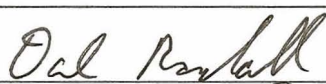
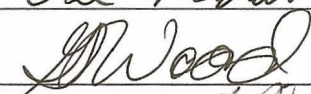



Survey Unit Release Record

Design #	EP-1.51D	Revision #	Original	Page 1 of 3
Survey Unit #(s)	1.51D			
Description	<p>1) Embedded Pipe (EP) Survey Unit 1.51D meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP 1.51D is a Class 1, Group 1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.</p> <p>3) Surveys in EP 1.51D were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP 3-9 from Survey Request (SR)-13 was referenced for this decision.</p> <p>4) Survey Instructions for this survey unit are incorporated into and performed in accordance with (IAW) the Babcock Services Incorporated (BSI)/LVS-002, Work Execution Package (WEP) 05-006. Survey instructions described in this document constitute "Special Methods" and the survey design used in the acquisition of survey measurements.</p> <p>5) Instrument efficiency determinations are developed in accordance with the BSI/LVS-002, WEP 05-006, these determinations are appropriate for the types of radiation involved and the media being surveyed.</p>			
Approval Signatures				Date:
FSS/Characterization Engineer				12-3-07
Technical Reviewer (FSS/Characterization Engineer)				12-5-07
FSS/Characterization Manager	 <small>R. Case</small>			12/17/07

Survey Unit: 1.51D

1.0 History/Description

- 1.1 The subject pipe system is a 2" drain located on the drain pit of the drain system for the annulus on the -25' elevation of the Reactor Building.
- 1.2 EP 1.51D is approximately 7 feet in length.

2.0 Survey Design Information

- 2.1 EP 1.51D was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 2" ID pipe was accessible for survey. The accessible 2" ID pipe was surveyed by static measurement at one foot increments, for a total of 7 survey measurements.
- 2.3 Surface area for the 2" ID piping is 486 cm² for each foot of piping, corresponding to a total 2" ID piping surface area of 3,405 cm² (0.3 m²) for the entire accessible length of (7') of 2" piping.

3.0 Survey Unit Measurement Locations/Data

- 3.1 Pipe interior radiological survey forms are provided in Attachment 2 of this release record.

4.0 Survey Unit Investigations/Results

- 4.1 None

5.0 Data Assessment Results

- 5.1 Data assessment results are provided in the EP/Buried Pipe (BP) Survey Report provided in Attachment 1.
- 5.2 All measurement results are less than the Derived Concentration Guideline Level (DCGL) for radionuclide specific EP that corresponds to the 1 mrem/yr dose goal established in Table 3-3 of the FSSP.
- 5.3 When implementing the Unity Rule, provided in Section 3.6.3 of the FSSP, and applying the Nuclide Fraction (NF), provided in TBD-06-004, the survey unit that is constituted by EP 1.51D passes FSS.
- 5.4 Background was not subtracted from the survey measurements and the Elevated Measurement Comparison (EMC) was not employed for the accessible portion of this survey unit.

Survey Unit: 1.51D

Statistical Summary Table

Statistical Parameter	2" Pipe
Total Number of Survey Measurements	7
Number of Measurements >MDC	0
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0179
Median	0.0175
Standard Deviation	0.0064
Maximum	0.0292
Minimum	0.0117

6.0 Documentation of evaluations pertaining to compliance with the unrestricted use limit of 25 mrem/yr and dose contributions from Embedded Pipe and radionuclides contributing 10% in aggregate of the total dose for both structural scenarios and soils.

6.1 A review of the survey results has shown that the dose contribution for the accessible portion of EP 1.51D to be less than 1 mrem/yr. The dose contribution is estimated to be 0.018 mrem/yr based on the average of the actual gross counts.

7.0 Attachments

Attachment 1 – BSI EP/BP Survey Report

Attachment 2 -Pipe Interior Radiological Survey Form

Attachment 3 – DQA Worksheet

Attachment 4 –Disc containing RR for EP 1.51D & Spreadsheet

SECTION 7
ATTACHMENT 1
2 **PAGE(S)**



BSI EP/BP SURVEY REPORT

Pipe ID	EP 1.51D	Survey Location	Drain Pit - Annulus Floor Drain -25'
Survey Date	09-Feb-06	2350-1 #	203488
Survey Time	13:08	Detector-Sled #	204402 / No Sled
Pipe Size (in.)	2	Detector Efficiency	0.00021
DCGL (dpm/100cm2)	2.41E+05	Pipe Area Incorporated by Detector Efficiency (in cm2)	486
Pipe Area Incorporated by Survey Data (m ²)	0.3	Field BKG (cpm)	5.1
Routine Survey	X	Field MDCR (cpm)	10.7
QA Survey		Nominal MDC (dpm/100cm2)	9,701
Survey Measurement Results			
Total Number of Survey Measurements			7
Number of Measurements >MDC			0
Number of Measurements Above 50% DCGL			0
Number of Measurements Above DCGL			0
Mean			0.0179
Median			0.0175
Standard Deviation			0.0064
Maximum			0.0292
Minimum			0.0117
Survey Technician(s)		ROSENHAGEN	
Survey Unit Classification			1
TBD 06-004 Piping Group			1
SR-13 Radionuclide Distribution Sample			EP 3-9
Measured Nuclide			Co-60
Area Factor/EMC Used			No
Pass/Fail FSS			Pass
MREM/YR Contribution			<1
COMMENTS: ACTIVITY VALUES NOT BACKGROUND CORRECTED			
RP Engineer Date		<i>Oel R. Smith</i> 12-3-07	

EP 1.51D
2" Pipe
TBD 06-004 Group 1

Measurement #	gcpm	ncpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Cs-137 activity (dpm/100cm2)	Eu-152 activity (dpm/100cm2)	Eu-154 activity (dpm/100cm2)	Nb-94 activity (dpm/100cm2)	Ag-108m activity (dpm/100cm2)	Unity
1	2	2	9,524	1,958	78	1,857	494	57	14	0.012
2	3	3	14,286	2,937	116	2,786	741	86	20	0.018
3	4	4	19,048	3,916	155	3,714	987	114	27	0.023
4	5	5	23,810	4,895	194	4,643	1,234	143	34	0.029
5	3	3	14,286	2,937	116	2,786	741	86	20	0.018
6	2.5	2.5	11,905	2,447	97	2,322	617	71	17	0.015
7	2	2	9,524	1,958	78	1,857	494	57	14	0.012
									MEAN	0.018
									MEDIAN	0.018
									STD DEV	0.006
									MAX	0.029
									MIN	0.012

SECTION 7
ATTACHMENT 2
2 **PAGE(S)**

Pipe Interior Radiological Survey Form

Date: 2-6-06 Time: 1308
 Building: RX Elevation: -25 Access Point Area: ANNUALS
 System: _____ Pipe Diameter: 2" Pipe ID # 1-51 D ^{DRAIN P.T.}
 Type of Survey Investigation Characterization Final Survey Other ✓
 Sled Size NOSLED inch
 Detector: 44-62 Detector ID #: 204408
 Cal Date: 11-17-05 Cal Due Date: 11-17-06
 Instrument: 2350-1 Instrument ID #: 217223
 Cal Date: 11-17-05 Cal Due Date: 11-17-06

From the Daily Pipe Survey Detector Control Form for the Selected Detector

Background Value 5.1 cpm
 MDCR_{static} 10.7 cpm
 Efficiency Factor for Pipe Diameter 0.00021 (taken from detector calibration certificate)
 MDC_{static} 9701 dpm/100cm²
 Is the MDC_{static} acceptable? (Yes) No (if no, adjust sample count time and recalculate MDCR_{static})
 Comments: INITIAL SURVEY

MSP/MULTIPLE SIZE
PIPE

Pipe Interior Radiological Survey

Radiological Survey Commenced: Date: 2-6-06 Time: 1308

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
1	1	2	4	n/a	n/a	n/a
2	2	2	6			
3	3	2	8			
4	4	2	10			
5	5	2	6			
6	6	2	5			
7	7	2	4			
8	<u>2</u>					
9						
10						



Package Page 1 of 2

Attachment 3, Page 1

REFERENCE COPY

4" FLOOR DRAIN
FOR EL. -15'-0"

RBCO-2

2" FROM SCUPPER DRAIN IN
INSTRUMENTATION DUCT
SEE DWG PF-00259

-25'-0" FL. EL.

SECTION 1
SCALE 1/2"=1'-0"

GENERAL NOTES

- 1- FOR SCHEDULE OF DWGS SEE DWG PF-00100.
- 2- ALL 4" FLOOR DRAINS SHALL BE JOSAM #204-37R WITH CHROME GRATE.
- 3- ALL DRAIN PIPING BELOW CONCRETE FLOOR SHALL BE WROUGHT IRON SCH. 80
- 4- ALL PIPING PIERCING 3/4" CONTAINMENT VESSEL SKIN SHALL BE SEAL WELDED FOR PRESSURE TIGHT CONNECTION.

"PER. FT"

SEE CONTAINMENT VESSEL
USER DIAG. (THIS SHEET)

FLOOR EL. -25'-0"

Point C

RGE FROM LOCKHEED
UMP (EL. -25'-0")

PITCH 4" HOT DRAIN TC - 1" PER 10'-0"

-26'-10 1/4" EL

4" FLOOR DRAIN
-25'-6 3/8" EL.

PITCH 4" HOT-COLD DRAIN 1/8" FT.

PF-00375

1'-0" I.D.

QUADRA "D"
FLOOR EL. -25'-0"

Sump
A

JOSAM #5586 WITH
CHROME GRATE

SEE 316 FOR TYPICAL PURGE

Sump
B

FOR CONTINUATION
SEE DWG PF-00406

2" DRAIN RISER - FOR CONTINUATION
SEE DWG PF-00259

3" Q&C KECHIC-PURGE QUAD "D"

10" Q&C PUMP OUT DRAIN QUAD "D"

JOSAM TYPE 0412
ANGLE DRAIN

2 1/2" UP TO EL. 7'-6"
1 1/2" DRIP RISER TO AIR
CONDITIONER #12 EL. 8'-0"
SEE DWG # PF-00377
FOR CONTINUATION

4" FLOOR DRAIN
FOR EL. -15'-0"

= pipe surveyed
2 ft 1.51 D 2-6-06

SECTION 7
ATTACHMENT 3
1 PAGE(S)

DQA Check Sheet

Design #	EP 1.51D	Revision #	Original	
Survey Unit #	EP 1.51D			

Preliminary Data Review

Answers to the following questions should be fully documented in the Survey Unit Release Record	Yes	No	N/A
1. Have surveys been performed in accordance with survey instructions in the Survey Design?	X		
2. Is the instrumentation MDC for structure static measurements below the DCGL _W for Class 1 and 2 survey units, or below 0.5 DCGL _W for Class 3 survey units?			X
3. Is the instrumentation MDC for embedded/buried piping static measurements below the DCGL _W ?	X		
4. Was the instrumentation MDC for structure scan measurements, soil scan measurements, and embedded/buried piping scan measurements below the DCGL _W , or, if not, was the need for additional static measurements or soil samples addressed in the survey design?			X
5. Was the instrumentation MDC for volumetric measurements and smear analysis < 10% DCGL _W ?			X
6. Were the MDCs and assumptions used to develop them appropriate for the instruments and techniques used to perform the survey?	X		
7. Were the survey methods used to collect data proper for the types of radiation involved and for the media being surveyed?	X		
8. Were "Special Methods" for data collection properly applied for the survey unit under review?	X		
9. Is the data set comprised of qualified measurement results collected in accordance with the survey design, which accurately reflects the radiological status of the facility?	x		

Graphical Data Review

1. Has a posting plot been created?			X
2. Has a histogram (or other frequency plot) been created?			X
3. Have other graphical data tools been created to assist in analyzing the data?			X

Data Analysis

1. Are all sample measurements below the DCGL _W (Class 1 & 2), or 0.5 DCGL _W (Class 3)?	X		
2. Is the mean of the sample data < DCGL _W ?	X		
3. If elevated areas have been identified by scans and/or sampling, is the average activity in each elevated area < DCGL _{EMC} (Class 1), < DCGL _W (Class 2), or < 0.5 DCGL _W (Class 3)?			X
4. Is the result of the Elevated Measurements Test < 1.0?			X
5. Is the result of the statistical test (S^+ for Sign Test or W_r for WRS Test) \geq the critical value?			X

Comments:

FSS/Characterization Engineer (print/sign)	Dale Randall / Dale Randall	Date	12-3-07
FSS/ Characterization Manager (print/sign)	R. Case	Date	12/17/07

SECTION 7
ATTACHMENT 4
1 DISC