



HITACHI

GE Hitachi Nuclear Energy

Matt J. Feyrer
Site Manager,
Vallecitos Nuclear Center

M200045

March 25, 2020

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-001

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Subject: GEH Annual Shutdown Reactor Reports for the Year 2019

Reference: License DPR-1, Docket 50-18 (VBWR), License DR-10, Docket 50-183 (EVESR), License TR-1, Docket 50-70 (GETR)

Enclosed are the 2020 Annual Reports for the deactivated Reactors (Vallecitos Boiling Water Reactor (VBWR), ESADA-Vallecitos Experimental Superheat Reactor (EVESR), and the General Electric Test Reactor (GETR)) located at the GE Hitachi, Vallecitos Nuclear Center near Sunol, California.

If there are any questions or additional information required, please contact me at the number above.

Sincerely,

Matt Feyrer, Site Manager
Vallecitos Nuclear Center

Enclosures: VBWR Annual Report No. 55, EVESR Annual Report No. 52, and GETR Annual Report No. 61

cc: NRC Region IV Administrator
J. Parrott, NRC NMSS

MJF 20-001

Enclosures

VBWR Annual Report No. 55

EVESR Annual Report No. 52

GETR Annual Report No. 61



HITACHI

GE Hitachi Nuclear Energy

*Vallecitos Nuclear Center
Sunol, California*

**VALLECITOS BOILING WATER REACTOR
(DEACTIVATED)**

**ANNUAL REPORT NO. 55
FOR THE YEAR 2019**

**LICENSE DPR-1
DOCKET 50-18**

MARCH 2020

**Vallecitos Boiling Water Reactor
(Deactivated)**

Annual Report No. 55

GE Hitachi Nuclear Energy has maintained the Vallecitos Boiling Water Reactor (VBWR) in a deactivated status under the authority of Amendment No. 21 to License DPR-1, Docket 50-18, issued Oct 22, 2007. In this annual report, a summary of the status of the facility for the period of January 1, 2019, to December 31, 2019, is presented, as required by paragraph 5.d.2 of the license.

1.0 SUMMARY

All reactor systems have been removed from the containment except for the reactor vessel. The water level within the reactor vessel was monitored and has remained essentially constant throughout the report period.

Radiation and contamination levels remain at acceptable levels. Environmental data is maintained on site and available for review.

2.0 STATUS OF FACILITY

In accordance with written procedures, the Facility Manager controls access to the containment building and general systems. The facility continues to be in deactivated status in safe storage condition.

3.0 RADIATION AND CONTAMINATION

Complete radiation and contamination surveys of the facility indicate that levels remain low. Results of the surveys are presented in attachment 1. Air sampling results are presented in attachment 2. The radiation/contamination levels listed are representative but not necessarily maximum values.

An assessment for radionuclide distribution was performed of the shutdown reactors. An external consultant performed the Updated Radiological Source Term for the Vallecitos Nuclear Center. The assessment has been submitted to the NRC for review and is available for further review at VNC if needed.

3.1 GROUND WATER MONITORING WELL

Groundwater well MW-9 was installed southwest of the EVESR and VBWR shutdown reactors. Monitoring Well 9 has two sampling points documented as MW-9S and MW-9D. These wells will provide additional groundwater monitoring of the hydrogeologic conditions downgradient of the shutdown reactors in this area. The installation of these wells is part of the response letter to the NRC, "NRC Request for Additional Information Related to Vallecitos Nuclear Center (VNC) Request for Alternate Decommissioning Schedules", GEH Response Summary Dated May 31, 2019. Analytical results of groundwater samples collected from the wells during the reporting periods. These wells were sampled quarterly after installation in 2019.

Well W-9S (4S-1E2P1)			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
July 2019	2.81	1.62	0
October 2019	2.31	2.82	176
Annual Average	2.56	2.22	88

Well W-9D (4S-1E2P2)			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
July 2019	5.04	2.29	395
October 2019	4.10	0.75	270
Annual Average	4.57	1.52	333

4.0 ACTIVITIES

Routine inspections were conducted during this report period. This included new monthly routines completed from February to December. Additional activities in VBWR included installation of a new automatic sump pump system in the VBWR Basement, and two monitoring wells downgradient of VBWR.

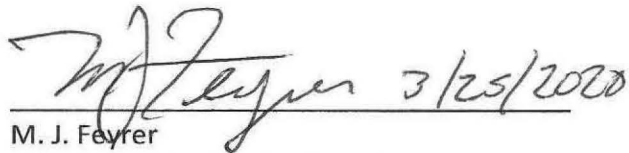
5.0 ORGANIZATION

The Site Manager remains M. J. Feyrer. The VBWR Facility Manager remains K. P. Zanotto. The Manager, Regulatory Compliance and EHS remains J. Smyly.

6.0 CONCLUSION

GE Hitachi Nuclear Energy concludes that the deactivated VBWR is being maintained in a safe shutdown condition. The inspections, access control, and administratively controlled activities ensure maximum protection for the public health and safety. The procedures will be continued to maintain this high level of protection.

GE Hitachi Nuclear Energy
Vallecitos Operations

 3/25/2020

M. J. Feyrer
Manager Vallecitos Nuclear Center

Attachment 1



HITACHI

VALLECITOS NUCLEAR CENTER
NUCLEAR SAFETY SURVEY RECORD

SURVEYOR (print and sign) Name and signature on original at GEH Vallecitos Nuclear Center	REVIEWER	NO. D-055
LOCATION VBWR Containment		DATE: 06/18/19
		TIME: 0900

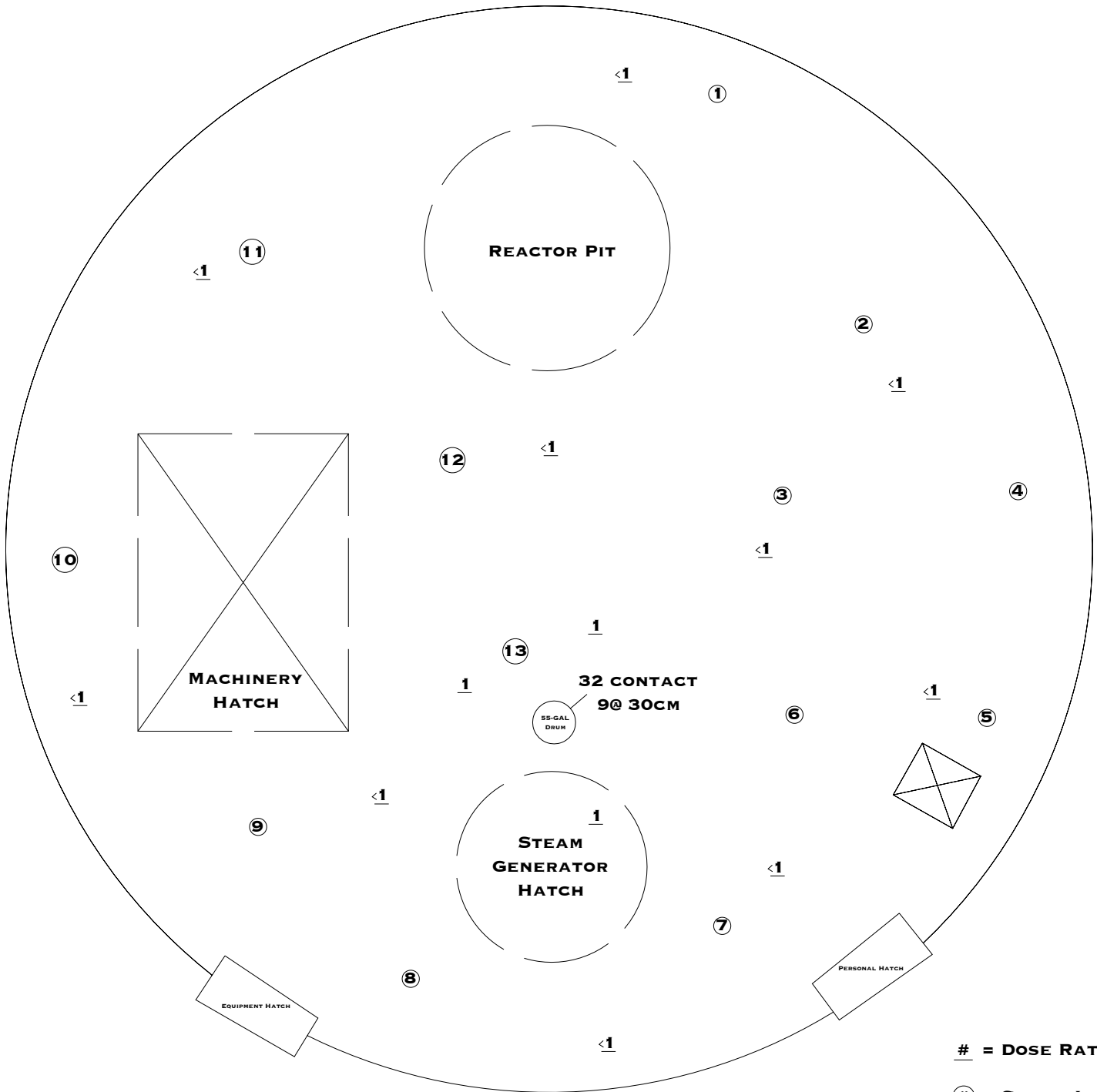
<input checked="" type="checkbox"/> Routine	REASON	Annual Survey
<input type="checkbox"/> Special		

ITEMS OR LOCATION		DOSE RATE				DIRECT READING				SMEAR READINGS				AREA
Item No.		β mRad/h	γ mR/h	n mRem/h	TOTAL mRem/h	Distance	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM	α dPM	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM	
1	Main Floor - General Area		<1-5		<1-5	F								
2	- Area Over Reactor Vessel		<1		<1	F								
3														
4	Basement - General Area		<1		<1	F								
5	- Sump		4		4	C								
6	- Sump @ 1'		<1		<1	1'								
7	Reactor Vessel Head Area		<1		<1	F								
8														
9	Top of Fuel Pool		<1		<1	F								
10														
11	Personnel Air Lock		<1		<1	F								
12														
13	Equipment Air Lock		<1		<1	F								
14														
15	Drum on first floor (Sludge)		38		38	C								
16	Drum on first floor (Sludge) @ 1'		8		8	1'								

INSTRUMENT USED	Tennelec	PRM - 7	CP - 5	RO - 20	PNR - 4	TBM -	E - 120	RM - 15	RM - 14	PAC - 1SA	LUDLUM-12
SERIAL NUMBER	2972-1			6128							

Area Posted: (circle applicable) RA HRA CA RMA AIRBORNE	PROBE	α AC - 3A (U)	10%	PROBE	$\beta\gamma$ PANCAKE	20%
COMMENTS Smears completed on Tennelec see attachment	EFF.	α 43 - 4 (U)	10%	EFF.		
Areas smeared are on maps with attachement	(4 P GEO.)			(4 P GEO.)		

VBWR MAIN FLOOR

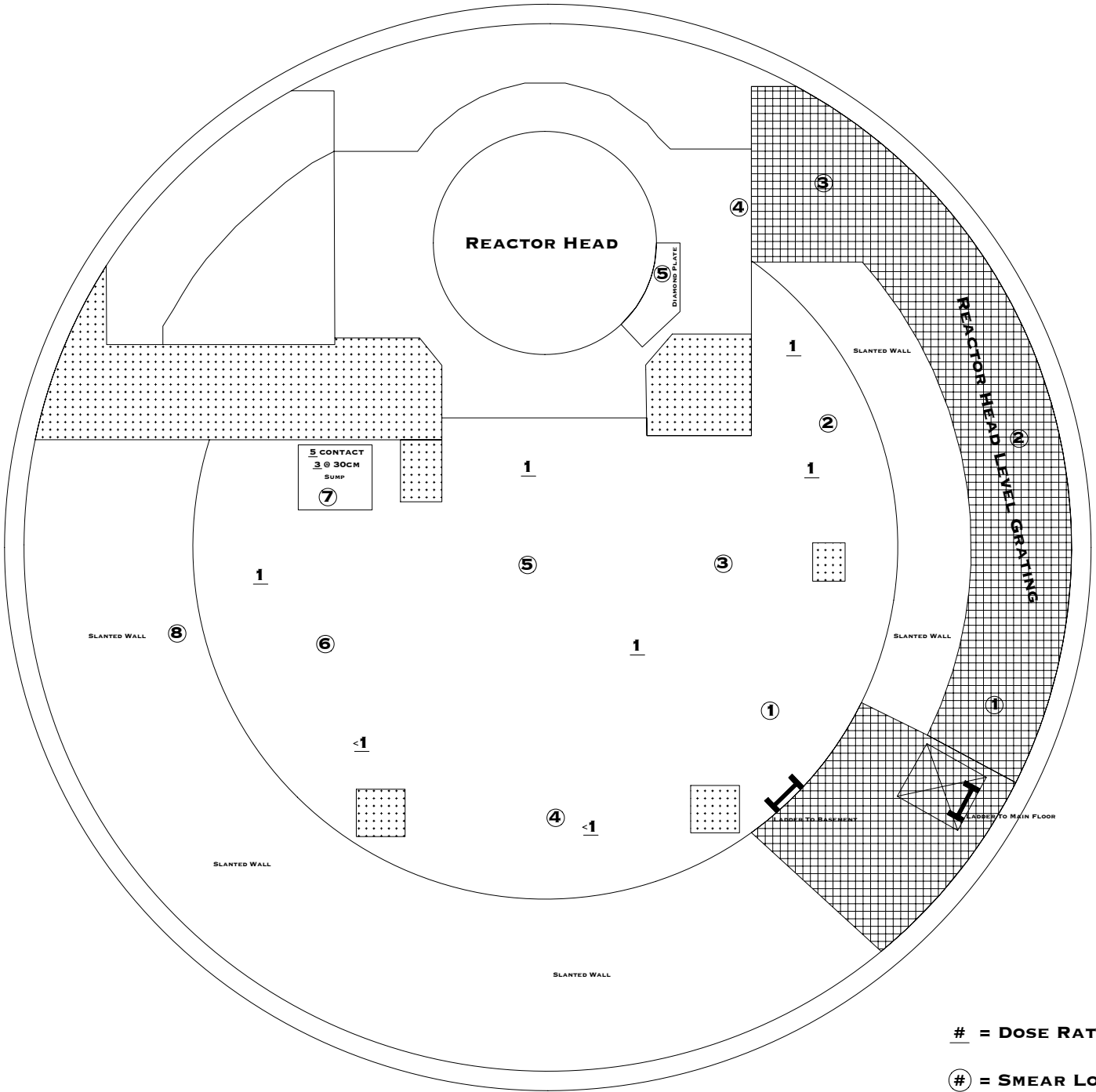


= DOSE RATE

⊕ = SMEAR LOCATION

DOSE RATES IN MR/HR

VBWR BASEMENT AREA



= DOSE RATE

⊙ = SMEAR LOCATION

DOSE RATES IN MR/HR

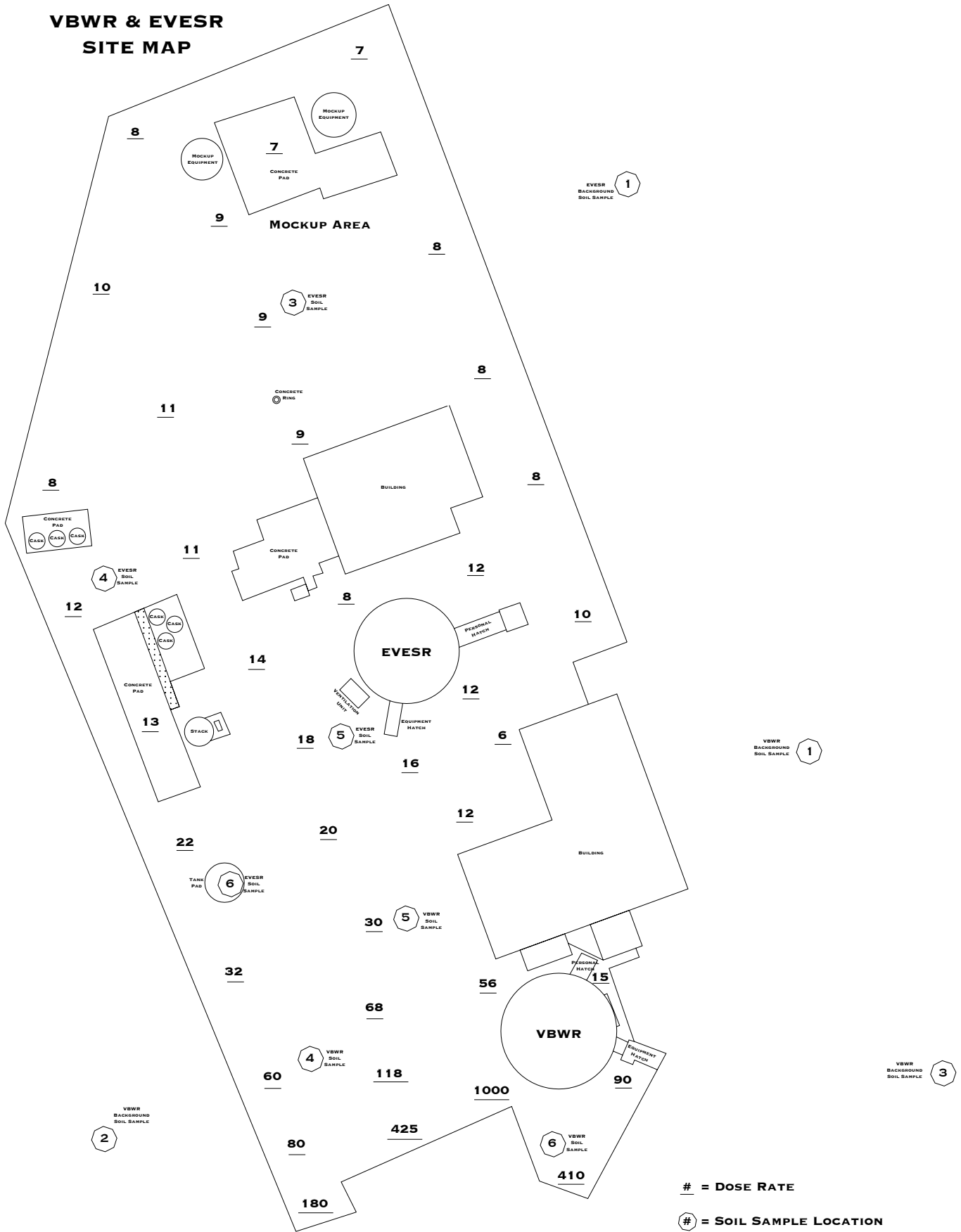
Attachment to Survey D-055: VBWR Containment Annual Survey Smear Results

Instrument:	<u>Tennelec XLB System A</u>	Analyzed By:	_____
Serial No.:	<u>2972-2</u>	Signature:	_____
Calibration Date:	<u>1 Mar 2019</u>	Reviewed:	_____
Beta Efficiency:	<u>33.47%</u>	Beta MDA:	<u>16.9 dpm</u>
Alpha Efficiency:	<u>36.28%</u>	Alpha MDA:	<u>10.5 dpm</u>
Sample Date:	<u>6/18/19</u>	Count Date:	<u>6/18/19</u>

Name and signature on original at GEH Vallecitos Nuclear Center

Level	Location	Alpha (NCPM/100 cm ²)	Alpha (DPM/100 cm ²)	Beta (NCPM/100 cm ²)	Beta (DPM/100 cm ²)
Main Floor Level 1	1	0	0	108.2	323
	2	0	0	47.2	141
	3	0	0	44.2	132
	4	0	0	79.2	237
	5	0	0	43.2	129
	6	0	0	49.2	147
	7	0.9	2.5	33.2	99.2
	8	0	0	37.2	111
	9	0	0	24.2	72.3
	10	0.9	2.5	27.2	81.3
	11	0	0	89.2	266
	12	0	0	51.2	153
	13	0	0	28.2	84.2
Rx Head Level	1	0.9	2.5	95.2	284
	2	0	0	28.2	84.2
	3	0	0	23.2	69.3
	4 (Bricks)	0	0	23.2	69.3
	5 (Diamond Plate)	0.9	2.5	104.2	311
Basement	1	2.9	8.0	1944.2	5810
	2	0	0	579.2	1730
	3	0	0	701.2	2090
	4	0	0	532.2	1590
	5	0	0	691.2	2060
	6	2.9	8.0	738.2	2210
	7 (Sump Cover)	0	0	399.2	1190
	8 (By Sump)	1.9	5.2	915..2	2730

VBWR & EVESR SITE MAP



= DOSE RATE

⊕ = SOIL SAMPLE LOCATION

DOSE RATES IN MICROREM/HR

ATTACHMENT 2: Air Sample Data for Vallecitos Reactor Annual Inspection 2019

Reactor	Location	Sample Volume (ml)	Initial				1 Hour Decay				>24 Hour Decay			
			Alpha		Beta		Alpha		Beta		Alpha		Beta	
			ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml
VBWR	First Floor	2.83E+06	333.99	1.46E-10	792.30	3.77E-10	103.39	4.53E-11	233.50	1.11E-10	0.00	0.00E+00	7.00	3.33E-12
	Basement	2.83E+06	820.19	3.60E-10	1991.90	9.47E-10	260.29	1.14E-10	592.20	2.81E-10	0.49	2.15E-13	21.50	1.02E-11
	Fuel Pool	2.83E+06	679.59	2.98E-10	1813.90	8.62E-10	71.89	3.15E-11	159.20	7.57E-11	1.09	4.78E-13	10.30	4.90E-12
EVESR	First Floor	2.83E+06	3227.29	1.42E-09	7953.80	3.78E-09	718.89	3.15E-10	1551.40	7.37E-10	0.29	1.27E-13	5.20	2.47E-12
	Basement	2.83E+06	4923.19	2.16E-09	11385.50	5.41E-09	999.79	4.38E-10	2181.90	1.04E-09	2.49	1.09E-12	75.60	3.59E-11
	519' Level	2.83E+06	6876.69	3.02E-09	16930.10	8.05E-09	1534.89	6.73E-10	3353.20	1.59E-09	1.09	4.78E-13	59.90	2.85E-11
GETR	First Floor	2.83E+06	190.09	8.33E-11	548.50	2.61E-10	71.99	3.16E-11	170.30	8.09E-11	1.29	5.66E-13	8.00	3.80E-12
	Basement	2.83E+06	99.59	4.37E-11	245.00	1.16E-10	29.29	1.28E-11	76.60	3.64E-11	1.09	4.78E-13	15.00	7.13E-12
	Third Floor	2.83E+06	124.29	5.45E-11	458.30	2.18E-10	43.29	1.90E-11	238.00	1.13E-10	0.79	3.46E-13	43.30	2.06E-11

Tennelec System "A" Efficiency & Conversion Factors

Alpha Efficiency	36.28%
Beta Efficiency	33.47%
dpm/uCi	2.22E+06
Alpha cpm/uCi	8.05E+05
Beta cpm/uCi	7.43E+05

Sampling Information										Initial	1 Hr	Approx.	
Reactor	Location	Date Sampled	Time On	Time Off	Minutes sampled	Flow Rate (cfm)	Total Flow (ft ³)	ml/ft ³	Total Sample Volume (ml)	Count	Count	Minutes Decay	Half-Life (min.)
VBWR	First Floor	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:54	9:52	58	34.3
VBWR	Basement	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:42	9:42	60	36.2
VBWR	Fuel Pool	6/25/2019	9:43	10:03	20	5	100.0	28317	2.83E+06	10:16	12:10	114	35.2
EVESR	First Floor	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:39	11:55	76	35.1
EVESR	Basement	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:49	12:05	76	33.0
EVESR	519' Level	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:28	11:44	76	35.1
GETR	First Floor	6/17/2019	14:17	14:37	20	5	100.0	28317	2.83E+06	14:45	15:49	64	45.7
GETR	Basement	6/17/2019	9:50	10:10	20	5	100.0	28317	2.83E+06	10:58	12:00	62	35.1
GETR	Third Floor	6/25/2019	8:55	9:15	20	5	100.0	28317	2.83E+06	9:36	10:36	60	39.4



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GE Hitachi Nuclear Energy

*Vallecitos Nuclear Center
Sunol, California*

**ESADA-VALLECITOS EXPERIMENTAL
SUPERHEAT REACTOR
(DEACTIVATED)**

**ANNUAL REPORT NO. 52
FOR THE YEAR 2019**

**LICENSE DR-10
DOCKET 50-183**

MARCH 2020

**ESADA-Vallecitos Experimental Superheat Reactor
(Deactivated)**

ANNUAL REPORT NO. 52

GE Hitachi Nuclear Energy (GEH) has maintained the ESADA Vallecitos Experimental Superheat Reactor (EVESR) in a deactivated status under the authority of Amendment No. 7 to License DR-10, Docket 50-183, issued December 1, 2008. In this annual report, a summary of the status of the facility for the period of January 1, 2019, to December 31, 2019, is presented, as required by Amendment 7, Appendix A, Technical Specifications, section C. 1.

1.0 SUMMARY

Component removal activities began in 2008 above the 549-foot level. Tech Spec changes issued in Amendment 7 December 1, 2008 authorize the removal of systems beside the reactor vessel and bio-shield below the 549-level. Component removal concluded (current scope) in 2010. Entry into the containment building was made for routine radiation surveys and a general examination of conditions throughout the building. In accordance with written procedures, the Facility Manager controls access to the containment building.

Radiation and contamination levels remain at acceptable levels. Environmental data is maintained on site and available for review.

2.0 STATUS OF FACILITY

The facility continues to be in deactivated status. The plugs to the reactor vessel and head storage shield, the wooden cover over the fuel storage pool remain in place.

3.0 RADIATION AND CONTAMINATION

Complete radiation and contamination surveys of the facility indicate that levels remain low. Results of the surveys are presented in attachment 1. Air sampling results are presented in attachment 2. The radiation/contamination levels listed are representative but not necessarily maximum values.

An assessment for radionuclide distribution was performed of the shutdown reactors. An external consultant performed the Updated Radiological Source Term for the Vallecitos Nuclear Center. The assessment has been submitted to the NRC for review and is available for further review at VNC if needed.

3.1 GROUND WATER MONITORING WELL

Groundwater well MW-9 was installed southwest of the EVESR and VBWR shutdown reactors. Monitoring Well 9 has two sampling points documented as MW-9S and MW-9D. These wells will provide additional groundwater monitoring of the hydrogeologic conditions downgradient of the shutdown reactors in this area. The installation of these wells is part of the response letter to the NRC, “NRC Request for Additional Information Related to Vallecitos Nuclear Center (VNC) Request for Alternate Decommissioning Schedules”, GEH Response Summary Dated May 31, 2019. Analytical results of groundwater samples collected from the wells during the reporting periods. These wells were sampled quarterly after installation in 2019.

Well W-9S (4S-1E2P1)			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
July 2019	2.81	1.62	0
October 2019	2.31	2.82	176
Annual Average	2.56	2.22	88

Well W-9D (4S-1E2P2)			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
July 2019	5.04	2.29	395
October 2019	4.10	0.75	270
Annual Average	4.57	1.52	333

4.0 ACTIVITIES

Routine inspections were conducted during this report period. During this report period, two additional monitoring wells were installed downgradient of EVESR. No major activities occurred inside the reactor during this period.

5.0 ORGANIZATION

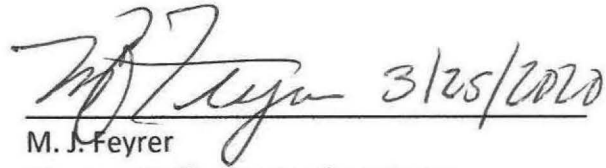
The Site Manager remains M. J. Feyrer. The EVESR Facility Manager remains K. P. Zanotto. The Manager, Regulatory Compliance and EHS remains J. Smyly.

6.0 CONCLUSION

GE Hitachi Nuclear Energy concludes that the deactivated ESADA-Vallecitos Experimental Superheat Reactor is being maintained in a safe shutdown condition. The

inspections, access control, and administratively controlled activities ensure maximum protection for the public health and safety. The procedures will be continued to maintain this high level of protection.

GE Hitachi Nuclear Energy
Vallecitos Operations

 3/25/2020

M. J. Feyrer
Manager Vallecitos Nuclear Center

Attachment 1



HITACHI

VALLECITOS NUCLEAR CENTER
NUCLEAR SAFETY SURVEY RECORD

SURVEYOR (print and sign)	REVIEWER	NO.
Name and signature on original at GEH Vallecitos Nuclear Center		D-056
LOCATION		DATE: 06/18/19
EVESR Containment		TIME: 1100

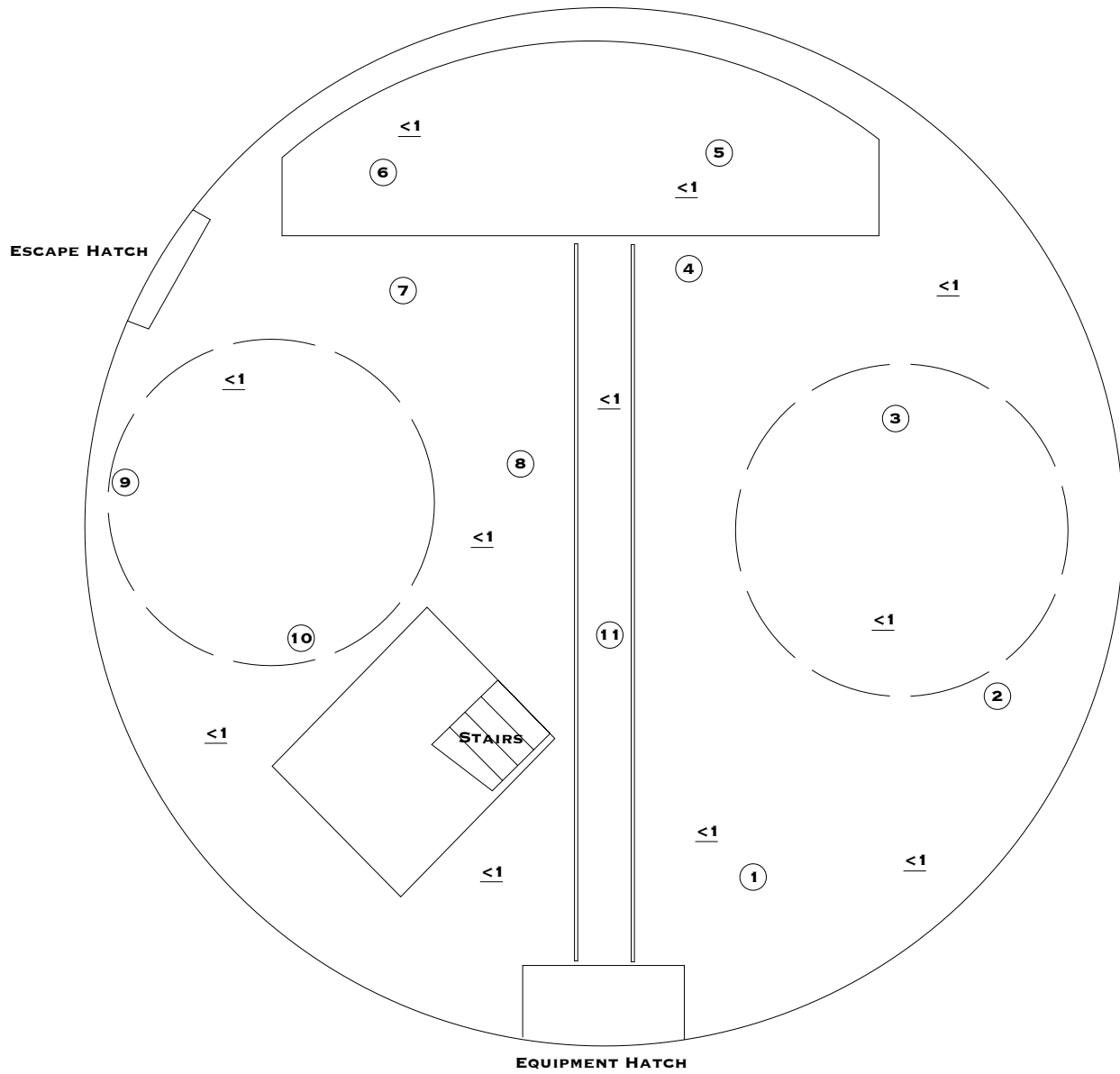
<input checked="" type="checkbox"/> Routine	REASON	Annual Survey
<input type="checkbox"/> Special		

ITEMS OR LOCATION		DOSE RATE				DIRECT READING				SMEAR READINGS				AREA	
		β mRad/h	γ mR/h	n mRem/h	TOTAL mRem/h	Distance	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM	α dPM	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM		α dPM
1	487' Level (Basement)		<1		<1	F									
2	503' Level		<1		<1	F									
3	519' Level		<1		<1	F									
4	534' Level - General Area		1.5		1.5	C									
5	- Floor Drain		7		7	C									
6	- Floor Drain @ 1'		1.5		1.5	C									
7	- Emergency Cooling Valves		4.5		4.5	F									
8															
9	549' Level		<1		<1	F									
10	Equipment Air Lock		<1		<1	F									
11	Personnel Air Lock		<1		<1	F									
12	Top of Spent Fuel Pool (Main Floor)		<0.5		<0.5	F									
13															
14															
15															
16															

INSTRUMENT USED	Tennelec	PRM - 7	CP - 5	RO - 20	PNR - 4	TBM -	E - 120	RM - 14	RM - 15	PAC - 1SA	LUDLUM-12	
SERIAL NUMBER	2972-1			6128								

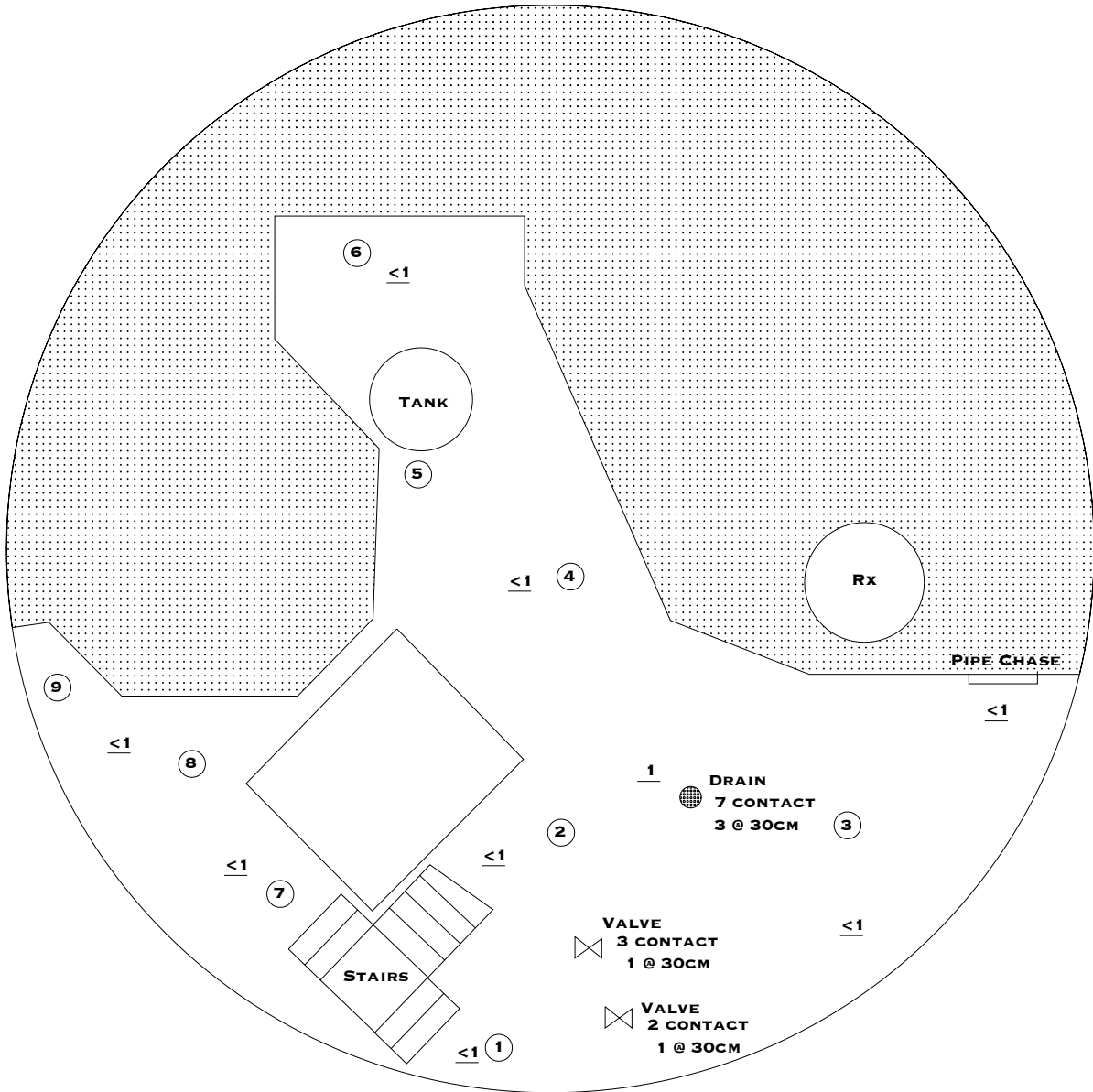
Area Posted: (circle applicable) RA HRA CA RMA AIRBORNE	PROBE	α AC - 3A (U)	10%	PROBE	βγ PANCAKE	20%
COMMENTS Smears completed on Tennelec see attachment Areas smeared are on maps with attachment	EFF.	α 43 - 4 (U)	10%	EFF.		
	(4 P GEO.)			(4 P GEO.)		

**EVESR
549' LEVEL**



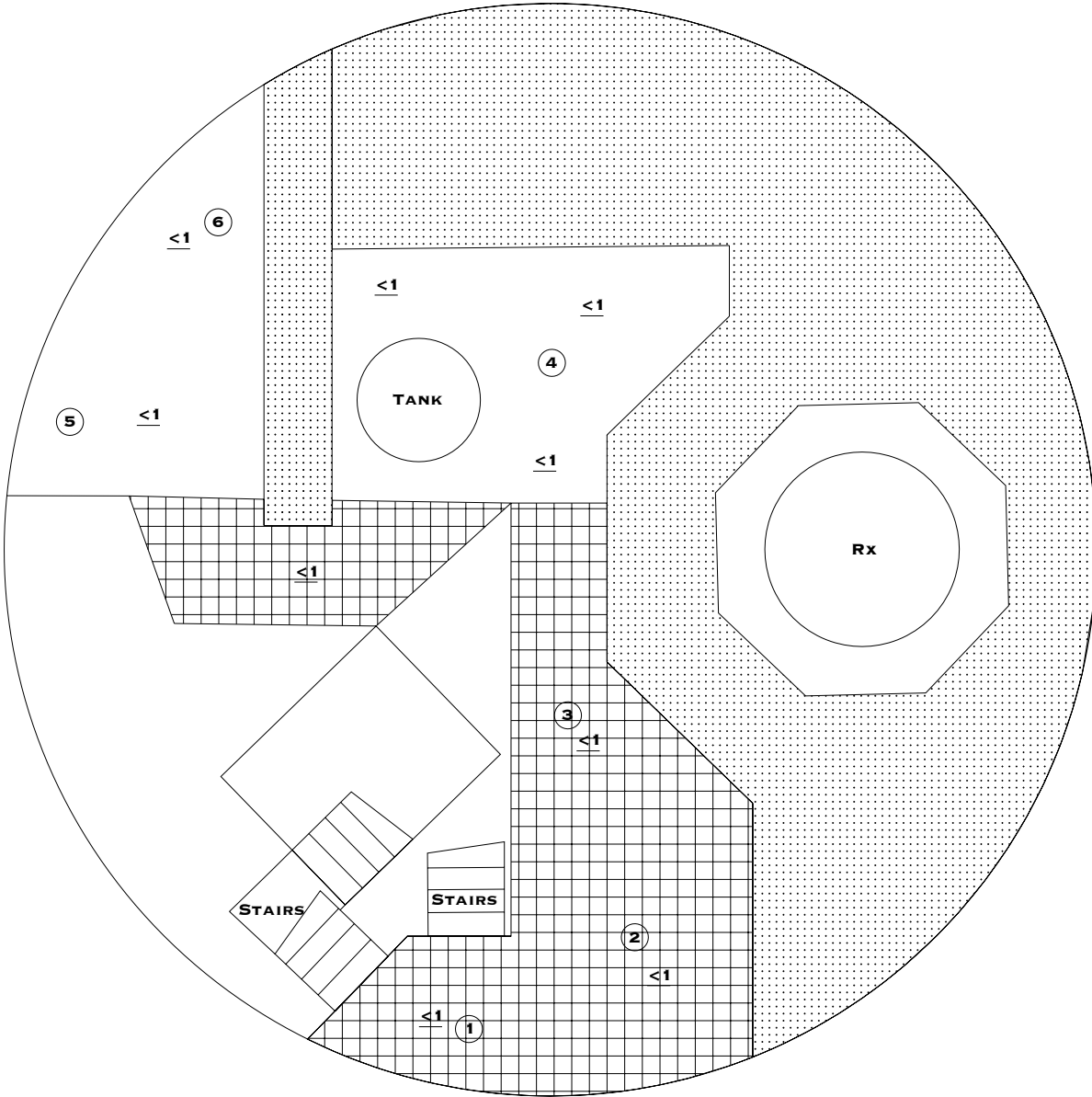
Dose Rates in mRem/hr

**EVESR
534' LEVEL**



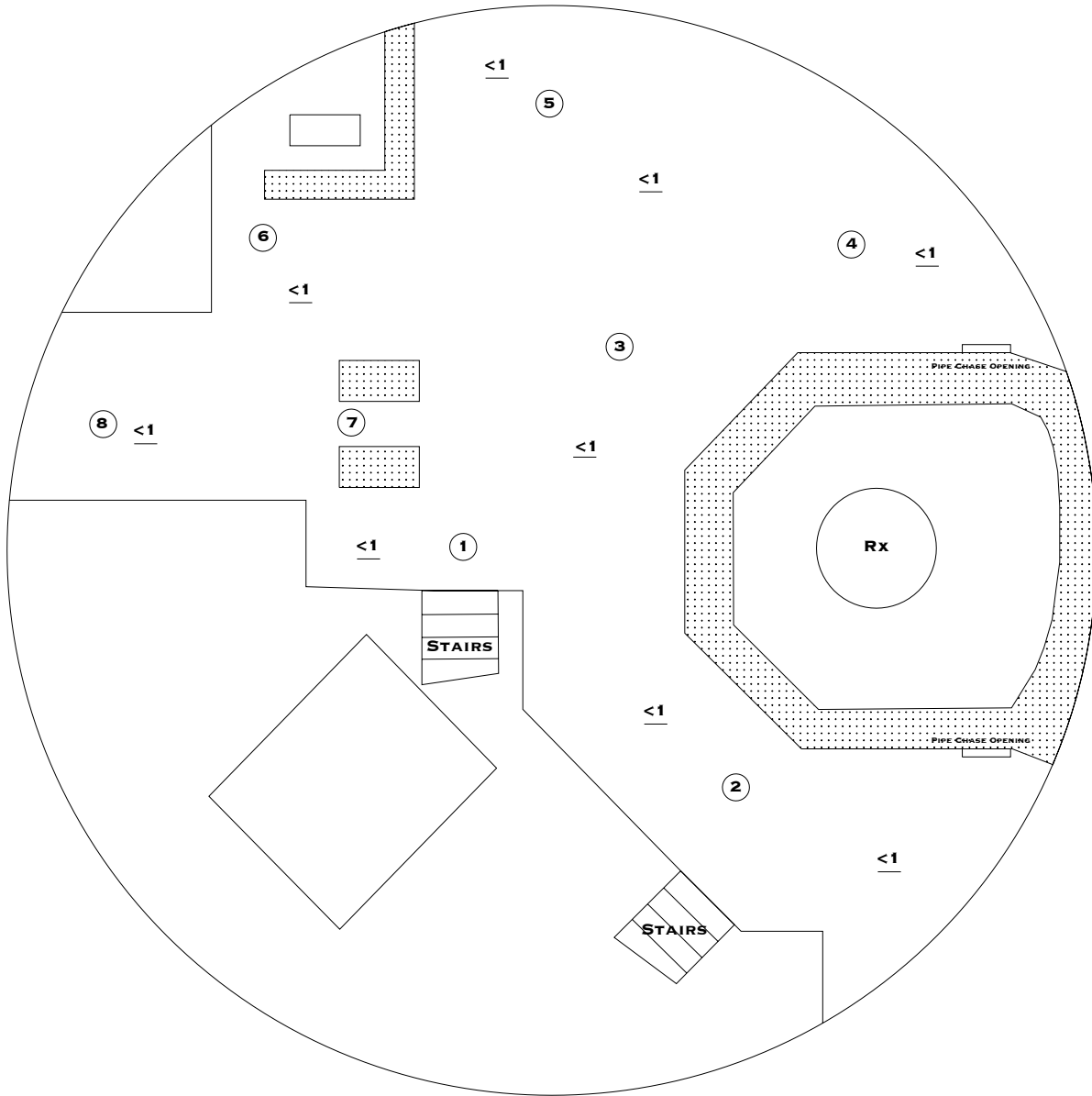
Dose Rates in mRem/hr

**EVESR
519' LEVEL**



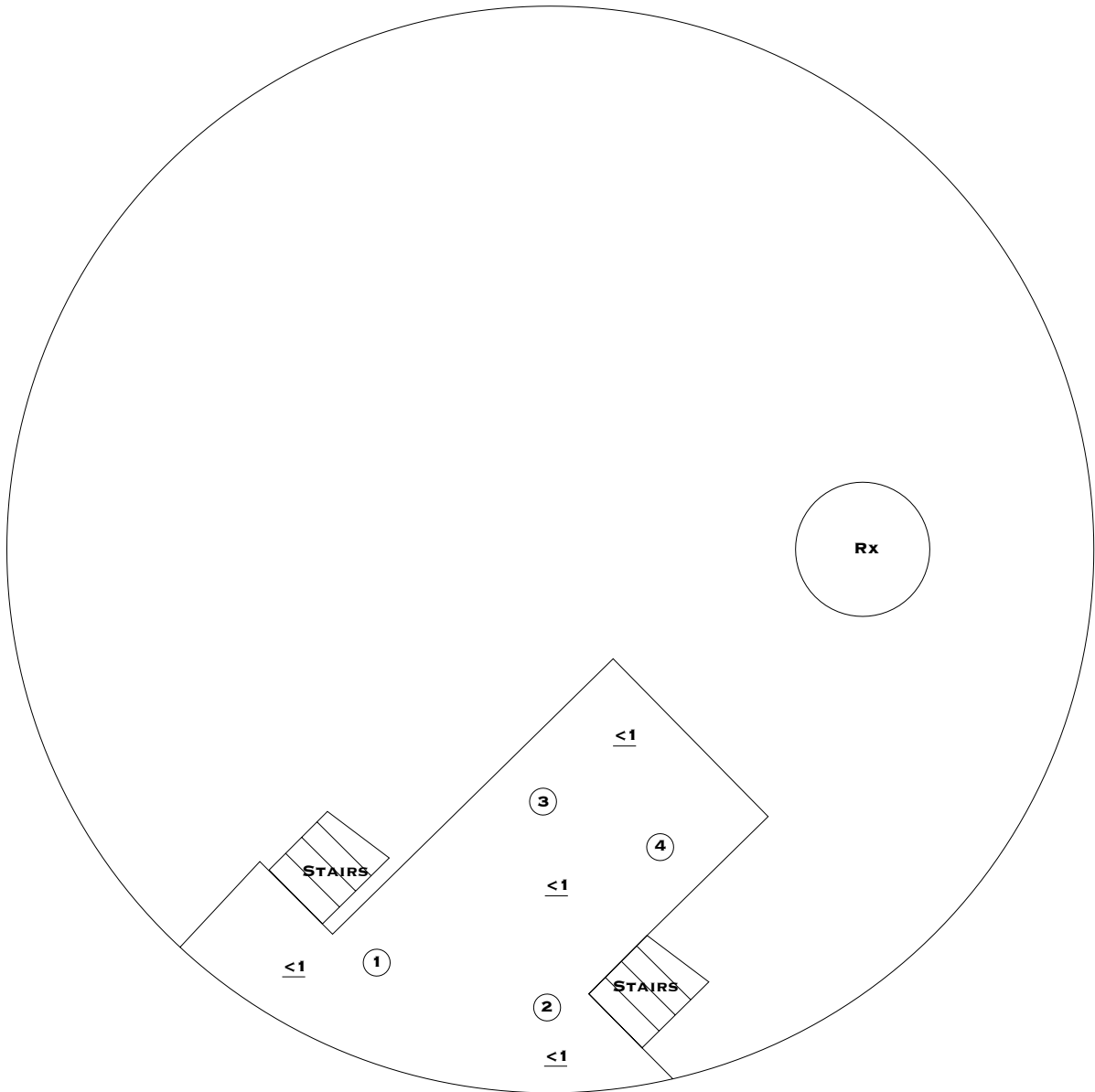
Dose Rates in mRem/hr

**EVESR
503' LEVEL**



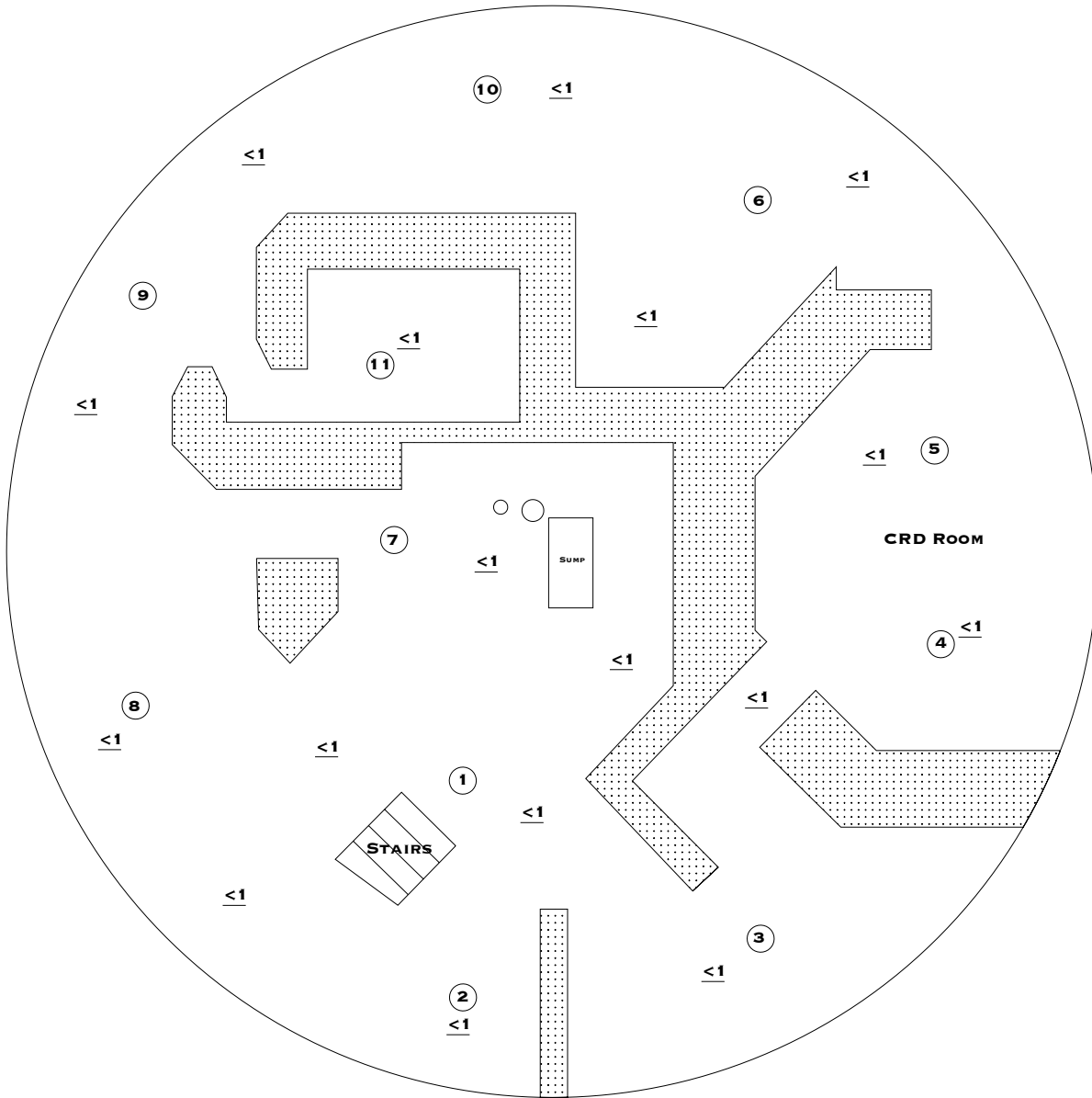
Dose Rates in mRem/hr

**EVESR
500' LEVEL
IN-CORE FLUX AREA**



Dose Rates in mRem/hr

**EVESR
487' LEVEL**



Dose Rates in mRem/hr

Attachment to Survey D-056: EVESR Containment Annual Survey Smear Results

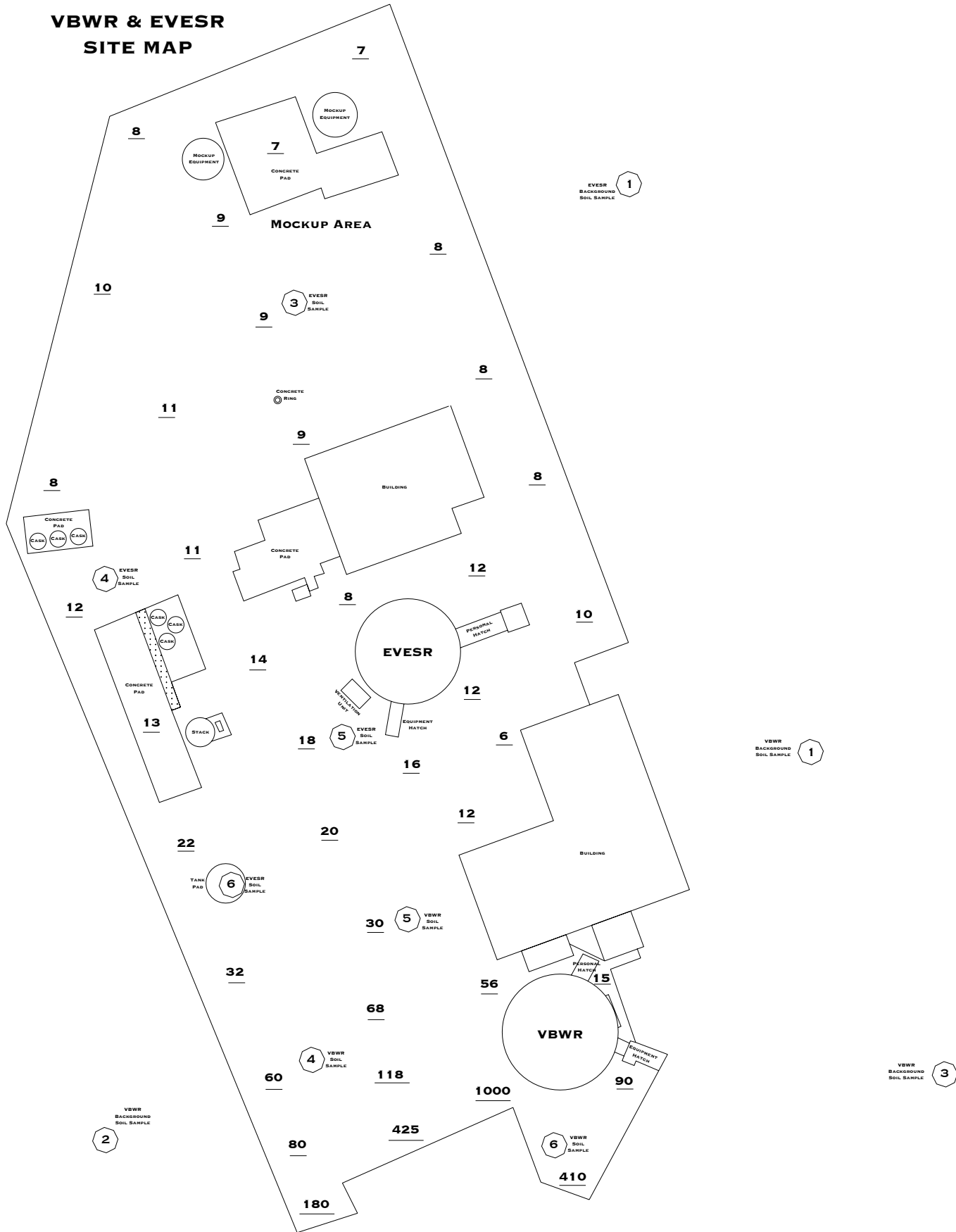
			Name and signature on original at GEH Vallecitos Nuclear Center	
Instrument:	<u>Tennelec XLB System A</u>	Analyzed By:	_____	
Serial No.:	<u>2972-2</u>	Signature:	_____	
Calibration Date:	<u>1 Mar 2019</u>	Reviewed:	_____	
Beta Efficiency:	<u>33.47%</u>	Beta MDA:	<u>16.9 dpm</u>	
Alpha Efficiency:	<u>36.28%</u>	Alpha MDA:	<u>10.5 dpm</u>	
Sample Date:	<u>6/18/19</u>	Count Date:	<u>6/18/19</u>	

Level	Location	Alpha (NCPM/100 cm ²)	Alpha (DPM/100 cm ²)	Beta (NCPM/100 cm ²)	Beta (DPM/100 cm ²)
549' Level 1	1	0	0	17.2	51.4
	2	0	0	17.2	51.4
	3	0	0	12.2	36.4
	4	0.9	2.5	16.2	48.4
	5	0.9	2.5	20.2	60.3
	6	0	0	8.2	24.5
	7	0	0	10.2	30.5
	8	0	0	12.2	36.4
	9	0	0	14.2	42.4
	10	0	0	18.2	18.2
	11	1.9	5.2	37.2	37.2
534' Level 2	1	0	0	120.2	359
	2	0	0	153.2	458
	3	0	0	482.2	1440
	4	0	0	207.2	619
	5	1.9	5.2	110.2	329
	6	0	0	95.2	284
	7	0	0	176.2	526
	8	0	0	36.2	108
	9	0.9	2.5	108.2	323
	10 (Fenced Area)	0.9	2.5	110.2	329
519' Level 3	1	0	0	71.2	213
	2	0	0	43.2	129
	3	0.9	2.5	76.2	228
	4	0.9	2.5	189.2	565

Attachment to Survey D-056: EVESR Containment Annual Survey Smear Results

Level	Location	Alpha (NCPM/100 cm²)	Alpha (DPM/100 cm²)	Beta (NCPM/100 cm²)	Beta (DPM/100 cm²)
	5	0	0	77.2	231
	6	0	0	48.2	144
503' Level 4	1	0	0	111.2	332
	2	0	0	883.2	2,640
	3	2.89	8.0	124.2	371
	4	0	0	78.2	234
	5	0	0	129.2	386
	6	0	0	193.2	577
	7	0	0	95.2	284
	8	0.89	2.5	281.2	840
500' In-Core Flux Level	1	0	0	144.2	431
	2	0	0	23.2	69.3
	3	0	0	298.2	891
	4	0	0	3650	10,900
487' Basement	1	0	0	106.2	317
	2	0	0	326.2	975
	3	1.89	5.2	130.2	389
	4	1.89	5.2	140.2	419
	5	0	0	47.2	141
	6	0	0	68.2	204
	7	0	0	118.2	353
	8	0	0	244.2	730
	9	0	0	210.2	628
	10	0.89	2.5	335.2	1000
	11	0.89	2.5	470.2	1400

VBWR & EVESR SITE MAP



Dose Rates in
microRem/hr

ATTACHMENT 2: Air Sample Data for Vallecitos Reactor Annual Inspection 2019

Reactor	Location	Sample Volume (ml)	Initial				1 Hour Decay				>24 Hour Decay			
			Alpha		Beta		Alpha		Beta		Alpha		Beta	
			ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml
VBWR	First Floor	2.83E+06	333.99	1.46E-10	792.30	3.77E-10	103.39	4.53E-11	233.50	1.11E-10	0.00	0.00E+00	7.00	3.33E-12
	Basement	2.83E+06	820.19	3.60E-10	1991.90	9.47E-10	260.29	1.14E-10	592.20	2.81E-10	0.49	2.15E-13	21.50	1.02E-11
	Fuel Pool	2.83E+06	679.59	2.98E-10	1813.90	8.62E-10	71.89	3.15E-11	159.20	7.57E-11	1.09	4.78E-13	10.30	4.90E-12
EVESR	First Floor	2.83E+06	3227.29	1.42E-09	7953.80	3.78E-09	718.89	3.15E-10	1551.40	7.37E-10	0.29	1.27E-13	5.20	2.47E-12
	Basement	2.83E+06	4923.19	2.16E-09	11385.50	5.41E-09	999.79	4.38E-10	2181.90	1.04E-09	2.49	1.09E-12	75.60	3.59E-11
	519' Level	2.83E+06	6876.69	3.02E-09	16930.10	8.05E-09	1534.89	6.73E-10	3353.20	1.59E-09	1.09	4.78E-13	59.90	2.85E-11
GETR	First Floor	2.83E+06	190.09	8.33E-11	548.50	2.61E-10	71.99	3.16E-11	170.30	8.09E-11	1.29	5.66E-13	8.00	3.80E-12
	Basement	2.83E+06	99.59	4.37E-11	245.00	1.16E-10	29.29	1.28E-11	76.60	3.64E-11	1.09	4.78E-13	15.00	7.13E-12
	Third Floor	2.83E+06	124.29	5.45E-11	458.30	2.18E-10	43.29	1.90E-11	238.00	1.13E-10	0.79	3.46E-13	43.30	2.06E-11

Tennelec System "A" Efficiency & Conversion Factors

Alpha Efficiency	36.28%
Beta Efficiency	33.47%
dpm/uCi	2.22E+06
Alpha cpm/uCi	8.05E+05
Beta cpm/uCi	7.43E+05

Sampling Information										Initial	1 Hr	Approx.	
Reactor	Location	Date Sampled	Time On	Time Off	Minutes sampled	Flow Rate (cfm)	Total Flow (ft ³)	ml/ft ³	Total Sample Volume (ml)	Count Time	Count Time	Minutes Decay	Half-Life (min.)
VBWR	First Floor	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:54	9:52	58	34.3
VBWR	Basement	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:42	9:42	60	36.2
VBWR	Fuel Pool	6/25/2019	9:43	10:03	20	5	100.0	28317	2.83E+06	10:16	12:10	114	35.2
EVESR	First Floor	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:39	11:55	76	35.1
EVESR	Basement	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:49	12:05	76	33.0
EVESR	519' Level	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:28	11:44	76	35.1
GETR	First Floor	6/17/2019	14:17	14:37	20	5	100.0	28317	2.83E+06	14:45	15:49	64	45.7
GETR	Basement	6/17/2019	9:50	10:10	20	5	100.0	28317	2.83E+06	10:58	12:00	62	35.1
GETR	Third Floor	6/25/2019	8:55	9:15	20	5	100.0	28317	2.83E+06	9:36	10:36	60	39.4



HITACHI

GE Hitachi Nuclear Energy

*Vallecitos Nuclear Center
Sunol, California*

**GENERAL ELECTRIC TEST REACTOR
(DEACTIVATED)**

**ANNUAL REPORT NO. 61
FOR THE YEAR 2020**

**LICENSE TR-1
DOCKET 50-70**

MARCH 2020

**General Electric Test Reactor
(Deactivated)**

ANNUAL REPORT NO. 61

GE Hitachi (GEH) has maintained the General Electric Test Reactor (GETR) in a deactivated status under the authority of Amendment No. 17 to License TR-1, Docket 50-70, issued October 22, 2007, as specified in TS 6.6.1 to Amendment No. 14, issued February 5, 1986. In this annual report, a summary of the status of the facility for the period of January 1, 2019, to December 31, 2019, is presented.

1.0 SUMMARY

The facility remains in essentially the same condition described in Annual Report No. 60. Entry into the reactor building was made for routine radiation surveys and a general examination of conditions throughout the building. The crane, elevator, and ventilation were serviced and tested in 2011 in anticipation of beginning remediation activities. Such activities have not begun.

Radiation and contamination levels remain at acceptable levels.

2.0 STATUS OF FACILITY

In accordance with written procedures, the Facility Manager controls access to the containment building and general systems. The facility continues to be in deactivated status. There were no changes authorized by the Facility Manager pursuant to 10CFR50.59(a) in 2019.

3.0 RADIATION AND CONTAMINATION

Complete radiation and contamination surveys of the facility indicate that levels remain low. Results of the surveys are presented in attachment 1. Air sampling results are presented in attachment 2. The radiation/contamination levels listed are representative but not necessarily maximum values.

Radiological surveys were performed in June 2019, in unknown areas that had not been surveyed previously using Change Authorization 19-05. Entries into these areas was

performed using SCBA and full-face respiratory protection. Radiological surveys are available for review at VNC. Some of the areas were found to have high radiation levels and high levels of contamination. Areas were posted as required by regulation based on survey results.

An assessment for radionuclide distribution was performed of the shutdown reactors. An external consultant performed the Updated Radiological Source Term for the Vallecitos Nuclear Center. The assessment has been submitted to the NRC for review and is available for further review at VNC if needed.

3.1 GETR Stack

Although maintenance was performed on the stack in 2011, and the stack was tested, there has been no remediation effort performed for the GETR reactor. The ventilation system is operational, but not currently in use.

GETR Stack was operational from June to November 2019, during entries made into unknown areas for surveying purposes. The data listed below is from the GETR stack.

GETR Stack		
Month	Beta (uCi)	Alpha (uCi)
May 2019	0.00	1.77E-02
June 2019	3.48E-03	3.67E-01
July 2019	1.39E-03	6.36E-02
August 2019	7.33E-03	5.59E-01
September 2019	6.57E-03	1.78E-01
October 2019	5.74E-03	1.14E-01
November 2019	6.91E-03	1.73E-01
Total (Annual)	3.14E-02	1.47E+00

3.2 Gamma Radiation

The yearly dose results for the year 2019 as determined from evaluation of site perimeter environmental monitoring dosimeters showed no departure from normal stable backgrounds.

3.3 Vegetation

No alpha, beta or gamma activity attributable to activities at the GETR facility was found on or in vegetation in the vicinity of the site.

3.4 Ground Water Monitoring Well Data

Analytical results of groundwater samples collected from the B-2 (GETR) well during the reporting periods. The GETR well was sampled quarterly in 2019. During the fourth quarter sampling period, a sample was not collected from the B-2 well due to a blockage caused by the sampling bag. Condition Report # 33068 was entered into the Condition Report System.

GETR Well B-2			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
January 2019	9.36	2.76	522
April 2019	3.93	3.24	149
August 2019	6.50	2.47	318
November 2019	No Sample Collected CR # 33068		

Groundwater well MW-8 was installed southwest of the GETR shutdown reactor. The well will provide additional groundwater monitoring of the hydrogeologic conditions downgradient of GETR. The installation of the well is part of the response letter to the NRC, "NRC Request for Additional Information Related to Vallecitos Nuclear Center (VNC) Request for Alternate Decommissioning Schedules", GEH Response Summary Dated May 31, 2019. Well was sampled quarterly in 2019 after installation.

Well W-8 (4S-1E2M01)			
Month	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
July 2019	6.86	1.51	371
October 2019	1.32	2.28	798
Annual Average	4.09	1.90	585

4.0 ACTIVITIES

Routine inspections were conducted during this report period. A small amount of water (<5 gallon) was identified in the elevator sump area of GETR. The water was removed (CR# 31626), and gamma spectroscopy was performed. Results were normal. There were no preventive or corrective maintenance activities performed having safety significance during the reporting period.

5.0 ORGANIZATION

The Site Manager remains M. J. Feyrer. The GETR Facility Manager remains K. P. Zanotto. The Manager, Regulatory Compliance and EHS remains J. Smyly.

6.0 CONCLUSION

GE Hitachi Nuclear Energy concludes that the deactivated GETR is being maintained in a safe shutdown condition. The inspections, access control, and administratively controlled activities ensure maximum protection for the public health and safety. The procedures will be continued to maintain this high level of protection.

GE Hitachi Nuclear Energy
Vallecitos Operations


M. J. Feyrer
Manager Vallecitos Nuclear Center

Attachment 1



HITACHI

VALLECITOS NUCLEAR CENTER
NUCLEAR SAFETY SURVEY RECORD

SURVEYOR (print and sign) Name and signature on original at GEH Vallecitos Nuclear Center	REVIEWER	NO. C-020
LOCATION 200 Area GETR Containment (1 of 2)		DATE: 06/17/19
		TIME: 1100

<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Special	REASON Annual Survey
---	----------------------------------	-------------------------

Item No.	ITEMS OR LOCATION	DOSE RATE				DIRECT READING				SMEAR READINGS				AREA	
		β mRad/h	γ mR/h	n mRem/h	TOTAL mRem/h	Distance	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM	α dPM	$\beta\gamma$ CPM	$\beta\gamma$ dPM	α CPM		α dPM
1	Personnel Air Lock		<1		<1	F									
2	Equipment Air Lock		<1		<1	F									
3	Personnel Air Lock SOP														
4	1st - Clean Area		<1		<1	F									
5	- Zone Area		<1		<1	F									
6	2nd - General Dose Rate		<1		<1	F									
7	- EEHS Cubicle Door		7		7	C									
8	- Field Reading Around EEHS Cubicle		<1-5		<1-5	F									
9	- Filter Bank		<1		<1	C									
10	- Filter Bank Down stairs		<1-5		<1-5	F									
11	3rd - Zone Area North		<1-1.5		<1-1.5	F									
12	- Zone Area South		<1-1		<1-1	F									
13	- Bridge		1.5		1.5	F									
14	- Missile Shield		<1		<1	F									
15	- Platform		<1		<1	F									
16	- Clean Area		<1		<1	F									

INSTRUMENT USED	Tennelec	PRM - 7	CP - 5	RO - 20	PNR - 4	TBM -	E - 120	RM - 14	RM - 15	PAC - 1SA	LUDLUM-12	
SERIAL NUMBER	2972-1			6128								

Area Posted: (circle applicable) RA HRA CA RMA AIRBORNE	PROBE	α AC - 3A (U)	10%	PROBE	β γ PANCAKE	20%
COMMENTS Smears completed on Tennelec see attachment Areas smeared are on maps with attachement	EFF.	α 43 - 4 (U)	10%	EFF.		
	(4 P GEO.)			(4 P GEO.)		



HITACHI

VALLECITOS NUCLEAR CENTER NUCLEAR SAFETY SURVEY RECORD

SURVEYOR (print and sign)		REVIEWER	NO.
Name and signature on original at GEH Vallecitos Nuclear Center			C-020
LOCATION		DATE:	06/17/19
200 Area GETR Containment (2 of 2)		TIME:	1100

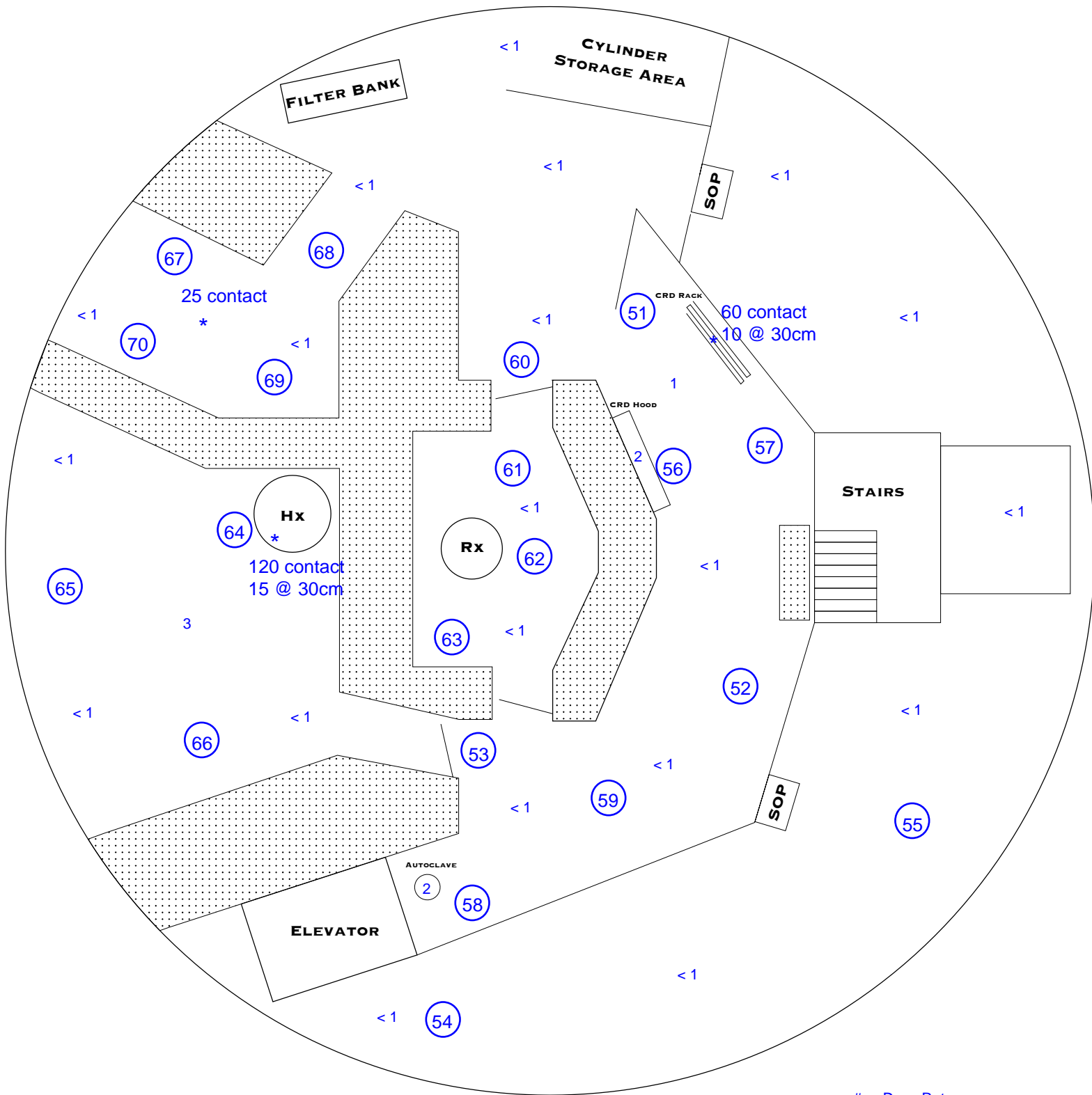
<input checked="" type="checkbox"/> Routine	REASON Annual Survey
<input type="checkbox"/> Special	

Item No.	ITEMS OR LOCATION	DOSE RATE				DIRECT READING				SMEAR READINGS				AREA	
		β mRad/h	γ mR/h	n mRem/h	TOTAL mRem/h	Distance	$\beta \gamma$ CPM	$\beta \gamma$ dPM	α CPM	α dPM	$\beta \gamma$ CPM	$\beta \gamma$ dPM	α CPM		α dPM
1	3rd Floor - Zone Area Floor Drain		6		6	C									
2	Elevator		<1		<1	F									
3	Basement - Clean Area		<1		<1	F									
4	- Filter Bank		<1		<1	F									
5	- Zone Area		<1-3		<1-3	F									
6	- Control Rod Storage		<1		<1	C									
7	- Control Rod Repair Hood		<1		<1	C									
8	- Autoclave		2		2	C									
9	Mezzanine between 2 nd & 3 rd Floors		<1		<1	F									
10	B-1 Basement G/A		<1-5		<1-5	F									
11	B-1 Basement Pipe		120		120	C									
12	B-1 Basement Pipe @1'		15		15	1'									
13	B-2/B-4 Basment G/A		<1		<1	F									
14	B-3 Basement G/A		<1		<1	F									
15	Heat Exchange		25		25	C									
16	Heat Exchange Room G/A		<1		<1										

INSTRUMENT USED	Tennelec	PRM - 7	CP - 5	RO - 20	PNR - 4	TBM -	E - 120	RM - 14	RM - 15	PAC - 1SA	LUDLUM-12	
SERIAL NUMBER	2972-1			6128								

Area Posted: (circle applicable) RA HRA CA RMA AIRBORNE	PROBE	α AC - 3A (U)	10%	X	PROBE	$\beta \gamma$ PANCAKE	20%	X
COMMENTS	EFF.	α 43 - 4 (U)	10%		EFF.			
Smears completed on Tennelec see attachment	(4 P				(4 P			
Areas smeared are on maps with attachement	GEO.)				GEO.)			

GETR Basement

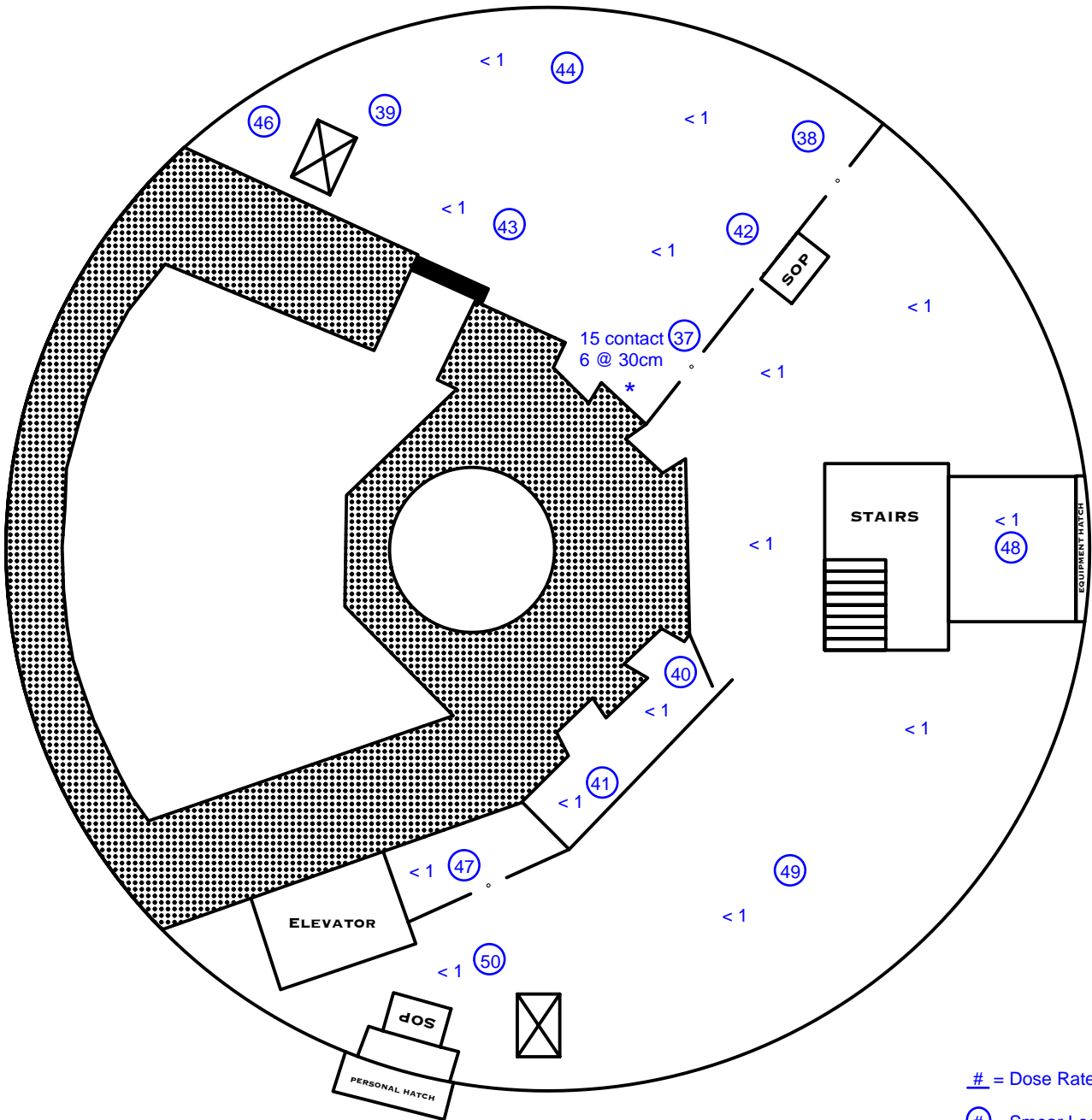


= Dose Rate

= Smear Location

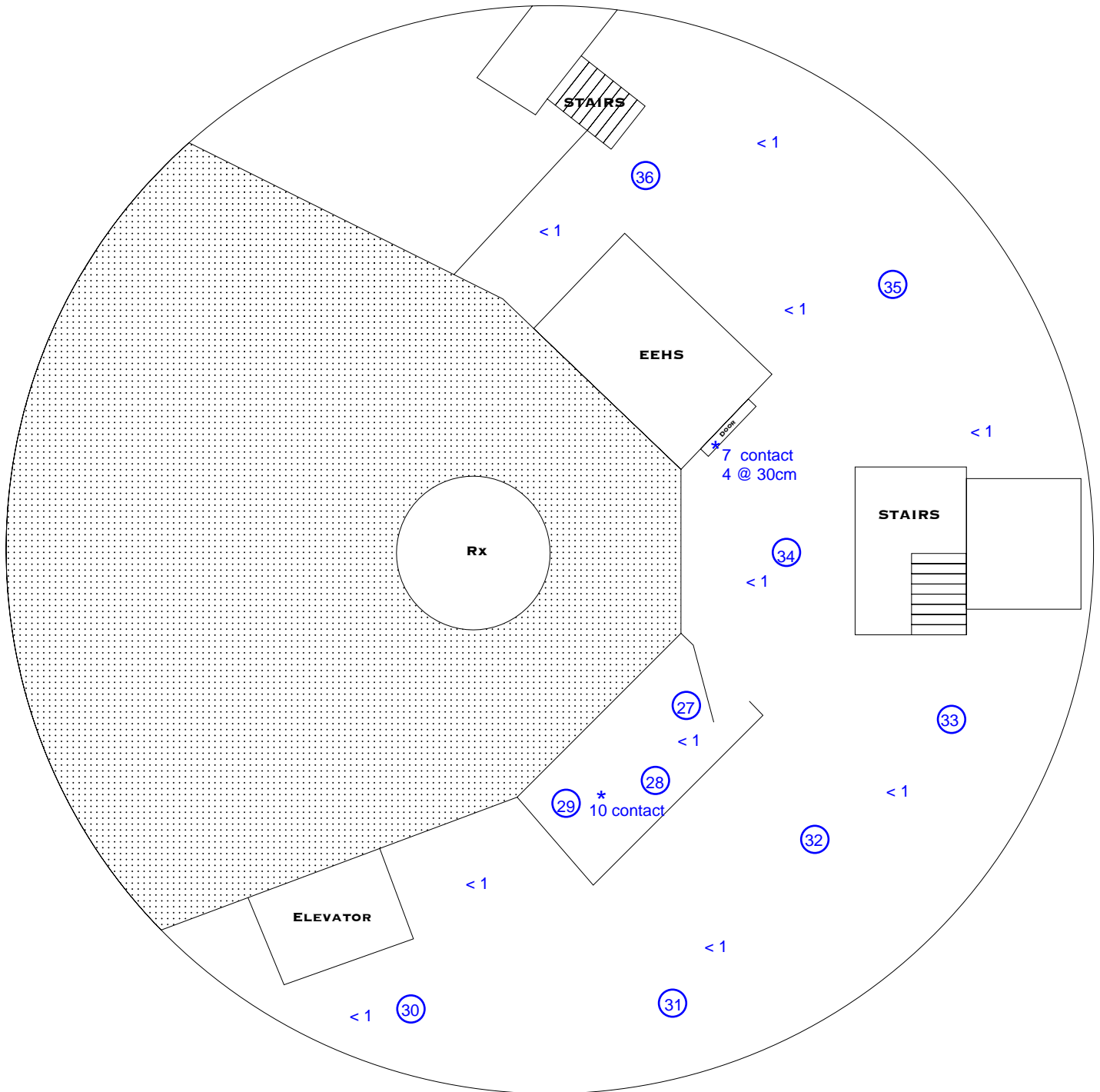
Dose Rates in mR/hr

GETR Level 1



= Dose Rate
 Ⓝ = Smear Location
 Dose Rates in mR/hr

GETR Level 2

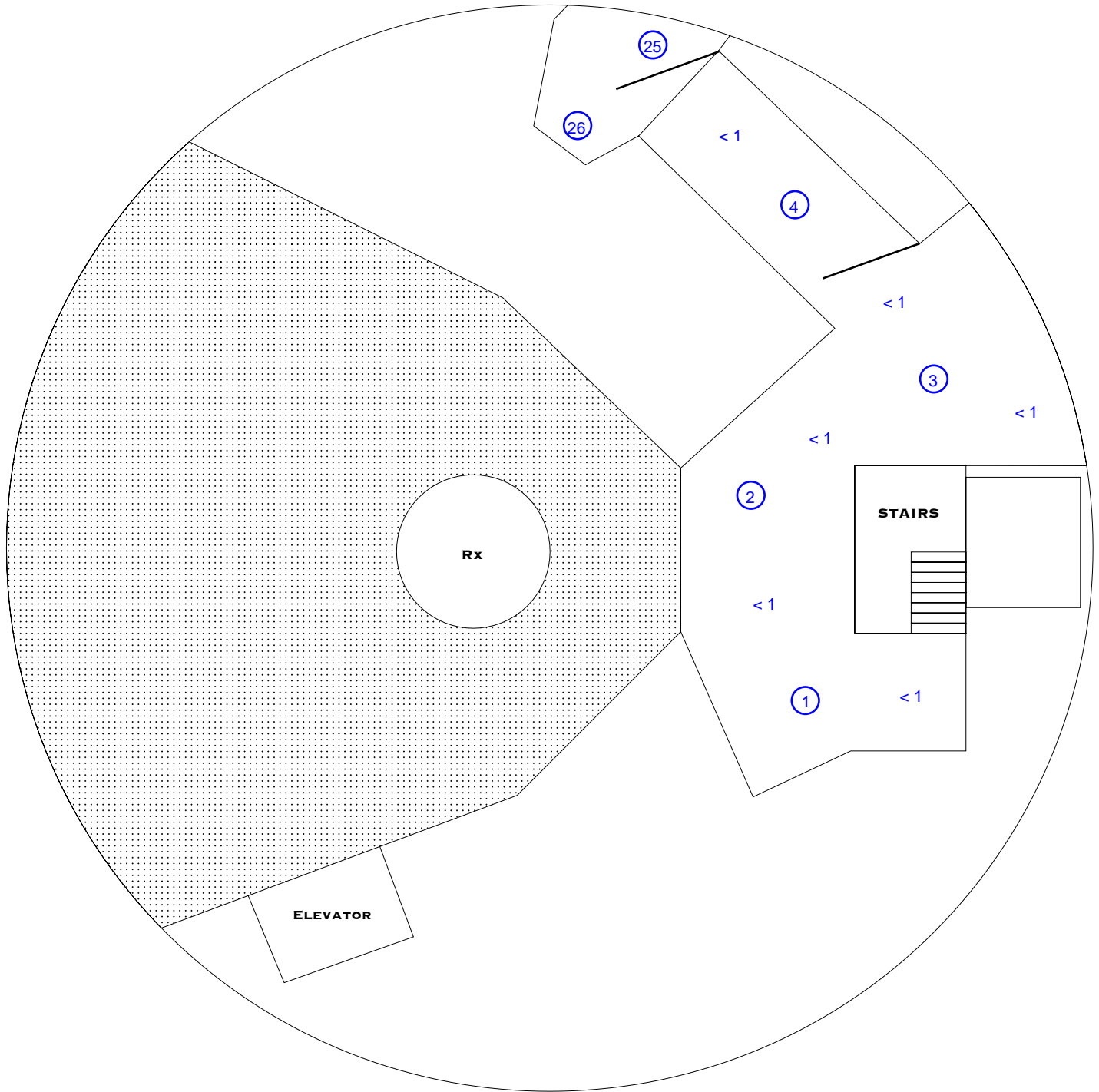


= Dose Rate

⊕ = Smear Location

Dose Rates in mR/hr

GETR Level 3 Mezzine

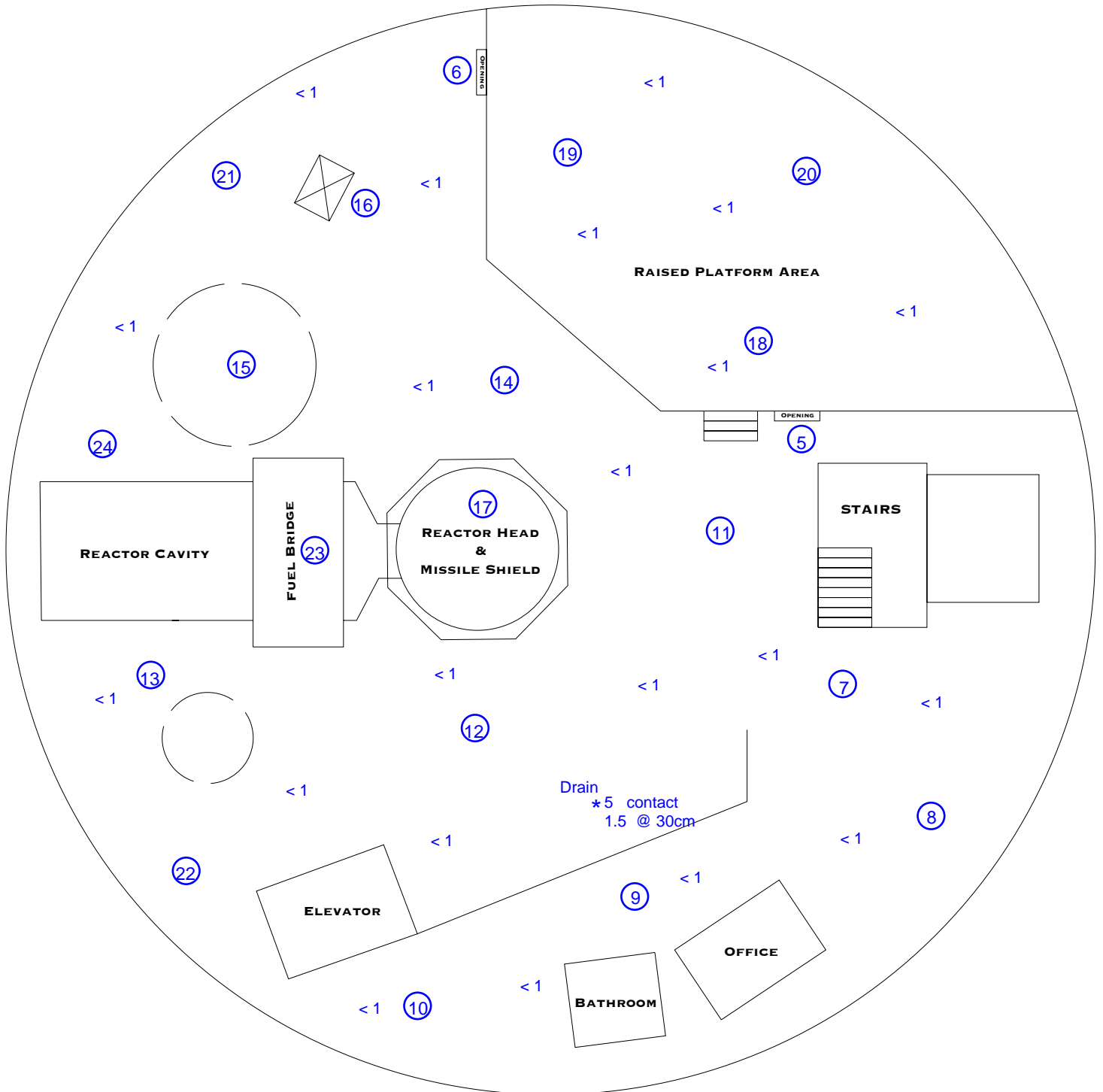


= Dose Rate

Ⓝ = Smear Location

Dose Rates in mR/hr

GETR Level 4



= Dose Rate

Ⓝ = Smear Location

Dose Rates in mR/hr

Attachment to Survey C-020: GETR Containment Annual Survey Smear Results

		Name and signature on original at GEH Vallecitos Nuclear Center	
Instrument:	<u>Tennelec XLB System A</u>	Analyzed By:	_____
Serial No.:	<u>2972-2</u>	Signature:	_____
Calibration Date:	<u>1 Mar 2019</u>	Reviewed:	_____
Beta Efficiency:	<u>33.47%</u>	Beta MDA:	<u>16.9 dpm</u>
Alpha Efficiency:	<u>36.28%</u>	Alpha MDA:	<u>10.5 dpm</u>
Sample Date:	<u>6/17/19</u>	Count Date:	<u>6/17/19</u>

Level	Location	Alpha (NCPM/100 cm ²)	Alpha (DPM/100 cm ²)	Beta (NCPM/100 cm ²)	Beta (DPM/100 cm ²)
Main Floor Level 1	1 (Zone Floor)	0.9	2.5	72	216
	2 (Zone Floor)	0.9	2.5	63	189
	3 (Zone Floor)	0.0	0.0	335	1,001
	4 (Zone Flats)	0.9	2.5	42	126
	5 (Zone Flats)	0.0	0.0	24	72
	6 (Zone Floor - Left of SOP)	0.0	0.0	598	1,787
	7 (Zone Floor - Right of SOP)	0.0	0.0	340	1,016
	8 (By Ladder)	0.0	0.0	1,075	3,212
	Flats behind GE Logo	0.0	0.0	17	51
	Floor Behind GE Logo	0.9	2.5	67	201
	CA Area Floor Near Entrance	0.0	0.0	15	45
	Equipment Air Lock	0.0	0.0	1	4
	Clean Floor Near Entrance	0.9	2.5	26	78
	Personnel Air Lock SOP	0.0	0.0	1	4
Basement	Zone Area CRD Rack	0.0	0.0	61	183
	Zone Area Table	0.9	2.5	35	105
	Heat Exchanger (HX) Room	0.0	0.0	25	75
	Elevator	0.9	2.5	32	96
	Clean Area	0.0	0.0	17	51
	Zone Area Rod Repair Hood	3.9	10.7	12,174	36,373
	Zone Area Floor	0.0	0.0	548	1,638
	Room B-3 Flats	0.0	0.0	151	452
	Room B-3 Floor	0.0	0.0	42	126
	Room B-3 Floor @ Door	0.9	2.5	925	2,764
	Under Vessel - Flats	1.9	5.2	75	225

Attachment to Survey C-020: GETR Containment Annual Survey Smear Results

Level	Location	Alpha (NCPM/100 cm²)	Alpha (DPM/100 cm²)	Beta (NCPM/100 cm²)	Beta (DPM/100 cm²)
	Under Vessel - Floor	0.9	2.5	157	470
	Under Vessel - Rust Floor	0.0	0.0	1,322	3,950
Basement	Basement: Under HX Room	0.9	2.5	59	177
	HX Room Lead Shield	0.9	2.5	21	63
	HX Room Flats/Pipes	0.9	2.5	54	162
	Pump Room (B-1)	0.0	0.0	117	350
	Pump Room (B-1) Floor	0.0	0.0	60	180
	Pump Room (B-1) Flats	0.0	0.0	64	192
	Pump Room (B-1) Floor	0.0	0.0	60	180
Level 2	Inside, Only Entrance Hot Spot	0.0	0.0	2,917	8,716
	Only Entrance Pump	0.0	0.0	261	780
	Only Entrance Drain	0.0	0.0	2,575	7,694
	Elevator	0.9	2.5	11	33
	1	0.0	0.0	3	10
	2	0.0	0.0	6	19
	3	0.0	0.0	31	93
	4 (@ Stairs)	0.9	2.5	41	123
	5	0.9	2.5	47	141
6 (@ Back Stairs Area)	0.9	2.5	34	102	
Level 2.5 Mezzanine	Room 1 Floor	0.9	2.5	138	413
	Room 1 Flats	1.9	5.2	157	470
	General Area 1	1.9	5.2	11	33
	General Area 2	1.9	5.2	18	54
	General Area 3	0.0	0.0	32	96
Level 3 Top Floor	Top of Bathroom	0.9	2.5	39	117
	Under Platform #1 Floor	0.9	2.5	39	117
	Under Platform #2 Floor	0.0	0.0	129	386
	Floor (1) @ Stairs	0.0	0.0	100	299
	Floor (2) Left of Stairs	0.0	0.0	26	78
	Floor (3) @ Bathroom	0.0	0.0	50	150
	Floor (4) @ Elevator	0.0	0.0	36	108
	Floor (5) @ Platform Stairs	0.9	2.5	135	404
	Floor (6) Left of Missile Shield	0.0	0.0	354	1,058
	Floor (7) Left side of Cavity	0.0	0.0	444	1,327
	Floor (8) Right of Missile Shield	0.0	0.0	211	631
	Floor (9) Right of Cavity	0.0	0.0	2,944	8,797
Floor (10) By Straight Ladder	0.0	0.0	1,083	3,236	

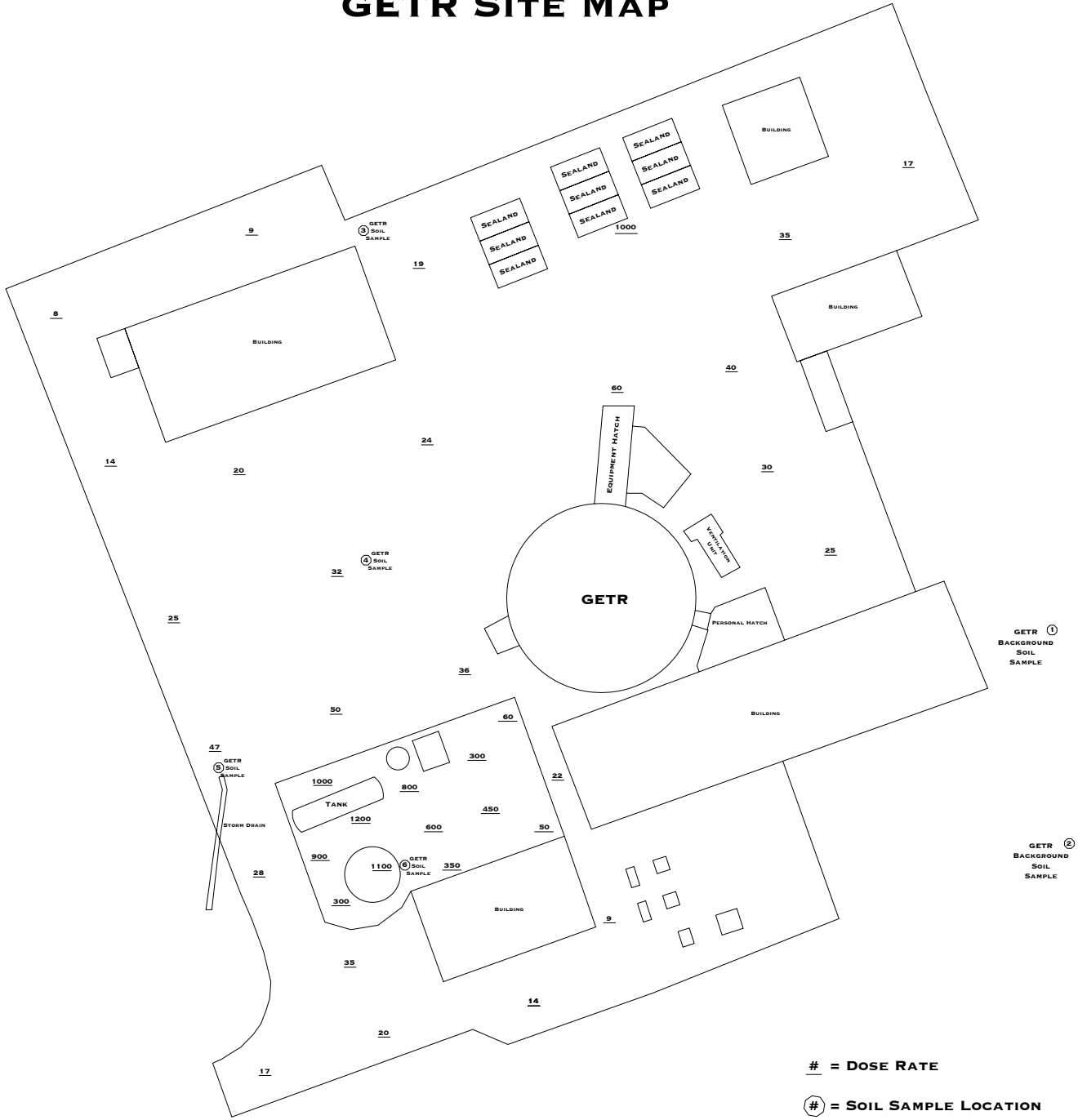
Attachment to Survey C-020: GETR Containment Annual Survey Smear Results

Level	Location	Alpha (NCPM/100 cm²)	Alpha (DPM/100 cm²)	Beta (NCPM/100 cm²)	Beta (DPM/100 cm²)
	Missile Shield (11)	0.0	0.0	147	440
	Upper Deck (12)	0.9	2.5	24	72
Level 3 Top Floor	Upper Deck (13)	2.9	8.0	48	144
	Upper Deck (14)	0.0	0.0	32	96
	Flats (15)	0.0	0.0	23	69
	Flats (16)	3.9	10.7	127	380
	Bridge (17)	0.9	2.5	234	700
	Flats - Spreader Bar (18)	0.9	2.5	131	392

Level	Location	Alpha (NCPM)	Alpha (DPM)	Beta (NCPM)	Beta (DPM)
Level 2	EEHS Floor - 1	76.9	211.9	334207	998527
	EEHS Floor - 2	21.9	60.3	31243	93346
	EEHS Floor - 3	3.9	10.7	73920	220855
	EEHS Flats - 1	5.9	16.2	36608	109376
	EEHS Flats - 2	0.9	2.5	24.2	72.3
	EEHS Flats - 3	7.9	21.7	9786	29238
	EEHS Flats - 4	0.9	2.5	2370	7081
	EEHS Flats - 5	9.9	27.3	29546	88276

Note: The smears in the Experiment Effluent Hold-up System (EEHS) room were taken with disk smears, but were not limited to 100 cm².

GETR SITE MAP



= DOSE RATE

Ⓝ = SOIL SAMPLE LOCATION

DOSE RATES IN MICROREM/HR

ATTACHMENT 2: Air Sample Data for Vallecitos Reactor Annual Inspection 2019

Reactor	Location	Sample Volume (ml)	Initial				1 Hour Decay				>24 Hour Decay			
			Alpha		Beta		Alpha		Beta		Alpha		Beta	
			ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml	ncpm	uCi/ml
VBWR	First Floor	2.83E+06	333.99	1.46E-10	792.30	3.77E-10	103.39	4.53E-11	233.50	1.11E-10	0.00	0.00E+00	7.00	3.33E-12
	Basement	2.83E+06	820.19	3.60E-10	1991.90	9.47E-10	260.29	1.14E-10	592.20	2.81E-10	0.49	2.15E-13	21.50	1.02E-11
	Fuel Pool	2.83E+06	679.59	2.98E-10	1813.90	8.62E-10	71.89	3.15E-11	159.20	7.57E-11	1.09	4.78E-13	10.30	4.90E-12
EVESR	First Floor	2.83E+06	3227.29	1.42E-09	7953.80	3.78E-09	718.89	3.15E-10	1551.40	7.37E-10	0.29	1.27E-13	5.20	2.47E-12
	Basement	2.83E+06	4923.19	2.16E-09	11385.50	5.41E-09	999.79	4.38E-10	2181.90	1.04E-09	2.49	1.09E-12	75.60	3.59E-11
	519' Level	2.83E+06	6876.69	3.02E-09	16930.10	8.05E-09	1534.89	6.73E-10	3353.20	1.59E-09	1.09	4.78E-13	59.90	2.85E-11
GETR	First Floor	2.83E+06	190.09	8.33E-11	548.50	2.61E-10	71.99	3.16E-11	170.30	8.09E-11	1.29	5.66E-13	8.00	3.80E-12
	Basement	2.83E+06	99.59	4.37E-11	245.00	1.16E-10	29.29	1.28E-11	76.60	3.64E-11	1.09	4.78E-13	15.00	7.13E-12
	Third Floor	2.83E+06	124.29	5.45E-11	458.30	2.18E-10	43.29	1.90E-11	238.00	1.13E-10	0.79	3.46E-13	43.30	2.06E-11

Tennelec System "A" Efficiency & Conversion Factors

Alpha Efficiency	36.28%
Beta Efficiency	33.47%
dpm/uCi	2.22E+06
Alpha cpm/uCi	8.05E+05
Beta cpm/uCi	7.43E+05

Sampling Information										Initial	1 Hr	Approx.	
Reactor	Location	Date Sampled	Time On	Time Off	Minutes sampled	Flow Rate (cfm)	Total Flow (ft ³)	ml/ft ³	Total Sample Volume (ml)	Count Time	Count Time	Minutes Decay	Half-Life (min.)
VBWR	First Floor	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:54	9:52	58	34.3
VBWR	Basement	6/18/2019	7:47	8:07	20	5	100.0	28317	2.83E+06	8:42	9:42	60	36.2
VBWR	Fuel Pool	6/25/2019	9:43	10:03	20	5	100.0	28317	2.83E+06	10:16	12:10	114	35.2
EVESR	First Floor	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:39	11:55	76	35.1
EVESR	Basement	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:49	12:05	76	33.0
EVESR	519' Level	6/18/2019	9:34	9:54	20	5	100.0	28317	2.83E+06	10:28	11:44	76	35.1
GETR	First Floor	6/17/2019	14:17	14:37	20	5	100.0	28317	2.83E+06	14:45	15:49	64	45.7
GETR	Basement	6/17/2019	9:50	10:10	20	5	100.0	28317	2.83E+06	10:58	12:00	62	35.1
GETR	Third Floor	6/25/2019	8:55	9:15	20	5	100.0	28317	2.83E+06	9:36	10:36	60	39.4