Rocky Flats Environmental Technology Site

PRE-DEMOLITION SURVEY REPORT (PDSR)

BUILDING B771 Exhaust Stack
Addendum
Surfaces greater than 24' Elevation

REVISION 0

June 18, 2004

CLASSIFICATION REVIEW NOT REQUIRED PER EXEMPTION NUMBER CEX-005-02

RECEIVED
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ADMIN RECORD

PRE-DEMOLITION SURVEY REPORT (PDSR)

BUILDING B771 Exhaust Stack
Addendum
Surfaces greater than 24' Elevation

REVISION 0

June 18, 2004

Prepared by: _____ Date: 6/16/04
Tommy Fontaine, Radiological Engineer

Reviewed by: _____ Date: 6/18/04
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Approved by: _____ Date: 6/18/04
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ABBREVIATIONS/ACRONYMS

ACM	Asbestos Containing Material
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
$DCGL_{EMC}$	Derived Concentration Guideline Level – elevated measurement comparison
$DCGL_W$	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
HSAR	Historical Site Assessment Report
HEUN	Highly Enriched Uranyl Nitrate
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
K-H	Kaiser-Hill
LBP	Lead-based paint
LLW	Low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated Biphenyls
PDS	Pre-demolition survey
PDSR	Pre-demolition survey report
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSA	Removable Surface Activity
RSOP	RFCA Standard Operating Protocol
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Total surface activity

VOCs	Volatile organic compounds
WSRIC	Waste Stream and Residue Identification and Characterization

EXECUTIVE SUMMARY

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the Building 771 Exhaust Stack (surfaces greater than 24' elevation). Because this Type 3 area will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Surfaces characterized as part of this PDS include the surfaces above 24' elevation of the Building 771 exhaust stack (24' elevation to 169' elevation). The remaining surfaces of the stack (i.e., surfaces below 24' elevation) have previously been demonstrated to meet unrestricted release limits (documented in Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004). This PDS does NOT include the exhaust tunnel leading to the 771 stack.

Based upon the results of this PDSR, the Building 771 Exhaust Stack meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan, and the concrete can be used for backfill on-site per the 771 Closure Project Decommissioning Operations Plan. To ensure that the facility remains free of contamination and PDS data remain valid, Level 2 isolation controls are established, however, the area will not be posted because personnel do not routinely access these areas.

1 INTRODUCTION

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the Building 771 Exhaust Stack (surfaces greater than 24' elevation). Because this Type 3 area will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Surfaces characterized as part of this PDS include the surfaces above 24' elevation of the Building 771 exhaust stack (24' elevation to 169' elevation). The remaining surfaces of the stack (i.e., surfaces below 24' elevation) have previously been demonstrated to meet unrestricted release limits (documented in Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004). This PDS does NOT include the exhaust tunnel leading to the 771 stack.

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed. Among these is the Building 771 Exhaust Stack. This facility no longer supports the RFETS mission and will be removed to reduce Site infrastructure, risks and/or operating costs.

1.1 Purpose

The purpose of this report is to communicate and document the results of the Building 771 Exhaust Stack PDS effort for surfaces greater than 24' in elevation. A PDS is performed prior to building demolition to define the pre-demolition radiological and chemical conditions of a facility. The pre-demolition conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

1.2 Scope

This report presents the pre-demolition radiological conditions of the upper portions of the Building 771 Exhaust Stack. The remaining surfaces of the stack (i.e., surfaces below 24' elevation) have previously been demonstrated to meet unrestricted release limits via remote survey (documented in Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004). This PDS does NOT include the exhaust tunnel leading to the 771 stack.

1.3 Data Quality Objectives

The Data Quality Objectives (DQOs) used in designing this PDS were the same DQOs identified in the Section 2.0 of the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to section 2.0 of MAN-127-PDSP for these DQOs.

2 HISTORICAL SITE ASSESSMENT

Refer to the Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004, for the Historical Site Assessment of the Building 771 Exhaust Stack.

3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

Characterization data for the upper portions of the Building 771 Exhaust Stack is limited due to accessibility of this area. Four (4) core samples were collected at 24' and 30' elevation to verify that no contamination was embedded in the concrete above 24' in elevation. The cores were sliced in ½" or 1/8" slices and submitted for isotopic analysis. All results were less than 100 dpm/100 cm^2 (refer to Attachment A).

Building 771 Exhaust Stack - (Survey Unit 771037)

The upper portions of the Building 771 Exhaust Stack (base to 24' elevation) was classified as a Class 1 survey unit based on contamination potential from the 1957 fire. Because personnel cannot access this area of the stack, a remote survey was performed. The survey was performed using the LARADS system, a radiological data logging system (Eberline E-600) interfacing a 100 cm^2 duel scintillation detector (Eberline 380 AB). The system was attached to a platform controlled by a rigged cable and winch, allowing the detector to be raised and lowered in the stack.

A total of 701 total surface activity (TSA) measurements were collected during the initial phase of survey (performed in July/August of 2001), with a minimum of four (4) measurements at each foot in elevation. The four measurements at each foot in elevation were spaced 90-degrees apart to allow for a thorough characterization of the surfaces.

Sixty-eight (68) TSA locations were investigated because they were initially flagged to exceed 100 dpm/100 cm^2 (due to statistical variations in background). The count time was increased to 3-minutes for these investigations. All of these results were less than 100 dpm/100 cm^2 following investigation.

A second remote survey was performed in October of 2002 to re-investigate thirty-five (35) of the originally flagged 68 results because the original investigation was determined to be more than 2" removed from the original survey point (i.e., detector did not overlap the original location by more than 50%). All results were less than 100 dpm/100 cm^2.

The remaining surfaces of the stack (i.e., surfaces below 24' elevation) have previously been demonstrated to meet unrestricted release limits via remote survey (documented in Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004).

Radiological survey data, statistical analysis results, survey locations, and radiological scan maps for survey unit 771037 are presented in Attachment B, Remote Survey Data Reports.

Additional Radiological Considerations

The accessible surfaces of the stack exterior has been surveyed at each phase of sampling/characterization and no contamination in excess of the unrestricted release limits have ever been detected. In addition, no contamination was detected on the roof or exterior of Buildings 771 or 774, collaborating the hypothesis that the structural surfaces

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in the Building 771 yard were not contaminated from a release from the stack during the 1957 fire. A survey of the stack exterior is included in Attachment A.

The exhaust tunnel adjacent to the Building 771 Exhaust Stack will not be free-released. The upper portions of the tunnel (i.e., surface within 6' of final grade) will be removed and disposed of as low-level radiological waste. The exhaust tunnel will not be disturbed during stack demolition.

4 CHEMICAL CHARACTERIZATION AND HAZARDS

Refer to the Building 771 Exhaust Stack Pre-Demolition Survey Report dated June 9, 2004, for the chemical characterization summary of the Building 771 Exhaust Stack.

5 PHYSICAL HAZARDS

Physical hazards associated with the Building 771 Exhaust Stack include those common to standard industrial environments, and include trips and falls and lighting concerns. The exhaust tunnel leading to the stack has been partially removed, and personnel should be aware of the potential for jagged metal surfaces in the immediate vicinity of removal. There are no other unique hazards associated with the area. The stack is in good physical condition, therefore, does not present hazards associated with structural deterioration.

Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

6 DATA QUALITY ASSESSMENT

Data quality requirements for the LARADS system are described in the Eberline Services Rocky Flats Environmental Test Site Building 771 LARADS Radiological Survey Reports (Attachment B).

7 DECOMMISSIONING WASTE TYPES

The demolition and disposal of Building 771 Exhaust Stack will generate concrete rubble that may be used as backfill onsite in accordance with the 771 Closure Project Decommissioning Operations Plan.

8 FACILITY CLASSIFICATION AND CONCLUSIONS

Based on the analysis of radiological, chemical and physical hazards, the Building 771 Exhaust Stack is classified as an RFCA Type 3 facility pursuant to the RFETS Decommissioning Program Plan (DPP; K-H, 1999). Based upon the results of this PDSR, the Building 771 Exhaust Stack meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan. The applicable limits are as follows:

Table 2

PDSP Table 7-1 Surface Contamination Limits

Radionuclides	**Total Average (dpm/100 cm^2) (1) ($DCGL_W$)**	**Total Maximum (dpm/100 cm^2) (2) ($DCGL_{EMC}$)**	**Removable (dpm/100 cm^2) ($DCGL_W$)**
Transuranics	100	300	20

(1) Measurements of average contamination should not be averaged over an area of more than 1 m^2.
(2) The maximum contamination level applies to an area of not more than 100 cm^2.

The concrete can be used for backfill on-site per 771 Closure Project Decommissioning Operations Plan. The PDS for the Building 771 Exhaust Stack was performed in accordance with the DDCP and PDSP, all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria.

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9 REFERENCES

B771 and B774 Hazards Characterization Report for the 771 Closure Project, dated June 12, 2001, Revision 0.

DOE/RFFO, CDPHE, EPA, 1996. *Rocky Flats Cleanup Agreement (RFCA)*, July 19, 1996.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*

DOE Order 414.1A, *Quality Assurance*

EPA, 1994. *The Data Quality Objective Process,* EPA QA/G-4.

K-H, 1999. *Decommissioning Program Plan*, June 21, 1999.

MAN-131-QAPM, *Kaiser-Hill Team Quality Assurance Program*, Rev. 1, November 1, 2001.

MAN-076-FDPM, *Facility Disposition Program Manual*, Rev. 3, January 1, 2002.

MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol*, Rev. 4, July 15, 2002.

MAN-127-PDSP, *Pre-Demolition Survey Plan for D&D Facilities*, Rev. 1, July 15, 2002.

MARSSIM - *Multi-Agency Radiation Survey and Site Investigation Manual* (NUREG-1575, EPA 402-R-97-016).

PRO-475-RSP-16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure,* Rev. 1, May 22, 2001.

PRO-476-RSP-16.02, *Pre-Demolition (Final Status) Radiological Surveys of Surfaces and Structures*, Rev. 2, March 10, 2003.

PRO-477-RSP-16.03, *Radiological Samples of Building Media*, Rev. 1, May 22, 2001.

PRO-478-RSP-16.04, *Radiological Survey/Sample Data Analysis for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-479-RSP-16.05, *Radiological Survey/Sample Quality Control for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-563-ACPR, *Asbestos Characterization Procedure,* Revision 0, August 24, 1999.

PRO-536-BCPR, *Beryllium Characterization Procedure*, Revision 0, August 24, 1999.

RFETS, Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition.

RFETS, Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal.

RFETS, RFCA RSOP for Recycling Concrete, September 28, 1999

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ATTACHMENT A

Survey Unit 771037
Core Sample Data Summary and Supporting Radiological Documentation

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Stack Core Effort #1
09/08/00

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID RIN 00N0065	NUCLIDE	pCi/g	Bkg (pCi/g)	Net (pCi/g)	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	Transuranic TOTAL ($dpm/100cm^2$)	Values Corrected for Results < MDC ($dpm/100\ cm^2$)
24' East - Interior 0.5"	1	017.001	Pu-238	0.127	0.000	0.127	0.358	141.65	7	88.4	249.3		
			Pu-239/240	0.106	0.066	0.040	0.143			27.9	99.6		
			Am-241	0.066	0.023	0.043	0.090			30.2	62.7	**146**	**0**
24' East - 0.5 to 1"	2	018.001	Pu-238	0.090	0.000	0.090	0.351	124.64	7	55.1	215.1		
			Pu-239/240	-0.034	0.066	-0.100	0.178			-61.3	109.1		
			Am-241	-0.011	0.023	-0.034	0.136			-20.6	83.3	**-27**	**0**
											MIN	**-27**	**0**
											MAX	**146**	**0**
											MEAN	**60**	**0**
											SD	**122**	**0**
											$DCGL_W$ =	**100**	**100**

Stack Core Effort #2
01/12/01

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID RIN 01N0066	NUCLIDE	pCi/g	Bkg (pCi/g)	Net (pCi/g)	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	Transuranic TOTAL ($dpm/100cm^2$)	Values Corrected for Results < MDC ($dpm/100\ cm^2$)	Sum of Activity in Core ($dpm/100cm^2$)
24' West, 1st Interior 1/8"	1	001.001	Pu-239/240	0.120	0.066	0.054	0.187	13.98	7	3.7	12.9			
			Am-241	0.033	0.023	0.010	0.088			0.7	6.0	4	0	
24' West, 2nd Interior 1/8"	2	001.002	Pu-239/240	0.000	0.066	-0.066	0.196	41.72	7	-13.5	40.2			
			Am-241	0.000	0.023	-0.023	0.079			-4.7	16.2	-18	0	
24' West, 3rd Interior 1/8"	3	003.001	Pu-238	0.215	0.000	0.215	0.083	26.89	7	28.4	11.0			
			Pu-239/240	0.018	0.066	-0.048	0.147			-6.3	19.4			
			Am-241	0.028	0.023	0.005	0.077			0.7	10.2	23	28	
24' West, 4th Interior 1/8"	4	004.001	Pu-238	0.131	0.000	0.131	0.071	17.40	7	11.2	6.1			
			Pu-239/240	0.026	0.066	-0.040	0.071			-3.4	6.1			
			Am-241	-0.013	0.023	-0.036	0.155			-3.1	13.3	5	11	40
30' West, 1st Interior 1/8"	5	008.001	Pu-239/240	0.000	0.066	-0.066	0.075	14.37	7	-4.7	5.3			
			Am-241	0.029	0.023	0.006	0.080			0.4	5.7	-4	0	
30' West, 2nd Interior 1/8"	6	009.001	Pu-238	0.174	0.000	0.174	0.079	25.04	7	21.4	9.7			
			Pu-239/240	0.000	0.066	-0.066	0.079			-8.1	9.7			
			Am-241	0.000	0.023	-0.023	0.081			-2.8	10.0	10	21	
30' West, 3rd Interior 1/8"	7	010.001	Pu-238	0.418	0.000	0.418	0.081	31.77	7	65.3	12.6			
			Pu-239/240	0.000	0.066	-0.066	0.081			-10.3	12.6			
			Am-241	0.031	0.023	0.008	0.084			1.3	13.1	56	65	
30' West, 4th Interior 1/8"	8	011.001	Pu-238	0.132	0.000	0.132	0.072	12.37	7	8.0	4.4			
			Pu-239/240	0.079	0.066	0.013	0.072			0.8	4.4			
			Am-241	-0.011	0.023	-0.034	0.127			-2.0	7.7	7	9	96
30' East, 1st Interior 1/8"	9	015.001	Pu-238	0.256	0.000	0.256	0.143	30.82	7	38.8	21.7			
			Pu-239/240	0.149	0.066	0.083	0.081			12.6	12.3			
			Am-241	0.000	0.023	-0.023	0.069			-3.4	10.5	48	51	
30' East, 2nd Interior 1/8"	10	016.001	Pu-238	0.107	0.000	0.107	0.072	41.85	7	22.0	14.8			
			Pu-239/240	0.000	0.066	-0.066	0.072			-13.6	14.8			
			Am-241	0.030	0.023	0.007	0.082			1.5	16.9	10	22	
30' East, 3rd Interior 1/8"	11	017.001	Pu-238	0.167	0.000	0.167	0.075	31.16	7	26	11.5			
			Pu-239/240	0.000	0.066	-0.066	0.075			-10	11.5			
			Am-241	0.000	0.023	-0.023	0.077			-3	11.8	12	26	
30' East, 4th Interior 1/8"	12	018.001	Pu-239/240	0.000	0.066	-0.066	0.074	28.23	7	-9	10.3			
			Am-241	0.059	0.023	0.036	0.080			5	11.1	-4	0	99

MIN	-18
MAX	56
MEAN	12
SD	21
$DCGL_W$ =	100

Note: Pu-238 Results reported if > MDC.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. NETech	Mfg. Eberline	Mfg. Eberline
Model Electra	Model SAC4	Model SAC4
Serial # 399	Serial # 1185	Serial # 1410
Cal Due 9-04	Cal Due 8-04	Cal Due 10-04
Bkg. 1.0	Bkg. 0.6	Bkg. 0.3
Efficiency 22.2%	Efficiency 33%	Efficiency 33%
MDA 94 dpm	MDA 200 dpm	MDA 200 dpm
Mfg. N/A	Mfg. N/A	Mfg. N/A
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency	Efficiency	Efficiency
MDA N/A	MDA N/A	MDA N/A

Survey Type: Contamination (alpha)

Building: 771
Location: 771 Stack
Purpose: characterization

RWP #: 04-771-5445

Date: 6-18-04 Time: 1030

[redacted]

PRN/REN # : N/A
Comments: N/A

Survey Tracking No.: 771-04-S 0751 **SURVEY RESULTS** A/S Tracking No.: 771-04-A N/A

I.D. #	LOCATION	alpha swipe dpm/ 100cm²	alpha direct dpm/ 100cm²	alpha wipe dpm/ wipe
1	See map	6	81	N/A
2		3	51	
3		0	51	
4		0	78	
5		0	69	
6		3	78	
7		0	72	
8		0	72	
9		6	66	
10		3	60	
11		0	72	
12		0	66	
13		3	66	
14		3	57	
15		0	57	
16		0	54	
17		0	42	
18		3	81	
19		0	90	
20		0	69	N/A

Date Reviewed: 6/18/04 **RS Supervision:** J. Fontaine [redacted]
Print Name Signature

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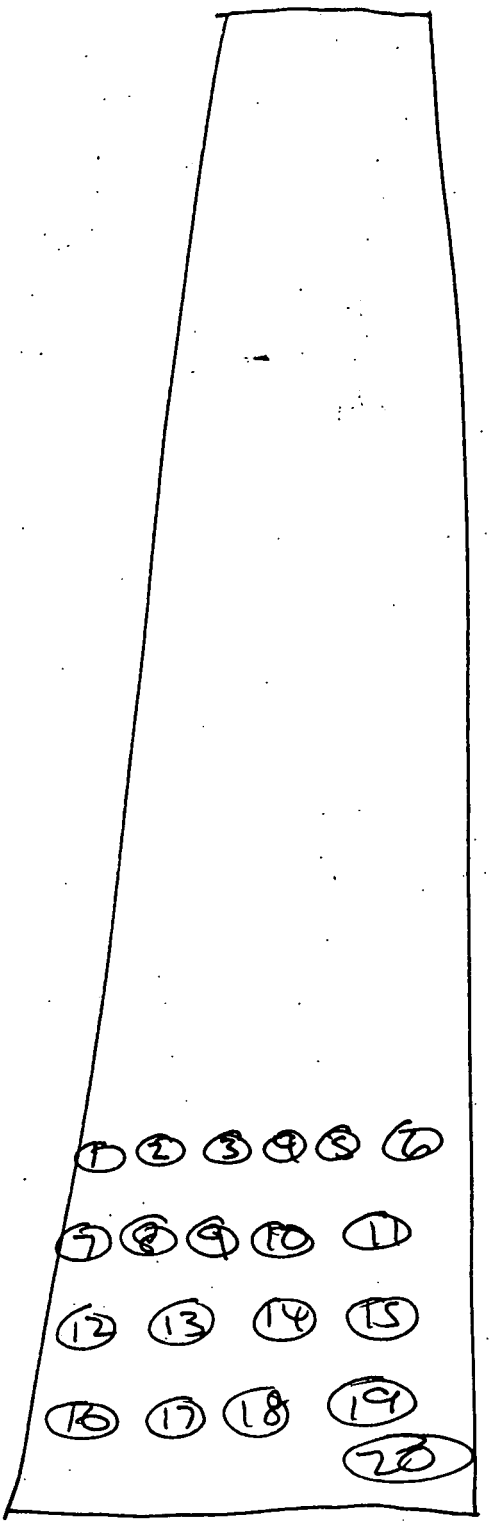
RADIOLOGICAL SAFETY

Drawing Showing Survey Points



South Side of Stack

ATTACHMENT B

Remote Survey Data Reports

17/17