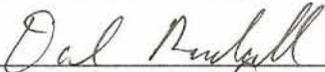
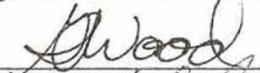


Survey Unit Release Record

Design #	EP-CPT-16	Revision #	Original	Page 1 of 3
Survey Unit #(s)	CPT-16			
Description	<p>1) Embedded Pipe (EP) Survey Unit CPT-16 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP CPT-16 is a Class 1, Group 4.1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.</p> <p>3) Surveys in EP CPT-16 were performed using a scintillation detector optimized to measure gamma energies representative of Cs-137. Sample #EP 4-4 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			10-30-07	
Technical Reviewer (FSS/Characterization Engineer)			11-5-07	
FSS/Characterization Manager	 <small>F. Case</small>		11/6/07	

Form CS-09/1 Rev 0

Survey Unit: CPT-16

1.0 History/Description

- 1.1 The subject pipe system is a 4" floor drain line located on the -27' el. valve pit of the Rx building.
- 1.2 EP CPT-16 consists of 4" diameter piping that is approximately 21 feet in length.

2.0 Survey Design Information

- 2.1 EP CPT-16 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 4" ID pipe was accessible for survey. The accessible 4" ID pipe was surveyed by static measurement at one foot increments, for a total of 21 survey measurements.
- 2.3 Surface area for the 4" ID piping is 973 cm² for each foot of piping, corresponding to a total 4" ID piping surface area of 20,430 cm² (2.0 m²) for the entire length of (approximately 21') of 4" 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 CPT-16 passes FSS.
- 5.4 Background was not subtracted from the survey measurements and the Elevated Measurement Comparison (EMC) was not employed for this survey unit.

Survey Unit: CPT-16

5.5 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	21
Number of Measurements >MDC	19
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0189
Median	0.0191
Standard Deviation	0.0047
Maximum	0.0270
Minimum	0.0103

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 EP CPT-16 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.019 mrem/yr based on the average of the actual gross counts measured.

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 CPT-16 & Spreadsheet

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ATTACHMENT 1
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BSI EP/BP SURVEY REPORT

Pipe ID	EP CPT-16	Survey Location	CPT drains -15 el.
Survey Date	05-Mar-07	2350-1 #	203488
Survey Time	13:09	Detector-Sled #	238369/101
Pipe Size	4"	Detector Efficiency	0.00071
DCGL (dpm/100cm2)	3.79E+06	Pipe Area Incorporated by Detector Efficiency (in cm2)	973
Pipe Area Incorporated by Survey Data (m ²)	2.0	Field BKG (cpm)	6.2
Routine Survey	X	Field MDCR (cpm)	11.6
QA Survey		Nominal MDC (dpm/100cm2)	2,165
Survey Measurement Results			
Total Number of Survey Measurements		21	
Number of Measurements >MDC		19	
Number of Measurements Above 50% DCGL		0	
Number of Measurements Above DCGL		0	
Mean		0.0189	
Median		0.0191	
Standard Deviation		0.0047	
Maximum		0.0270	
Minimum		0.0103	
Survey Technician(s)	STOCK		
Survey Unit Classification		1	
TBD 06-004 Piping Group		4.1	
SR-13 Radionuclide Distribution Sample		EP 4-4	
Measured Nuclide		Cs-137	
Area Factor/EMC Used		No	
Pass/Fail FSS		Pass	
MREM/YR Contribution		<1	
COMMENTS: ACTIVITY VALUES NOT BACKGROUND CORRECTED			
RP Engineer Date		<i>Oil Rowell / 10-30-07</i>	

EP CPT-16
4" Pipe
TBD 06-004 Group 4.1

Measurement #	gcpm	ncpm	Cs-137 activity (total dpm)	Cs-137 activity (dpm/100cm2)	Co-60 activity (dpm/100cm2)	Eu-152 activity (dpm/100cm2)	Eu-164 activity (dpm/100cm2)	Nb-94 activity (dpm/100cm2)	Ag-108m activity (dpm/100cm2)	Unity
1	14	14	19,718	2,027	2,548	-	-	-	-	0.011
2	19	19	26,761	2,751	3,459	-	-	-	-	0.015
3	27	27	38,028	3,909	4,915	-	-	-	-	0.021
4	29	29	40,845	4,198	5,279	-	-	-	-	0.023
5	24	24	33,803	3,475	4,369	-	-	-	-	0.019
6	20	20	28,169	2,895	3,641	-	-	-	-	0.016
7	34	34	47,887	4,922	6,189	-	-	-	-	0.027
8	18	18	25,352	2,606	3,276	-	-	-	-	0.014
9	26	26	36,620	3,764	4,733	-	-	-	-	0.021
10	26	26	36,620	3,764	4,733	-	-	-	-	0.021
11	21	21	29,577	3,040	3,823	-	-	-	-	0.017
12	20	20	28,169	2,895	3,641	-	-	-	-	0.016
13	24	24	33,803	3,475	4,369	-	-	-	-	0.019
14	33	33	46,479	4,777	6,007	-	-	-	-	0.026
15	26	26	36,620	3,764	4,733	-	-	-	-	0.021
16	21	21	29,577	3,040	3,823	-	-	-	-	0.017
17	29	29	40,845	4,198	5,279	-	-	-	-	0.023
18	13	13	18,310	1,882	2,366	-	-	-	-	0.010
19	27	27	38,028	3,909	4,915	-	-	-	-	0.021
20	31	31	43,662	4,488	5,643	-	-	-	-	0.025
21	17	17	23,944	2,461	3,094	-	-	-	-	0.014
									MEAN	0.019
									MEDIAN	0.019
									STD DEV	0.005
									MAX	0.027
									MIN	0.010

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ATTACHMENT 2
3 **PAGE(S)**

Pipe Interior Radiological Survey Form

Date: 3/5/07 Time: 1309
 Pipe ID#: CPT-104 (CPT-16) Pipe Diameter: 4" Access Point Area: CPT
 Building: R/CPT Elevation: -15' System: DRAINS

Type of Survey Investigation Characterization Final Survey Other
 Gross Co60 Cs
 Detector ID# / Sled ID# 44-159 #238369 / 101
 Detector Cal Date: 9/5/06 Detector Cal Due Date: 9/5/07
 Instrument: 2350-1 Instrument ID #: 203488
 Instrument Cal Date: 7/5/06 Instrument Cal Due Date: 7/5/07

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

Background Value 6.2 cpm
 MDCR_{static} 11.6 cpm
 Efficiency Factor for Pipe Diameter 0.00071 (from detector efficiency determination)
 MDC_{static} 2165 dpm/ 100 cm²
 Is the MDC_{static} acceptable? Yes No (if no, adjust sample count time and recalculate MDCR_{static})
 Comments: INITIAL EPA-4 COMPLETE

CA-05 ✓ gw
 Technician Signature [Signature]

Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
1	1	<u>4</u>	14	14	<u>N/A</u>	<u>N/A</u>
2	2	↓	19	19	↓	↓
3	3		27	27		
4	4		29	29		
5	5		29	24		
6	6		20	20		
7	7		34	34		
8	8		18	18		
9	9		26	26		
10	10		26	26		

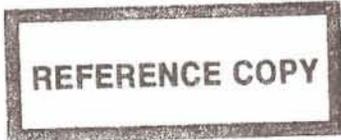


Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3/5/07
 Pipe ID#: CPT 104 / CPT 16 Pipe Diameter: 4" Access Point Area: CPT
 Building: Rx / CPT Elevation: -15' System: DRAINS

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
11	11	1	21	21	n/a	n/a
12	12	↓	20	20	↓	↓
13	13		24	24		
14	14		33	33		
15	15		26	26		
16	16		21	21		
17	17		29	29		
18	18		13	13		
19	19		27	27		
20	20		31	31		
21	21		1	17		

N
A



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ATTACHMENT 3
1 PAGE(S)

DQA Check Sheet

Design #	EP CPT-16	Revision #	Original			
Survey Unit #	EP CPT-16					
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) ≥ the critical value?					X
Comments:						
FSS/Characterization Engineer (print/sign)				Date		10-30-07
FSS/ Characterization Manager (print/sign)				Date		11/6/07

Form
CS-09/2
Rev 0

**SECTION 7
ATTACHMENT 4
1 DISC**