	Survey	Unit Release R	lecord						
Design #	EP-Rx 126D	Revision #	Original	Page 1 of 3					
Survey Unit #(s)	12	Rx 126D							
Survey Unit #(s) IX 120D   1) Embedded Pipe (EP) Survey Unit Rx 126D meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).   2) EP Rx 126D is a Class 1, Group 2 survey unit as per the PBRF Final Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.   3) Surveys in EP Rx 126D were performed using a scintillation detecto optimized to measure gamma energies representative of Co-60. Sample 2 from Survey Request (SR)-13 was referenced for this decision.   4) Survey Instructions for this survey unit are incorporated into and per in accordance with (IAW) the Babcock Services Incorporated (BSI)/LV Work Execution Package (WEP) 05-006. Survey instructions described document constitute "Special Methods" and the survey design used in t acquisition of survey measurements.   5) Instrument efficiency determinations are developed in accordance w BSI/LVS-002, WEP 05-006, these determinations are appropriate for th of radiation involved and the media being surveyed.									
	Approval Sign	atures	17	Date:					
FSS/Characterizatio	n Engineer	Dal Rm	all	10-26-07					
(FSS/Characterizatio	n Engineer)	18th		10/30/07					
FSS/Characterizatio	n Manager	Flass OC	n	10/31/07					
				Form					

CS-09/1 Rev 0

Survey	Unit:						
		Rx 126D					
1.0	Histo	ry/Description					
	1.1	The subject pipe sy building.	stem is the 0.75" drain located in r	room 22 of the Rx			
	1.2 EP Rx 126D consists of 0.75" diameter piping that is approximate feet in length.						
2.0	Surve	y Design Information	1				
	2.1	EP Rx 126D was st	arveyed IAW Procedure #BSI/LVS	5-002.			
	2.2	100% of the 0.75" ID pipe was survey total of 15 survey n	D pipe was accessible for survey. ed by static measurement at one fo neasurements.	The accessible 0.75' oot increments, for a			
	2.3	Surface area for the 0.75" ID piping is $182 \text{ cm}^2$ for each foot of piping, corresponding to a total 0.75" ID piping surface area of 2,736 cm <sup>2</sup> (0.3 m <sup>2</sup> for the entire length of (approximately 15') of 0.75" piping.					
3.0	Survey Unit Measurement Locations/Data						
	3.1	Pipe interior radiolethis release record.	ogical survey forms are provided in	h Attachment 2 of			
4.0	Surve	y Unit Investigations	/Results				
	4.1	None					
5.0	Data	Assessment Results					
	5.1	Data assessment re Report provided in	sults are provided in the EP/Buried Attachment 1.	Pipe (BP) Survey			
	5.2	All measurement re Level (DCGL) for mrem/yr dose goal	esults are less than the Derived Con radionuclide specific EP that corre- established in Table 3-3 of the FSS	ncentration Guideline sponds to the 1 SP.			
	5.3	When implementin FSSP, and applying the survey unit that	g the Unity Rule, provided in Section the Nuclide Fraction (NF), provided is constituted by EP Rx 126D pass	ion 3.6.3 of the led in TBD-06-004, ses FSS.			
	5.4	Background was no Elevated Measuren survey unit.	ot subtracted from the survey meas- nent Comparison (EMC) was not e	urements and the mployed for this			

Survey Unit: Rx 126D

#### 5.5 Statistical Summary Table

Statistical Parameter	0.75" Pipe
Total Number of Survey Measurements	15
Number of Measurements >MDC	15
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0383
Median	0.0379
Standard Deviation	0.0098
Maximum	0.0620
Minimum	0.0241

- 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 Rx 126D to be less than 1 mrem/yr. The dose contribution is estimated to be 0.038 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 Rx 126D & Spreadsheet

# SECTION 7 ATTACHMENT 1 \_\_\_\_\_PAGE(S)

Pipe ID	EP Rx 126D	Survey Location	Rm 22 Trench drain -27'			
Survey Date	189094					
Survey Time	FO/1.5L-X 0047/ no sle					
Pipe Size	Pipe Size 0.75" Detector Efficiency					
DCGL (dpm/100cm2)	CGL (dpm/100cm2) 2.41E+05 Pipe Area Incorporated by Detector Efficiency (in cm2)					
Pipe Area Incorporated by	0.3	Field BKG (cpm)	6.1			
Routine Survey	X	Field MDCR (cpm)	11.5			
QA Survey		Nominal MDC (dpm/100cm2)	9,808			
	Bellin and a start of	Survey Measurement Results				
	Total Number of Su	rvey Measurements	15			
	Number of Meas	surements >MDC	15			
N	lumber of Measureme	ents Above 50% DCGL	0			
	Number of Measure	ments Above DCGL	0			
	0.0383					
	0.0379					
	Standard	Deviation	0.0098			
	0.0620					
	Mini	mum	0.0241			
	Survey Unit	Classification	1 1			
	TBD 06-004	Piping Group	2			
	SR-13 Radionuclide	Distribution Sample	EP 2-2			
	Measure	d Nuclide	Co-60			
	Area Factor	/EMC Used	No			
	Pass/F	ail FSS	Pass			
	MREM/YR	Contribution	<1			

### EP Rx 126D 0.75" Pipe TBD 06-004 Group 2

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	11	11	15,942	8,739	4,532	72	51	4	252	0.038
2	7	7	10,145	5,561	2,884	46	33	3	160	0.024
3	10	10	14,493	7,945	4,120	66	47	4	229	0.034
4	13	13	18,841	10,328	5,356	86	60	5	297	0.045
5	13	13	18,841	10,328	5,356	86	60	5	297	0.045
6	8	8	11,594	6,356	3,296	53	37	3	183	0.028
7	18	18	26,087	14,301	7,416	119	84	7	412	0.062
8	11	11	15,942	8,739	4,532	72	51	4	252	0.038
9	13	13	18,841	10,328	5,356	86	60	5	297	0.045
10	10	10	14,493	7,945	4,120	66	47	4	229	0.034
11	13	13	18,841	10,328	5,356	86	60	5	297	0.045
12	12	12	17,391	9,534	4,944	79	56	5	274	0.041
13	12	12	17,391	9,534	4,944	79	56	5	274	0.041
14	9	9	13,043	7,150	3,708	59	42	3	206	0.031
15	7	7	10,145	5,561	2,884	46	33	3	160	0.024
									MEAN	0.038
									MEDIAN	0.038
									STD DEV	0.010
									MAX	0.062
									MIN	0.024

## SECTION 7 ATTACHMENT 2 \_\_\_\_ PAGE(S)

BSI/LVSPipeCrawler-002 Revision 4

#### Pipe Interior Radiological Survey Form

Date: 3/12/07 Time: 1350
Pipe ID#: R 126D Pipe Diameter: .75 Access Point Area: Rm 22 TREACH
Building: R Elevation: -27' System: LINE DRAIN
Type of Survey Investigation Characterization Final Survey A Other
Detector ID# / Sled ID# $FO/I.5L-X OOF7$ NO SLED
Detector Cal Date: $1/11/07$ Detector Cal Due Date: $1/11/08$
Instrument: 2350-/ Instrument ID #: 189094-
Instrument Cal Date: $1-11-07$ Instrument Cal Due Date: $1-11-08$
From the Daily Pipe Survey Detector Control Form for the Selected Detector
Background Value <u>6.1</u> cpm
$MDCR_{static}$ 11.5 cpm
Efficiency Factor for Pipe Diameter 0.00069 (from detector efficiency determination)
$MDC_{static}$ 9808 dpm/ LOO cm <sup>2</sup>
Is the MDC <sub>static</sub> acceptable? (Yes No (if no, adjust sample count time and recalculate MDCR <sub>static</sub> )
Comments: INITIAL SURVEY EP2-2 COMPLETE
CA-05 NO MAP ATTILABLE IN
Technician AAA
Technician Signature

### Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross	Net	dpm/100cm <sup>2</sup>
1	1	1	11	11	nia	nia
2	2		7	7	1	1
3	3		10	10		
4	4		13	13		
5	5		13	13		
6	6		8	C		
7	7		18	18		
8	8			()		
9	9		13	13		
10	10	V	10	10		¥ V

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Package Page 1 of <u>></u>

Attachment 3, Page 1

### Pipe Interior Radiological Survey Form (Continuation Form)

Date:	3/12/07		6			
Pipe ID#:	BX 126 D	Pipe Diameter	75	Access	Point Area:	RmZZ TRENGH
Building:	R4	Elevation:	-27'	S	ystem:	LINE DRAIN
			±		1	
Position	Feet into Pipe	Count Time	Gross Counts	Gross	Net	$dpm/100cm^2$
#	from Opening	(min)		cpm	cpm	
<u> </u>	(		13	13	nla	no
12	12		12	12		
13	13		12	(2		
14	14		9	9		
15	15			7		
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# SECTION 7 ATTACHMENT 3 \_\_\_\_\_ PAGE(S)

				DQA Check S	heet			
	Design #	Rx 126D	Revision #	Original				
S	urvey Unit #				Rx 126D			
			Prel	liminary Data	Review			
	Answers to	the following que	stions should Release	d be fully doc Record	umented in the Survey Unit	Yes	No	N//
1.	Have surveys	been performed in ac	cordance with	survey instruction	ons in the Survey Design?	x		
2.	Is the instrume survey units, o	entation MDC for strue or below 0.5 DCGL <sub>W</sub> f	cture static mea or Class 3 surv	asurements belo ey units?	w the $DCGL_W$ for Class 1 and 2			x
3.	Is the instrume	entation MDC for emb	edded/buried p	iping static mea	surements below the DCGLw?	x		
4.	Was the instru embedded/bur static measure	mentation MDC for s ried piping scan meas ments or soil sample	tructure scan m surements below s addressed in	easurements, s w the DCGL <sub>W,</sub> o the survey desi	oil scan measurements, and r, if not, was the need for additional gn?			x
5.	Was the instru	mentation MDC for v	olumetric meas	urements and s	mear analysis < 10% DCGL <sub>W</sub> ?			X
5.	Were the MDC used to perform	s and assumptions unter the survey?	used to develop	them appropria	te for the instruments and techniques	x		
7.	Were the surve media being se	ey methods used to o urveyed?	collect data prop	per for the types	of radiation involved and for the	x		
3.	Were "Special	Methods" for data co	ellection properly	y applied for the	survey unit under review?	х		
9.	Is the data set design, which	comprised of qualifie accurately reflects the	ed measuremen e radiological st	t results collect tatus of the facil	ed in accordance with the survey ity?	x		
			Gr	aphical Data	Review			
1.	Has a posting	plot been created?						X
2.	Has a histogra	m (or other frequenc	y plot) been cre	ated?				X
3.	Have other gra	aphical data tools bee	en created to as	sist in analyzing	the data?			X
				Data Analys	is	1	9	
1.	Are all sample	measurements below	w the DCGL <sub>W</sub> (0	Class 1 & 2), or	0.5 DCGL <sub>W</sub> (Class 3)?	x		
2.	Is the mean of	the sample data < D	CGLw?			X		
3.	If elevated are elevated area	as have been identifi < DCGL <sub>EMC</sub> (Class 1	ed by scans and ), < DCGL <sub>W</sub> (C	d/or sampling, is lass 2), or <0.5	the average activity in each DCGL <sub>W</sub> (Class 3)?			x
4.	Is the result of	the Elevated Measur	rements Test <	1.0?				X
5.	Is the result of	the statistical test (S	+ for Sign Test	or Wr for WRS	Test) ≥ the critical value?			X
Cor	nments:							
F	SS/Characteriza	ation Engineer (print/s	sign)	le Randall	I tolal Ranhall	Date	10-2	6-0
F	SS/ Characteriza	ation Manager (print/	sign)	R. Case	Mah	Date	10/3	110
							Fo CS-0 Ret	rm 09/2

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