6	Source room core
UVA-SL-132	Surface	N/A	N/A	36.8	0.2	Non-det	3.7	1.9	Heat Exch. Suction line
									Excavation

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Pool Floor Core Soil Samples
Table 7 (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-PSL-001-1	0 to 6	10985	75	28.6	Non-det	Non-det	0.2	0.4	Pool Floor Core # 6
UVA-PSL-001-2	6 to 18	13527	77	36.6	Non-det	Non-det	3.0	1.3	
UVA-PSL-001-3	18 to 30	14705	92	37.3	Non-det	Non-det	2.7	1.2	
UVA-PSL-001-4	30 to 42	13718	108	34.4	Non-det	Non-det	4.2	1.6	
UVA-PSL-001-5	42 to 54	14784	86	44.6	Non-det	Non-det	3.9	1.7	
UVA-PSL-002-1	0 to 6	9694	64	41.0	Non-det	Non-det	1.7	0.8	Pool Floor Core # 9
UVA-PSL-002-2	6 to 18	10241	78	45.1	Non-det	Non-det	2.0	1.1	
UVA-PSL-002-3	18 to 30	10401	52	42.3	Non-det	Non-det	2.4	1.4	
UVA-PSL-002-4	30 to 42	9948	67	41.0	Non-det	Non-det	2.7	1.2	
UVA-PSL-002-5	42 to 54	8813	117	38.8	Non-det	4.7	2.0	1.0	
UVA-PSL-002-5A	42 to 54	N/A	N/A	41.2	Non-det	Non-det	2.0	1.2	Soil removal after collapse
UVA-PSL-002-6	54 to 66	9691	71	40.0	Non-det	Non-det	2.3	1.3	
UVA-PSL-002-7	66 to 78	10213	84	40.4	Non-det	Non-det	2.5	1.3	
UVA-PSL-002-8	78 to 90	10321	61	37.6	Non-det	Non-det	2.0	1.0	
UVA-PSL-003-1	0 to 6	11529	60	32.0	Non-det	Non-det	1.8	1.2	Pool Floor Core # 8
UVA-PSL-003-2	6 to 18	13556	59	40.4	Non-det	Non-det	3.2	1.7	
UVA-PSL-003-3	18 to 30	23559	144	33.8	Non-det	Non-det	8.2	3.4	
UVA-PSL-003-4	30 to 42	21869	120	39.6	Non-det	Non-det	8.1	3.5	
UVA-PSL-003-5	42 to 54	17693	93	42.9	Non-det	Non-det	4.6	2.1	
UVA-PSL-004-1	0 to 6	20262	107	27.2	Non-det	0.9	2.8	1.4	Pool Floor Core # 7
UVA-PSL-004-2	6 to 18	22437	70	36.1	Non-det	Non-det	4.8	3.2	
UVA-PSL-004-3	18 to 30	21510	131	38.2	Non-det	Non-det	8.0	3.6	
UVA-PSL-004-4	30 to 42	21048	78	34.7	Non-det	Non-det	6.7	2.4	
UVA-PSL-004-5	42 to 54	21552	145	37.7	Non-det	Non-det	10.7	3.5	
UVA-SL-029	surface	N/A	N/A	29.2	Non-det	3.7	0.6	0.2	Soil under 18" core # 9
UVA-SL-033-1	0 to 6	N/A	150	29.5	Non-det	1.7	1.4	0.5	Pool Floor Core # 9
UVA-SL-033-2	6 to 18	N/A	133	34.0	Non-det	Non-det	1.9	0.8	To verify first sampling
UVA-SL-033-3	18 to 30	N/A	159	30.9	Non-det	1.1	1.9	0.8	Event after cutting 18"
UVA-SL-033-4	30 to 42	N/A	143	33.2	Non-det	Non-det	1.7	0.9	Concrete core
UVA-SL-033-5	42 to 54	N/A	176	31.0	Non-det	Non-det	2.0	0.8	Sample name PF1
UVA-SL-033-6	54 to 66	N/A	186	31.5	Non-det	Non-det	2.2	1.1	
UVA-SL-033-7	66 to 78	N/A	134	29.2	Non-det	Non-det	2.7	1.3	
UVA-SL-035-1	0 to 6	N/A	121	28.9	Non-det	1.5	2.9	1.1	Pool Floor Core # 9
UVA-SL-035-2	6 to 18	N/A	143	32.3	Non-det	1.0	1.7	0.7	To verify first sampling
UVA-SL-035-3	18 to 30	N/A	158	32.8	Non-det	Non-det	2.9	1.5	Event after cutting 18"

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Pool Floor Core Soil Samples
Table 7 cont. (Onsite Lab Results)

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy					Remarks
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
UVA-SL-035-4	30 to 42	N/A	155	35.9	Non-det	Non-det	2.0	1.2	Pool Floor Core # 9
UVA-SL-035-5	42 to 54	N/A	181	31.0	Non-det	Non-det	2.1	1.4	Concrete second sample
UVA-SL-035-6	54 to 66	N/A	143	33.2	Non-det	1.0	2.2	1.2	Sample name PF1A
UVA-SL-035-7	66 to 78	N/A	169	30.1	Non-det	Non-det	2.4	1.2	
UVA0SL-035-8	78 to 90	N/A	147	32.7	Non-det	Non-det	3.2	1.7	
UVA-SL-036drain a	Surface	N/A	N/A	25.9	Non-det	Non-det	Non-det	Non-det	Pool Floor Core # PF2
UVA-SL-037drain b	Surface	N/A	N/A	28.1	Non-det	Non-det	3.6	0.3	Pool Floor Core # PF3

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparation of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas

Background soil sample results
Table 8 (Onsite Lab Results)
Ragged Mountain Reservoir Sediment Samples

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
		44-2	44-9	K-40	Cs-137	Co-60	Pb-212	Pb-214	U-238	Th-232	Ac-228
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-RS-001-1	0 to 6	2031	10	17.4	1.0	Non-det	0.1	Non-det	Non-det	Non-det	Non-det
UVA-RS-001-2	6 to 18	2575	10	20.8	0.1	Non-det	0.3	0.2	0.3	Non-det	Non-det
UVA-RS-001-3	18 to 30	2626	10	22.3	0.1	Non-det	0.2	0.2	0.3	Non-det	0.2
UVA-RS-002-1	0 to 6	1906	10	21.5	0.6	Non-det	0.3	0.1		Non-det	Non-det
UVA-RS-002-2	6 to 18	2618	10	20.7		Non-det	0.2	0.2	0.2	Non-det	Non-det
UVA-RS-003-1	0 to 6	2311	10	30.0	1.2	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det
UVA-RS-003-2	6 to 18	3637	10	25.0	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det
UVA-RS-003-3	18 to 30	3782	10	28.4	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det
UVA-RS-004-1	0 to 6	1860	10	16.5	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det
UVA-RS-004-2	6 to 18	2471	15	18.8	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det	Non-det
Upstream Creek Background											
UVA-BKGSL-001	0 to 6	N/A	N/A	19.0	Non-det	Non-det	1.1	0.8	0.9	Non-det	1.2
UVA-BKGSL-002	0 to 6	N/A	N/A	25.1	Non-det	Non-det	2.0	1.7	Non-det	Non-det	2.0
Rock Face Background											
UVA-BKGSL-003-1	0 to 6	28253	111	45.0	Non-det	Non-det	3.7	1.6	Non-det	Non-det	3.4
UVA-BKGSL-003-2	6 to 18	N/A	119	54.4	Non-det	Non-det	3.2	1.2	4.4	Non-det	2.7
UVA-BKGSL-003-3	18 to 30	N/A	109	46.9	Non-det	Non-det	3.4	0.8	Non-det	Non-det	3.4
Fill Dirt Background											
UVA-BKGSL-004-1	0 to 6	19214	96	32.4	Non-det	Non-det	3.4	1.1	Non-det	Non-det	3.7
UVA-BKGSL-004-2	6 to 18	N/A	130	35.3	Non-det	Non-det	4.2	2.05	Non-det	Non-det	4.5
UVA-BKGSL-004-3	18 to 30	N/A	127	39.6	Non-det	Non-det	3.6	1.3	1.2	Non-det	4.0

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a non-standard preparationof sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Soil Areas
Offsite Lab Results for Part-61 Analysis
Table 9

Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
AmNT	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.67	0.85	0.04
Am241	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.67	0.85	0.04
GLEPS	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	3738.00	406.90	5.17
AmNT	AM-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.06
Am241	AM-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.06
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.08
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.08
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.71	0.27	0.10
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.88	0.44	0.07
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.22	0.38	0.11
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.88	0.74	0.08
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.01	0.05
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.75	0.29	0.07
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.69	0.51	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	5.79	1.02	0.08
Am241	CM-244	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	5.79	1.02	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
Am241	CM-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.01	0.01	0.09
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.01	0.01	0.09
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.18	0.22	0.07
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.14	0.11	0.13
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.66	0.37	0.09
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.43	0.20	0.12

UVAP Continuing Characterization:
Reactor Pool Soil Areas
Offsite Lab Results for Part-61 Analysis
Table 9

Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Fe055	CO-57	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	3548.00	450.50	11.29
GLEPS	CO-57	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	1396.00	189.60	4.17
GLEPS	CO-57	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.08	0.08	0.11
Gamma	CO-57	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.01	0.02
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.15	0.10	0.12
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.06	0.12
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.01	0.04	0.08
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.01	0.06	0.09
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.05	0.07	0.12
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.09	0.11	0.14
Gamma	CO-60	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	262.40	19.50	1.19
Gamma	CO-60	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.01	0.02	0.04
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	29.81	2.22	0.34
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-BKG-SL-001	pCi/g	0.14	0.13	0.27
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	16.26	1.21	0.21
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.01	0.09	0.15
Gamma	CS-137	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	156.90	16.66	1.03
Gamma	CS-137	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.02	0.04
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.21	0.20	0.31
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.11	0.18
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.03	0.10	0.18
Gamma	EU-152	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.13	0.27
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.93	0.66	1.26
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.33	0.55	0.84

UVAP Continuing Characterization:
Reactor Pool Soil Areas
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Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.65	0.61	1.06
Gamma	EU-154	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.02	0.05	0.10
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.03	0.36	0.60
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.07	0.26	0.47
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.19	0.29	0.42
Gamma	EU-155	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.04	0.07
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.06	0.22	0.32
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.31	0.17	0.27
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	2.43	0.39	0.40
Fe055	FE-55	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.75	1.16	1.94
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.15	0.83	1.47
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.27	0.75	1.29
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.20	0.87	1.54
H0003	H-3	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	117.07	4.46	3.86
H0003	H-3	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	1.89	2.19	3.67
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	1.70	1.97	3.30
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.68	1.94	3.26
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	1.92	3.29
GLEPS	I-129	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.17	0.36	0.68
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.13	0.24	0.48
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.06	0.25	0.47
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.31	0.57
Gamma	K-40	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.24	0.35
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	12.45	2.60	1.46

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Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	43.60	5.11	1.00
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	43.65	5.16	1.01
Ni063	NI-63	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	938.22	11.90	5.07
Ni063	NI-63	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	4.43	3.07	5.07
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	1.30	0.61	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-BKG-SL-001	pCi/g	0.00	0.58	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.58	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.58	0.99
PuISO	PU-238	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.65	1.16	0.19
PuISO	PU-238	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.07	0.10	0.18
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.02	0.06
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.03
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.00	0.02
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	Process Blank	pCi/g	0.00	0.00	0.04
PuISO	PU-239	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	6.49	1.54	0.15
PuISO	PU-239	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.01	0.10
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.07
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.03
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.01	0.02	0.02
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	Process Blank	pCi/g	0.00	0.00	0.04
Pu241	PU-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	253.00	6.83	5.83
Pu241	PU-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	1.17	0.64	1.05
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.94	1.01	1.70
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.23	0.67	1.10

UVAP Continuing Characterization:
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Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.73	0.64	1.04
Pu4ISO	PU242	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.28	0.85	0.07
Pu4ISO	PU242	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.06	0.07	0.09
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.03
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.02	0.01	0.01
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.01	0.01
Pu4ISO	PU-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.04	0.12
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.04
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.01	0.01	0.01
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.02	0.02	0.01
Sr890_2C	SR-89	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	-1.26	1.47	1.20
Sr890_2C	SR-89	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	0.18	0.47	1.13
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	0.13	0.11	0.22
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.03	0.10	0.23
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	-0.08	0.10	0.23
Sr890_2C	SR-90	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	12.72	0.49	0.91
Sr890_2C	SR-90	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	-0.30	0.09	0.89
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	-0.02	0.02	0.15
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.02	0.01	0.15
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	0.10	0.01	0.14
Tc099	TC-99	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	811.04	5.15	1.39
Tc099	TC-99	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.91	1.54
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.04	0.07	0.13
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.11	0.09	0.15

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Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.09	0.15
ThISO	TH-228	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.85	0.94	0.07
ThISO	TH-228	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.03
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.27	0.10	0.04
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	2.59	0.48	0.03
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	8.00	1.53	0.05
ThISO	TH-230	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.79	0.93	0.03
ThISO	TH-230	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.85	0.25	0.03
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.46	0.14	0.04
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.79	0.35	0.04
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	5.95	1.16	0.02
ThISO	TH-232	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.90	0.95	0.06
ThISO	TH-232	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.06
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.29	0.10	0.04
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	2.50	0.47	0.03
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	7.01	1.35	0.06
Gamma	TH-234	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.19	0.32	0.60
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.35	2.25	2.43
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.31	1.94	2.07
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	8.76	2.82	4.03
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	11.46	0.98	0.78
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	-0.12	0.38	0.70
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	0.10	0.07	0.12
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.05	0.08	0.13

UVAP Continuing Characterization:
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Table 9

Analysis Code	Isotope	Run	Client Name	Sample Type	Client ID	Report Units	Result	Uncertainty	MDA
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	0.02	0.08	0.14
UUISO	U-234	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	6.32	1.24	0.08
UUISO	U-234	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.03
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.35	0.15	0.08
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.69	0.41	0.10
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	5.00	1.03	0.10
UUISO	U-235	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	0.32	0.17	0.06
UUISO	U-235	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.03	0.04
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.04	0.05
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.11	0.10	0.11
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.28	0.17	0.10
UUISO	U-236	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.04
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.04
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.13	0.11	0.11
UUISO	U-238	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	7.12	1.38	0.08
UUISO	U-238	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.04	0.06
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.49	0.18	0.04
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.55	0.39	0.08
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	4.93	1.02	0.13
Gamma	ZN-65	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.04	0.07
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.14	0.51	0.88
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.15	0.33	0.50
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.11	0.21	0.30

UVAP Continuing Characterization: Reactor Pool Interior Summary

The reactor pool structure is approximately four meters wide, ten meters long and nine meters in depth. The pool is separated into two halves by a concrete buttress that housed the reactor pool gate. The pool is oriented slightly off from true North to South. For the purpose of this survey, the pool structure interior surface has been referenced in two sections consisting of the north section and its three walls, and the south section and its three walls. Half of each buttress wall will be included in its adjoining wall and floor section. There are two beam ports located in the south section, on the west wall, approximately 2 meters off the pool floor. The north beam port (referred to as the hot beam port or #1 beam port) was activated by the reactor's neutron beam and has been removed along with the activated concrete surrounding the port. The second beam port area (referred to as the cold beam port or #2 beam port) was not used as extensively and only the first 18-inches was removed from the poolside with a portion of surrounding concrete. The pool surface paint was removed by means of a hydrolazer. The knee wall surrounding the pool was cut off flush to the reactor room floor and disposed of in accordance with Work Package 002, Radiological Surveys to Release Material for Unrestricted Use.

Five full width by 12 inches high sections were removed from the aluminum gate guide, to provide access that allowed the determination of the condition of the underlying concrete surface.

Co-60 has been determined to be the major facility related contaminate. The Decommissioning Plan provides a Derived Concentration Guideline Level (DCGL) for Co-60 of 7100-dpm/100cm^2 total activity and 710-dpm/100cm^2 removable activity.

A reference Grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. Surface Scan Surveys

Portions of the pool floor were scanned for surface beta radioactivity, using a Ludlum Model 239-1F floor monitor with a Model 43-37 large-area (582 cm^2) gas proportional detector, with a scan path of 0.44 m (1.44 ft) operated in the alpha-plus-beta detection mode. A Ludlum Model 2221 ratemeter/scaler was used to provide detector power and monitor the scan results.

Scans of wall surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map.

UVAP Continuing Characterization: Reactor Pool Interior Summary

The beta/alpha scans ranged from 150 cpm to 2000 cpm with one measurement of 16,000 cpm utilizing the 43-68 probe and 1500 cpm to 4700 cpm with the 43-37 probe. The gamma scans ranged from 9000 cpm to 17000 cpm. Surveys UVAP- 0387, 0388, 0389, 0390, 0578, 0632, and 0712 are available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Direct integrated readings ranged from 293 dpm/100cm^2 to 17,632 dpm/100cm^2 with one measurement of 56,000-dpm/100 cm^2. Surveys UVAP- 0387, 0388, 0389, 0390, 0578, 0632, and 0712 are available in the UVAP files.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. Smear sample activity ranged from <MDA (22.99 dpm/100cm^2) to 101.3 dpm/100cm^2. Surveys UVAP- 0387, 0388, 0389, 0390, and 0578 are available in the UVAP files.

4. Drain Surveys

Drains and piping associated with the reactor pool are addressed in the Impacted Drain Lines and Piping Summary.

UVAP Continuing Characterization: Reactor Pool Interior Summary

5. Volumetric Sample Collection and Analysis

Samples were taken from areas where the possibility of contamination was identified by elevated measurements. Twenty-four core samples were taken from the reactor pool floor and walls. See Figure 1 for locations. Eight samples, approximately 4" to 12" in depth were obtained for surface activity determination. The outer .25" (representing the pool wetted surface) of these samples were composited for offsite activity determination.

Fourteen borings were through the floor and wall to obtain soil samples from below the concrete surfaces. Soil from cores 18 through 23 was for soil migration determination from contaminated soil under "I" core in the reactor room. See Table 1 for results by onsite gamma spectroscopy. Core number 13 near the north 1 beam port was obtained to a depth of 18" for concrete activation determination.

Initial pool floor core sample #9 taken on 12/18/02 indicated activity of 4.72 pCi/g at a depth of 42 to 54 inches. This elevated activity is believed to have resulted from cross contamination, from the beam port concrete removal operation. Two additional sample locations were selected adjacent to #9 sample location and labeled PF1 And PF1A. Reactor pool core bore PF1 surface grab sample indicated activity for Co-60 at 3.7 pCi/gram. Auger samples from PF1 and PF1A contained no activity from licensed material above DCGL levels to the depth of 90 inches.

Samples were submitted for onsite Gamma isotopic analyses. A composite sample of the pool 4-inch surface cores designated UVA-PCC-001 and two soil samples, one from core # 9 designated UVA-PSL-002-5 and core # 8 designated UVA-PSL-003-4 were managed under chain-of-custody procedures and submitted to the offsite laboratory, for radionuclide analyses. See offsite lab report for results, Table 2.

6. Reactor Pool Gate Guides

The reactor pool gate guides are included in the middle pool buttresses, on centerline, between the north half and south half of the pool. The area where the gate guide sides contact the concrete have separated and opened a void space from 1/8th of an inch to one inch in width. The aluminum gate guide is embedded in the interior faces of the east and west buttresses, and in the top face of the floor grade beam, forming a "U" shape. The guide embedment consists of a 12-inch deep aluminum channel and an 8-inch deep aluminum channel. The 12-inch deep channel is embedded in the concrete with the toes of the channel flanges flush with the concrete surface, to form a gate guide channel in the concrete face. The 8-inch deep channel is welded to the backside of the 12-inch channel to act as an anchor for the 12-inch deep aluminum channel. The total depth of the embedment is approximately 11 inches. The length of the embedment is approximately 25 feet vertically in each of the two buttress interior faces, and approximately 7 feet horizontally in the top face of the floor beam.

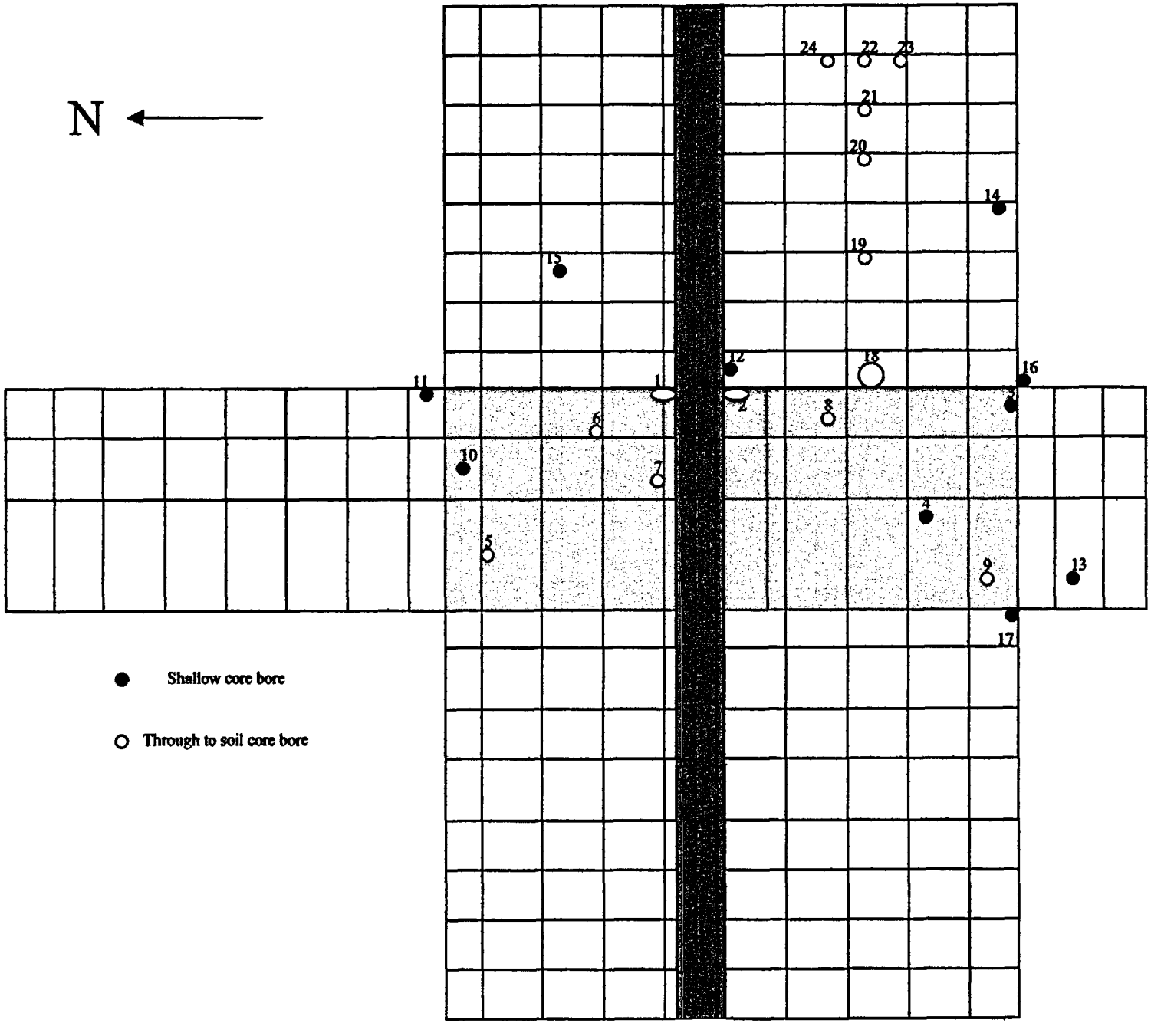
A gamma scan with a L2221 and sodium iodide crystal was performed along the outer surface of the guide edge and concrete interface. A Beta scan with a L2221 and 43-68 probe was performed along the outer surface of the guide edge and concrete interface. Direct one minute integrated static measurements were performed at each elevated area of concern, as determined by the gamma or beta scans. Five locations were chosen to perform surveys on the unexposed

surfaces of the gate guide. The two highest static count areas from each side, and one from the bottom guide area, were then removed and static counts performed on the exposed interface concrete surfaces. Each location had two; 2-inch core bores removed to a depth of 8-inches. Surveys of these core bores, the 12-inch channel, the 8-inch channel and the concrete surfaces exposed were all less then the DCGL for Co-60. Surveys UVAP-0390, 0551, 0576, 0578, 0632 are available in the UVAP files.

7. Conclusions

Based on results of the initial surveys and surveys after D&D evolutions, no further remediation is required. The reactor pool is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 2 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

Reactor Pool Interior Walls &Floor Concrete Cores
Figure 1



UVAP Continuing Characterization: Reactor Pool Interior Summary

Reactor Pool Interior Walls & Floor Soil Results

Table 1 Onsite Results

Sample number	Interval	Gamma Logging	Gamma Spectroscopy Note 1								
		44-2	K-40	Cs-137	Co-60	Pb-212	Bi-214	Pb-214	Ra-226	Ac-228	U-238
	Inches	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
Pool core # 6	0 to 6	10985	28.6	Non-det	Non-det	0.19	0.37	0.34	Non-det	Non-det	Non-det
Pool core # 6	6 to 18	13527	36.6	Non-det	Non-det	2.96	1.18	1.28	Non-det	2.78	Non-det
Pool core # 6	18 to 30	14705	37.3	Non-det	Non-det	2.69	1.24	1.19	2.14	2.69	1.73
Pool core # 6	30 to 42	13718	34.4	Non-det	Non-det	4.21	1.69	1.65	5.11	4.09	Non-det
Pool core # 6	42 to 54	14784	45.6	Non-det	Non-det	3.94	1.89	1.72	4.07	3.34	Non-det
Pool core # 7	0 to 6	20262	27.2	Non-det	0.90	2.85	1.24	1.40		2.49	Non-det
Pool core # 7	6 to 18	22437	36.1	Non-det	Non-det	4.80	3.09	3.19	7.49	4.87	4.50
Pool core # 7	18 to 30	21510	38.2	Non-det	Non-det	7.96	2.90	3.62	8.66	8.17	Non-det
Pool core # 7	30 to 42	21048	34.7	Non-det	Non-det	6.68	2.10	2.42	5.05	5.98	Non-det
Pool core # 7	42 to 54	21552	37.7	Non-det	Non-det	10.7	2.84	3.50	8.24	10.6	Non-det
Pool core # 8	0 to 6	11529	32.1	Non-det	Non-det	1.76	1.10	1.16	2.96	1.80	Non-det
Pool core # 8	6 to 18	13556	40.4	Non-det	Non-det	3.24	1.60	1.68	4.61	2.89	Non-det
Pool core # 8	18 to 30	23559	33.8	Non-det	Non-det	8.22	2.96	3.40	7.13	8.21	4.53
Pool core # 8	30 to 42	21869	39.6	Non-det	Non-det	8.05	3.10	3.53	8.25	7.58	6.08
Pool core # 8	42 to 54	17693	42.9	Non-det	Non-det	4.57	2.23	2.13	7.23	5.07	4.78
Pool core # 9	0 to 6	9694	41.0	Non-det	Non-det	1.71	8.42	8.10		1.60	Non-det
Pool core # 9	6 to 18	10241	45.1	Non-det	Non-det	1.96	0.96	1.13	4.65	2.16	Non-det
Pool core # 9	18 to 30	10401	42.3	Non-det	Non-det	2.38	1.34	1.42	4.33	2.36	Non-det
Pool core # 9	30 to 42	9948	41.0	Non-det	Non-det	2.72	1.17	1.17	3.67	2.47	Non-det
Pool core # 9 Note 2	42 to 54	8813	38.8	Non-det	4.72	2.03	1.02	0.97		1.89	Non-det
Pool core # 9	54 to 66	9691	41.2	Non-det	Non-det	2.01	1.11	1.23		1.91	Non-det
Pool core # 9	66 to 78	10213	40.4	Non-det	Non-det	2.48	1.14	1.32	2.64	2.42	Non-det
Pool core # 9	78 to 90	10321	37.6	Non-det	Non-det	2.04	0.95	0.98	3.25	2.23	Non-det
Pool core # 9A	Surface	N/A	29.2	Non-det	3.72	0.61	0.20	0.17	Non-det	Non-det	Non-det
Pool core # 9A	0 to 6	N/A	29.5	Non-det	1.68	1.45	0.51	0.52	2.62	1.41	Non-det
Pool core # 9A	6 to 18	N/A	34.0	Non-det	Non-det	1.87	0.89	0.81	2.41	1.58	Non-det
Pool core # 9A	18 to 30	N/A	30.9	Non-det	1.11	1.86	0.73	0.76	Non-det	2.01	Non-det
Pool core # 9A	30 to 42	N/A	33.2	Non-det	Non-det	1.66	1.01	0.90	Non-det	Non-det	1.62
Pool core # 9A	42 to 54	N/A	31.0	Non-det	Non-det	1.96	0.86	0.78	2.84	2.19	Non-det
Pool core # 9A	54 to 66	N/A	31.5	Non-det	Non-det	2.16	1.00	1.10	2.76	2.01	1.13
Pool core # 9A	66 to 78	N/A	29.2	Non-det	Non-det	2.71	1.15	1.32	Non-det	2.53	Non-det

Non-det: Denotes Non- Detectable

Note 1: Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

Note 2: Two additional auger samples taken on both sides of the original sample to verify Co-60 activity at 42 to 54-inch Depth. No activity noted in additional samples. Initial results believed due to cross contamination of sample.

UVAP Continuing Characterization:
Reactor Pool Interior Summary

Reactor Pool Interior Walls & Floor Soil Results

Table 1 Onsite Results cont.

Sample number	Interval	Beta Scan	Gamma Spectroscopy Note 1								
		44-9	K-40	Cs-137	Co-60	Pb-212	Bi-214	Pb-214	Ra-226	Ac-228	U-238
	Inches	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
Pool core # 9	0 to 6	121	28.9	Non-det	1.48	2.87	1.17	1.07	Non-det	3.01	Non-det
Pool core # 9B	6 to 18	143	32.3	Non-det	0.97	1.72	0.61	0.73	3.58	2.34	Non-det
Pool core # 9B	18 to 30	158	32.8	Non-det	Non-det	2.88	1.30	1.50	Non-det	2.40	0.94
Pool core # 9B	30 to 42	155	35.9	Non-det	Non-det	2.04	1.48	1.26	Non-det	1.94	Non-det
Pool core # 9B	42 to 54	131	31.0	Non-det	Non-det	2.07	1.46	1.39	0.87	1.80	Non-det
Pool core # 9B	54 to 66	143	33.2	Non-det	0.98	2.20	1.27	1.24	2.77	1.74	Non-det
Pool core # 9B	66 to 78	169	30.1	Non-det	Non-det	2.40	1.26	1.19	Non-det	2.27	Non-det
Pool core # 9B	78 to 90	147	32.7	Non-det	Non-det	3.16	1.73	1.72	2.94	3.35	1.57
Pool core # 1	0 to 6	N/A	25.9	Non-det	Non-det	1.42	0.71	0.71	1.09	Non-det	Non-det
Pool core # 1	0 to 6	N/A	28.1	Non-det	Non-det	0.36	0.43	0.33	Non-det	Non-det	Non-det
Pool core # 18	0 to 18	N/A	9.04	Non-det	Non-det	0.65	0.67	0.57	Non-det	Non-det	Non-det
Pool core # 18	18 to 30	76	19.1	Non-det	Non-det	2.34	1.32	1.01	2.20	2.31	Non-det
Pool core # 18	30 to 36	88	18.8	Non-det	Non-det	2.76	1.09	1.04	Non-det	2.94	1.12
Pool core # 19	0 to 6	60	12.0	Non-det	Non-det	1.54	1.21	1.00	Non-det	1.56	Non-det
Pool core # 19	6 to 18	92	15.5	Non-det	Non-det	1.69	1.13	1.08	1.26	1.88	Non-det
Pool core # 19	18 to 30	72	16.2	Non-det	Non-det	1.80	0.96	0.91	2.15	2.00	Non-det
Pool core # 19	30 to 42	55	10.8	Non-det	Non-det	1.67	1.16	0.98	Non-det	1.54	Non-det
Pool core # 19	42 to 48	80	17.2	Non-det	Non-det	1.98	1.36	1.06	Non-det	1.84	0.42
Pool core # 20	0 to 6	82	20.2	Non-det	Non-det	1.59	0.82	0.96	3.13	1.86	0.96
Pool core # 20	6 to 18	93	20.8	Non-det	Non-det	1.69	1.01	0.95	1.85	1.32	Non-det
Pool core # 20	18 to 30	71	19.7	Non-det	Non-det	1.88	0.89	0.94	1.62	1.87	Non-det
Pool core # 20	30 to 42	70	20.8	Non-det	Non-det	1.69	0.88	1.03	1.77	Non-det	0.11
Pool core # 20	42 to 54	71	21.6	Non-det	Non-det	1.65	0.97	0.79	Non-det	1.80	Non-det
Pool core # 21	0 to 6	96	25.9	Non-det	Non-det	1.93	1.32	1.39	2.97	2.48	1.57
Pool core # 21	6 to 18	110	27.8	Non-det	Non-det	2.38	1.39	1.34	2.82	1.70	1.09
Pool core # 21	18 to 30	83	26.8	Non-det	Non-det	2.41	1.34	1.42	3.54	2.21	Non-det
Pool core # 21	30 to 42	105	30.0	Non-det	Non-det	2.14	1.14	1.28	1.90	2.02	Non-det
Pool core # 21	42 to 54	86	23.9	Non-det	Non-det	1.89	0.93	1.31	Non-det	1.56	Non-det
Pool core # 22	0 to 6	102	24.0	Non-det	Non-det	1.96	1.37	1.23	2.15	1.89	Non-det
Pool core # 22	6 to 18	78	21.5	Non-det	Non-det	1.97	0.86	1.11	2.29	1.79	Non-det
Pool core # 22	18 to 30	96	22.7	Non-det	Non-det	2.14	1.09	1.28	2.26	1.89	Non-det
Pool core # 22	30 to 42	86	19.6	Non-det	Non-det	1.87	1.20	0.97	2.96	1.86	Non-det
Pool core # 22	42 to 54	82	23.4	Non-det	Non-det	2.03	1.24	1.07	2.52	2.01	Non-det

Non-det: Denotes Non- Detectable

Note 1: Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Interior Summary

Reactor Pool Interior Walls & Floor Soil Results

Table 1 Onsite Results cont.

Sample number	Interval	Gamma Logging	Gamma Spectroscopy Note 1								
			K-40	Cs-137	Co-60	Pb-212	Bi-214	Pb-214	Ra-226	Ac-228	U-238
	Inches	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
Pool core # 23	0 to 6	95	16.0	Non-det	Non-det	1.19	0.89	0.91	2.37	1.19	Non-det
Pool core # 23	6 to 18	91	15.7	Non-det	Non-det	1.24	0.80	0.70	Non-det	1.27	Non-det
Pool core # 23	18 to 30	87	22.1	Non-det	Non-det	1.49	0.67	0.83	1.67	1.56	1.39
Pool core # 23	30 to 42	105	26.3	Non-det	Non-det	1.76	0.98	1.08	Non-det	1.93	Non-det
Pool core # 23	42 to 54	103	25.4	Non-det	Non-det	1.65	0.98	0.91	3.31	2.01	0.45
Pool core # 24	0 to 6	97	14.6	Non-det	Non-det	1.00	0.52	0.63	Non-det	Non-det	Non-det
Pool core # 24	6 to 18	88	19.6	Non-det	Non-det	1.54	0.84	0.87	2.86	1.62	0.02
Pool core # 24	18 to 30	79	25.8	Non-det	Non-det	1.84	1.07	1.00	3.00	1.71	Non-det
Pool core # 24	30 to 42	100	25.5	Non-det	Non-det	1.88	1.15	1.12	2.95	1.73	Non-det
Pool core # 24	42 to 54	80	21.7	Non-det	Non-det	1.77	0.89	0.90	3.44	1.61	Non-det

Non-det: Denotes Non- Detectable

Note 1: Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Reactor Pool Interior Summary
Table 2 Offsite Laboratory Report

AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
AmNT	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.67	0.85	0.04
Am241	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.67	0.85	0.04
GLEPS	AM-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	3738.00	406.90	5.17
AmNT	AM-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.06
Am241	AM-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.06
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.08
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.08
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.71	0.27	0.10
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.88	0.44	0.07
Am241	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.22	0.38	0.11
AmNT	AM-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.88	0.74	0.08
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.01	0.05
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.75	0.29	0.07
AmNT	AM-243	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.69	0.51	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	5.79	1.02	0.08
Am241	CM-244	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	5.79	1.02	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
Am241	CM-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.01	0.01	0.09
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.01	0.01	0.09
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.18	0.22	0.07
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.14	0.11	0.13
AmNT	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.66	0.37	0.09
Am241	CM-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.43	0.20	0.12
Fe055	CO-57	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	3548.00	450.50	11.29
GLEPS	CO-57	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	1396.00	189.60	4.17
GLEPS	CO-57	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.08	0.08	0.11
Gamma	CO-57	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.01	0.02
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.15	0.10	0.12
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.06	0.12

UVAP Continuing Characterization:
Reactor Pool Interior Summary
Table 2 Offsite Laboratory Report

AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.01	0.04	0.08
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.01	0.06	0.09
GLEPS	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.05	0.07	0.12
Gamma	CO-57	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.09	0.11	0.14
Gamma	CO-60	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	262.40	19.50	1.19
Gamma	CO-60	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.01	0.02	0.04
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	29.81	2.22	0.34
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-BKG-SL-001	pCi/g	0.14	0.13	0.27
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	16.26	1.21	0.21
Gamma	CO-60	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.01	0.09	0.15
Gamma	CS-137	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	156.90	16.66	1.03
Gamma	CS-137	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.02	0.04
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.21	0.20	0.31
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.11	0.18
Gamma	CS-137	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.03	0.10	0.18
Gamma	EU-152	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.13	0.27
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.93	0.66	1.26
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.33	0.55	0.84
Gamma	EU-152	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.65	0.61	1.06
Gamma	EU-154	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.02	0.05	0.10
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.03	0.36	0.60
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.07	0.26	0.47
Gamma	EU-154	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.19	0.29	0.42
Gamma	EU-155	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.04	0.07
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.06	0.22	0.32
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.31	0.17	0.27
Gamma	EU-155	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	2.43	0.39	0.40
Fe055	FE-55	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.75	1.16	1.94
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.15	0.83	1.47
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.27	0.75	1.29
Fe055	FE-55	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.20	0.87	1.54

UVAP Continuing Characterization:
Reactor Pool Interior Summary
Table 2 Offsite Laboratory Report

AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
H0003	H-3	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	117.07	4.46	3.86
H0003	H-3	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	1.89	2.19	3.67
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	1.70	1.97	3.30
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.68	1.94	3.26
H0003	H-3	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	1.92	3.29
GLEPS	I-129	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.17	0.36	0.68
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.13	0.24	0.48
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.06	0.25	0.47
GLEPS	I-129	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.31	0.57
Gamma	K-40	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.24	0.35
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	12.45	2.60	1.46
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	43.60	5.11	1.00
Gamma	K-40	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	43.65	5.16	1.01
Ni063	NI-63	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	938.22	11.90	5.07
Ni063	NI-63	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	4.43	3.07	5.07
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	1.30	0.61	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-BKG-SL-001	pCi/g	0.00	0.58	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.58	1.00
Ni063	NI-63	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.58	0.99
PuISO	PU-238	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.65	1.16	0.19
PuISO	PU-238	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.07	0.10	0.18
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.02	0.06
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.03
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.00	0.02
PuISO	PU-238	1	Safety & Ecology Consultants	TRG	Process Blank	pCi/g	0.00	0.00	0.04
PuISO	PU-239	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	6.49	1.54	0.15
PuISO	PU-239	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.01	0.10
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.01	0.03	0.07
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.03
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.01	0.02	0.02
PuISO	PU-239	1	Safety & Ecology Consultants	TRG	Process Blank	pCi/g	0.00	0.00	0.04

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AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
Pu241	PU-241	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	253.00	6.83	5.83
Pu241	PU-241	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	1.17	0.64	1.05
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.94	1.01	1.70
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.23	0.67	1.10
Pu241	PU-241	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	1.73	0.64	1.04
Pu4ISO	PU242	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.28	0.85	0.07
Pu4ISO	PU242	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.06	0.07	0.09
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.03
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.02	0.01	0.01
Pu4ISO	PU242	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.01	0.01
Pu4ISO	PU-244	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.04	0.12
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.04
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.01	0.01	0.01
Pu4ISO	PU-244	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.02	0.02	0.01
Sr890_2C	SR-89	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	-1.26	1.47	1.20
Sr890_2C	SR-89	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	0.18	0.47	1.13
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	0.13	0.11	0.22
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.03	0.10	0.23
Sr890_2C	SR-89	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	-0.08	0.10	0.23
Sr890_2C	SR-90	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	12.72	0.49	0.91
Sr890_2C	SR-90	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	-0.30	0.09	0.89
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	-0.02	0.02	0.15
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.02	0.01	0.15
Sr890_2C	SR-90	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	0.10	0.01	0.14
Tc099	TC-99	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	811.04	5.15	1.39
Tc099	TC-99	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.00	0.91	1.54
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.04	0.07	0.13
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.11	0.09	0.15
Tc099	TC-99	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.00	0.09	0.15
ThISO	TH-228	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.85	0.94	0.07
ThISO	TH-228	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.03

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AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.27	0.10	0.04
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	2.59	0.48	0.03
ThISO	TH-228	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	8.00	1.53	0.05
ThISO	TH-230	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.79	0.93	0.03
ThISO	TH-230	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.85	0.25	0.03
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.46	0.14	0.04
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.79	0.35	0.04
ThISO	TH-230	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	5.95	1.16	0.02
ThISO	TH-232	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	4.90	0.95	0.06
ThISO	TH-232	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.06
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.29	0.10	0.04
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	2.50	0.47	0.03
ThISO	TH-232	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	7.01	1.35	0.06
Gamma	TH-234	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	-0.19	0.32	0.60
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.35	2.25	2.43
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.31	1.94	2.07
Gamma	TH-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	8.76	2.82	4.03
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	LCS	LCS	pCi/l	11.46	0.98	0.78
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	MBL	BLANK	pCi/l	-0.12	0.38	0.70
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/l	0.10	0.07	0.12
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/l	0.05	0.08	0.13
Sr890_2C	TOTAL SR	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/l	0.02	0.08	0.14
UUISO	U-234	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	6.32	1.24	0.08
UUISO	U-234	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.05	0.03
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.35	0.15	0.08
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.69	0.41	0.10
UUISO	U-234	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	5.00	1.03	0.10
UUISO	U-235	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	0.32	0.17	0.06
UUISO	U-235	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.03	0.04
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.04	0.05
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.11	0.10	0.11

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AnalysisCode	Isotope	Run	ClientName	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
UUISO	U-235	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.28	0.17	0.10
UUISO	U-236	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.01	0.03	0.08
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.02	0.03	0.04
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	0.00	0.00	0.04
UUISO	U-236	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	0.13	0.11	0.11
UUISO	U-238	1	Safety & Ecology Consultants	LCS	LCS	pCi/g	7.12	1.38	0.08
UUISO	U-238	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.02	0.04	0.06
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	0.49	0.18	0.04
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	1.55	0.39	0.08
UUISO	U-238	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	4.93	1.02	0.13
Gamma	ZN-65	1	Safety & Ecology Consultants	MBL	BLANK	pCi/g	0.05	0.04	0.07
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PCC-001	pCi/g	-0.14	0.51	0.88
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PSL-002-5	pCi/g	-0.15	0.33	0.50
Gamma	ZN-65	1	Safety & Ecology Consultants	TRG	UVA-PSL-003-4	pCi/g	-0.11	0.21	0.30

UVAP Continuing Characterization: Reactor Plant Stack Summary

The University of Virginia Reactor (UVAR) Facility plant stack is located on the east side of the Reactor Confinement Building. The plant stack is 58-feet in total height running from the Mezzanine floor to 4-feet above the Confinement Building. The plant stack is made out of red brick and contains two duct liners; one 14-inch diameter made of transite and one 8-inch diameter made of terracotta. The 14-inch duct is the exhaust from the fume hoods in room M019, the hot cell, the beam port closures, and the bulk access facility. The 8-inch duct is the exhaust flue from the boiler and was replaced in approximately 1992 with a new metal duct running along the outside of the plant stack. The plant stack also contains the air inlet and exhaust ducting to the reactor room.

The Characterization survey included the 14-inch duct, 8-inch duct, reactor room exhaust inlet, and top plenum area. A flue brush was used to obtain a volumetric sample from the interior of the 8-inch flue running the length of the plant stack. The HEPA filter and associated ducting, inline from the hot laboratory Room M019 fume hoods exhaust, was removed and discarded.

Co-60 has been determined to be the major facility related contaminant. The Decommissioning Plan provides a Derived Concentration Guideline Level (DCGL) of 7100 dpm/100cm^2 total activity and 710 dpm/100cm^2 removable activity for Co-60.

1. Surface Scan Surveys

Scans of surfaces at the inlet and exhaust of the each flue, reactor room exhaust inlet, and plenum area were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions and marked the location for activity determination by static count. The observed lowest to highest range was recorded on the associated survey map. Survey UVAP-0400 and UVAP-0571 are available in the UVAP files. The beta/alpha scans ranged from 263 cpm to 982 cpm. The gamma scans ranged from 7400 cpm to 17,800 cpm.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity was performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions

from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Direct integrated readings ranged from 136 dpm/100cm^2 to 3146 dpm/100cm^2.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. Smear sample activity ranged from <MDA (22.99 dpm/100cm^2) to 124 dpm/100cm^2.

4. Ducting Survey

A volumetric sample was obtained utilizing a cleaning brush pulled through the 8-inch boiler flue. Swabs were obtained from the inlet and outlets of both the 8 and 14-inch ducts. These samples were submitted for onsite gamma isotopic analyses. Results from the swab obtained from the top of the 14-inch duct indicated the presence of U-238 at detectable levels. All other samples indicated no reactor facility related isotopes. Gamma spectroscopy reports are attached. Samples were managed under chain-of-custody procedures and stored for additional counting or offsite analysis.

5. Conclusions

Static surveys and the volumetric sample did not indicate facility related activity above the DCGL. Based on results of these surveys, no remediation is required. The plant stack and associated ventilation is ready for Final Status Survey. This survey satisfies the continuing characterization requirements of Area 3 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Laboratory Rooms M008 and M005 Summary

Laboratory rooms M008 and M005 are located on the mezzanine floor level, west end of the UVAR facility. M008 and M005 rooms are classified as a Class 1 area, floor, and lower walls with approximately 100-m^2 floor area. Upper walls and ceiling are classified as a class 2 area. The room contains painted block and poured concrete walls, a false drop panel ceiling and a prefab concrete floor covered in tile. The area contained laboratory soap stone counter tops, sinks, and fume hoods with HEPA filtered ventilation to the building exterior. New fume hoods and associated ventilation up to the HEPA filter housings were replaced in both rooms. Ni-63 was determined to be the contaminate of concern as denoted in Appendix A of the University of Virginia Reactor Decommissioning Plan and offsite lab report 03-04154 attached to survey UVAP-0663. Structure surface DCGL for Ni-63 is 1.8E+06 cpm/100 cm^2. Elevated areas were noted during surveys. Counter tops were decontaminated, the elevated floor tile, cabinet bottom, sink, sink drain, HEPA filters, and part of the ventilation systems were removed during D&D operations. Surveys UVAP-0509 and 0663 were performed with thin Mylar window Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler calibrated to Ni-63.

A reference Grid system was not used for this survey.

1. Surface Scan Surveys

Scans of walls, floors, counter tops and other surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. Increases were noted above ambient levels during scans. Surveys UVAP-0301, 0303, 0304, 0509, and 0510 are available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered

(shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from -11 dpm/100cm^2 to 81,439 dpm/100cm^2. Surveys UVAP-0301, 0303, 0304, 0409, 0509, 0510, and 0663 are available in the UVAP files.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. All smear results ranged from MDA for beta (22.99 or 28.26 dpm/100cm^2 pre or post instrument re-calibration) to 1060 dpm/100cm^2 and less than MDA for alpha (19.04 or 21.38 dpm/100cm^2 pre or post instrument re-calibration). Surveys UVAP-0301, 0303, 0304, 0409, 0509, 0510, and 0663 are available in the UVAP files.

4. Ventilation

The old ventilation systems installed from the fume hoods in both rooms were surveyed. Room M005 had a HEPA filter installed. The HEPA filter and housing were removed. In room M008, the blower wheel and housing was removed. Scans, integrated direct readings and smears were performed on the remaining ductworks. A water sample was obtained from the outside vent stack vertical cleanout. No elevated activity was detected in or on the remaining ventilation. Surveys UVAP-0301, 0303, and 0304 are available in the UVAP files.

5. Drains

Sink drain traps were removed from rooms M005 and M008 water residue was collected and analyzed by onsite gamma spectroscopy. The east sink drain was surveyed with the PSL2 pipe probe connected to a Ludlum Model 2221 ratemeter/scaler from room M008 to the overhead piping in the Cavalier room. No elevated activity was noted. A smear indicated elevated activity at 1600 dpm/100cm^2 by using the onsite Tennelec counter. Subsequent, offsite lab analysis of the smear noted Ni-63 as the only contaminant. Survey UVAP-0663 is available in the UVAP files.

6. Conclusions

Based on results of these surveys, no further remediation is required. Rooms M008 and M005 are ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 4 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Demineralizer Room Summary

Demineralizer area, rooms M021 and M021A, are located on the mezzanine floor level, northeast corner of the UVAR facility. M021 and M021A rooms are classified as a class 1 area, floor, walls, and ceiling, with approximately 100-m^2 floor area. The room contains painted block and poured concrete walls, painted precast concrete panel ceiling and poured concrete floor. The area contained the reactor pool demineralizer system (resin and charcoal vessels, pumps and associated piping and equipment) and the associated regenerating equipment. All piping, motors, pumps, resin and charcoal vessels and associated materials were removed during D&D operations. The reactor room floor drain header runs vertically in the north west corner of room M021. The reactor room drain header piping will be addressed separately.

A reference Grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. Surface Scan Surveys

Portions of the floor were scanned for surface beta radioactivity, using a Ludlum Model 239-1F floor monitor with a Model 43-37 large-area (582 cm^2) gas proportional detector, with a scan path of 0.44 m (1.44 ft) operated in the alpha-plus-beta detection mode. A Ludlum Model 2221 ratemeter/scaler was used to provide detector power and monitor the scan results.

Scans of wall, overhead and other surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. No increases were noted above ambient levels during all scans. Survey UVAP-0391 is available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity was performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this

second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from 329 dpm/100cm^2 to 2302 dpm/100cm^2. Survey UVAP-0391 is available in the UVAP files.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. All smear results were less than MDA for beta (22.99 dpm/100cm^2) and alpha (19.04 dpm/100cm^2). Survey UVAP-0391 is available in the UVAP files.

4. Conclusions

Based on results of these surveys, no remediation is required. The demineralizer room is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 5 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Hot Cell Room Summary

Hot cell area, rooms G025, G026 and G027, are located on the ground floor level, southeast corner of the UVAR facility. G025, G026 and G027 rooms are classified as a Class 1 area, floor, walls, and ceiling, with approximately 70-m^2 floor area. The room contains painted poured concrete walls, ceiling, and floor.
The area contained the hot cell interior, manipulator arms, lead glass window and mechanical hoist. Both manipulator arms and the lead glass window were removed during D&D operations. Cs-137 activity was detected at six discreet locations on the floor and was the floor was decontaminated during D&D operations. The Cs-137 DCGL value of 2.8E4 dpm/100cm^2 was used as the screening level for structure surfaces in accordance with the UVAR decommissioning plan. The hot cell room drain and associated piping will be addressed separately.

A reference Grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. **Surface Scan Surveys**

Portions of the floor were scanned for surface beta radioactivity, using a Ludlum Model 239-1F floor monitor with a Model 43-37 large-area (582 cm^2) gas proportional detector, with a scan path of 0.44 m (1.44 ft) operated in the alpha-plus-beta detection mode. A Ludlum Model 2221 ratemeter/scaler was used to provide detector power and monitor the scan results.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. Increases were noted above ambient levels during scans. Surveys UVAP-0275 and 0392 are available in the UVAP files.

2. **Integrated Direct Surface Beta Radioactivity Measurements**

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from 1484 dpm/100cm^2 to 34,831 dpm/100cm^2. Surveys UVAP-0275 and 0392 are available in the UVAP files.

UVAP Continuing Characterization: Hot Cell Room Summary

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. Smear results ranged from less than MDA for beta (22.99 dpm/100cm^2) to 79 dpm/100cm^2 and less than MDA for alpha (19.04 dpm/100cm^2). Surveys UVAP-0275 and 0392 are available in the UVAP files.

4. Volumetric sample

A volumetric sample was obtained from the elevated floor concrete during decontamination effort in rooms G026 and G027. This sample was analyzed by onsite gamma spectroscopy, retained and stored under chain of custody. The crane hook was analyzed by onsite gamma spectroscopy for isotopic determination. Reports UVA-CD-130 and MRS-00184 are available in the UVAP files.

5. Conclusions

Based on results of these surveys and decontamination efforts, no further remediation is required. The hot cell room is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 7 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Heat Exchanger Room Summary

Heat exchanger area, room G024, is located on the ground floor level, northeast corner of the UVAR facility. G024 room is classified as a Class 1 area, floor, walls, and ceiling, with approximately 100-m^2 floor area. The room contains painted block and poured concrete walls, painted precast concrete panel ceiling and poured concrete floor.
The area contained the reactor pool heat exchanger, primary and secondary side pumps and associated piping and equipment. All piping, motors, pumps, heat exchanger and associated materials were removed during D&D operations. A section of the primary suction and return piping was left in place inside the floor and wall and will be addressed separately. A valve-gallery sump is located along the middle of the south wall. It contained the valves for the reactor pool drains, heat exchanger primary suction piping drain, and a connection to the reactor room floor drain header for discharge to the pond. The sump is including in this summary, the drain piping will be addressed separately.

A reference Grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. Surface Scan Surveys

Portions of the floor were scanned for surface beta radioactivity, using a Ludlum Model 239-1F floor monitor with a Model 43-37 large-area (582 cm^2) gas proportional detector, with a scan path of 0.44 m (1.44 ft) operated in the alpha-plus-beta detection mode. A Ludlum Model 2221 ratemeter/scaler was used to provide detector power and monitor the scan results.

Scans of wall, overhead and other surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. No increases were noted above ambient levels during all scans. Survey UVAP-0456 is available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions

from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from 572 dpm/100cm^2 to 6078dpm/100cm^2. Survey UVAP-0456 is available in the UVAP files.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. All smear results ranged from MDA for beta (22.99 dpm/100cm^2) to 153 dpm/100cm^2 and less than MDA for alpha (19.04 dpm/100cm^2). Survey UVAP-0456 is available in the UVAP files.

4. Volumetric Sample Collection and Analysis

Soil samples were obtained from the concrete core hole located in bottom of the sump by hand auguring 0 to 6-inches in depth. Samples were submitted for onsite gamma isotopic analyses. No facility related activity was detected. The samples were logged on a chain of custody form and stored onsite.

5. Conclusions

Based on results of these surveys, no remediation is required. The heat exchanger room is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 8 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Source Room Summary

The Source room, G022 is located on the ground floor level, next to the biological shield, on the east side of the UVAR facility. The G022 room is classified as a Class 1 area, floor, walls, and ceiling, with approximately 30-m^2 floor area. The room contains painted block, ceramic and poured concrete walls, painted precast concrete panel ceiling and poured concrete floor. This room was originally a restroom and contains sanitary sewer piping that was used recently as a discharge point for treated and filtered radioactive liquids
The original rest room was converted to store high-level radioactive materials. All associated materials were removed during D&D operations. The source room sanitary drain header piping will be addressed separately.

A reference grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. Surface Scan Surveys

Scans of wall, overhead, floor and other surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. Increases were noted above ambient levels during scans. Three areas ranging from1839 cpm to 4271 cpm were decontaminated to below DCGL value for Co-60. Survey UVAP-0696 is available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at

elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from 11,111 dpm/100cm^2 to 28,972 dpm/100cm^2. Survey UVAP-0696 is available in the UVAP files.

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. Smear results ranged from less than MDA for beta (28.26 dpm/100cm^2) to 852 dpm/100cm^2 and less than MDA for alpha (21.38 dpm/100cm^2). Survey UVAP-0696 is available in the UVAP files.

4. Volumetric sample

A volumetric sample was obtained from the elevated tile during decontamination effort in room G022. This sample was analyzed by onsite gamma spectroscopy, retained and stored under chain of custody. Co-60 = 11.1pCi/g and Cs-137= 38.6 pCi/g Survey UVAP-0696 is available in the UVAP files.

5. Conclusions

Based on results of this survey, no further remediation is required. The source room G022 is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 9 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Beamport Area Summary

The neutron beamport area is located on the ground floor level, lower west side of the reactor pool in the biological shield through to the south west wall, approximately 2 meters off the pool floor. Two beam ports were located in this area. The north beam port (referred to as the hot beamport or No.1 beam port) was radioactively activated by the reactor's neutron beam and has been removed along with the activated concrete surrounding the port. The south beamport (referred to as the cold beam port or No. 2 beamport) was not used as extensively and only the first 18-inches of beam tube was removed from the pool wall with a portion of surrounding concrete. The beamport area is classified as a Class 1 area.

A reference grid system was not used for this survey.

1. Surface Scan Surveys

Scans were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma dose rate determination was performed using an Eberline R020 handheld ion chamber detector. See attached surveys UVAP-0455 for results

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. No increases were noted above ambient levels during all scans. Initial scans with a 43-68 detector ranged from 300 cpm to 17,700 cpm. After remediation scans with a 43-68 detector ranged from 334 cpm to 597cpm. Surveys UVAP-0474, 0633, 0688, and 0712 are available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, less than10%, and all detected counts are considered to be from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from -458 dpm/100cm^2 to 23,229 dpm/100cm^2. Surveys UVAP-0633, 0678, and 0688 are available in the UVAP files.

UVAP Continuing Characterization: Beamport Area Summary

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. Smear results ranged from less than MDA for beta (22.99 dpm/100cm^2) and alpha (19.04 dpm/100cm^2). Surveys UVAP-0455, 0633, and 0688 are available in the UVAP files.

4. Volumetric sample

Two concrete samples were obtained from the beamport area. One sample was counted by onsite gamma spectroscopy. See attached report for results. A second beamport concrete sample UVA-CD-032 was managed under chain of custody and sent to the offsite lab for isotopic analysis. The STL Richland sample results are available in the UVAP files.

5. Conclusions

Based on results of survey UVAP-0712, no further remediation is required. The beamport area is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 10 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

The University of Virginia Research Reactor facility utilized several systems to, handle, process, or dispose of potentially radioactive liquids and effluents. Among these systems were the Heat Exchanger systems, Reactor room drains that discharged to the pond, Reactor pool drains that could be directed to the pond or liquid waste tanks, sanitary system that discharged to the offsite sanitary facility, CAVALIER pit drain that discharged to the pond, hot cell floor drain that discharged to the hot cell liquid waste tank and the ground floor drains that discharged to the pond. These systems were surveyed and characterized during the D & D operations of the facility decommissioning.

The bulk of known potentially contaminated piping was removed from the UVAR Facility during remediation activities, but sections of radiologically impacted piping previously associated with the reactor coolant system and various drains from the reactor facility remain. This remaining piping is embedded in concrete or buried beneath concrete or asphalt paving and soil. The piping is generally of small diameter (2 in to 4 in ID); however there are several short sections of larger diameter. Remaining piping includes:

- Heat exchanger lines: Stainless Steel (SS), 6 in ID x 22 ft and 6 in ID x 32 ft.
- Reactor pool drains: SS, 2 in ID x 32 ft and 2 in ID x 36 ft.
- Reactor Room floor drains: Cast Iron (CI), 2 in ID x ~160 ft (multiple sections).
- Ground floor drain to Pond standpipe: CI, 2 in ID x 40 ft and 4 in ID x 140 ft.
- Reactor liquid drains to outside underground collection tanks: CI, 2 in ID x 75 ft.
- Hot Cell drain to outside underground collection tanks: PVC and Duriron (Fe+Si), 2 in ID x 55 ft.
- Ground floor drain to Pond hillside: CI, 2 in ID x 40 ft and terra cotta, 4 in ID x 80 ft.

In addition, the facility and property are serviced by storm and sanitary sewer services; drains for these services are located beneath the paved area, south of the building. Figures 1 through 3 illustrate the locations of the reactor facility piping.

Visual (boroscope) inspection of the internal surfaces of reactor piping revealed breaks or blockages in the floor drain piping system beneath the Reactor Room floor. This inspection also identified accumulations of scale and loose debris, concentrated on the bottom surfaces of the piping. Visual inspection of the sanitary system piping was performed and the lines appeared clean and free from scale. Visual inspection of the storm drain system was not conducted.

Broken or damaged areas of piping were accessed, and contaminated pieces of pipe and soil were identified and removed. Hydrolazing of reactor piping internal surfaces was performed to remove scale and loose debris. Piping access points have been created to enable final status survey and NRC confirmatory activities.

Direct and removable activity measurements were performed at exposed drain entries and on accessible internal piping surfaces. Swabs and water rinses were performed inside piping to determine loose surface activity. (See Tables 1 and 2 for results) Small diameters, fittings, bends,

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

and other internal obstructions limited access to most other piping and accumulations of scale and debris prevented reliable quantification of surface activity levels. A soil sample was obtained from inside the French drain to assess the presence of activity. See table 3 for results.
Direct measurements at drain openings; swabs, and rinsate samples indicated low levels of contamination, but at levels below the Co-60 and Cs-137 criterion. Surveys UVAP-438, 515,615,618,622,626,634-636, 642, 644, 645, 653, 654, 695, 699, 700, 709, 711, 713-717 and 730 are available in the UVAP files.

The storm drain system was accessed at the 5 man ways in the paved area, south of the building. Gamma scans, Beta static 1-minute counts, and sludge samples were obtained from each access. No elevated activity above DCGL for Co-60 was detected. Surveys UVAP-0668 and 0069 are available in the UVAP files.

The sanitary system was accessed in the ground floor main header, the source room, and the outside man way. One elevated area was noted in the sanitary piping in the source room that was used as a discharge point for process liquids to the sanitary system. This section of piping was removed. Scan, one minute static counts, smears and sediment samples were performed in the remaining portions of the sanitary piping and man way. No elevated activity above DCGL for Co-60 was detected. Surveys UVA-0715 and UVA-0716 are available in the UVAP files.

Soil removed during excavation of the underground waste tanks, soil from the vicinity of piping breaks, debris collected from piping, and pieces of removed piping were analyzed by gamma spectroscopy. These analyses identified Co-60 as the primary potential contaminant in most of the remaining piping. Cs-137 is the major potential contaminant associated with the Hot Cell drain and was also present in other piping systems, but at lower levels than Co-60. Even smaller quantities of Co-57, Eu-152 and Ag-108m were identified in several of the samples.

Based on use history, visual inspections, and results of the limited scoping surveys, all remaining reactor-associated piping is considered potentially contaminated. With exception of the Hot Cell drain, which is predominantly contaminated with Cs-137, the contaminant in reactor facility piping is assumed to be Co-60; this is the most limiting of the identified potential contaminants and, in consideration of the limitations in performing such piping surveys, provides a level of conservative assurance that decommissioning is adequate. Criteria for FSS of reactor facility piping are therefore 28,000-dpm/100 cm^2 total activity for the Hot Cell piping and 7,100 dpm/100 cm^2 total activity for other piping. Removable activity criteria are 10% of these total activity values

Conclusions:

Based on results of the initial surveys and surveys after D&D evolutions, no further remediation is required. The reactor facility piping is ready for Final Status Survey. These surveys satisfy the continuing characterization requirements of Area 1, 11, 12, 14 and 15 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

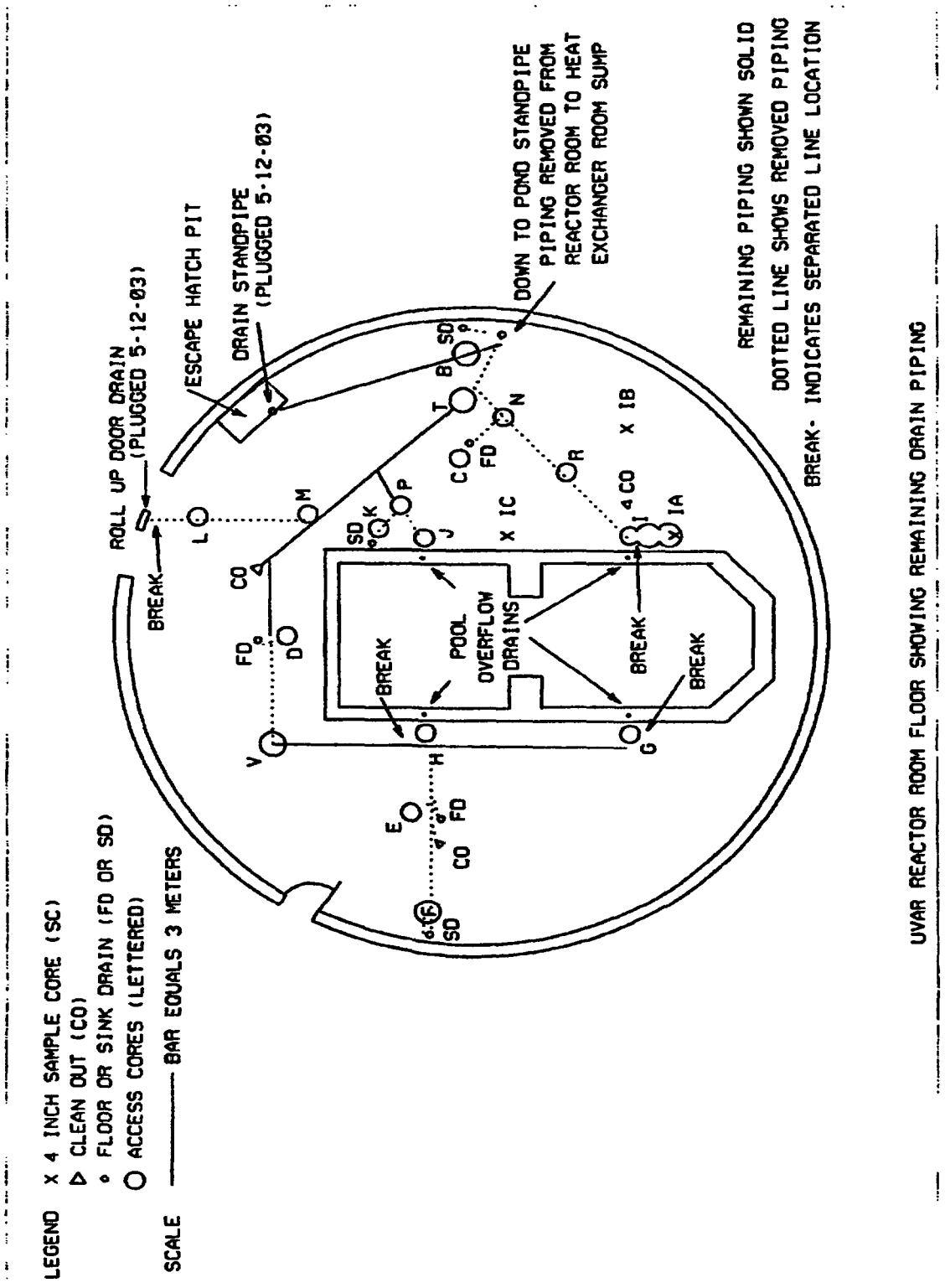

Figure 1 Reactor Room Floor, Indicating Locations of Drains and Piping

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

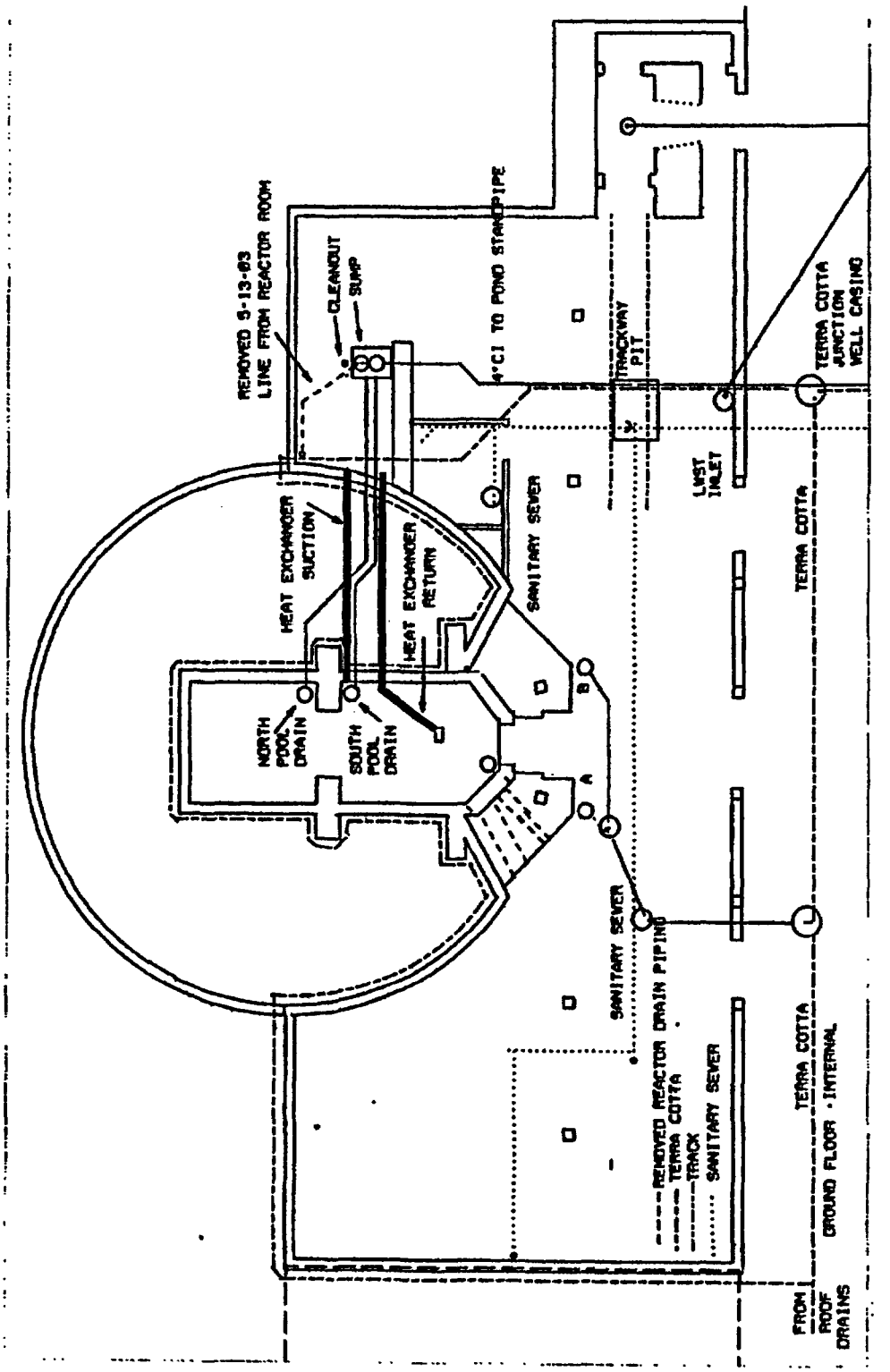

Figure 2 Ground Floor, Indicating Locations of Drains and Piping.

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

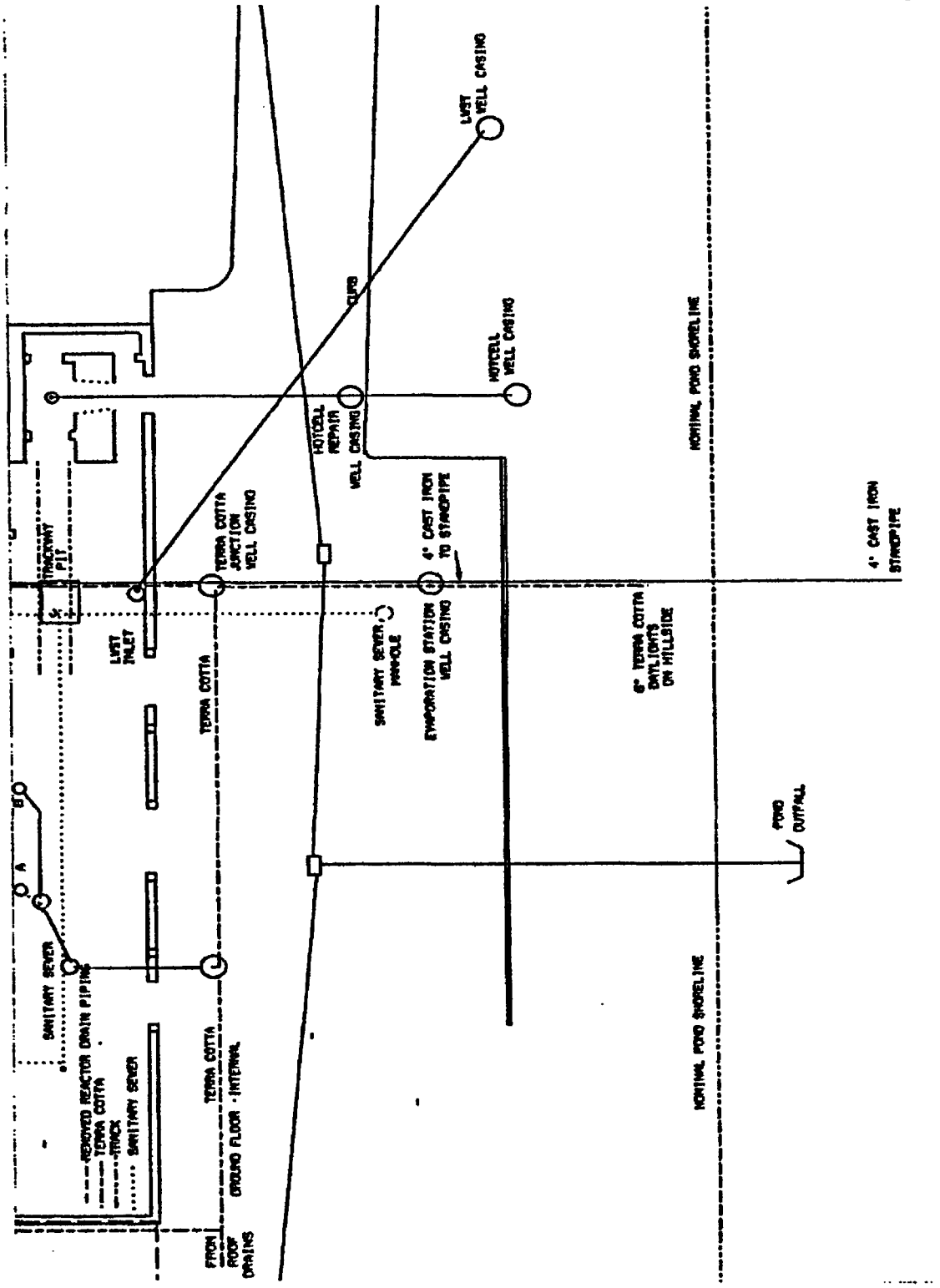

Figure 2-3 Ground Floor, external

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

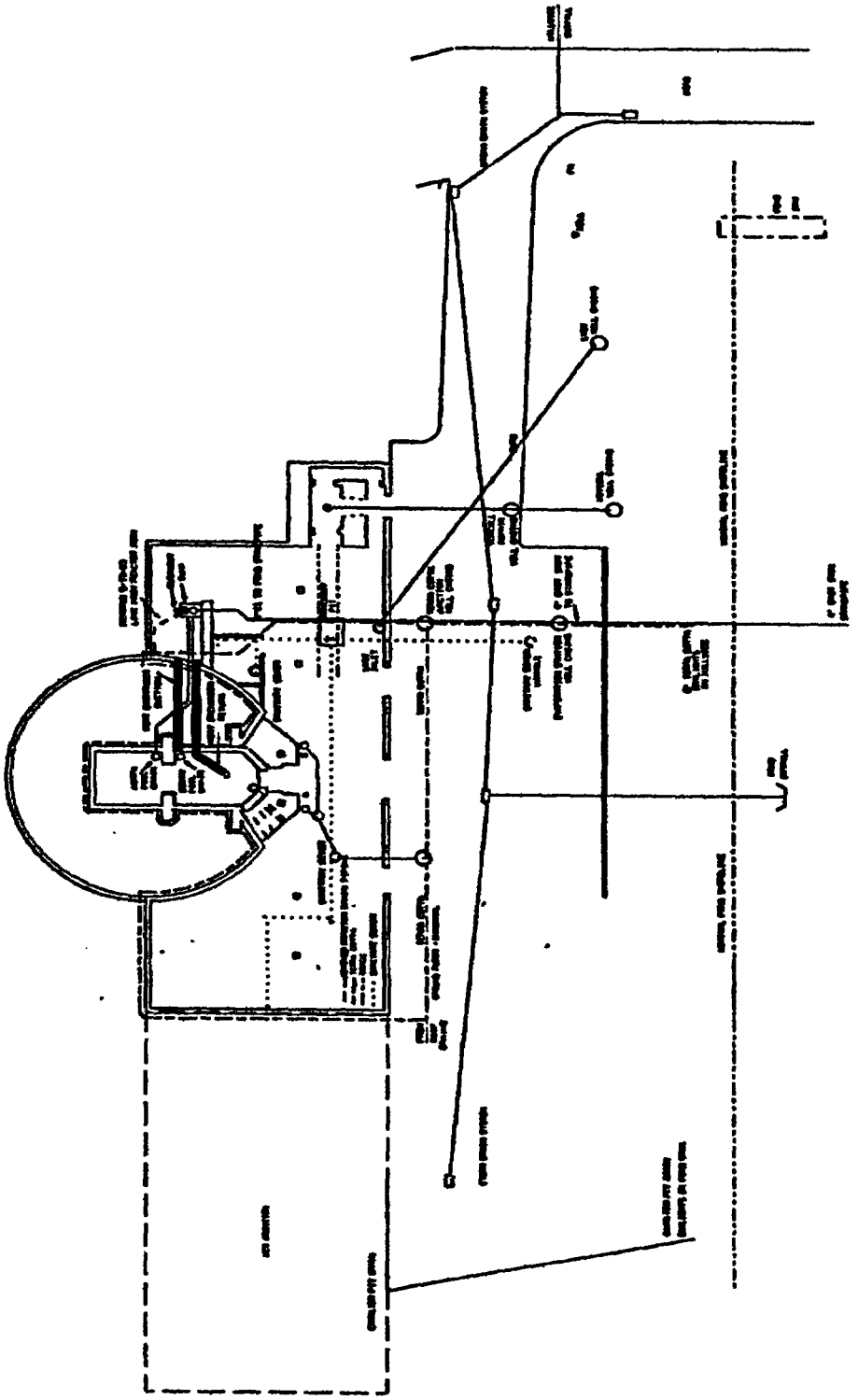

Figure 2-4 Outside Area of Facility

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

Drain line Swabs
Table 1 (Onsite Lab Results)

Sample number	Gamma Spectroscopy Detectable Isotopes						Remarks
	Co-57	Co-60	Ag-108M	Cs-137	Eu-152	Eu-154	
UVA-CD-115							"D" clean out RF
UVA-CD-120							"D" core to "M" core RF
UVA-CD-125							"E" core to "H" core RF
UVA-CD-118							"F" drain to "H" core RF
UVA-CD-067							"G" drain to "G" core RF
UVA-CD-070							"G" core to "H" core RF
UVA-CD-119		X					"H" core to "D" core RF
UVA-CD-068							"H" drain to "H" core RF
UVA-CD-147							"H" core to "V" core RF
UVA-CD-078							"I" clean out to "I" core RF
UVA-CD-077							"I" drain to "I" core RF
UVA-CD-079	X	X	X	X	X	X	"I" core to "N" core RF
UVA-CD-075							"J" drain to "J" core RF
UVA-CD-074							"K" drain to "P" core RF
UVA-CD-129							"L" drain to "M" core RF
UVA-CD-127							"M" core to "T" core RF
UVA-CD-101							"N" core to demineralizer room core RF
UVA-CD-130							"P" core to "T" core RF
UVA-CD-145							"T" core to demineralizer room core RF
UVA-CD-148							Sump clean out to sump GF
UVA-CD-140		X					"Sump" core to "E" excavation GF
UVA-CD-142							"E" excavation to Evaporation station well casing
UVA-CD-143							Evaporation station well casing to pond GF
UVA-CD-116							South pool drain to sump GF
UVA-CD-117		X					North pool drain to sump GF
UVA-CD-062							Heat exchanger return line GF
UVA-CD-134		X					Heat exchanger suction line GF
UVA-CD-066							Heat exchanger suction line1-inch drain line GF

Gamma Spectroscopy results is considered qualitative for screening purposes and isotopic identification.
Swabs performed inside of drain piping to determine presence of facility related isotopes.
GF= Ground Floor RF= Reactor Room Floor "E" excavation is the same as the Trackway Pit on Figure 2, 3 and 4

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

Drain line Swabs
Table 1 cont. (Onsite Lab Results)

Sample number	Gamma Spectroscopy Detectable Isotopes						Remarks
	Co-57	Co-60	Ag-108M	Cs-137	Eu-152	Eu-154	
UVA-CD-085							A Bulk access core to A&B header GF
UVA-CD-123							B Bulk access core to A&B header GF
UVA-CD-122							A&B Bulk access header to sewer header GF
UVA-CD-133							A&B Bulk access header to outside man way GF
UVA-CD-087							Hotcell drain pipe to outfall GF
UVA-CD-137							Liquid waste tank drain line to outfall GF
UVA-CD-115							Washing machine drain line Mezz. floor
UVA-CD-105							Terracotta French drain at "E" excavation GF
UVA-CD-146							HX room PVC drain to Terracotta French drain
UVA-CD-138							RM G018 sewer header to 90 degree elbow GF
UVA-CD-139							RM G018 sewer clean out to Trackway pit GF
UVA-CD-144				X			Rm G022 shower/toilet drain to Trackway GF
UVA-CD-149							Rm G022 sewer cleanout to Trackway GF

Gamma Spectroscopy results is considered qualitative for screening purposes and isotopic identification.
Swabs performed inside of drain piping to determine presence of facility related isotopes.
GF= Ground Floor RF= Reactor Room Floor "E" excavation is the same as the Trackway Pit on Figure 2, 3 and 4

UVAP Continuing Characterization: Impacted Drain Lines and Piping Summary

Drain line Rinsate
Table 2 (Onsite Lab Results)

Sample number	Gamma Spectroscopy Detectable Isotopes						Remarks
	Co-57	Co-60	Ag-108M	Cs-137	Eu-152	Eu-154	
UVA-WT-029				X			Hotcell drain line
UVA-WT-037							Reactor room escape pit drain line
UVA-WT-038		X		X			Reactor room sink drain "B"
UVA-WT-039							Reactor room floor drain "C"
UVA-WT-040							Reactor room floor drain "D"
UVA-WT-041		X					Reactor room floor drain "E"
UVA-WT-042							Reactor room floor drain "F"
UVA-WT-043		X					Reactor room pool overflow drain "J"
UVA-WT-044	X	X	X		X	X	Reactor room floor drain "K"
UVA-WT-045							Reactor room composite from intact drain lines
UVA-WT-048							Bulk access A & B drain line
UVA-WT-054				X			G018 sink drain to sanitary sewer

French Drain line Soil sample
Table 3 (Onsite Lab Results)

Sample number	Gamma Spectroscopy Detectable Isotopes						Remarks
	Co-57	Co-60	Ag-108M	Cs-137	Eu-152	Eu-154	
UVA-SL-133				X			French drain line was filled with soil

Gamma Spectroscopy results is considered qualitative for screening purposes and isotopic identification.
Water rinse performed inside of drain piping to determine presence of facility related isotopes.
GF= Ground Floor RF= Reactor Room Floor "E" excavation is the same as the Trackway Pit on Figure 2, 3 and 4

UVAP Continuing Characterization: Mezzanine Crawl Space Summary

The Mezzanine Crawl Space is located on the mezzanine level of the UVAR facility. Access to the area is located in the main stairwell. The room is classified as a class 2 area with approximately 100-m^2 surface area. The room contains concrete block walls, precast concrete panel ceiling with steel support beams and a dirt floor.

A reference Grid system was used for this survey. The grid was set at 1-meter intervals with the grid starting location being the southwest corner of the room.

1. Surface Scan Surveys

Scans of wall, overhead and other surfaces were performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector with a Ludlum Model 2221 ratemeter/scaler. Scanning was accomplished by moving the detector over the surface at a speed of approximately 10 cm per second (approximately 4 inches per second). The distance between the detector and the surface was maintained at a practical minimum, consistent with surface conditions.

Gamma scans were performed using a Ludlum Model 44-10 handheld sodium iodide detector with a Ludlum Model 2221 ratemeter/scaler. The scan was performed by moving the detector in a serpentine pattern, while advancing at a speed of approximately 0.5 m per second. The distance between the detector and surface was maintained within 5 cm.

The count rate was monitored by means of the audible signal output, and when an increase in instrument response above the ambient level was noted, the surveyor paused for several seconds to confirm the conditions. The observed lowest to highest range was recorded on the associated survey map. Two slightly elevated reading were noted during the scan of the dirt floor and marked for soil sampling. No other increases were noted above ambient levels during all other scan. Surveys UVAP-0570, 0573 and 0574 are available in the UVAP files.

2. Integrated Direct Surface Beta Radioactivity Measurements

Measurements of surface alpha-plus-beta radioactivity was performed using a Ludlum Model 43-68 handheld 125 cm^2 gas proportional detector coupled to a Ludlum Model 2221 ratemeter/scaler. The expected alpha activity is minimal, <10% and all detected counts are considered to from beta activity. Counts were integrated for a one-minute counting interval. Two measurements were performed. The first was a surface measurement, performed in the typical manner (i.e., with the detector face uncovered); this measurement included contributions from beta particles emitted from the surface and interactions of ambient gamma photons with the detector. The second measurement was performed at the same location with the detector face covered by a layer of wood approximately 1.27 cm (½-inch thick). The detector response for this second measurement is representative of the contribution from gamma radiation only. The difference between measurements with an uncovered (unshielded) detector and covered (shielded) detector represents the level of beta activity. Measurements were performed at elevated locations as identified by scans and at locations representative of the general surface area. Results for these static readings ranged from 286 dpm/100cm^2 to 2195 dpm/100cm^2.

UVAP Continuing Characterization: Mezzanine Crawl Space Summary

3. Smear Sample Collection and Analysis

Smear samples for removable activity were collected by wiping a 5 cm (2-inch) diameter cloth disc over approximately 100 cm^2 (15.5 in^2) areas of the surface, while applying moderate pressure. Smear samples were obtained at each location of direct surface activity measurement. Smear samples were counted for alpha and beta radioactivity on a Tennelec automatic gas proportional counter. All smear results were less than MDA for beta (22.99 dpm/100cm^2) and alpha (19.04 dpm/100cm^2).

4. Volumetric Sample Collection and Analysis

Soil samples were obtained by hand auguring, at 9 locations in the dirt floor, 0 to 6-inches in depth. Samples were submitted for onsite gamma isotopic analyses. No facility related activity was detected. The samples were placed on a chain of custody and stored onsite. See Table 1 for results.

5. Conclusions

Based on results of these surveys, no remediation is required. The mezzanine crawl space is ready for Final Status Survey.

UVAP Continuing Characterization: Mezzanine Crawl Space Summary

Mezzanine Crawl Space Soil Results
(Onsite results)
Table 1

Sample number	Interval	Gamma Logging	Gamma Spectroscopy								
		44-10	K-40	Cs-137	Co-60	Pb-212	Bi-214	Pb-214	Ra-226	Ac-228	U-238
	Inches	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
MCS-001	0 to 6	30321	29.5			2.57	1.25	1.61		2.40	3.75
MCS-002	0 to 6	24011	31.8			2.08	1.06	1.09	2.50	1.89	
MCS-003	0 to 6	28003	28.4			2.24	1.26	1.30	5.08	1.92	1.88
MCS-004	0 to 6	27307	29.8			2.41	1.27	1.35	3.80	2.20	2.41
MCS-005	0 to 6	31210	26.9			4.83	1.58	2.10	4.81	4.70	2.36
MCS-006	0 to 6	27724	23.8			3.21	1.62	1.52	6.67	2.75	2.30
MCS-007	0 to 6	32095	28.6			4.05	1.42	1.59	4.94	3.91	
MCS-008	0 to 6	27586	26.7			3.73	1.63	1.99	3.56	3.85	1.69
MCS-009	0 to 6	36346	21.9			4.16	1.95	1.90	3.10	3.95	2.22

Note 1: Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization: Pond Sediment Summary

A pond, covering a surface area of approximately 1600 m^2 and ranging in depth from approximately 2 to 4 m, is located just to the south of the University of Virginia Reactor Facility. During Reactor Facility operation this pond received discharges from certain laboratory drains, floor drains, and other sources of non-sanitary wastewater from the building. Run off from the adjacent land areas drain directly into this pond; an overflow from the nearby storm drain also empties into the pond.

The pond was drained to expose and permit the sediments to dry for improved access and to facilitate radiological monitoring and sediment sampling. Thickness of sediments varied from a fraction of a meter to 2 meters depending on location.

Survey grid corners were marked, dividing the pond into 10-meter square sections and referenced to the centerline of the dam spillway. Sections containing greater than 25% pond surface were numbered 1 thru 22, starting in the southeastern corner section (Figure 1). Surface gamma scans were initially performed in each 10-meter square section to identify locations of elevated direct radiation. The results were logged per 1.5-meter wide lanes with the highest to lowest noted readings. Survey UVAP-0245 is available in the UVAP files. Any discernable localized increase readings were denoted on the map and physically flagged for bias sampling.

Gamma scans of the drainage stream from the pond were performed for approximately 20 meters below the spillway release point. Samples of sediment were obtained at 3 locations considered representative of the average stream conditions.

Pond sediment samples were obtained from 16 statistical sample points and 18 biased sample locations (Figure 1). A 2-inch diameter bucket auger and 2-inch PVC piping was used to collect samples. Continuous sampling was performed from surface to 6 inches beyond the interface of sediment/original soil or to auger refusal, whichever occurred first. Samples were placed in plastic bags or jars with each sample representing 6-12 inches of sediment depth. To the extent possible, a plastic sleeve was utilized to maintain an open sampling hole. Sampling tools were cleaned and surveyed for contamination, following each sample collection.

Samples of the pond sediments were screened by the onsite gamma spectroscopy system, and ranged from 0.3 pCi/g to 4.0 pCi/g Cs-137. One sample indicated Co-60 at 1.6 pCi/g. Results are shown in Table 1.

Background sediment samples were obtained from the nearby Ragged Mountain Reservoir, upstream on the drainage feeding into the pond, and the soft rock face and fill dirt in the upper parking area. They were screened by the onsite gamma spectroscopy system and results are shown in Table 2.

Samples from the UVAR pond, UVAR drainage and Ragged Mountain Reservoir were scanned for indication of increased direct gamma levels. Boreholes were gamma logged initially at 6", then at 12" intervals to the borehole bottom. Some locations did require insertion of a sealed tube to maintain the borehole open during gamma logging.

Based on the onsite gamma screening, gamma logging and direct beta readings, six of the highest activity samples were sent to the offsite laboratory for analysis. Gamma spectroscopy and 10 CFR Part 61 analyses for transuranics, Sr-90, and other hard-to-detect radionuclides were performed. Results ranged from 2.08 pCi/g to 3.46 pCi/g for Cs-137, no detectable Co-60 above MDC[1] level, 1.29 pCi/g to 3.61 pCi/g Ra-226, 2.42pCi/g to 4.77pCi/g Th-232, and Pu-241 at 15.8pCi/g. Results are shown in Table 3.

Two background samples were also submitted to the offsite laboratory for analysis. Results are shown in Table 4.

[1] MDC is Minimal Detectable Concentration

UVAP Continuing Characterization: Pond Sediment Summary

The remaining unanalyzed samples (those not sent to the offsite laboratory) were retained and stored under chain of custody.

Conclusion

Based on the results of offsite laboratory analyses, surface measurements, and gamma borehole logs, the levels and ratios of facility-derived contaminants were determined and no areas in the pond were identified to require remediation. This survey satisfies the continuing characterization requirements of Area 13 and 14 from the characterization report, Appendix A of the University of Virginia Reactor Decommissioning Plan.

UVAP Continuing Characterization:
Pond Sediment Summary

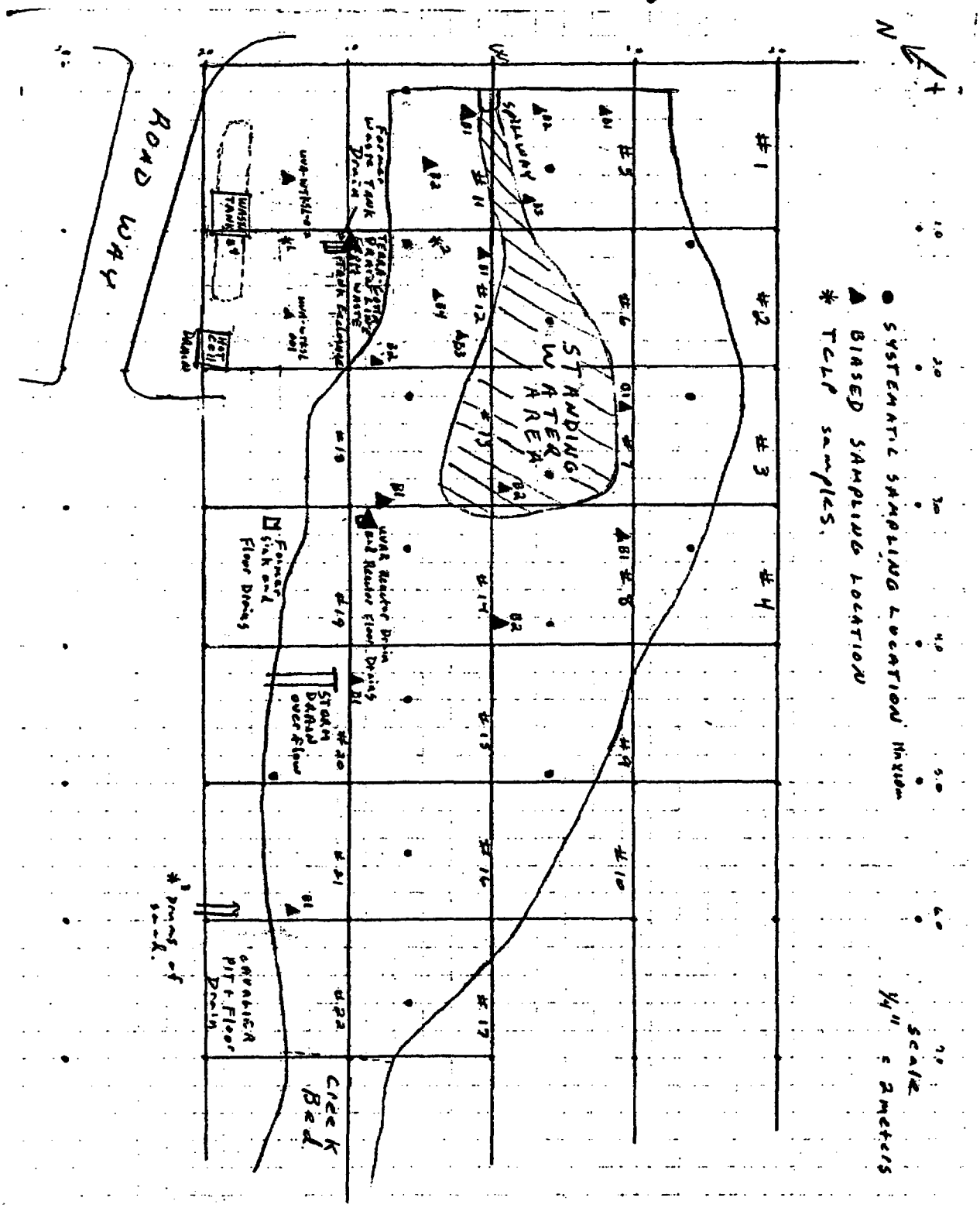

Figure 1

UVAP Continuing Characterization: Pond Sediment Summary

Pond Sediment Samples
(Onsite results)
Table 1

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
				K-40	Cs-137	Co-60	Pb-212	Pb-214	U-238	Th-232	Ac-228
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-PD-002	0 to 6	7842	22#	28.6			3.7	1.8			2.3
UVA-PD-002DUP	0 to 6	*7120	80+	22.3			2.3	2.6			
UVA-PD-003	0 to 6	*6760	50+	15.8			1.2	1.1			
UVA-PD-004	0 to 6	*7028	60+	38.5	0.6		2.5				2.9
UVA-PD-005-1	0 to 6	6795		13.2	0.6		2.2	1.7			
UVA-PD-005-2	6 to 18	7648	160+	21.1			3.3	2.9			2.7
UVA-PD-005-3	18 to 30	6654		29.5			2.2	1.5			2.2
UVA-PD-005B1-1	0 to 6	7518		11.2	0.8		2.5	2.8			
UVA-PD-005B1-2	6 to 18	8625	200+	39.6			3.7	2.3			3.3
UVA-PD-005B1-3	18 to 30	7568		40.6			3.9	2.9			3.3
UVA-PD-005B2-1	0 to 6	7518		12.6	0.9		2.4	1.5			
UVA-PD-005B2-2	6 to 18	8625	180+	12.4	0.6		2.5	3.1			
UVA-PD-005B2-3	18 to 30	7568		24.2			2.1	0.9			1.8
UVA-PD-005B3-1	0 to 6	8347		23.3	0.3		1.8	1.3			2.1
UVA-PD-005B3-2	6 to 18	7984	17#	13.5	0.4		1.7	1.1			1.7
UVA-PD-006-1	0 to 6	6686		4.2	0.3		0.8	0.7			
UVA-PD-006-2	6 to 18	8118		30.2			4.2	3.1			
UVA-PD-006-3	18 to 30	6699	20#	64.1			4.5	9.6			
UVA-PD-006-4	30 to 42	7419		37.7			3.6	2.8			
UVA-PD-007-1	0 to 6	5243		23.9	0.6		5.1	1.8			
UVA-PD-007-2	6 to 18	5463		22.1			3.4	2.5			
UVA-PD-007-3	18 to 30	6102		15.9			1.7	1.5			
UVA-PD-007-4	30 to 42	7075	140+	22.5			2.4	2.2			
UVA-PD-007B1-1	0 to 6	*7252	20+	8.4	1.0		2.8	1.8			
UVA-PD-007B2-1	0 to 6	4186			0.9		3.3	3.8			
UVA-PD-007B2-2	6 to 18	4867		22.0			3.1	2.3			2.8
UVA-PD-007B2-3	18 to 30	5689	14#	21.2			2.3	2.4	3.9		
UVA-PD-008-1	0 to 6	6938		8.8			2.2	3.7			
UVA-PD-008-2	6 to 18	7173	50+	39.0			3.3	2.8	1.6		
UVA-PD-008-3	18 to 30	6936		31.2			2.1	1.6			1.8
UVA-PD-008B1-1	0 to 6	*6459		14.6	0.5		2.1	2.0			
UVA-PD-008B1-2	6 to 18	*7846	100+	33.7			2.9	2.4			
UVA-PD-008B2-1	0 to 6	4440		4.1	0.2		0.9	0.6			0.7

* Denotes no PVC liner used for gamma logging
# Denotes 44-9 Beta /Gamma probe readings
+ Denotes 43-68 Beta/Gamma probe reading
Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a
Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization: Pond Sediment Summary

Pond Sediment Samples
(Onsite results)
Table 1 cont.

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
				K-40	Cs-137	Co-60	Pb-212	Pb-214	U-238	Th-232	Ac-228
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-PD-008B2-2	6 to 18	6388		24.7			2.5	1.9			
UVA-PD-008B2-3	18 to 30	6743	17#	33.1			3.1	2.6			
UVA-PD-009-1	0 to 6	*6149	40+	31.9			2.3	2.8			2.2
UVA-PD-009-2	6 to 18	*7210		30.4			1.9	1.4			
UVA-PD-011-1	0 to 6	*6540		18.4			4.1	5.2			
UVA-PD-011-2	6 to 18	*7517		23.7	0.5		2.0	1.4			2.1
UVA-PD-011-3	18 to 30	*9724	100+	17.0	0.5		2.3	1.9			1.8
UVA-PD-011B1-1	0 to 6	4962		7.8			3.4	2.4			
UVA-PD-011B1-2	6 to 18	6475		6.7	0.7		1.7	3.0			
UVA-PD-011B1-3	18 to 30	7773	200+	17.5	1.0		3.0	1.4			
UVA-PD-011B2-1	0 to 6	*6551		4.5			1.8	.07			
UVA-PD-011B2-2	6 to 18	*8341	30+		0.7		1.7	1.2			
UVA-PD-012-1	0 to 6	*6050		11.1	2.27		1.6	1.2			
UVA-PD-012-2	6 to 18	*8325		9.3	1.1		1.1	1.0			
UVA-PD-012-3	18 to 30	*9325	80+	21.7	1.5		1.8	1.2			1.9
UVA-PD-012DUP-1	0 to 6	*5820		17.4	2.4		2.8	2.3			
UVA-PD-012DUP-2	6 to 18	*4795		14.3	1.7		2.3	2.3			
UVA-PD-012DUP-3	18 to 30	*9820	100+	24.2	1.4		2.4	1.4			1.7
UVA-PD-012B1-1	0 to 6	*5430		11.1	0.6	0.5	2.1	0.9			1.5
UVA-PD-012B1-2	6 to 18	*7572		23.4			2.7	1.0			2.8
UVA-PD-012B1-3	18 to 30	*7318	18#	12.8			2.0	1.8			1.5
UVA-PD-012B1-4	30 to 42	*8019		22.8			4.5	3.7			3.7
UVA-PD-012B2-1	0 to 6	*7765					5.9	10.3			
UVA-PD-012B2-2	6 to 18	*10897	280+	40.3			3.7	2.6			4.2
UVA-PD-012B3-1	0 to 6			21.5			2.8	1.7			2.4
UVA-PD-012B3-2	6 to 18			25.7			2.6	1.5			2.5
UVA-PD-012B3-3	18 to 30			13.0			0.9	0.6			
UVA-PD-012B4-1	0 to 6			11.3	0.5		0.7	0.4			
UVA-PD-012B4-2	6 to 18			27.2	0.3		2.0	1.2			1.9
UVA-PD-012B5-1	0 to 6			29.8	3.2	0.9	2.0	0.8			2.2
UVA-PD-013-1	0 to 6	7094		47.6	1.6		2.6				
UVA-PD-013-2	6 to 18	7620	17#	27.2			2.3				
UVA-PD-013-3	18 to 30	7503		51.5			4.4				3.9
UVA-PD-013-4	30 to 42	8383		33.1			1.7				

* Denotes no PVC liner used for gamma logging

# Denotes 44-9 Beta /Gamma probe readings

+ Denotes 43-68 Beta/Gamma probe reading

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization: Pond Sediment Summary

Pond Sediment Samples
(Onsite results)
Table 1 cont.

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
				K-40	Cs-137	Co-60	Pb-212	Pb-214	U-238	Th-232	Ac-228
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-PD-013B-1	0 to 6	5237	50+	10.9	1.4		2.6	1.9			
UVA-PD-013B-2	6 to 18	7439		10.7	0.5		1.9	1.5			
UVA-PD-013B-3	18 to 30			21.3	1.6		2.6				
UVA-PD-014-1	0 to 6	6653	24#	39.5	0.7		5.7				
UVA-PD-014-2	6 to 18	8089		52.1			4.8				3.3
UVA-PD-014-3	18 to 30	7854		50.1			4.5				
UVA-PD-014-4	30 to 42	5596		20.2			1.2				
UVA-PD-014B-1	0 to 6			12.9	1.1		0.8				
UVA-PD-015-1	0 to 6	5729		41.3			3.9				
UVA-PD-015-2	6 to 18	5371	16#	18.6	0.7		1.7				
UVA-PD-015-3	18 to 30	7854		31.0	0.3		2.9				
UVA-PD-015-4	30 to 42	7631		33			1.9				
UVA-PD-015B-1	0 to 6	4147		12.5			0.7	0.9			
UVA-PD-015B-2	6 to 18	5615		15.6	0.7		1.6	1.1			
UVA-PD-015B-3	18 to 30	7819	50+	24.9			1.8	1.2			1.6
UVA-PD-015B-4	30 to 42	6426		27.8			2.5	2.7	1.6		
UVA-PD-015B-5	42 to 54	7415		28.2			2.2	2.6			2.1
UVA-PD-016-1	0 to 6	6070		38.9			2.2				
UVA-PD-016-2	6 to 18	7666	20#	34.7			3.3	1.9			2.6
UVA-PD-016-3	18 to 30	8015		17.0			1.8	1.6			
UVA-PD-016-4	30 to 42	8009		19.8			1.6	1.1			
UVA-PD-017-1	0 to 6	*4655		13.0			2.9	6.8			
UVA-PD-017-2	6 to 18	*5538	10+	9.5			1.6	2.3	3.6		
UVA-PD-020-1	0 to 6	*5728		24.0			2.5				
UVA-PD-020-2	6 to 18	*6503		30.2			2.4				
UVA-PD-020-3	18 to 30	*7688	270+	26.3			3.0				
UVA-PD-021B-1	0 to 6	*5350		10.0			1.0	1.8			
UVA-PD-021B-2	6 to 18	*7130	310+	26.4			2.4	1.9			1.8
UVA-PD-021B-3	18 to 30	6375		4.7			1.2	2.0			
UVA-CR-001	SURFACE	27000	40#	6.75			0.5	0.7			
UVA-CR-002	SURFACE	25000	20#	12.4			1.1				
UVA-CR-003	SURFACE	22000	20#	12.5			0.7			1.0	

* Denotes no PVC liner used for gamma logging

# Denotes 44-9 Beta /Gamma probe readings

+ Denotes 43-68 Beta/Gamma probe reading

Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization: Pond Sediment Summary

Background soil sample results
(Onsite results)
Table 2
Ragged Mountain Reservoir Sediment Samples

Sample number	Interval	Gamma Logging	Core Scan	Gamma Spectroscopy							
				K-40	Cs-137	Co-60	Pb-212	Pb-214	U-238	Th-232	Ac-228
	Inches	CPM	CPM	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
UVA-RS-001-1	0 to 6	*2031	10#	17.4	1.0		0.1				
UVA-RS-001-2	6 to 18	*2575	10#	20.8	0.1		0.3	0.2	0.3		
UVA-RS-001-3	18 to 30	*2626	10#	22.3	0.1		0.2	0.2	0.3		0.2
UVA-RS-002-1	0 to 6	*1906	10#	21.5	0.6		0.3	0.1			
UVA-RS-002-2	6 to 18	*2618	10#	20.7			0.2	0.2	0.2		
UVA-RS-003-1	0 to 6	*2311	10#	30.0	1.2						
UVA-RS-003-2	6 to 18	*3637	10#	25.0							
UVA-RS-003-3	18 to 30	*3782	10#	28.4							
UVA-RS-004-1	0 to 6	*1860	10#	16.5							
UVA-RS-004-2	6 to 18	*2471	15#	18.8							
Upstream Creek Background											
UVA-BKGSL-001	0 to 6			19.0			1.1	0.8	0.9		1.2
UVA-BKGSL-002	0 to 6			25.1			2.0	1.7			2.0
Rock Face Background											
UVA-BKGSL-003-1	0 to 6			45.0			3.7	1.6			3.4
UVA-BKGSL-003-2	6 to 18			54.4			3.2	1.2	4.4		2.7
UVA-BKGSL-003-3	18 to 30			46.9			3.4	0.8			3.4
Fill Dirt Background											
UVA-BKGSL-004-1	0 to 6			32.4			3.4	1.1			3.7
UVA-BKGSL-004-2	6 to 18			35.3			4.2	2.05			4.5
UVA-BKGSL-004-3	18 to 30			39.6			3.6	1.3	1.2		4.0

* Denotes no PVC liner used for gamma logging
# Denotes 44-9 Beta /Gamma probe readings
+ Denotes 43-68 Beta/Gamma probe reading
Gamma Spectroscopy results are considered qualitative for screening purposes due to being counted in a
Non-standard preparations of sample for homogeneous mixture and drying.

UVAP Continuing Characterization:
Pond Sediment Summary

Pond Sediment Samples
(Offsite Laboratory)
Table 3

Sample number	Interval in	Gamma Spectroscopy and Part 61 results pCi/g									
	Inches	Ni-63	Pu-238	Pu-239/40	Pu-241	Am-241	Cm-242	Cm-244	C-14	Tc-99	H-3
UVA-PD-005B1-2	6 to 18	-4.68E-02	3.30E-03	6.60E-03	7.22E-01	4.71E-03	0.00E+00	0.00E+00	2.05E-01	-8.77E-02	1.44E+02
Qualifier/MDA		U/ 9.19E-01	U/ 1.98E-02	U/ 2.33E-02	J/ 6.79E-01	U/ 1.28E-02	U/ 1.84E-02	U/ 1.29E-02	U/ 7.99E-01	U/ 7.47E-01	J/ 4.67E+01
UVA-PD-11B1-3	18 to 30	3.06E+00	1.74E-02	2.08E-02	6.81E-01	9.33E-03	0.00E+00	0.00E+00	2.75E-02	4.83E-02	2.59E+02
Qualifier/MDA		J/ 9.63E-01	J/ 1.16E-02	J/ 2.07E-02	U/ 7.09E-01	U/ 2.48E-02	U/ 2.02E-02	U/ 1.42E-02	U/ 8.11E-01	U/ 7.68E-01	J/ 9.07E+01
UVA-PD-012-3	18 to 30	1.07E+00	1.69E-02	3.56E-03	9.53E-01	2.00E-02	-1.43E-02	0.00E+00	3.24E-01	-8.78E-02	1.33E+02
Qualifier/MDA		J/ 9.02E-01	U/ 2.13E-02	U/ 2.13E-02	J/ 7.77E-01	J/ 1.35E-02	U/ 3.44E-02	U/ 1.37E-02	U/ 7.84E-01	U/ 7.63E-01	J/ 5.34E+01
UVA-PD-012B2-2	6 to 18	1.59E-01	0.00E+00	2.64E-02	1.31E+01	8.66E-02	0.00E+00	4.37E-02	-1.32E-01	-8.48E-02	5.75E+01
Qualifier/MDA		U/ 8.17E-01	U/ 1.19E-01	U/ 2.49E-01	J/ 8.83	U/ 1.17E-01	U/ 1.69E-01	U/ 1.18E-01	U/ 8.00E-01	U/ 7.60E-01	J/ 3.24E+01
UVA-PD-013B-1	0 to 6	2.29E+01	1.23E-01	0.00E+00	1.58E+01	0.00E+00	0.00E+00	0.00E+00	-1.90E-02	5.94E-01	1.10E+01
Qualifier/MDA		8.73E-01	U/ 2.67E-01	U/ 1.28E-01	1.06E+01	U/ 1.28E-01	U/ 1.85E-01	U/ 1.29E-01	U/ 8.09E-01	U/ 6.04E-01	U/ 8.96E+01
UVA-PD-021B-2	6 to 18	1.24E-01	6.92E-03	-1.54E-03	1.07E+00	-1.34E-03	0.00E+00	0.00E+00	2.24E-01	-2.04E-01	5.32E+01
Qualifier/MDA		U/ 8.35E-01	U/ 1.84E-02	U/ 2.17E-02	J/ 8.91E-01	U/ 3.20E-02	U2.61E-02	U/ 1.83E-02	U/ 8.10E-01	U/ 7.55E-01	J/ 4.96E+01

Sample number	Interval in	Gamma Spectroscopy and Part 61 results pCi/g								
	Inches	Co-60	Cs-137	K-40	Ra-226	Th-232	U-238DHP	I-129L	Sr-90	Fe-55
UVA-PD-005B1-2	6 to 18	1.32E-02	9.80E-02	3.63E+01	2.02E+00	2.64E+00	2.97E+00	-6.47E-03	5.58E-02	-5.58E+01
Qualifier/ MDA		U/ 1.48E-01	U/ 1.54E-01	1.18	2.37E-01	6.59E-01	1.43	U/ 2.05E-01	U/ 6.05E-01	U/ 2.03E+01
UVA-PD-11B1-3	18 to 30	1.11E-01	2.22E+00	3.62E+01	3.29E+00	4.77E+00	not	1.73E-01	1.09E-01	-3.95E+01
Qualifier/ MDA		U/ 3.08E-01	2.73E-01	1.82	4.80E-01	1.35	Detected	U/ 5.06E-01	U/ 7.22E-01	U/ 1.80E+01
UVA-PD-012-3	18 to 30	2.23E-02	2.08E+00	2.78E+01	1.69E+00	2.42E+00	2.92E+00	4.33E-02	1.50E-01	-2.60E+01
Qualifier/ MDA		U/ 1.52E-01	1.18E-01	9.26E-01	2.18E-01	6.00E-01	1.31	U/ 2.16E-01	U/ 6.45E-01	U/ 1.55E+01
UVA-PD-012B2-2	6 to 18	2.99E-02	-1.62E-02	3.04E+01	1.50E+00	3.01E+00	not	1.21E-01	3.14E-01	-3.42E+01
Qualifier/ MDA		U/ 1.46E-01	U/ 1.24E-01	1.27	1.96E-01	5.58E-01	Detected	U/ 2.65E-01	U/ 6.01E-01	U/ 2.03E+01
UVA-PD-013B-1	0 to 6	9.53E-01	3.46E+00	2.13E+01	3.61E+00	4.16E+00	not	-2.30E-01	4.27E-02	-4.21E+01
Qualifier/ MDA		U/ 6.12E-01	3.18E-01	3.17	5.28E-01	1.53	Detected	U/ 4.54E-01	U/ 8.64E-01	U/ 1.79E+01
UVA-PD-021B-2	6 to 18	3.89E-02	2.71E-02	2.88E+01	1.29E+00	2.51E+00	not	-1.05E-01	8.76E-01	-4.94E+01
Qualifier/ MDA		U/ 1.36E-01	U/ 1.22E-01	1.13	1.95E-01	5.57E-01	Detected	U/ 2.16E-01	J/ 6.17E-01	U/ 1.34E+01

J Qualifier - No U qualifier has been assigned and result is below the reporting limit, contractual required detection limit, or report value is estimated.

U Qualifier - Analyzed for, but the result is less than the MDC/MDA. Total uncertainty or gamma scan software did not identify the nuclide.

MDC/MDA- The Minimum Detectable Concentration / Minimum Detectable Activity

UVAP Continuing Characterization: Pond Sediment Summary

Creek Background, Upstream
(Offsite Laboratory)
Table 4

Sample number	Interval in	Gamma Spectroscopy and Part 61 results pCi/g									
	Inches	Ni-63	Pu-238	Pu-239/40	Pu-241	Am-241	Cm-244	Am-243	C-14	Tc-99	H-3
UVA-BKGSL-001	0 to 6	0.00	5.75E-03	5.00E-03	1.20	3.28E-02	3.29E-02	3.50e-02	6.50	1.08E-01	0.00E+00
Qualifier/ MDA		U/ 1.00	U/ 4.0e-02	U/ 1.0e-02	1.08	U/ 5.00E-02	U/ 5.0e-02	3.0e-02	4.09	U/ 1.50e-01	U/ 3.09
UVA-BKGSL-002	0 to 6	-4.01E-01	3.30E-02	8.99E-03	0.65	2.00E-01	4.45E-02	5.10e-2	3.00	5.54E-02	1.85E+00
Qualifier/ MDA		U/ 9.2e-01	U/ 5.0e-02	U4.0e-02	U/ 1.17	5.00E-02	4.0e-02	3.0e-02	2.51	U/ 1.60e-01	U/ 3.59

		Co-60	Cs-137	K-40	Fe-55	Th-232	U-238DHP	I-129	Sr-90	Th-230
UVA-BKGSL-001	0 to 6	1.36E-01	2.77E-01	2.26E+01	-9.25E-01	1.61E+00	1.58E+00	-2.38E-01	-4.93E-02	3.26
Qualifier/ MDA		U/ 2.70e-01	2.30e-01	1.69	U/ 1.57	3.0e-02	9.0e-02	U/ 5.4e-01	U/ 1.40e-01	2.0e-02
UVA-BKGSL-002	0 to 6	2.45E-02	3.81E-02	2.93E+01	4.09E-01	1.92E+00	1.55E+00	1.22E-01	2.12E-01	1.55
Qualifier/ MDA		U/ 1.20e-01	U/ 1.30e-01	1.11	U/ 1.22	2.0e-02	8.0e-02	U/ 4.0e-01	1.90e-01	3.0e-02

U Qualifier - Analyzed for, but the result is less than the MDC/MDA. Total uncertainty or gamma scan software did not identify the nuclide.

MDC/MDA- The Minimum Detectable Concentration / Minimum Detectable Activity