August 14, 2019

Created by Pamela A. Powell

Site ALARA Committee Meeting Minutes

The Site ALARA Committee and Change Control Board in 735-B Alternate EOC.

Rollcall was performed and Quorum was met for the SAC and CCB. (See Attached)

1) Introduction: Kent Williams

Kent welcomed everyone to the meeting. Kent discussed the employee that exceeded the site ACL for 2nd quarter. An investigation is ongoing to determine the contributor to the dose. The employee will be assigned the dose from the 2nd quarter TLD.

2) Environmental ALARA: Teresa Eddy

Teresa Eddy presented history on the Environmental ALARA program. The Environmental ALARA liquid dose vs goal was presented. All goals are below 50% action level. The Environmental ALARA airborne dose vs goal was presented. H-Area was 86.4% of their year-to-date guide through the end of May. Group will be requesting an increase after the June report. Request will be sent out via email for approval.

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3) **Review of 2nd Quarter Performance**: Pamela Powell

2nd Quarter PI were reviewed (See Attached)

4) **Review of +/- 25% Discrepancy**: Facility Representatives
(Note: All doses are in rem)

CLab - Target 3.9 vs Actual 5.390 (+38.211%)
Todd Brantley discussed TLDs being issued for Clab that should have been issued at 235-F. No request for dose adjustments at this time

HBL Target 0.48 vs Actual 0.732 (52.5%)
Rick Burns discussed the flushing of resin from the columns and having to spend more time making adjustments. No request for dose adjustments at this time.

HCA Target 5.75 vs Actual 3.842 (-33.18%)
Rick Burns discussed the decrease in jumpers, reduced maintenance, and delayed processing of TRM from Canada. No request for dose adjustment at this time.

FCA/235 Target 4.6 vs Actual 0.78 (-83.04%)
Todd Brantley discussed that worker dose was lower due to decrease in work. No request for dose adjustment at this time.

INF Target 2.8 vs Actual 1.99 (-28.93%)
Evan Croy discussed the highest individual dose moved to other facilities. INF has reduced the number of TLDs issued by ~130. TLDs will only be issued to personnel when they need them. Facility requested to reduce their 3rd quarter goal from 1.4 to 0.7. Request was approved per the board.

LWO Target 32.76 vs Actual 41.838 (+27.71%)
Susie Spires discussed Tank Farm equipment removal, high dose tank samples, and shipment of high dose rate legacy waste. Ron Sykes discussed waste treatment SWPF tie-in work. A request will be made to increase dose for LWO. The request will be submitted to the SAC when it is approved by ESQB.

Dennis Carr ended the meeting discussing 2 events that occurred at Portsmouth. Both involved spreadsheets that had not been controlled. One involved air analysis where calculations were being performed incorrectly for 12 years. The other involved a spreadsheet that tracked allocation of bioassay for radiological workers. Workers were being skipped for submission of bioassay samples and were not being sampled within the 12-month required timeframe.

Kent discussed the current DOELAP assessment going on in External Dosimetry. Assessment is going well and scheduled to end today.

SITE ALARA COMMITTEE
&
CHANGE CONTROL BOARD

ATTENDANCE ROSTER

Meeting Date: 09/14/2019 **Quarter/Year:** 2/2019

	Chair		Alternate
DJC	Dennis Carr	____	Wyatt Clark
____	Doug Bumgardner (Vice Chair)	____	Jim Wilson

	SAC Voting Member		Alternate
KFW	Kent Williams (Ex. Secretary)	RW	Roy Windham
____	Richard Sprague (ESH&Q)	____	Mary Flora
____	Deborah Solomon (SRTE)	RP	Ruby Parks
____	Verne Mooneyhan (SWM/TRU)	____	Robert Minnick
SW	Steve Wilkerson (NMD)	RTB	Richard Burns
____	Janice Lawson (NMSP)	____	Durwood Melvin
____	Donald Barfield (SRNL)	SR	Scott Craft
DB	Doug Bumgardner (TF)	____	
____	Joel Cantrell (WT) MES Bryan	____	
____	William Harris		
✓	Jim Wilson (LWO RPD)	____	Cindy Head
✓	Tim West (EC&ACP)	____	

Quorum Requirements: SAC = Chair/Vice Chair + 7 other members* = 8 total

Member may be represented by designated alternate. At least 2 members from each company are required for an official vote. CCB = Chair/Vice Chair + 5 other members = 6 Total May be represented by designated alternate.

Quorum Met SAC: (Yes) No

Quorum Met CCB: (Yes) No

SITE ALARA COMMITTEE
&
CHANGE CONTROL BOARD

ATTENDANCE ROSTER

Other Meeting Attendees (print name)

John Gall
Eric Roman
Teresa Eddy
Jamie Willing
Todd Brantley
Evan Coy
Susie Spires
Pamela Powell
Jim Wood
Adam Reese
Joyce Hopperdietzel
Dennis Hedlock
Gerald M. Achenbach
Paul Rowan (SRR)
Debbie Black
Lillie M. Gordon/LA Gordon

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2nd Quarter Site ALARA Committee Meeting

Kent Williams

Radiological Protection Director

Savannah River Nuclear Solutions, LLC

August 14, 2019

2nd Quarter Review

735-B AEOC

AGENDA

1.	Introduction	Kent Williams
2.	Environmental ALARA	Teresa Eddy
3.	2nd Quarter Performance Indicators	Pamela Powell
4.	± 25% Discrepancy	Facility Reps

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2019 Environmental ALARA Overview and Guides Status

Teresa Eddy

Savannah River Nuclear Solutions, LLC
August 14, 2019

Site ALARA Committee

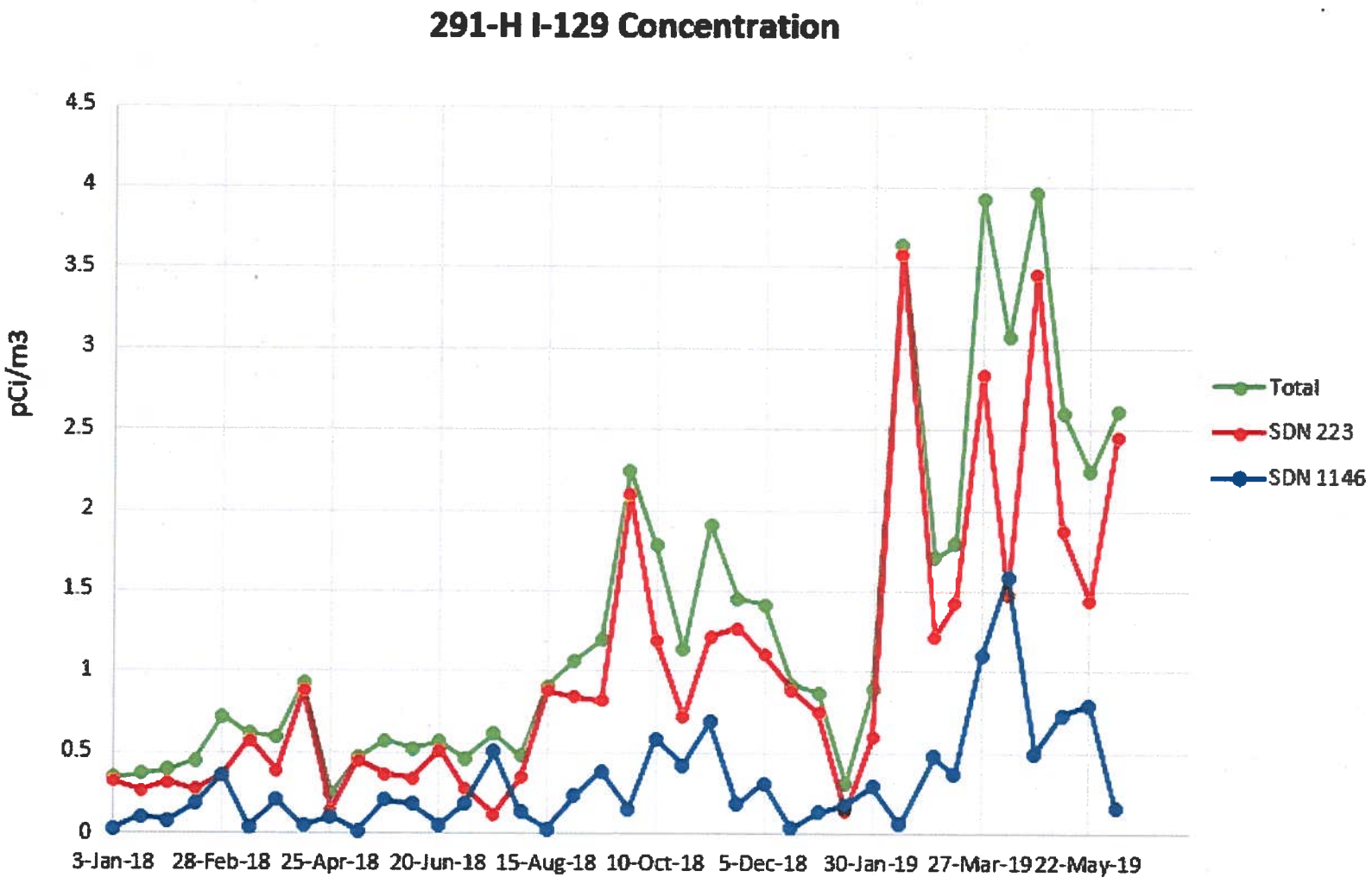
Environmental ALARA Liquid Status for May 2019

Area	YTD TED (mrem)	ALARA Guide (mrem/yr)	YTD % of Guide
A-Area	3.88E-06	6.00E-05	6.5%
F-Area	2.10E-04	5.20E-04	40.3%
F-Tk Farm	0.00E+00	1.00E-03	0.0%
H-Area	2.50E-05	1.04E-03	2.4%
H-ETP	1.25E-04	7.25E-03	1.7%
H-Tk Farm	6.09E-04	8.65E-03	7.0%
K-Area	0.00E+00	8.55E-06	0.0%
L-Area	0.00E+00	7.08E-05	0.0%
S-Area	2.29E-06	1.50E-04	1.5%
Tritium	9.21E-06	3.00E-04	3.1%
Site Totals	**9.84E-04**	**1.90E-02**	**5.2%**

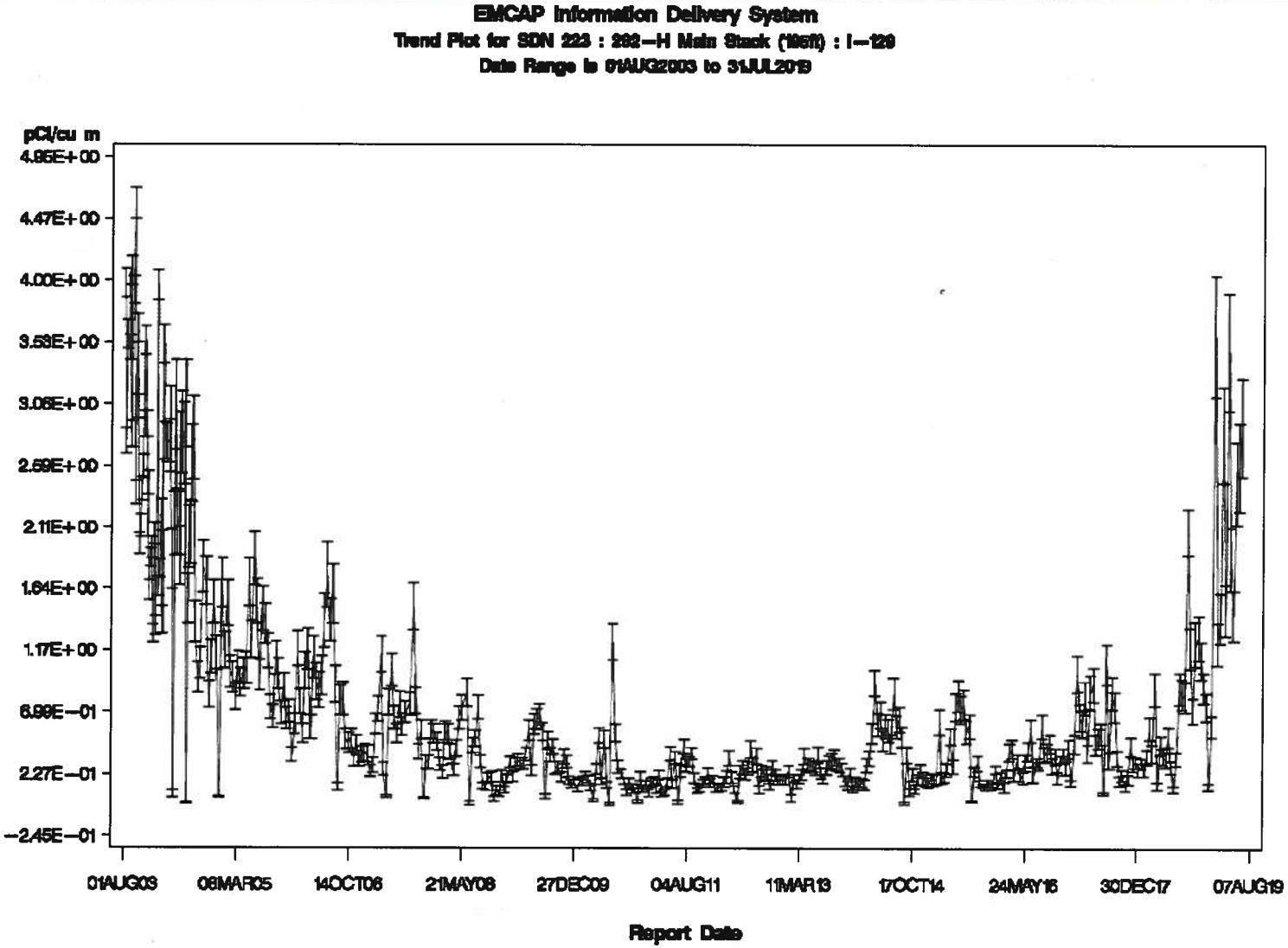
Environmental ALARA Airborne Status for May 2019

Area	YTD TED (mrem)	ALARA Guide (mrem/yr)	YTD % of Guide
A-Area	4.15E-06	1.25E-04	3.3%
C-Area	5.92E-05	2.31E-04	25.6%
F-Area	9.42E-05	1.87E-03	5.0%
H-Area	1.62E-03	1.88E-03	86.4%
H-ETP	0.00E+00	1.00E-07	0.0%
H-Tk Farm	2.34E-09	1.00E-06	0.2%
K-Area	6.72E-04	2.05E-03	32.8%
L-Area	7.45E-04	1.95E-03	38.2%
S-Area	7.55E-07	5.00E-05	1.5%
Tritium	8.71E-03	8.95E-02	9.7%
Z-Area	4.30E-09	5.00E-06	0.1%
Site Totals	**1.19E-02**	**9.77E-02**	**12.2%**

291-H Iodine-129 Trends



291-H Iodine-129 Trend History



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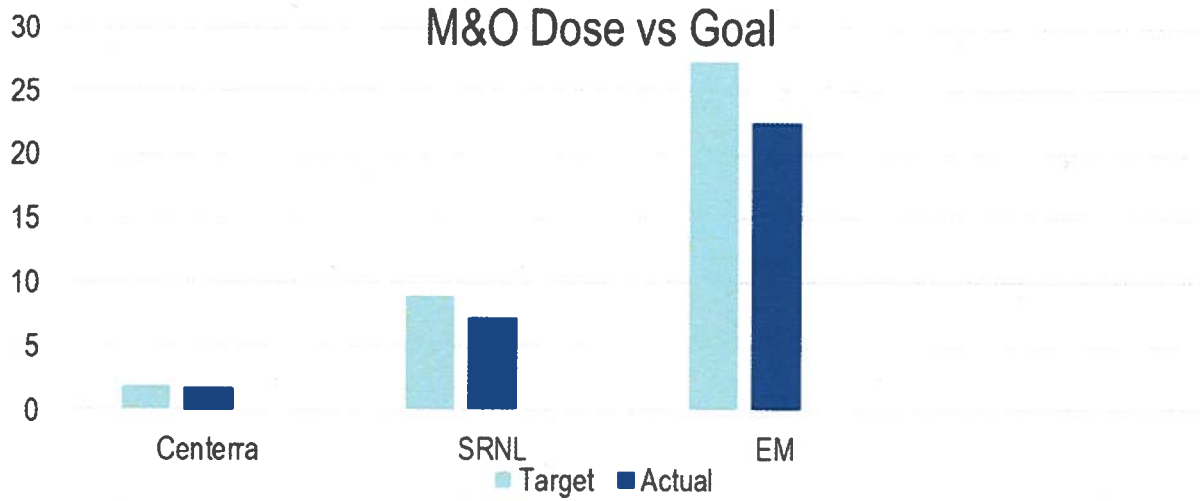
M&O Dose vs Goal



Title	Target	Actual	Percent
Centerra	2.0	1.778	-11.0
SRNL	9.0	7.137	-20.7
EM	27.34	22.545	-17.54

LWO Dose vs Goal

Title	June 2019
LWO Target	32.76
LWO YTD Dose	41.838
LWO Percent	+27.71

Maximum Individual Dose

Title	YTD	QTR	Facility
EM	0.622	0.204	CLB
LWO	0.304	0.257	FTF
SRNL	0.746	0.741	
Centerra	0.087	0.044	

Maximum Extremity

Title	CY19
EM Maximum Extremity Dose	4.928 (235)
LWO Maximum Extremity Dose	3.941 (SSS)

Radiological Events

Title	March 2019	Event
M&O ORPS PerCon	0	
M&O Non ORPS Percon	0	
M&O ORPS Rad Mat	2	University Shipment 731-1N Skin Contamination 772-1F
M&O Non ORPS Rad Mat	0	
LWO ORPS PerCon	1	Skin Contamination 512-S
LWO Non ORPS PerCon	0	
LWO ORPS Rad Mat	0	
LWO Non ORPS Rad Mat	0	

Intakes

Title	CY19
M&O > 500 mrem	0
M&O > 100 mrem	0
LWO > 500 mrem	0
LWO > 100 mrem	0

+/- 25% Discrepancy

Title	Target	Actual	Percent
C Lab	3.9	5.390	+38.21
HCA	5.75	3.842	-33.18
HBL	0.48	.732	+52.5
FCA/235	4.6	0.78	-83.04
INF	2.8	1.99	-28.93
LWO	32.76	41.838	+27.71

Pamela02 Powell

From: Scott Craft
Sent: Thursday, October 03, 2019 6:34 AM
To: Pamela02 Powell
Cc: Kent Williams; Roy Windham
Subject: RE: ALARA Goals Revision

Pam,

I concur.

Thank you,
Scott T. Craft I **Savannah River National Lab** I SRNL RPD Facility Manager | 803.725.9886 I pager 1-9965 | cell 803.646-7296

From: Kent Williams <Kent.Williams@srs.gov>
Sent: Wednesday, October 02, 2019 12:44 PM
To: Roy Windham <roy.windham@srs.gov>; Scott Craft <scott.craft@srnl.doe.gov>
Subject: FW: ALARA Goals Revision

Kent F. Williams
Director of Radiological Protection, SRNS
803-952-7489 (w)
803-646-9097 (c)

From: Pamela02 Powell <pamela02.powell@srs.gov>
Sent: Thursday, September 19, 2019 2:12 PM
To: Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy Windham <roy.windham@srs.gov>; Richard Sprague <richard.sprague@srs.gov>; Mary Flora <mary.flora@srs.gov>; Debd Solomon <debd.solomon@srs.gov>; Ruby Parks <ruby.parks@srs.gov>; Verne Mooneyhan <verne.mooneyhan@srs.gov>; Robert Minnick <robert.minnick@srs.gov>; Steven Wilkerson <Steven.Wilkerson@srs.gov>; Richard Burns <Richard.Burns@srs.gov>; Janice Lawson <janice.lawson@srs.gov>; Donald Barfield <donald.barfield@srnl.doe.gov>; Scott Craft <scott.craft@srnl.doe.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; Joel Cantrell <joel.cantrell@srs.gov>; Timothy02 West <timothy02.west@srs.gov>; Cindy Head <cindy.head@srs.gov>
Subject: RE: ALARA Goals Revision

Sorry. Wrong attachment previously sent.

From: Pamela02 Powell
Sent: Thursday, September 19, 2019 10:31 AM
To: Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy

Pamela02 Powell

From: Roy Windham
Sent: Wednesday, October 02, 2019 12:45 PM
To: Pamela02 Powell
Subject: Fwd: ALARA Goals Revision
Attachments: Untitled Extract Pages.pdf; ATT00001.htm

I am good with it.

Roy Windham, CHP
Radiological Protection Department
Office: 803-952-8477
Cell: 803-507-7951
SIPR: roy.windham@srnl.doe.sgov.gov
JWICS: roy.windham@doe.ic.gov

Begin forwarded message:

> **From:** Kent Williams <Kent.Williams@srs.gov>
> **Date:** October 2, 2019 at 12:43:53 PM EDT
> **To:** Roy Windham <roy.windham@srs.gov>, Scott Craft <scott.craft@srnl.doe.gov>
> **Subject: FW: ALARA Goals Revision**
>
> Kent F. Williams
> Director of Radiological Protection, SRNS
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> 803-646-9097 (c)
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> **Subject:** RE: ALARA Goals Revision
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Pamela02 Powell

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Sent: Wednesday, October 02, 2019 12:43 PM
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Subject: RE: ALARA Goals Revision

agree

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Director of Radiological Protection, SRNS
803-952-7489 (w)
803-646-9097 (c)

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Subject: ALARA Goals Revision

Please see the attached for the revised ALARA goals document which includes the reduction in dose for INF that was approved at the SAC meeting and the increase requested by LWO. Increase was approved by SRR ESQB. Please respond to me with concurrence.

Thank you,

Pamela02 Powell

From: James Wilson
Sent: Monday, September 23, 2019 9:18 AM
To: Pamela02 Powell
Cc: Carol Hunter
Subject: Re: ALARA Goals Revision

I agree with the revision.

Jim

On Sep 19, 2019, at 2:47 PM, Pamela02 Powell <pamela02.powell@srs.gov> wrote:

> She sent me the worksheet and I went strictly off of those.
>
> **From:** James Wilson <james.wilson@srs.gov>
> **Sent:** Thursday, September 19, 2019 2:46 PM
> **To:** Pamela02 Powell <pamela02.powell@srs.gov>; Carol Hunter <carol.hunter@srs.gov>
> **Subject:** RE: ALARA Goals Revision
>
> Pam.....I need to get Carol to look at the Base Ops and Special Work numbers since I don't have the worksheets. Carol will be back on Monday. We'll get this back to early Monday, if that is OK.
>
> Jim
>
> **From:** Pamela02 Powell <pamela02.powell@srs.gov>
> **Sent:** Thursday, September 19, 2019 2:12 PM
> **To:** Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy Windham <roy.windham@srs.gov>; Richard Sprague <richard.sprague@srs.gov>; Mary Flora <mary.flora@srs.gov>; Debd Solomon <debd.solomon@srs.gov>; Ruby Parks <ruby.parks@srs.gov>; Verne Mooneyhan <verne.mooneyhan@srs.gov>; Robert Minnick <robert.minnick@srs.gov>; Steven Wilkerson <Steven.Wilkerson@srs.gov>; Richard Burns <Richard.Burns@srs.gov>; Janice Lawson <janice.lawson@srs.gov>; Donald Barfield <donald.barfield@srnl.doe.gov>; Scott Craft <scott.craft@srnl.doe.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; Joel Cantrell <joel.cantrell@srs.gov>; Timothy02 West <timothy02.west@srs.gov>; Cindy Head <cindy.head@srs.gov>
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Pamela02 Powell

From: Dennis Carr
Sent: Friday, September 20, 2019 11:13 AM
To: Pamela02 Powell; Wyatt Clark; Douglas Bumgardner; James Wilson; Kent Williams; Roy Windham; Richard Sprague; Mary Flora; Debd Solomon; Ruby Parks; Verne Mooneyhan; Robert Minnick; Steven Wilkerson; Richard Burns; Janice Lawson; Donald Barfield; Scott Craft; Douglas Bumgardner; Joel Cantrell; Timothy02 West; Cindy Head
Subject: RE: ALARA Goals Revision

I concur Thanks

From: Pamela02 Powell <pamela02.powell@srs.gov>
Sent: Thursday, September 19, 2019 10:31 AM
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Thank you,

Pamela02 Powell
Site ALARA Coordinator
HPS Records
735-B Rm 120
803-952-5825/15776/803-646-0938

SAVANNAH RIVER REMEDIATION LLC *We do the right thing.*

Savannah River Site, Aiken, SC 29808

DATE:

TO: Joel Cantrell, Waste Teatment Operations Mngr.

FROM: Ron Sykes, Waste Treatment Safety & Mngr.

SUBJECT: CY2019 RADIOLOGICAL PERFORMANCE GOALS (R1)

Administrative guidelines for allowable radiation exposure have been established for Waste Treatment Personnel. The following table dictates the radiation exposure levels that must not be exceeded without Facility Line Management approval. The Administrative Control Level (ACL) is established by senior management and based upon historic and projected radiation exposure, work load and mission. This evaluation was performed per SCD-6 SRS ALARA Manual.

MAXIMUM INDIVIDUAL EXPOSURE

SRR Administrative Control Level	500 mRem/Yr
Extremity Control Level	15 Rem/Yr

DOE and SRS Limits and Administrative Guides

DOE Whole Body Radiation Exposure Limit	5 Rem/Yr
DOE Whole Body Administrative Control Limit	2 Rem/Yr
DOE Extremity/Skin/Organ Radiation Exposure Limit	50 Rem/Yr
Doe Exposure Limit for Lens of Eyes	15 Rem/Yr
Limit for Minors, Students, Visitors, and General Public	100 mRem/Yr

CUMULATIVE EXPOSURE

BASE ROUTINE OPERATIONS		**14.000**	REM
SPECIAL WORK OPERATIONS	QTR 1	**2.100**	REM
	QTR 2	**1.700**	REM
	QTR 3	**3.875**	REM
	QTR 4	**6.175**	REM
SPECIAL WORK TOTAL		**13.850**	REM
NEUTRON CONTRIBUTION TO TOTAL		N/A	REM
TOTAL (Base Routine and Special Work)		**27.850**	REM

Exposure Received From Unplanned Work Occuring in Q1 & Q2

511-S Horse Shoe Jumper Removal	0.730 REM
CMA Decon of MPC	0.167 REM
511-S/512-S Prep/Package Filter Feed Pump Motor for Shipment	0.147 REM
TOTAL	1.044 REM

PERSONNEL CONTAMINATION

SKIN	0
PERSONAL CLOTHING	2
UPTAKES RESULTING IN A CEDE > 100 MRem	0

Radiation Exposure Worksheet

		Estimated Total Exposure (mRem)	Anticipated Schedule			
			Q1	Q2	Q3	Q4
A	**Base Routine Operations**					
A1	Waste Treatment	14000	3,500	3,500	3,500	3,500
	A. Base Routine Total	**14,000**	3500	3500	3500	3500
B	**Special Work Operations**		Q1	Q2	Q3	Q4
B1	GWSB Modifications-Double Stack	800	100	100	300	300
B2	Canyon Process Pump Rebuilds	1900	400	400	500	600
B3	512-S Lay Up Activities	1900	500	500	400	500
B4	294-S Sandfilter Inlet Collection Sump Install New Pump	431	200			231
B5	Size Reduce 512-S Secondary Filters for Disposition	550		250	300	
B6	Disposition of High Rad Liquid Carboys	400	200	200		
B7	511-S Jumper Work	2300			1700	600
B8	SS Process Room Modifications/Upset Recovery	1075	450		225	400
B9	Vault 4 Enclosure Upgrades	2500	250	250	100	1900
B10	Vault 4 Cell K Leachate Level Transmitter Replace	450			150	300
B11	Vault 4 Leachate Temp Mod Hose Replace	500			200	300
B12	511-S Horse Shoe Jumper Removal/Q1 Unplanned					730
B13	CMA Decon MPC/Q1 Unplanned					167
B14	511-S/512-S Prep & Package Filter Feed Pump Motor for Shipment					147
			Q1	Q2	Q3	Q4
	A. Base Routine Quarterly Totals	**14000**	3500	3500	3500	3500
	B. Special Work Operations Totals	**13850**	2100	1700	3875	6175
	Quarterly Totals (A+B)		5600	5200	7375	9675
	Base & Special Work Total	**27850**				

Approvals:

_____ DATE: _____

Ron Sykes, Waste Treatment Safety and Health Manager

_____ DATE: _____

Joel Cantrell, Wste Treatment Facility Manager

CY 2019 Tank Farm Radiation Exposure Worksheet

Date: **Quarter I & II Actual Exposure** **Qtr III (Projected in Red) Date 9/5/2019**

				Anticipated Schedule							
		Estimated Total Exposure (mRem)	Q1 (ACT)	Q1 (EST)	Q2 (ACT)	Q2 (EST)	Q3 (ACT)	Q3 (EST)	Q4 (ACT)	Q4 (EST)
A	**Base Routine Operations**									
A1	HTF Base Operations Exposure	17990	5450	4250	7742	4250	6575	5240		4250
	A. Base Routine Total									
B	**HTF Special Work Operations**	Est. (mRem)	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
B1	299H Support	1400	702	325	1255	325	580	500		250
B2	Ops: Sample, Camera, HRA & HEPA/96H	2750	1269	850	764	850	695	850		200
B3	Tank 38 BFV Removal GDL Cleaning	600	175		10	350		0		250
B4	Tank Reel Tape Repairs	200				100		50		50
B5	HDB-5 Pump & Jumper Repairs	350				350		0		0
B6	HDB-8 Pump & Jumper Repairs	450				450		0		0
B7	2 H Mech Cleaning	450		200	55	200	75	50		0
B8	TCCR (Misc Repairs) Tank 10 Pump	1200		150		150		100		800
B9	TCCR Operation / Sampling	375		150		125		50		50
B10	MCU Operation Support/Sampling	750	475	300	471	300		100		50
B11	MCU Cell Entries (Pump/Equip Repairs) & Outage	1300	1962	650	275	650		0		0
B12	MCU Contactor Work/Replace	400		200		200		0		0
B13	MCU HEPA Replacement	450	380	200	140	150		100		0
B14	Disposal of Legacy Waste Boxes	350	145	50	198	100		100		100
B15	HRA Shipments	630	395	200	388	130	75	200		100
B16	Reheater Replacements	325		100		100		100		25
B 17	Tk 9 Salt Dissalution D & R riser 1 (LVMJ) & 7 (DC)	1100	137		234	450	295	300		350
B18	Tank 23 Remove Failed Pump	250			298	250		0		0
B19	Tank 43 Replace Feed Pump	325		325				0		0
B20	SWPF Tie-In (MCU & DWPF) Excavation & Linebreaks	6520		200		600	3950	5020		700
B21	Tank 11 STP	0	158							
B22	Replace Tank 49 Pump	0			59					
B23	Tank 41 Install CSMP	300					150	300		
B24	Tank 50 Linebreaks (Brenner Tank Transfer)	0					70	100		
B25	Emergent Work	0						2650		2650
B26		0								
B27		0								
B28		0								
			Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
HTF	**A. Base Routine Quarterly Totals**	17990	5450	4250	7742	4250	6575	5240	0	4250
	B. Special Work Operations Totals	25875	5798	3900	4147	5830	5890	10570	0	5575
	Quarterly Totals (A+B)		11248	8150	11889	10080	12465	15810	0	9825
	Base & Special Work Total	43865								

A2	FTF Base Operations Exposure Est.	2828	955	650	53	400	650	750		325
C	**FTF Special Work Operations**		Q1 (ACT)	Q1 (EST)	Q2 (ACT)	Q2 (EST)	Q3 (ACT)	Q3 (EST)	Q4 (ACT)	Q4 (EST)
C 1	Operations Sampling, Camera, HEPA Repl	1050	479	350	179	300	180	200		200
C 2	ETP (RCO/Lab Tech)	560	91	140	168	140	155	160		120
C 3	FDB-4 Jumper Work	1350		950	1794		411	400		
C 4	Tank 4 Pump Replacement	200		200						
C 5	Tank 27 Transfer Line Tie-In	400		175		225				
C 6	Tank 27 STP Mining/STP Installation	625				200		275		150
C 7	HRA Shipments	0	175							
C 8	Tank Ventilation Upgrades Tank 4 Reheater	0	230		101			125		
C 9	Tank 44 D & R Riser Install Pump	0								275
			Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
FTF	**A. Base Routine Quarterly Totals**	2125	955	650	53	400	650	750	0	325
	B. Special Work Operations Totals	4585	975	1815	2242	865	746	1160	0	745
	Quarterly Totals (A+B)		1930	2465	2295	1265	1396	1910	0	1070
	Base & Special Work Total	6710								

Tank Farm CY 2018 Radiation Exposure Worksheet Totals

			Q1 (ACT)	Q1 (EST)	Q2 (ACT)	Q2 (EST)	Q3 (ACT)	Q3 (EST)	Q4 (ACT)	Q4 (EST)
Tank Farm	**A. Base Routine Quarterly Totals**	20115	6405	4900	7795	4650	7225	5990	0	4575
	B. Special Work Operations Totals	30460	6773	5715	6389	6695	6636	11730	0	6320
	Quarterly Totals (A+B)		13178	10615	14184	11345	13861	17720	0	10895
	Base & Special Work Total Goal	50575								
	Base & Special Work Total Actual	41223								

Savannah River Site

2019 ALARA Goals (U)
Rev 2 – Approved 08/14/2019 per the CCB see meeting minutes SRNS-J6000-2019-00023

M&O Senior Executive **Date**

SRR Senior Executive **Date**

Executive Summary

The ALARA goals for the Savannah River Site for calendar year 2019 were established by the appropriate radiological facilities and their support groups based on the anticipated work for the year.

The annual base routine operations cumulative exposure goal is 97.01 Rem. Exposure goals for special (non-recurring) work operations are maintained by calendar quarter. The preliminary special work goal for the year is 32.925 Rem. The total exposure goal for 2019 is 129.935 Rem. In comparison, the goal for 2018 was 133.475 Rem. The 2019 goal is a 6% decrease from the 2018 goal.

SRS has established an annual Administrative Control Level (ACL) of 500 mRem Total Effective Dose (TED) for most Site workers, the same as past few years. This can be compared to the DOE ACL of 2,000 mRem, and a federal limit of 5,000 mRem. Contractor chief official approval is necessary to allow a contractor employee to exceed the SRS ACL. DOE/National Nuclear Security Administration Secretarial Officer, or designee, approval is necessary to allow a Site worker to exceed the DOE ACL. DOE-SR has established the Site ACL for DOE employees at 150 mRem.

The goal for intakes of radioactive material resulting in an exposure greater than 500 mRem Committed Effective Dose (CED) from a single event continues to be zero.

Radiological Performance Goals

Cumulative Radiation Exposure is based on total effective dose exposures (including tritium) resulting from Base Routine Operations and Special Work Operations.

- *Base Routine Operations* are related to normal day to day activities.
- *Special Work Operations* are not part of routine operations and typically are of limited, non-repetitive duration. Special Work Operations goals are reviewed quarterly by the facilities and goals may be adjusted as approved by the company's executive committee.

Maximum Individual Exposure/Administrative Control Levels are established to maintain personnel radiation exposure well below the Department of Energy's Administrative Control Level of 2,000 mRem, while being both challenging and achievable for the site.

Personnel Contamination Events are established for skin and personnel effects contamination that are reportable in accordance with the criteria contained in DOE O 232.2A, "Occurrence Reporting and Processing of Operations Information." These reporting criteria are available in the site's SIRIM/ORPS information system.

Confirmed Intakes Resulting in CED are established for a single intake of radioactive material that exceeds the anticipated exposure of 500 mRem or greater. This criterion is based on DOE M 232.2A, "Occurrence Reporting and Processing of Operations Information." The reporting criterion is available in the site's SIRIM/ORPS information system.

CY19 ALARA Goals

Business Unit	Base Routine (Rem)	Special Work (Rem)	Total Cumulative Exposure Goal (Rem)
Management & Operations Total	**67.81**	**7.125**	**74.935**
H-Area Material Disposition			
HB-Line	0.56	0.30	0.86
H-Canyon/OF	9.70	1.80	11.50
Nuclear Materials Storage Project			
K-Area	8.8	4.00	12.8
L-Area	1.70	0.30	2.0
Solid Waste			
E-Area	3.6	0	3.6
INF	4.9	0	4.9
EC&ACP			
SGWR, Facility Disposition, BAL	0.25	0	0.25
Tritium Projects			
TRI/TEF	2.50	0.225	2.725
Laboratories			
772-F/772-1F	7.80	0	7.80
F-Area Operations	6.00	0	6.00
Savannah River National Laboratory	18.0	0.5	18.5
Centerra-SRS Total	**34.115**	**0**	**4.0**
Liquid Waste Operations Total	**34.115**	**44.31**	**78.425**
Waste Treatment			
DWPF/Saltstone	14.000	13.850	27.850
Tank Farms			
H-Tank Farm/299-H/ETP/F-Tank Farm	20.115	30.460	50.575
Site Goal	**101.925**	**51.435**	**153.360**

SRS ADMINISTRATIVE CONTROL LEVEL – 500 mRem

DOE-SR ADMINISTRATIVE CONTROL LEVEL – 150 mRem (for DOE-SR employees)

CISR 40 79 (Rev 5-12-2000)

Radiation Exposure Worksheet

Proc. Ref. SQ1.1-505

Facility/Work Group	Manager	Area	ALARA Coordinator	Phone	Date
INF	Terry Pifer	Site	Evan Croy	2-8368	8/15/2019

PART I (Enter Percentages % of Exposure, as applicable)

Activity	Estimated Total Exposure	Anticipated Schedule				Percent % of Work Group Exposure per Section	Percent % of Work Group Exposure per Total		Final Yearly Exposure
		Quarter 1	Quarter 2	Quarter 3	Quarter 4				
A. Base Routine Operations	4.9	1.4	1.4	0.7	1.4	100			
A.1								A.1	
A.2								A.2	
A.3								A.3	
A.4								A.4	
A.5								A.5	
A.6								A.6	
A.7								A.7	
A.8								A.8	
A.9								A.9	
A.10								A.10	
A. Total	4.9	1.4	1.4	0.7	1.4	100			
B. Special Work Operations									
B.1								B.1	
B.2								B.2	
B.3								B.3	
B.4								B.4	
B.5								B.5	
B.6								B.6	
B.7								B.7	
B.8								B.8	
B.9								B.9	
B.10								B.10	
B.11								B.11	
B.12								B.12	
B. Total									
TOTALS									

4.9 REM Base Rem | 4.9 REM Total (Base + Special) | By exposure anticipated in the quarter the work is performed | _____ REM Facility/Work Group Total

Part II (List specific ALARA Actions to Reduce Exposures on above work/jobs. Reference to sections in Part I.)

Reduced the total number of TLD's issued by asking workers that were delinquent in returning 2nd qtr TLD's not to get a new one until they were ready to enter a radiological area. Also ensured craft workers from N-Area/Central Shops that were performing radiological work in other areas were not issued a TLD from INF but in the facility they were performing the work.

Retention Period – 75 Years

Pamela02 Powell

From: Dennis Carr
Sent: Thursday, October 24, 2019 2:55 PM
To: Pamela02 Powell
Cc: Kent Williams; Teresa Eddy; Martha Thompson; Bill Clifton; Richard Burns; Sherman Powell; Thelesia Oliver; Amy Meyer; Kenneth Burrows; Ken Cheeks
Subject: Re: Request for Increase in Environmental ALARA Goals

I approve the request increase to the goal based upon the increased processing and movement of spent fuel through the canyon not considered in the original goal setting.

I would expect that we will take our results this year into consideration in the goal setting process for next year

I appreciate everyone's time in resolving my concern

Sent from my iPhone

On Oct 24, 2019, at 2:42 PM, Pamela02 Powell <pamela02.powell@srs.gov> wrote:

> Dennis,
>
> Please see the attached for justification for increase to the Airborne Environmental ALARA goal for H area. Please respond to me with your concurrence for approving the increase. The Site ALARA Committee has reviewed and approved the increase.
>
> If you have any further questions, you may address them to Teresa Eddy – Environmental ALARA chair.
>
> Thanks
>
> ***Pamela02 Powell***
> ***Site ALARA Coordinator***
> ***HPS Records***
> ***735-B Rm 120***
> ***803-952-5825/15776/803-646-0938***
>
> <SRNS-E1122-2019-00018 291-H Airborne ALARA Guide Exceedance Investigation Rev 0.pdf>
>
> <Env ALARA goal.docx>

Pamela02 Powell

From: Kent Williams
Sent: Monday, October 28, 2019 12:40 PM
To: Pamela02 Powell
Subject: Re: Request for Increase in Environmental ALARA Goals

Pam I concur

Sent from my iPhone

On Oct 28, 2019, at 9:15 AM, Pamela02 Powell <pamela02.powell@srs.gov> wrote:

Kent please respond with your concurrence as well.
Sent from my iPhone

Begin forwarded message:

From: Teresa Eddy <teresa.eddy@srs.gov>
Date: October 24, 2019 at 3:18:29 PM EDT
To: Dennis Carr <Dennis.Carr@srs.gov>
Cc: Pamela02 Powell <pamela02.powell@srs.gov>, Kent Williams <Kent.Williams@srs.gov>, Martha Thompson <martha.thompson@srs.gov>, Bill Clifton <bill.clifton@srs.gov>, Richard Burns <Richard.Burns@srs.gov>, Sherman Powell <sherman.powell@srs.gov>, Thelesia Oliver <thelesia.oliver@srs.gov>, Amy Meyer <Amy.Meyer@srs.gov>, Kenneth Burrows <kenneth.burrows@srs.gov>, Ken Cheeks <ken.cheeks@srs.gov>
Subject: Re: Request for Increase in Environmental ALARA Goals

Thanks so much for the quick response.

Sent from my iPhone

On Oct 24, 2019, at 1:55 PM, Dennis Carr <Dennis.Carr@srs.gov> wrote:

I approve the request increase to the goal based upon the increased processing and movement of spent fuel through the canyon not considered in the original goal setting.

I would expect that we will take our results this year into consideration in the goal setting process for next year

I appreciate everyone's time in resolving my concern

Sent from my iPhone

Pamela02 Powell

From: Mary Flora
Sent: Tuesday, September 17, 2019 1:02 PM
To: Pamela02 Powell
Cc: Dennis Carr; Wyatt Clark; Douglas Bumgardner; James Wilson; Kent Williams; Roy Windham; Richard Sprague; Debd Solomon; Ruby Parks; Verne Mooneyhan; Robert Minnick; Steven Wilkerson; Richard Burns; Janice Lawson; Durwood Melvin; Donald Barfield; Scott Craft; Joel Cantrell; Timothy02 West; Cindy Head; Teresa Eddy
Subject: Re: Request for Increase in H-Area Environmental ALARA Airborne Guide

I concur.

-Mary Flora
803.952.9153 (O)
803.507.7204 (M)

> On Sep 17, 2019, at 6:58 AM, Pamela02 Powell <pamela02.powell@srs.gov> wrote:
>
> Please review the attached and information below for request for increase. Please respond to me with your concurrence for approval by 09/27/2019.
>
> Thanks
>
> Pamela02 Powell
> Site ALARA Coordinator
> HPS Records
> 735-B Rm 120
> 803-952-5825/15776/803-646-0938
>
>
>
> From: Teresa Eddy <teresa.eddy@srs.gov>
> Sent: Monday, September 16, 2019 2:55 PM
> To: Pamela02 Powell <pamela02.powell@srs.gov>
> Subject: Request for Increase in H-Area Environmental ALARA Airborne Guide
>
> The Environmental ALARA Committee would like to request approval for an increase in the H-Area Airborne ALARA guide from 1.88E-03 to 5.00E-03 mrem per year.
>
> The facility ECA provided an exceedance investigation which is included in the July Monthly Radiological Releases Report (attached) and states the following:
> "A correlation has not been established between process operations and increases in iodine emissions based 2019 investigations. However, like in F Area, Iodine-129 will continue to be the
> predominant contributor to dose contributions based on processing used nuclear fuels. An Idaho National Laboratory report (INL/EXT-13-30119) entitled, "Iodine Pathways and Off-Gas Stream
> Characteristics for Aqueous Reprocessing Plants – A Literature Survey and Assessment", suggest that 95 -99% of the Iodine is evolved from dissolver solutions into the off-gas system; and that the
> 40-50% remaining Iodine is emitted by way of the Process Vessel Vent which has a higher flow rate. This trend will continue as more used nuclear fuel is processed and stored in H

Pamela02 Powell

From: James Wilson
Sent: Tuesday, September 17, 2019 11:57 AM
To: Pamela02 Powell
Cc: Daniel Skiff
Subject: RE: Request for Increase in H-Area Environmental ALARA Airborne Guide

Pam:

Liquid Waste (SRR) concurs with the proposed increase.

Jim

From: Pamela02 Powell <pamela02.powell@srs.gov>
Sent: Tuesday, September 17, 2019 6:58 AM
To: Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy Windham <roy.windham@srs.gov>; Richard Sprague <richard.sprague@srs.gov>; Mary Flora <mary.flora@srs.gov>; Debd Solomon <debd.solomon@srs.gov>; Ruby Parks <ruby.parks@srs.gov>; Verne Mooneyhan <verne.mooneyhan@srs.gov>; Robert Minnick <robert.minnick@srs.gov>; Steven Wilkerson <Steven.Wilkerson@srs.gov>; Richard Burns <Richard.Burns@srs.gov>; Janice Lawson <janice.lawson@srs.gov>; Durwood Melvin <durwood.melvin@srs.gov>; Donald Barfield <donald.barfield@srnl.doe.gov>; Scott Craft <scott.craft@srnl.doe.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; Joel Cantrell <joel.cantrell@srs.gov>; Timothy02 West <timothy02.west@srs.gov>; Cindy Head <cindy.head@srs.gov>
Cc: Teresa Eddy <teresa.eddy@srs.gov>
Subject: FW: Request for Increase in H-Area Environmental ALARA Airborne Guide

Please review the attached and information below for request for increase. Please respond to me with your concurrence for approval by 09/27/2019.

Thanks

Pamela02 Powell
Site ALARA Coordinator
HPS Records
735-B Rm 120
803-952-5825/15776/803-646-0938

From: Teresa Eddy <teresa.eddy@srs.gov>
Sent: Monday, September 16, 2019 2:55 PM
To: Pamela02 Powell <pamela02.powell@srs.gov>
Subject: Request for Increase in H-Area Environmental ALARA Airborne Guide

The Environmental ALARA Committee would like to request approval for an increase in the H-Area Airborne ALARA guide from 1.88E-03 to 5.00E-03 mrem per year.

Pamela02 Powell

From: Richard Burns
Sent: Tuesday, September 17, 2019 10:51 AM
To: Pamela02 Powell; Dennis Carr; Wyatt Clark; Douglas Bumgardner; James Wilson; Kent Williams; Roy Windham; Richard Sprague; Mary Flora; Debd Solomon; Ruby Parks; Verne Mooneyhan; Robert Minnick; Steven Wilkerson; Janice Lawson; Durwood Melvin; Donald Barfield; Scott Craft; Douglas Bumgardner; Joel Cantrell; Timothy02 West; Cindy Head
Cc: Teresa Eddy
Subject: RE: Request for Increase in H-Area Environmental ALARA Airborne Guide

I concur

RTB

From: Pamela02 Powell <pamela02.powell@srs.gov>
Sent: Tuesday, September 17, 2019 6:58 AM
To: Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy Windham <roy.windham@srs.gov>; Richard Sprague <richard.sprague@srs.gov>; Mary Flora <mary.flora@srs.gov>; Debd Solomon <debd.solomon@srs.gov>; Ruby Parks <ruby.parks@srs.gov>; Verne Mooneyhan <verne.mooneyhan@srs.gov>; Robert Minnick <robert.minnick@srs.gov>; Steven Wilkerson <Steven.Wilkerson@srs.gov>; Richard Burns <Richard.Burns@srs.gov>; Janice Lawson <janice.lawson@srs.gov>; Durwood Melvin <durwood.melvin@srs.gov>; Donald Barfield <donald.barfield@srnl.doe.gov>; Scott Craft <scott.craft@srnl.doe.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; Joel Cantrell <joel.cantrell@srs.gov>; Timothy02 West <timothy02.west@srs.gov>; Cindy Head <cindy.head@srs.gov>
Cc: Teresa Eddy <teresa.eddy@srs.gov>
Subject: FW: Request for Increase in H-Area Environmental ALARA Airborne Guide

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Pamela02 Powell
Site ALARA Coordinator
HPS Records
735-B Rm 120
803-952-5825/15776/803-646-0938

From: Teresa Eddy <teresa.eddy@srs.gov>
Sent: Monday, September 16, 2019 2:55 PM
To: Pamela02 Powell <pamela02.powell@srs.gov>
Subject: Request for Increase in H-Area Environmental ALARA Airborne Guide

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Pamela02 Powell

From: Scott Craft
Sent: Tuesday, September 17, 2019 7:21 AM
To: Pamela02 Powell
Subject: RE: Request for Increase in H-Area Environmental ALARA Airborne Guide

I concur..

From: Pamela02 Powell
Sent: Tuesday, September 17, 2019 6:58 AM
To: Dennis Carr <Dennis.Carr@srs.gov>; Wyatt Clark <Wyatt.Clark@srs.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; James Wilson <james.wilson@srs.gov>; Kent Williams <Kent.Williams@srs.gov>; Roy Windham <roy.windham@srs.gov>; Richard Sprague <richard.sprague@srs.gov>; Mary Flora <mary.flora@srs.gov>; Debd Solomon <debd.solomon@srs.gov>; Ruby Parks <ruby.parks@srs.gov>; Verne Mooneyhan <verne.mooneyhan@srs.gov>; Robert Minnick <robert.minnick@srs.gov>; Steven Wilkerson <Steven.Wilkerson@srs.gov>; Richard Burns <Richard.Burns@srs.gov>; Janice Lawson <janice.lawson@srs.gov>; Durwood Melvin <durwood.melvin@srs.gov>; Donald Barfield <donald.barfield@srnl.doe.gov>; Scott Craft <scott.craft@srnl.doe.gov>; Douglas Bumgardner <Douglas.Bumgardner@srs.gov>; Joel Cantrell <joel.cantrell@srs.gov>; Timothy02 West <timothy02.west@srs.gov>; Cindy Head <cindy.head@srs.gov>
Cc: Teresa Eddy <teresa.eddy@srs.gov>
Subject: FW: Request for Increase in H-Area Environmental ALARA Airborne Guide

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Pamela02 Powell
Site ALARA Coordinator
HPS Records
735-B Rm 120
803-952-5825/15776/803-646-0938

From: Teresa Eddy <teresa.eddy@srs.gov>
Sent: Monday, September 16, 2019 2:55 PM
To: Pamela02 Powell <pamela02.powell@srs.gov>
Subject: Request for Increase in H-Area Environmental ALARA Airborne Guide

The Environmental ALARA Committee would like to request approval for an increase in the H-Area Airborne ALARA guide from 1.88E-03 to 5.00E-03 mrem per year.

The facility ECA provided an exceedance investigation which is included in the July Monthly Radiological Releases Report (attached) and states the following:
"A correlation has not been established between process operations and increases in iodine emissions based 2019 investigations. However, like in F Area, Iodine-129 will continue to be the predominant contributor to dose contributions based on processing used nuclear fuels. An Idaho National Laboratory report (INL/EXT-13-30119) entitled, "Iodine Pathways and Off-Gas Stream

Pamela02 Powell

From: Teresa Eddy
Sent: Monday, September 16, 2019 2:55 PM
To: Pamela02 Powell
Subject: Request for Increase in H-Area Environmental ALARA Airborne Guide
Attachments: July 2019 MRRR.pdf

The Environmental ALARA Committee would like to request approval for an increase in the H-Area Airborne ALARA guide from 1.88E-03 to 5.00E-03 mrem per year.

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SRNS-TR-2019-00256
Revision 0
Tracking Number: 10708

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Eric Doman, Liquid Effluent Program Owner &
Airborne Effluent Program Reviewer

9/12/19
Date

M. C. Thompson, Airborne Effluent Program Owner &
Liquid Effluent Program Reviewer

9/12/19
Date

T. P. Eddy, Manager, Environmental Monitoring Program,
Environmental Compliance & Area Completion Projects
Approver

9/12/19
Date

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

EXECUTIVE SUMMARY

The Department of Energy (DOE) Order 458.1 *Radiation Protection of the Public and the Environment* requires that DOE site operations be conducted so that the exposure of members of the public to ionizing radiation will not cause a total effective dose (TED) of more than 100 mrem per year. DOE Order 458.1 further requires that a documented as low as reasonably achievable (ALARA) process be implemented to optimize control and management of radiological activities so that doses to the public and releases to the environment are maintained ALARA.

Also, in accordance with DOE Order 458.1, liquid and airborne effluent radionuclide concentrations are compared directly with the Derived Concentration Standards (DCS). The DCS are radionuclide-specific values in water and air that equate to a dose of 100 mrem per year. The DCS values are provided in DOE standard DOE-STD-1196-2011 *Derived Concentration Technical Standard.*

In accordance with Manual 3Q, Procedure 18.5 *Radiological Effluent Monitoring, Reporting, and Environmental ALARA Process*, the Monthly Radioactive Releases Report (MRRR) is issued on a monthly basis within 45 days after the end of subject month. The MRRR summarizes all measured releases (liquid and airborne) of radioactivity and their resultant calculated offsite year-to-date TED. The MRRR includes direct comparisons of the projected annual TED based on year-to-date measured releases with the established area-specific annual ALARA Guides (provided in SRNS-J2230-2019-00006). Releases and doses are projected for the calendar year based on the to-date results. Due to the way projections are made and with challenging ALARA guides, it is not uncommon that early in a calendar year, an area may be projected to exceed the ALARA guide. This may occur when a source with an analyte (with a higher dose factor) that has occasional detects experiences a detect early in the year.

Compliance with DOE Order 458.1 DCS requirements is demonstrated when, for each source, the sum of the fractional DCS values is less than 1.00 based on rolling twelve-month average concentrations. Because of the nature of the operations and the application of DCSs at the release point, airborne tritium concentrations routinely exceed airborne tritium DCSs. Tritium compliance with DOE Order 458.1 is achieved by maintaining tritium releases ALARA.

Through July, the estimated TED from the site's radiological liquid emissions was 1.86E-03 mrem and from the site's radiological airborne emissions was 1.68E-02 mrem. Through July, one airborne effluent location (291-F stack) exceeded the DCS requirement and one airborne effluent stack (291-H stack) exceeded the ALARA guide. These exceedances are discussed below. The site-wide overall year-to-date (YTD) ALARA Guides for liquid and air have not been exceeded.

COMPLIANCE STATUS AND PROPOSED ACTIONS

This section includes source-specific information that impacts the current compliance status for July's report.

No samples were acquired at liquid effluent location **S-04** for June and July due to equipment failure at the location. As a result, a management field observation (2019-MFO-012843) was performed and corrective actions were initiated. The equipment at this location has subsequently been repaired and samples are being acquired. Radionuclide concentrations downstream of S-04 were monitored at stream surveillance locations G-010, FM-A7, and FM-6 for the months of June and July. The radionuclide concentrations were within historical trends and none of the radionuclide concentrations were above the DOE recommended DCS (Derived Concentration Standard).

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

As stated last month, the uranium-234 analytical data for one sample from liquid effluent outfall **F-012** was not available from the laboratory for the June report. This data has been received and is reflected in this July report.

The custody of the sample for the July 3 – July 11 airborne effluent sample from the Tritium Facilities' **264-H stack** was not maintained. A STAR action item (2019-CTS-007373) was created to document this issue. As a result of the loss of sample custody, no sample was processed for this time period. Releases will be adjusted for annual reporting purposes.

The **291-H stack** releases continue to indicate an increasing trend due to elevated iodine-129. The H-Area Airborne ALARA guide has been exceeded with the dose through July 121% and the projected annual dose 207% of the 1.88E-03 mrem ALARA guide. The facility ECA provided an exceedance investigation which stated the following:

> "A correlation has not been established between process operations and increases in iodine emissions based 2019 investigations. However, like in F Area, Iodine-129 will continue to be the predominant contributor to dose contributions based on processing used nuclear fuels. An Idaho National Laboratory report (INL/EXT-13-30119) entitled, "Iodine Pathways and Off-Gas Stream Characteristics for Aqueous Reprocessing Plants – A Literature Survey and Assessment", suggest that 95 -99% of the Iodine is evolved from dissolver solutions into the off-gas system; and that the 40-50% remaining Iodine is emitted by way of the Process Vessel Vent which has a higher flow rate. This trend will continue as more used nuclear fuel is processed and stored in H Canyon. Environmental Compliance, Rad Protection, H Canyon Operations, and Engineering propose changing the goal back to the 2017 Value [of 5.00E-03 mrem/yr]."

The Environmental ALARA Committee chairperson will request approval from the Site ALARA Committee of this H-Area airborne ALARA guide increase from 1.88E-03 to 5.00E-3 mrem per year.

As discussed in previous monthly reports, the airborne effluent source **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017. The rolling 12-month DCS sum of fractions is currently 2.01. This is a slight decrease from last month's value of 2.11 and still above 1.00. Actinides are the primary contributors to the 291-F sum of fractions. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum in May 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through May of 2018. In June 2018, a full timeline of the exceedance investigation (SRNS-J2220-2018-00234) was provided by the facility ECA and was included as an attachment to the April 2018 monthly report. Exceedance investigation addendums, SRNS-J2220-2018-00271, SRNS-J2220-2018-00309, SRNS-J2600-2018-00028, SRNS-J2600-2018-00061, SRNS-J2600-2018-00119, SRNS-J2600-2018-00124, SRNS-J2600-2019-00004, SRNS-J2600-2019-00064, SRNS-J2600-2019-00121, SRNS-J2600-2019-00172, SRNS-J2600-2019-00225, SRNS-J2600-2019-00259, SRNS-J2600-2019-00303, SRNS-J2600-2019-00350, and SRNS-J2600-2019-00396 were submitted in the months of July 2018 through September 2019. The June 2018 full timeline exceedance investigation and subsequent addendums are attached to this report. ALARA principles were utilized to determine the safest pathforward. The associated risks (i.e., worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility.

In addition to DOE Order 458.1 requirements, the **291-F stack** environmental compliance sample of record results continue to contribute to the SRS maximally exposed individual dose under the U.S. Environmental Protection Agency's (EPA's) 40 Code of Federal Regulations (CFR) 61 Subpart H. The environmental compliance sample of record analytical results are also used to determine the source's Potential Impact Category (PIC) under 40 CFR 61 Subpart H. The source is currently a PIC 2 source.

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

GENERAL INFORMATION:

The monthly radioactive releases report is generated as part of the Savannah River Site Radiological Effluent Monitoring Program and the Environmental ALARA Program. The releases apply only to measured, direct discharges from site facilities. Radionuclide quantities that are calculated from fugitive sources and migration from site seepage basins and solid waste disposal areas are not included. Also excluded from the dose estimates are unidentified alpha and beta releases (explained in more detail in the next section), and releases of radionuclides (e.g., krypton-85) that cannot be directly (or practically) measured in facility effluents, using routine radioanalytical methods.

With the exception of tritium releases, the stack emissions reported in the airborne monthly radioactive release report represent only the emissions that occur during the respective sampling period. The emissions for missing data (e.g., when sampling equipment malfunctions) for continuous monitoring and the emissions from the time periods between sampling for periodic monitoring is not included herein.

However, official year-end dose estimates, including the monitored, fugitive, migration, unidentified alpha and beta, and calculated releases, and their annual totals based on actual operations, are published in the SRS Annual Environmental Report. The dose estimates in this monthly report, which allow for trending and management oversight on a monthly basis, are expected to differ from the official values reported in the SRS Annual Environmental Report. The monthly radiological release reports can be found online at http://shrine01.srs.gov/eshqa/EPD/radreleases/index.html.

The environmental dose-factors used in this report are applicable only to establishing and trending of facility releases. Because of the conservative, a priori assumptions made during the calculation of these dose-factors, they are not applicable for use in any other release scenario. If you have questions or needs concerning environmental dose determinations, contact Savannah River National Laboratory (SRNL) Environmental Science and Biotechnology.

GROSS ALPHA AND BETA ANALYSIS RESULTS:

The current reporting protocol for the gross alpha and gross beta results includes reporting and documentation of all significant results. These results are being reported for information only; they are not to be used for dose determinations, facility trending, or for determining DCS compliance. The radionuclide-specific results have not been subtracted from these gross values.

DERIVED CONCENTRATION TECHNICAL STANDARDS (DCS, previously derived concentration guides)

DOE Order 458.1 requires that Best Available Technology (BAT) be used if, at a point of discharge, the 12-month average concentration of a given radionuclide, excluding tritium, is greater than the DOE-approved Derived Concentration Technical Standard (DCS) value for water. Additionally, for multiple radionuclides, the composite DCS must be the sum of the fractional DCS values derived from DOE-approved DCS values (provided in DOE-STD-1196-2011). Similarly, as part of the SRS Environmental ALARA program, SRS 12-month average concentrations of airborne effluent radionuclides are compared to the DOE-DCS values for airborne effluents to determine if corrective actions or additional treatment technology is required. DCS monitoring points directly coincide with all official liquid and airborne effluent monitoring locations. DCS compliance is demonstrated when the sum of the fractional DCS values (based on a rolling twelve-month average concentrations) for all radionuclides detectable in the effluent is less than 1.00.

CONVENTIONS:

This report incorporates the DCS values, dose conversion factors (DCFs), and revised ALARA guides per SRNL-L4310-2012-00007, SRNS-J2230-2017-00028, SRNS-J2230-2014-00024, SRNL-L4310-2014-00026, SRNL-L4310-2014-00031, and SRNS-J2230-2019-00006. The DCS values for each point of discharge (explained above) are in accordance with DOE Order 458.1 and DOE-STD-1196-2011. The revision of the SRS ALARA Release Guides Dose-Factors was prompted by the use of more conservative site-specific reference person usage parameters (SRNL-STI-2013-00115) to show compliance with DOE Order 458.1 and an update to the SRS 5-year meteorological dataset (SRNL-L2200-2014-00032 and SRNL-L2200-2013-00055). In addition to historical releases and projected CY2019 releases, these dose factors were taken into consideration by the Environmental Compliance Authorities (ECAs) for each SRS operating area during development of the 2019 Environmental ALARA Guides. It is important to note that the ALARA airborne dose factors shown in the MRRR for DOE Order 458.1 compliance can differ significantly from the National Emission Standards for Hazardous Air Pollutants Area Specific Dose Release Factors for 40 CFR 61 Subpart H evaluations.

In this report, when the analytical result is not statistically significant and/or is below the detection limit of the radioanalytical method used, the quantity released is reported as 0.00 curies. Refer to 2017 Environmental Monitoring Program Data Report (http://www.srs.gov/general/pubs/ERsum/er17/docs/Environmental-Data-Report-17.pdf) for the most recent listing of the representative minimum detectable concentrations for radiological analyses.

For the comparison of liquid and airborne effluent concentrations to the applicable DCS, all quantifiable concentration values (including negative concentrations, which regularly occur when the effluent sample counts are at or less than background counts) are reported and included in the 12-month averages. This is in accordance with DOE-HDBK-1216-2015, section 8.5.2.

Reporting of "forced activity concentrations" (FAC) has been implemented for cobalt-60 and cesium-137. These two radionuclides were selected because of their usefulness in dose calculations, and because availability of these data allows for trending of activities below the method detection limits. However, these values typically have a significance of "NO" and may have some unusual (extremely high) uncertainties (i.e., +/-1000 percent or more) and other features that may appear anomalous. Questions or concerns about FAC results should be directed to the Environmental Bioassay Laboratory.

Several enhancements to the MRRR were incorporated beginning in April 2016. The *ALARA Guide Summary Report* section of the MRRR (liquid and airborne) now includes the YTD % of ALARA guide for each area. Also, for each source the sum of fractions excluding tritium is now included in the liquid report's *Concentrations in Site Streams and Tributaries* section. Additionally, some terminology (TED vs EDE, DCS for DCG) was revised for consistency in the (liquid and airborne) report.

Compositing for analyses is being implemented in the airborne program in an effort to reduce the associated minimum detectable concentrations (MDCs). Compositing may increase the number of detected results that are obtained which may cause some Area ALARA guides to be approached sooner. Compositing for analyses was implemented at two airborne sources beginning in April 2016. Compositing of samples from the remaining airborne sources, where feasible, was phased in during CY2017.

Since ALARA guides are already challenging, beginning with the January 2017 report, only actual year-to-date exceedances of ALARA guides will be discussed in the MRRR and projected exceedances will be discussed when

historical data trend/out of norm results indicate that facility issues need to be addressed. Exceedance investigations with appropriate ECA and facility personnel will be followed according to 3Q 18.5 protocol.

Beginning in June 2018, the sum of fractions excluding tritium is included in the air report's *Concentrations in Site Stacks* section.

Beginning in January 2019, Z-Basin concentrations are reflected in the liquid report's *Concentrations in Site Streams and Tributaries* section.

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
ALARA Guide Summary Report for All Areas
July 2019

Area	YTD TED (mrem)	Projected Annual TED (mrem/yr)	Alara Guide (mrem/yr)	YTD % of Guide	Projected % of Guide
A-Area	5.17E-06	8.87E-06	6.00E-05	8.6%	14.8%
F-Area	2.11E-04	3.62E-04	5.20E-04	40.6%	69.6%
F-Tk Frm	1.49E-04	2.56E-04	1.00E-03	14.9%	25.6%
H-Area	5.76E-05	9.87E-05	1.04E-03	5.5%	9.5%
H-ETP	2.58E-04	4.43E-04	7.25E-03	3.6%	6.1%
H-Tk Frm	1.16E-03	1.99E-03	8.65E-03	13.4%	23.0%
K-Area	0.00E+00	0.00E+00	8.55E-06	0.0%	0.0%
L-Area	0.00E+00	0.00E+00	7.08E-05	0.0%	0.0%
S-Area	2.29E-06	3.93E-06	1.50E-04	1.5%	2.6%
Tritium	1.77E-05	3.03E-05	3.00E-04	5.9%	10.1%
Site Totals:	1.86E-03	3.19E-03	1.90E-02	9.8%	16.8%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
ALARA Guide Summary Report
July 2019

Area	Discharge Point	YTD TED (mrem)
A-Area	TB-2 Outfall at Road 1A	5.17E-06
	Total TED =	5.17E-06
	Projected Annual TED(mrem/yr) =	8.87E-06
	ALARA Guide (mrem/yr) =	6.00E-05
	YTD % of Guide =	8.6%
	Projected % of Guide =	14.8%
F-Area	F-013 200-F Cooling Basin	1.15E-04
	F-05	1.37E-05
	FM-3 F-Area Effluent	8.27E-05
	Total TED =	2.11E-04
	Projected Annual TED(mrem/yr) =	3.62E-04
	ALARA Guide (mrem/yr) =	5.20E-04
	YTD % of Guide =	40.6%
	Projected % of Guide =	69.6%
F-Tk Frm	F-012 281-8F Retention Basin	1.49E-04
	Total TED =	1.49E-04
	Projected Annual TED(mrem/yr) =	2.56E-04
	ALARA Guide (mrem/yr) =	1.00E-03
	YTD % of Guide =	14.9%
	Projected % of Guide =	25.6%
H-Area	FM-1C H-Area Effluent	5.29E-05
	H-04	4.71E-06
	Total TED =	5.76E-05
	Projected Annual TED(mrem/yr) =	9.87E-05
	ALARA Guide (mrem/yr) =	1.04E-03
	YTD % of Guide =	5.5%
	Projected % of Guide =	9.5%
H-ETP	U3R-2A ETP Outfall at Road C	2.58E-04
	Total TED =	2.58E-04
	Projected Annual TED(mrem/yr) =	4.43E-04
	ALARA Guide (mrem/yr) =	7.25E-03
	YTD % of Guide =	3.6%
	Projected % of Guide =	6.1%

Liquid Discharges
ALARA Guide Summary Report
July 2019

Area	Discharge Point	YTD TED (mrem)
H-Tk Frm	H-017 H-Retention Basin	1.16E-03
	HP-52 H-Area Tank Farm	3.77E-06
	Total TED =	1.16E-03
	Projected Annual TED(mrem/yr) =	1.99E-03
	ALARA Guide (mrem/yr) =	8.65E-03
	YTD % of Guide =	13.4%
	Projected % of Guide =	23.0%
K-Area	K Canal	0.00E+00
	Total TED =	0.00E+00
	Projected Annual TED(mrem/yr) =	0.00E+00
	ALARA Guide (mrem/yr) =	8.55E-06
	YTD % of Guide =	0.0%
	Projected % of Guide =	0.0%
L-Area	L-07	0.00E+00
	Total TED =	0.00E+00
	Projected Annual TED(mrem/yr) =	0.00E+00
	ALARA Guide (mrem/yr) =	7.08E-05
	YTD % of Guide =	0.0%
	Projected % of Guide =	0.0%
S-Area	S-04	2.29E-06
	Total TED =	2.29E-06
	Projected Annual TED(mrem/yr) =	3.93E-06
	ALARA Guide (mrem/yr) =	1.50E-04
	YTD % of Guide =	1.5%
	Projected % of Guide =	2.6%
Tritium	HP-15 Outfall	1.77E-05
	Total TED =	1.77E-05
	Projected Annual TED(mrem/yr) =	3.03E-05
	ALARA Guide (mrem/yr) =	3.00E-04
	YTD % of Guide =	5.9%
	Projected % of Guide =	10.1%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
A-Area	TB-2 Outfall at Road 1A	C-14	0.00E+00	1.74E-04	1.57E-06
		U-234	3.67E-06	1.11E-05	2.00E-06
		U-238	2.28E-06	9.79E-06	1.08E-06
		Pu-238	0.00E+00	1.14E-06	5.26E-07
		Gross B	6.24E-05	3.64E-04	0.00E+00
		Gross A	2.79E-05	1.29E-04	0.00E+00
				TOTAL =	5.17E-06
F-Area	F-013 200-F Cooling Basin	H-3	2.24E-03	4.20E-02	5.72E-07
		Cs-137	0.00E+00	2.44E-04	1.12E-04
		U-234	0.00E+00	3.60E-06	6.48E-07
		U-235	0.00E+00	2.50E-07	2.74E-08
		U-238	1.44E-07	3.59E-06	3.94E-07
		Pu-238	0.00E+00	1.09E-06	5.01E-07
		Pu-239	0.00E+00	2.37E-07	1.21E-07
		Gross B	1.13E-05	1.72E-04	0.00E+00
				TOTAL =	1.15E-04
	F-05	H-3	0.00E+00	2.87E-03	3.91E-08
		Tc-99	0.00E+00	1.01E-05	7.87E-06
		U-234	0.00E+00	7.71E-08	1.39E-08
		U-238	0.00E+00	1.03E-07	1.14E-08
		Pu-238	0.00E+00	3.22E-08	1.48E-08
		Sr-89/90	0.00E+00	3.38E-05	5.75E-06
		Gross B	0.00E+00	7.24E-05	0.00E+00
				TOTAL =	1.37E-05
	FM-3 F-Area Effluent	H-3	7.95E-03	3.10E-02	4.21E-07
		Tc-99	0.00E+00	1.02E-04	7.97E-05
		U-234	6.20E-07	6.87E-06	1.24E-06
		U-238	5.23E-07	6.63E-06	7.29E-07
		Pu-238	6.72E-07	1.22E-06	5.60E-07
		Gross B	4.31E-05	4.20E-04	0.00E+00
		Gross A	0.00E+00	1.10E-04	0.00E+00
				TOTAL =	8.27E-05

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
F-Tk Frm	F-012 281-8F Retention Basin	H-3	0.00E+00	3.42E-03	4.66E-08
		Cs-137	1.05E-04	3.24E-04	1.49E-04
		U-234	0.00E+00	5.37E-07	9.67E-08
		U-238	6.95E-07	1.23E-06	1.36E-07
		Gross B	1.36E-04	3.01E-04	0.00E+00
				TOTAL =	1.49E-04
H-Area	FM-1C H-Area Effluent	H-3	1.39E-01	3.35E-01	4.56E-06
		U-234	0.00E+00	3.05E-06	5.48E-07
		U-238	0.00E+00	3.73E-06	4.10E-07
		Np-237	0.00E+00	2.92E-07	6.73E-08
		Pu-238	9.31E-06	2.05E-05	9.43E-06
		Pu-239	5.39E-07	1.06E-06	5.43E-07
		Am-241	1.96E-06	4.02E-06	3.82E-06
		Cm-244	5.92E-07	1.22E-06	3.30E-07
		Sr-89/90	9.77E-05	1.95E-04	3.32E-05
		Gross B	3.24E-04	7.67E-04	0.00E+00
		Gross A	1.60E-04	1.72E-04	0.00E+00
				TOTAL =	5.29E-05
	H-04	H-3	3.84E-03	2.17E-01	2.95E-06
		U-234	4.47E-07	8.12E-06	1.46E-06
		U-235	0.00E+00	2.63E-07	2.89E-08
		U-238	8.59E-08	1.35E-06	1.49E-07
		Pu-238	0.00E+00	2.67E-07	1.23E-07
		Gross B	0.00E+00	1.65E-05	0.00E+00
		Gross A	0.00E+00	1.20E-06	0.00E+00
				TOTAL =	4.71E-06
H-ETP	U3R-2A ETP Outfall at Road C	H-3	7.55E+00	1.85E+01	2.51E-04
		C-14	0.00E+00	1.78E-05	1.61E-07
		Cs-137	0.00E+00	1.41E-05	6.48E-06
		U-234	5.04E-08	4.00E-07	7.20E-08
		U-238	1.02E-07	5.73E-07	6.30E-08
		Gross B	4.63E-06	1.15E-05	0.00E+00
				TOTAL =	2.58E-04

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
H-Tk Frm	H-017 H-Retention Basin	H-3	2.96E-02	1.62E-01	2.21E-06
		Tc-99	0.00E+00	3.59E-05	2.80E-05
		I-129	0.00E+00	1.24E-05	5.10E-06
		Cs-137	6.63E-04	2.38E-03	1.09E-03
		U-234	5.91E-07	9.03E-06	1.62E-06
		U-238	6.90E-07	7.16E-06	7.88E-07
		Pu-238	2.04E-06	1.19E-05	5.47E-06
		Pu-239	0.00E+00	3.62E-07	1.85E-07
		Sr-89/90	3.01E-05	1.30E-04	2.22E-05
		Gross B	4.31E-04	2.02E-03	0.00E+00
		Gross A	8.29E-06	2.32E-05	0.00E+00
				TOTAL =	1.16E-03
H-Tk Frm	HP-52 H-Area Tank Farm	H-3	8.67E-04	1.49E-01	2.02E-06
		U-234	1.04E-08	2.51E-06	4.51E-07
		U-238	1.22E-08	2.72E-06	2.99E-07
		Pu-238	1.26E-08	1.03E-06	4.72E-07
		Am-241	2.11E-08	5.55E-07	5.27E-07
		Gross B	1.37E-06	4.52E-04	0.00E+00
		Gross A	0.00E+00	8.96E-05	0.00E+00
				TOTAL =	3.77E-06
K-Area	K Canal	Gross B	7.95E-05	6.69E-04	0.00E+00
				TOTAL =	0.00E+00
L-Area	L-07	Gross B	2.12E-03	9.72E-03	0.00E+00
				TOTAL =	0.00E+00
S-Area	S-04	H-3	0.00E+00	9.24E-02	1.26E-06
		U-234	0.00E+00	2.61E-06	4.69E-07
		U-238	0.00E+00	3.18E-06	3.50E-07
		Pu-238	0.00E+00	4.70E-07	2.16E-07
		Gross B	0.00E+00	7.48E-04	0.00E+00
		Gross A	0.00E+00	8.50E-05	0.00E+00
				TOTAL =	2.29E-06

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
Tritium	HP-15 Outfall	H-3	4.17E-01	1.30E+00	1.77E-05
		Gross B	0.00E+00	6.26E-05	0.00E+00
				TOTAL =	1.77E-05

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = A-Area							
TB-2 Outfall at Road 1A	H-3	-5.04E-09	1.38E-07	8.75E-08	3.63E-08	1.90E-03	4.60E-05
	Tc-99	2.26E-10	5.53E-10	1.80E-09	2.28E-10	4.40E-05	4.09E-05
	C-14	-4.05E-10	4.37E-09	4.48E-10	1.28E-09	6.20E-05	7.22E-06
	Co-60	-3.76E-10	1.91E-09	3.02E-10	5.77E-10	7.20E-06	4.20E-05
	I-129	3.32E-10	2.77E-10	1.78E-10	1.30E-10	3.30E-07	5.38E-04
	Cs-137	-2.98E-09	2.45E-09	-5.37E-10	6.18E-10	3.00E-06	0.00E+00
	U-234	1.37E-10	1.97E-11	8.72E-11	4.58E-12	6.80E-07	1.28E-04
	U-235	6.60E-12	3.84E-12	4.47E-12	9.98E-13	7.20E-07	6.21E-06
	U-238	8.55E-11	1.36E-11	7.30E-11	4.03E-12	7.50E-07	9.74E-05
	Pu-238	9.24E-12	4.63E-12	1.08E-11	1.50E-12	1.50E-07	7.23E-05
	Pu-239	-1.55E-12	1.61E-12	1.29E-12	6.84E-13	1.40E-07	9.25E-06
	Gross B	2.34E-09	4.17E-10	1.67E-09	1.01E-10	0.00E+00	0.00E+00
	Gross A	1.04E-09	3.26E-10	7.39E-10	7.59E-11	0.00E+00	0.00E+00
					Sum of Fractions :		9.88E-04
					Sum of Fractions Excluding H-3:		9.42E-04
Area = E-Area							
E-01 : SWDF Basin South	H-3	1.65E-06	1.73E-07	2.59E-06	5.69E-08	1.90E-03	1.36E-03
	Tc-99	1.06E-09	8.28E-10	2.29E-09	2.64E-10	4.40E-05	5.20E-05
	C-14	7.25E-09	4.50E-09	5.53E-09	1.23E-09	6.20E-05	8.92E-05
	Co-60	1.65E-09	1.63E-09	9.10E-10	5.83E-10	7.20E-06	1.26E-04
	Cs-137	-2.48E-09	1.99E-09	6.73E-10	6.44E-10	3.00E-06	2.24E-04
	Sr-89/90	5.87E-10	5.03E-10	3.34E-10	1.15E-10	1.10E-06	3.04E-04
	Gross B	2.60E-09	6.94E-10	2.78E-09	1.83E-10	0.00E+00	0.00E+00
	Gross A	7.82E-11	1.66E-10	2.54E-10	7.00E-11	0.00E+00	0.00E+00
					Sum of Fractions :		2.16E-03
					Sum of Fractions Excluding H-3:		7.95E-04
E-02 : SWDF Basin North	H-3	7.42E-06	2.86E-07	8.19E-06	8.57E-08	1.90E-03	4.31E-03
	Tc-99	6.11E-10	8.20E-10	2.61E-09	2.70E-10	4.40E-05	5.93E-05
	C-14	-7.68E-10	4.38E-09	-1.15E-09	1.25E-09	6.20E-05	0.00E+00
	Co-60	2.30E-09	1.93E-09	5.02E-10	5.81E-10	7.20E-06	6.97E-05
	Cs-137	-5.11E-09	2.16E-09	-1.49E-11	6.28E-10	3.00E-06	0.00E+00
	Sr-89/90	-2.98E-10	4.42E-10	1.94E-10	1.10E-10	1.10E-06	1.77E-04
	Gross B	4.09E-09	7.92E-10	3.00E-09	1.84E-10	0.00E+00	0.00E+00
	Gross A	5.68E-10	3.29E-10	4.34E-10	8.54E-11	0.00E+00	0.00E+00
					Sum of Fractions :		4.61E-03
					Sum of Fractions Excluding H-3:		3.06E-04

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = E-Area							
E-03 : EAV Basin South	H-3	1.89E-06	1.84E-07	4.66E-06	8.10E-08	1.90E-03	2.46E-03
	Tc-99	1.13E-09	8.29E-10	2.96E-09	3.53E-10	4.40E-05	6.73E-05
	C-14	-7.10E-09	4.63E-09	-3.56E-09	1.43E-09	6.20E-05	0.00E+00
	Co-60	-4.30E-10	1.78E-09	6.77E-11	6.73E-10	7.20E-06	9.40E-06
	Cs-137	-6.19E-10	2.30E-09	-5.11E-10	7.33E-10	3.00E-06	0.00E+00
	Sr-89/90	2.77E-09	6.65E-10	2.49E-09	1.89E-10	1.10E-06	2.26E-03
	Gross B	6.88E-09	9.42E-10	7.08E-09	2.84E-10	0.00E+00	0.00E+00
	Gross A	5.40E-10	3.14E-10	6.50E-10	1.04E-10	0.00E+00	0.00E+00
					Sum of Fractions	:	4.79E-03
					Sum of Fractions Excluding H-3:		2.34E-03
E-04 : EAV Basin North	H-3	5.94E-06	2.60E-07	7.80E-06	8.34E-08	1.90E-03	4.11E-03
	Tc-99	-7.35E-10	8.04E-10	1.46E-09	2.59E-10	4.40E-05	3.32E-05
	C-14	-6.64E-09	4.98E-09	-5.18E-10	1.33E-09	6.20E-05	0.00E+00
	Co-60	3.43E-09	1.96E-09	-1.34E-10	5.95E-10	7.20E-06	0.00E+00
	Cs-137	-7.76E-11	2.25E-09	4.90E-10	6.33E-10	3.00E-06	1.63E-04
	Sr-89/90	-6.64E-10	4.33E-10	-1.87E-11	1.16E-10	1.10E-06	0.00E+00
	Gross B	2.95E-09	7.18E-10	2.25E-09	1.75E-10	0.00E+00	0.00E+00
	Gross A	3.87E-10	2.73E-10	3.22E-10	7.61E-11	0.00E+00	0.00E+00
					Sum of Fractions	:	4.30E-03
					Sum of Fractions Excluding H-3:		1.97E-04
E-05	H-3	6.27E-06	2.62E-07	4.32E-06	7.22E-08	1.90E-03	2.28E-03
	Tc-99	2.26E-09	9.37E-10	1.71E-09	2.91E-10	4.40E-05	3.88E-05
	C-14	-3.56E-09	4.68E-09	2.56E-10	1.31E-09	6.20E-05	4.13E-06
	Co-60	3.28E-09	1.82E-09	9.21E-10	6.58E-10	7.20E-06	1.28E-04
	Cs-137	-1.36E-09	2.21E-09	3.09E-09	8.88E-10	3.00E-06	1.03E-03
	Sr-89/90	-5.25E-10	4.46E-10	2.03E-10	1.27E-10	1.10E-06	1.84E-04
	Gross B	2.48E-09	6.88E-10	5.35E-09	2.65E-10	0.00E+00	0.00E+00
	Gross A	5.54E-10	3.21E-10	7.69E-10	1.24E-10	0.00E+00	0.00E+00
					Sum of Fractions	:	3.66E-03
					Sum of Fractions Excluding H-3:		1.39E-03

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

		--- Report Month ---		---- 12 Month ----			
Discharge Point	Nuclide	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = F-Area							
F-013 200-F Cooling Basin	H-3	6.39E-07	1.34E-07	1.09E-06	4.55E-08	1.90E-03	5.72E-04
	Tc-99	4.47E-11	8.00E-10	9.84E-10	2.41E-10	4.40E-05	2.24E-05
	Co-60	-4.67E-09	2.05E-09	-2.08E-10	5.78E-10	7.20E-06	0.00E+00
	I-129	-2.11E-10	2.71E-10	-8.60E-12	1.34E-10	3.30E-07	0.00E+00
	Cs-137	2.99E-09	2.56E-09	5.87E-09	8.26E-10	3.00E-06	1.96E-03
	U-234	2.30E-11	1.45E-11	9.73E-11	9.20E-12	6.80E-07	1.43E-04
	U-235	0.00E+00	8.95E-12	9.67E-12	3.64E-12	7.20E-07	1.34E-05
	U-238	4.12E-11	2.05E-11	1.01E-10	9.28E-12	7.50E-07	1.34E-04
	Np-237	3.13E-12	1.13E-11	2.17E-15	3.29E-12	3.20E-07	6.77E-09
	Pu-238	3.70E-11	1.98E-11	4.14E-11	6.29E-12	1.50E-07	2.76E-04
	Pu-239	2.16E-11	1.77E-11	1.97E-11	4.18E-12	1.40E-07	1.41E-04
	Am-241	4.48E-11	2.43E-11	1.38E-11	3.77E-12	1.70E-07	8.13E-05
	Cm-244	1.02E-11	1.02E-11	3.31E-12	2.77E-12	2.60E-07	1.27E-05
	Sr-89/90	1.94E-10	1.05E-09	8.74E-10	2.75E-10	1.10E-06	7.94E-04
	Gross B	3.22E-09	1.24E-09	4.20E-09	3.66E-10	0.00E+00	0.00E+00
	Gross A	4.78E-11	3.44E-10	3.26E-10	1.26E-10	0.00E+00	0.00E+00
				Sum of Fractions		:	4.15E-03
				Sum of Fractions Excluding H-3:			3.57E-03
Area = F-Area							
F-05	H-3	0.00E+00	0.00E+00	1.84E-06	1.04E-07	1.90E-03	9.70E-04
	Tc-99	0.00E+00	0.00E+00	3.54E-09	4.72E-10	4.40E-05	8.05E-05
	C-14	0.00E+00	0.00E+00	-1.61E-09	2.40E-09	6.20E-05	0.00E+00
	Co-60	0.00E+00	0.00E+00	1.49E-09	1.17E-09	7.20E-06	2.07E-04
	I-129	0.00E+00	0.00E+00	3.74E-10	3.00E-10	3.30E-07	1.13E-03
	Cs-137	0.00E+00	0.00E+00	1.02E-09	1.22E-09	3.00E-06	3.40E-04
	U-234	0.00E+00	0.00E+00	5.12E-11	7.70E-12	6.80E-07	7.52E-05
	U-235	0.00E+00	0.00E+00	4.15E-12	1.92E-12	7.20E-07	5.77E-06
	U-238	0.00E+00	0.00E+00	6.37E-11	8.63E-12	7.50E-07	8.49E-05
	Np-237	0.00E+00	0.00E+00	7.82E-13	1.14E-12	3.20E-07	2.44E-06
	Pu-238	0.00E+00	0.00E+00	9.06E-12	2.76E-12	1.50E-07	6.04E-05
	Pu-239	0.00E+00	0.00E+00	5.18E-12	1.96E-12	1.40E-07	3.70E-05
	Am-241	0.00E+00	0.00E+00	2.38E-12	1.32E-12	1.70E-07	1.40E-05
	Cm-244	0.00E+00	0.00E+00	2.17E-12	1.13E-12	2.60E-07	8.36E-06
	Sr-89/90	0.00E+00	0.00E+00	1.70E-08	6.32E-10	1.10E-06	1.55E-02
	Gross B	0.00E+00	0.00E+00	3.71E-08	1.12E-09	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	5.44E-10	1.97E-10	0.00E+00	0.00E+00
				Sum of Fractions		:	1.85E-02
				Sum of Fractions Excluding H-3:			1.75E-02

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = F-Area							
FM-3 F-Area Effluent	H-3	5.40E-07	1.59E-07	5.05E-07	4.34E-08	1.90E-03	2.66E-04
	Tc-99	2.36E-09	1.05E-09	2.19E-09	2.59E-10	4.40E-05	4.98E-05
	C-14	-6.12E-10	4.61E-09	-1.47E-09	1.31E-09	6.20E-05	0.00E+00
	Co-60	1.68E-09	2.09E-09	-3.65E-11	5.95E-10	7.20E-06	0.00E+00
	I-129	2.00E-10	2.73E-10	3.14E-10	1.37E-10	3.30E-07	9.52E-04
	Cs-137	-1.63E-09	2.38E-09	8.70E-10	6.38E-10	3.00E-06	2.90E-04
	U-234	4.21E-11	9.06E-12	7.30E-11	4.56E-12	6.80E-07	1.07E-04
	U-235	6.58E-13	2.47E-12	2.74E-12	8.61E-13	7.20E-07	3.80E-06
	U-238	3.56E-11	7.75E-12	7.41E-11	4.46E-12	7.50E-07	9.88E-05
	Np-237	8.36E-12	5.01E-12	1.61E-12	8.23E-13	3.20E-07	5.05E-06
	Pu-238	4.57E-11	1.05E-11	1.12E-11	1.65E-12	1.50E-07	7.48E-05
	Pu-239	4.14E-12	3.29E-12	5.12E-12	1.06E-12	1.40E-07	3.66E-05
	Am-241	-3.64E-12	2.81E-12	3.18E-12	9.21E-13	1.70E-07	1.87E-05
	Cm-244	1.54E-12	1.55E-12	2.52E-12	8.65E-13	2.60E-07	9.70E-06
	Sr-89/90	2.58E-10	2.01E-10	2.19E-10	5.80E-11	1.10E-06	1.99E-04
	Gross B	2.93E-09	7.22E-10	3.68E-09	2.20E-10	0.00E+00	0.00E+00
	Gross A	7.80E-10	4.25E-10	1.09E-09	1.30E-10	0.00E+00	0.00E+00
						Sum of Fractions :	2.11E-03
						Sum of Fractions Excluding H-3:	1.85E-03
Area = F-Tank Farm							
F-012 281-8F Retention Basin	H-3	2.75E-07	1.22E-07	5.07E-07	5.52E-08	1.90E-03	2.67E-04
	Tc-99	2.39E-10	8.16E-10	7.42E-10	3.32E-10	4.40E-05	1.69E-05
	Co-60	2.44E-09	2.03E-09	1.58E-09	7.78E-10	7.20E-06	2.19E-04
	I-129	-5.83E-11	3.15E-10	5.83E-11	1.85E-10	3.30E-07	1.77E-04
	Cs-137	1.13E-08	3.31E-09	1.25E-08	1.52E-09	3.00E-06	4.15E-03
	U-234	2.77E-11	1.86E-11	6.57E-11	1.10E-11	6.80E-07	9.66E-05
	U-235	2.07E-11	1.47E-11	1.58E-11	5.68E-12	7.20E-07	2.20E-05
	U-238	7.53E-11	2.63E-11	8.12E-11	1.16E-11	7.50E-07	1.08E-04
	Np-237	0.00E+00	8.82E-12	1.01E-11	5.50E-12	3.20E-07	3.17E-05
	Pu-238	3.31E-11	1.89E-11	4.03E-11	8.56E-12	1.50E-07	2.68E-04
	Pu-239	-5.23E-12	5.33E-12	-2.37E-12	4.09E-12	1.40E-07	0.00E+00
	Am-241	-1.68E-11	1.19E-11	-5.34E-12	4.02E-12	1.70E-07	0.00E+00
	Cm-244	2.48E-11	1.76E-11	3.22E-12	4.24E-12	2.60E-07	1.24E-05
	Sr-89/90	9.00E-10	1.11E-09	1.57E-09	4.10E-10	1.10E-06	1.43E-03
	Gross B	1.47E-08	1.93E-09	9.83E-09	6.28E-10	0.00E+00	0.00E+00
	Gross A	3.99E-11	3.33E-10	9.11E-11	1.20E-10	0.00E+00	0.00E+00
						Sum of Fractions :	6.80E-03
						Sum of Fractions Excluding H-3:	6.53E-03

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = H-Area							
FM-1C H-Area Effluent	H-3	3.11E-06	2.13E-07	2.42E-06	5.41E-08	1.90E-03	1.27E-03
	C-14	-7.04E-10	4.43E-09	8.21E-10	1.27E-09	6.20E-05	1.32E-05
	Co-60	1.92E-10	2.07E-09	5.07E-12	5.87E-10	7.20E-06	7.04E-07
	Cs-137	5.41E-09	2.21E-09	8.63E-10	6.40E-10	3.00E-06	2.88E-04
	U-234	8.59E-12	4.41E-12	3.54E-11	3.17E-12	6.80E-07	5.20E-05
	U-235	3.97E-12	2.92E-12	1.99E-12	8.02E-13	7.20E-07	2.77E-06
	U-238	5.91E-12	3.91E-12	3.81E-11	3.17E-12	7.50E-07	5.08E-05
	Np-237	4.54E-12	3.39E-12	6.24E-12	1.18E-12	3.20E-07	1.95E-05
	Pu-238	2.08E-10	2.50E-11	1.24E-10	5.74E-12	1.50E-07	8.29E-04
	Pu-239	1.20E-11	4.72E-12	1.07E-11	1.44E-12	1.40E-07	7.61E-05
	Am-241	4.37E-11	9.89E-12	2.12E-11	1.94E-12	1.70E-07	1.25E-04
	Cm-244	1.32E-11	5.30E-12	6.15E-12	1.00E-12	2.60E-07	2.37E-05
	Sr-89/90	2.18E-09	3.22E-10	1.13E-09	7.54E-11	1.10E-06	1.03E-03
	Gross B	7.23E-09	9.71E-10	4.89E-09	2.25E-10	0.00E+00	0.00E+00
	Gross A	3.57E-09	7.81E-10	1.69E-09	1.52E-10	0.00E+00	0.00E+00
				Sum of Fractions		:	3.78E-03
				Sum of Fractions Excluding H-3:			2.51E-03
Area = H-Area							
H-04	H-3	2.69E-06	2.07E-07	7.64E-06	8.18E-08	1.90E-03	4.02E-03
	Co-60	1.19E-09	2.09E-09	7.81E-10	6.01E-10	7.20E-06	1.08E-04
	Cs-137	6.10E-10	2.45E-09	3.49E-11	6.32E-10	3.00E-06	1.16E-05
	U-234	3.13E-10	5.76E-11	4.36E-10	2.00E-11	6.80E-07	6.41E-04
	U-235	4.25E-11	2.15E-11	2.95E-11	5.58E-12	7.20E-07	4.10E-05
	U-238	6.02E-11	2.31E-11	1.12E-10	9.54E-12	7.50E-07	1.50E-04
	Pu-238	4.21E-11	1.90E-11	3.70E-11	5.89E-12	1.50E-07	2.47E-04
	Pu-239	-4.12E-14	5.42E-13	5.19E-12	3.08E-12	1.40E-07	3.71E-05
	Sr-89/90	9.41E-10	1.24E-09	6.92E-10	2.72E-10	1.10E-06	6.29E-04
	Gross B	1.67E-09	1.12E-09	2.57E-09	3.21E-10	0.00E+00	0.00E+00
	Gross A	7.03E-10	5.74E-10	1.04E-09	1.83E-10	0.00E+00	0.00E+00
				Sum of Fractions		:	5.89E-03
				Sum of Fractions Excluding H-3:			1.86E-03
Area = H-ETP							
U3R-2A ETP Outfall at Road C	H-3	2.01E-03	2.03E-06	1.40E-03	5.72E-07	1.90E-03	7.37E-01
	C-14	2.02E-09	2.32E-09	3.08E-09	7.47E-10	6.20E-05	4.96E-05
	Co-60	1.31E-09	9.69E-10	4.57E-10	3.41E-10	7.20E-06	6.35E-05
	Cs-137	4.34E-09	1.43E-09	2.48E-09	4.35E-10	3.00E-06	8.27E-04
	U-234	2.51E-11	8.40E-12	7.96E-11	4.30E-12	6.80E-07	1.17E-04
	U-235	2.65E-12	4.72E-12	5.19E-12	1.50E-12	7.20E-07	7.21E-06
	U-238	3.42E-11	8.53E-12	7.90E-11	4.25E-12	7.50E-07	1.05E-04
	Np-237	3.33E-12	3.78E-12	2.95E-12	1.35E-12	3.20E-07	9.22E-06
	Pu-238	1.11E-11	5.54E-12	1.14E-11	1.90E-12	1.50E-07	7.58E-05
	Pu-239	4.02E-12	3.33E-12	5.84E-12	1.39E-12	1.40E-07	4.17E-05
	Am-241	1.65E-12	3.46E-12	1.84E-12	1.20E-12	1.70E-07	1.08E-05
	Cm-244	4.28E-12	4.30E-12	1.11E-12	1.19E-12	2.60E-07	4.27E-06
	Sr-89/90	6.46E-10	4.24E-10	5.43E-10	1.22E-10	1.10E-06	4.93E-04
	Gross B	1.35E-09	2.21E-10	7.32E-10	5.28E-11	0.00E+00	0.00E+00
	Gross A	6.87E-11	8.29E-11	3.72E-11	2.11E-11	0.00E+00	0.00E+00
				Sum of Fractions		:	7.39E-01
				Sum of Fractions Excluding H-3:			1.81E-03

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

		--- Report Month ---		---- 12 Month ----			
Discharge Point	Nuclide	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = H-Tank Farm							
H-017 H-Retention Basin	H-3	1.60E-06	1.14E-07	2.47E-06	3.97E-08	1.90E-03	1.30E-03
	Tc-99	8.27E-10	5.80E-10	2.00E-09	1.78E-10	4.40E-05	4.54E-05
	Co-60	-7.85E-12	1.50E-09	9.30E-10	4.23E-10	7.20E-06	1.29E-04
	I-129	-1.65E-10	2.11E-10	4.02E-10	8.93E-11	3.30E-07	1.22E-03
	Cs-137	3.34E-08	3.51E-09	2.60E-08	9.77E-10	3.00E-06	8.68E-03
	U-234	3.60E-11	1.26E-11	1.17E-10	7.00E-12	6.80E-07	1.71E-04
	U-235	6.69E-12	7.80E-12	8.75E-12	2.50E-12	7.20E-07	1.22E-05
	U-238	3.31E-11	1.27E-11	8.91E-11	6.13E-12	7.50E-07	1.19E-04
	Np-237	-5.00E-14	5.08E-12	4.42E-12	2.28E-12	3.20E-07	1.38E-05
	Pu-238	1.09E-10	2.32E-11	1.25E-10	7.75E-12	1.50E-07	8.31E-04
	Pu-239	-1.48E-12	9.55E-12	1.76E-11	3.10E-12	1.40E-07	1.26E-04
	Am-241	1.03E-11	8.90E-12	1.22E-11	2.77E-12	1.70E-07	7.20E-05
	Cm-244	1.79E-12	8.41E-12	1.65E-12	2.16E-12	2.60E-07	6.35E-06
	Sr-89/90	2.78E-09	8.33E-10	2.61E-09	2.30E-10	1.10E-06	2.37E-03
	Gross B	2.23E-08	7.50E-10	2.04E-08	2.11E-10	0.00E+00	0.00E+00
	Gross A	5.28E-10	1.68E-10	4.37E-10	4.72E-11	0.00E+00	0.00E+00
					Sum of Fractions :		1.51E-02
					Sum of Fractions Excluding H-3:		1.38E-02
Area = H-Tank Farm							
HP-52 H-Area Tank Farm	H-3	8.25E-07	1.55E-07	1.75E-06	5.04E-08	1.90E-03	9.24E-04
	Co-60	-1.36E-09	2.19E-09	1.99E-10	5.85E-10	7.20E-06	2.77E-05
	Cs-137	3.49E-09	2.58E-09	4.03E-09	7.17E-10	3.00E-06	1.34E-03
	U-234	9.93E-12	4.12E-12	4.28E-11	2.72E-12	6.80E-07	6.29E-05
	U-235	0.00E+00	2.03E-12	2.44E-12	8.36E-13	7.20E-07	3.38E-06
	U-238	1.16E-11	4.44E-12	4.15E-11	2.65E-12	7.50E-07	5.53E-05
	Pu-238	1.20E-11	4.42E-12	1.81E-11	1.76E-12	1.50E-07	1.21E-04
	Pu-239	-2.99E-12	1.74E-12	9.22E-13	6.47E-13	1.40E-07	6.59E-06
	Am-241	2.01E-11	6.05E-12	9.44E-12	1.27E-12	1.70E-07	5.55E-05
	Cm-244	0.00E+00	2.01E-12	1.61E-12	6.65E-13	2.60E-07	6.18E-06
	Sr-89/90	4.32E-11	2.08E-10	1.54E-10	5.25E-11	1.10E-06	1.40E-04
	Gross B	1.30E-09	2.37E-10	4.84E-09	9.68E-11	0.00E+00	0.00E+00
	Gross A	4.97E-11	7.56E-11	8.50E-10	5.51E-11	0.00E+00	0.00E+00
					Sum of Fractions :		2.74E-03
					Sum of Fractions Excluding H-3:		1.82E-03
Area = K-Area							
K Canal	H-3	9.80E-08	1.40E-07	1.60E-07	3.74E-08	1.90E-03	8.44E-05
	Co-60	-4.10E-09	2.22E-09	7.35E-10	6.14E-10	7.20E-06	1.02E-04
	Cs-137	-8.60E-10	2.39E-09	4.79E-10	6.25E-10	3.00E-06	1.60E-04
	Sr-89/90	1.23E-10	2.42E-10	2.09E-10	5.69E-11	1.10E-06	1.90E-04
	Gross B	1.62E-09	6.24E-10	2.15E-09	1.81E-10	0.00E+00	0.00E+00
	Gross A	2.61E-11	1.87E-10	1.25E-10	6.03E-11	0.00E+00	0.00E+00
					Sum of Fractions :		5.36E-04
					Sum of Fractions Excluding H-3:		4.52E-04

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = L-Area							
L-07	H-3	-1.18E-08	1.39E-07	8.88E-08	3.69E-08	1.90E-03	4.68E-05
	Co-60	-1.33E-09	2.08E-09	1.26E-09	6.02E-10	7.20E-06	1.74E-04
	Cs-137	-4.49E-10	2.23E-09	-1.39E-10	6.16E-10	3.00E-06	0.00E+00
	Sr-89/90	2.41E-11	2.38E-10	1.77E-10	5.67E-11	1.10E-06	1.61E-04
	Gross B	1.96E-09	3.92E-10	1.70E-09	1.03E-10	0.00E+00	0.00E+00
	Gross A	1.09E-10	1.39E-10	3.65E-11	2.85E-11	0.00E+00	0.00E+00
				Sum of Fractions :			3.82E-04
				Sum of Fractions Excluding H-3:			3.35E-04
Area = S-Area							
S-04	H-3	0.00E+00	0.00E+00	4.44E-06	7.20E-08	1.90E-03	2.34E-03
	Co-60	0.00E+00	0.00E+00	9.18E-10	6.62E-10	7.20E-06	1.28E-04
	Cs-137	0.00E+00	0.00E+00	9.90E-10	6.76E-10	3.00E-06	3.30E-04
	U-234	0.00E+00	0.00E+00	1.76E-10	1.32E-11	6.80E-07	2.58E-04
	U-235	0.00E+00	0.00E+00	7.34E-12	3.59E-12	7.20E-07	1.02E-05
	U-238	0.00E+00	0.00E+00	1.39E-10	1.15E-11	7.50E-07	1.85E-04
	Pu-238	0.00E+00	0.00E+00	2.28E-11	5.43E-12	1.50E-07	1.52E-04
	Pu-239	0.00E+00	0.00E+00	-7.17E-13	3.52E-12	1.40E-07	0.00E+00
	Sr-89/90	0.00E+00	0.00E+00	-7.79E-11	2.82E-10	1.10E-06	0.00E+00
	Gross B	0.00E+00	0.00E+00	2.96E-08	7.89E-10	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	4.30E-09	4.26E-10	0.00E+00	0.00E+00
				Sum of Fractions :			3.40E-03
				Sum of Fractions Excluding H-3:			1.06E-03
Area = Tritium							
HP-15 Outfall	H-3	1.51E-05	3.89E-07	9.57E-06	9.05E-08	1.90E-03	5.04E-03
	Co-60	-1.75E-10	2.23E-09	2.90E-10	5.97E-10	7.20E-06	4.02E-05
	Cs-137	-6.99E-10	2.20E-09	1.95E-11	6.29E-10	3.00E-06	6.50E-06
	Sr-89/90	1.54E-10	2.36E-10	4.82E-11	5.23E-11	1.10E-06	4.39E-05
	Gross B	1.24E-09	5.97E-10	1.72E-09	1.71E-10	0.00E+00	0.00E+00
	Gross A	2.21E-10	2.77E-10	3.08E-10	7.86E-11	0.00E+00	0.00E+00
				Sum of Fractions :			5.13E-03
				Sum of Fractions Excluding H-3:			9.06E-05

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Liquid Discharges
Concentrations in Site Streams and Tributaries
July 2019

		--- Report Month ---		---- 12 Month ----			
Discharge Point	Nuclide	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = Z-Area							
Z-Area Basin	H-3	7.28E-07	1.44E-07	1.10E-06	4.53E-08	1.90E-03	5.77E-04
	Tc-99	5.54E-09	9.23E-10	6.86E-09	3.12E-10	4.40E-05	1.56E-04
	Co-60	2.53E-09	1.83E-09	3.43E-10	6.03E-10	7.20E-06	4.76E-05
	I-129	3.50E-10	2.72E-10	2.50E-10	1.18E-10	3.30E-07	7.58E-04
	Cs-137	1.64E-07	1.37E-08	1.53E-07	3.66E-09	3.00E-06	5.09E-02
	U-234	2.33E-11	1.10E-11	5.93E-11	4.83E-12	6.80E-07	8.72E-05
	U-235	7.53E-12	5.35E-12	5.00E-12	1.44E-12	7.20E-07	6.94E-06
	U-238	1.51E-11	7.86E-12	6.07E-11	4.74E-12	7.50E-07	8.10E-05
	Np-237	3.61E-12	3.62E-12	-4.26E-13	1.20E-12	3.20E-07	0.00E+00
	Pu-238	5.96E-11	1.79E-11	3.01E-11	3.46E-12	1.50E-07	2.01E-04
	Pu-239	3.53E-12	4.30E-12	3.10E-12	1.57E-12	1.40E-07	2.21E-05
	Am-241	-3.99E-12	7.26E-12	1.19E-12	1.31E-12	1.70E-07	6.99E-06
	Cm-244	0.00E+00	7.28E-12	9.51E-13	1.11E-12	2.60E-07	3.66E-06
	Sr-89/90	-2.93E-10	4.00E-10	1.36E-10	1.00E-10	1.10E-06	1.24E-04
	Gross B	1.29E-07	3.66E-09	1.15E-07	9.44E-10	0.00E+00	0.00E+00
	Gross A	4.38E-11	1.61E-10	2.92E-10	7.66E-11	0.00E+00	0.00E+00
					Sum of Fractions :		5.30E-02
					Sum of Fractions Excluding H-3:		5.24E-02

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
ALARA Guide Summary Report for All Areas
July 2019

Area	YTD TED (mrem)	Projected Annual TED (mrem/yr)	Alara Guide (mrem/yr)	YTD % of Guide	Projected % of Guide
A-Area	4.15E-06	7.11E-06	1.25E-04	3.3%	5.7%
C-Area	8.35E-05	1.43E-04	2.31E-04	36.1%	61.9%
F-Area	1.11E-04	1.91E-04	1.87E-03	5.9%	10.2%
H-Area	2.27E-03	3.90E-03	1.88E-03	121%	207.2%
H-ETP	0.00E+00	0.00E+00	1.00E-07	0.0%	0.0%
H-Tk Frm	2.43E-09	4.17E-09	1.00E-06	0.2%	0.4%
K-Area	9.44E-04	1.62E-03	2.05E-03	46.0%	78.9%
L-Area	1.04E-03	1.78E-03	1.95E-03	53.3%	91.3%
S-Area	4.50E-07	7.72E-07	5.00E-05	0.9%	1.5%
Tritium	1.24E-02	2.12E-02	8.95E-02	13.8%	23.7%
Z-Area	4.30E-09	7.38E-09	5.00E-06	0.1%	0.1%
Site Totals:	1.68E-02	2.88E-02	9.77E-02	17.2%	29.5%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
ALARA Guide Summary Report
July 2019

Area	Discharge Point	YTD TED (mrem)
A-Area	735-A Stack	0.00E+00
	773-A B Stack	0.00E+00
	773-A C Stack	0.00E+00
	776-A Stack	0.00E+00
	791-A Sandfilter Discharge	4.15E-06
	Total TED =	4.15E-06
	Projected Annual TED(mrem/yr) =	7.11E-06
	ALARA Guide (mrem/yr) =	1.25E-04
	YTD % of Guide =	3.3%
	Projected % of Guide =	5.7%
C-Area	C-Area Main Stack (148')	8.35E-05
	Total TED =	8.35E-05
	Projected Annual TED(mrem/yr) =	1.43E-04
	ALARA Guide (mrem/yr) =	2.31E-04
	YTD % of Guide =	36.1%
	Projected % of Guide =	61.9%
F-Area	235-F Sandfilter Discharge	7.23E-08
	291-F Stack Isokinetic	1.11E-04
	772-1F Stack	0.00E+00
	772-4F Stack	2.99E-07
	Total TED =	1.11E-04
	Projected Annual TED(mrem/yr) =	1.91E-04
	ALARA Guide (mrem/yr) =	1.87E-03
	YTD % of Guide =	5.9%
	Projected % of Guide =	10.2%
H-Area	291-H Stack Isokinetic	2.27E-03
	Total TED =	2.27E-03
	Projected Annual TED(mrem/yr) =	3.90E-03
	ALARA Guide (mrem/yr) =	1.88E-03
	YTD % of Guide =	120.9%
	Projected % of Guide =	207.2%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
ALARA Guide Summary Report
July 2019

Area	Discharge Point	YTD TED (mrem)
H-ETP	241-81H ETP Process Stack	0.00E+00
	241-84H ETP Lab Stack	0.00E+00
	Total TED =	0.00E+00
	Projected Annual TED(mrem/yr) =	0.00E+00
	ALARA Guide (mrem/yr) =	1.00E-07
	YTD % of Guide =	0.0%
	Projected % of Guide =	0.0%
H-Tk Frm	241-278H CAUSTIC EXTRACTION	2.43E-09
	241-2H Mercury Stack	0.00E+00
	Total TED =	2.43E-09
	Projected Annual TED(mrem/yr) =	4.17E-09
	ALARA Guide (mrem/yr) =	1.00E-06
	YTD % of Guide =	0.2%
	Projected % of Guide =	0.4%
K-Area	K-Area Main Stack (148')	9.44E-04
	KIS Facility	1.97E-09
	Total TED =	9.44E-04
	Projected Annual TED(mrem/yr) =	1.62E-03
	ALARA Guide (mrem/yr) =	2.05E-03
	YTD % of Guide =	46.0%
	Projected % of Guide =	78.9%
L-Area	L-Area Disassembly	2.88E-06
	L-Area Main Stack (148')	1.04E-03
	Total TED =	1.04E-03
	Projected Annual TED(mrem/yr) =	1.78E-03
	ALARA Guide (mrem/yr) =	1.95E-03
	YTD % of Guide =	53.3%
	Projected % of Guide =	91.3%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
ALARA Guide Summary Report
July 2019

Area	Discharge Point	YTD TED (mrem)
S-Area	221-S Personnel Area (Zone 2)	2.07E-07
	291-S Vit. Process (Zone 1)	1.98E-07
	511-S Low Pt. Pump Pit	4.40E-08
	512-S Late Wash	1.41E-09
	Total TED =	4.50E-07
	Projected Annual TED(mrem/yr) =	7.72E-07
	ALARA Guide (mrem/yr) =	5.00E-05
	YTD % of Guide =	0.9%
	Projected % of Guide =	1.5%
Tritium	232-H (200ft)	4.25E-03
	233-H	1.26E-03
	234-H	3.67E-03
	238-H	5.16E-04
	264-H	2.66E-03
	Total TED =	1.24E-02
	Projected Annual TED(mrem/yr) =	2.12E-02
	ALARA Guide (mrem/yr) =	8.95E-02
	YTD % of Guide =	13.8%
	Projected % of Guide =	23.7%
Z-Area	210-Z Building Stack	4.29E-09
	Z201-SSRT	1.22E-11
	Total TED =	4.30E-09
	Projected Annual TED(mrem/yr) =	7.38E-09
	ALARA Guide (mrem/yr) =	5.00E-06
	YTD % of Guide =	0.1%
	Projected % of Guide =	0.1%

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
A-Area	735-A Stack	Gross B	7.66E-08	2.33E-07	0.00E+00
				TOTAL =	0.00E+00
	773-A B Stack	ALL	0.00E+00	0.00E+00	0.00E+00
				TOTAL =	0.00E+00
	773-A C Stack	Gross B	0.00E+00	2.94E-07	0.00E+00
				TOTAL =	0.00E+00
	776-A Stack	ALL	0.00E+00	0.00E+00	0.00E+00
				TOTAL =	0.00E+00
	791-A Sandfilter Discharge	I-129	0.00E+00	1.83E-07	4.15E-06
				TOTAL =	4.15E-06
C-Area	C-Area Main Stack (148')	H-3	3.27E+00	2.25E+01	8.35E-05
				TOTAL =	8.35E-05
F-Area	235-F Sandfilter Discharge	U-234	4.01E-09	4.81E-08	1.35E-08
		U-238	5.87E-09	5.40E-08	1.26E-08
		Pu-238	0.00E+00	5.22E-09	1.60E-08
		Pu-239	5.17E-09	9.05E-09	3.01E-08
		Gross B	0.00E+00	2.65E-06	0.00E+00
				TOTAL =	7.23E-08

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
F-Area	291-F Stack Isokinetic	I-129	1.07E-05	4.91E-05	3.10E-05
		Cs-137	0.00E+00	2.89E-06	5.92E-08
		U-234	3.05E-07	5.88E-06	1.65E-06
		U-235	1.96E-08	3.64E-07	9.18E-08
		U-238	3.81E-07	8.47E-06	1.98E-06
		Np-237	0.00E+00	1.80E-08	2.74E-08
		Pu-238	2.52E-08	4.23E-07	1.30E-06
		Pu-239	9.74E-07	2.14E-05	7.13E-05
		Am-241	4.00E-08	1.18E-06	3.28E-06
		Cm-244	0.00E+00	6.09E-09	1.10E-08
		Sr-89/90	0.00E+00	1.44E-06	4.30E-08
		Gross B	0.00E+00	2.03E-05	0.00E+00
		Gross A	1.32E-06	3.40E-05	0.00E+00
				TOTAL =	1.11E-04
	772-1F Stack	Gross B	2.03E-05	2.37E-05	0.00E+00
				TOTAL =	0.00E+00
	772-4F Stack	U-234	1.55E-08	6.99E-08	1.97E-08
		U-238	1.15E-08	7.40E-08	1.73E-08
		Pu-238	0.00E+00	6.00E-08	1.84E-07
		Pu-239	0.00E+00	1.19E-08	3.96E-08
		Am-241	1.67E-09	1.38E-08	3.85E-08
				TOTAL =	2.99E-07

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
H-Area	291-H Stack Isokinetic	I-129	7.51E-04	5.84E-03	2.27E-03
		Cs-137	6.38E-06	1.69E-05	2.13E-07
		U-234	4.23E-08	2.59E-07	5.08E-08
		U-238	2.79E-08	1.44E-07	2.35E-08
		Pu-238	1.06E-07	1.87E-06	4.07E-06
		Pu-239	4.36E-08	7.83E-07	1.84E-06
		Am-241	5.67E-09	5.98E-08	1.18E-07
		Sr-89/90	4.04E-06	1.49E-05	2.76E-07
		Gross B	1.08E-05	5.00E-05	0.00E+00
				TOTAL =	2.27E-03
H-ETP	241-81H ETP Process Stack	ALL	0.00E+00	0.00E+00	0.00E+00
				TOTAL =	0.00E+00
	241-84H ETP Lab Stack	ALL	0.00E+00	0.00E+00	0.00E+00
				TOTAL =	0.00E+00
H-Tk Frm	241-278H CAUSTIC EXTRACTION	Cs-137	0.00E+00	1.18E-07	1.49E-09
		U-234	2.65E-10	1.24E-09	2.44E-10
		U-238	2.78E-10	1.11E-09	1.81E-10
		Am-241	0.00E+00	2.63E-10	5.18E-10
				TOTAL =	2.43E-09
	241-2H Mercury Stack	Gross B	0.00E+00	6.68E-09	0.00E+00
				TOTAL =	0.00E+00
K-Area	K-Area Main Stack (148')	H-3	3.01E+01	2.05E+02	9.44E-04
		Gross B	6.23E-07	1.65E-06	0.00E+00
				TOTAL =	9.44E-04

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
K-Area	KIS Facility	Th-228	7.27E-11	2.34E-10	5.96E-10
		Th-230	2.85E-10	5.70E-10	5.87E-10
		Th-232	1.39E-10	3.29E-10	5.49E-10
		U-234	8.54E-11	2.70E-10	7.26E-11
		U-238	7.74E-11	2.87E-10	6.47E-11
		Pu-238	0.00E+00	3.39E-11	9.60E-11
				TOTAL =	1.97E-09
L-Area	L-Area Disassembly	H-3	1.40E-01	9.56E-01	2.88E-06
		Gross B	4.90E-08	3.22E-07	0.00E+00
		Gross A	6.81E-09	4.79E-08	0.00E+00
				TOTAL =	2.88E-06
	L-Area Main Stack (148')	H-3	4.92E+01	3.44E+02	1.04E-03
		Gross B	1.83E-06	4.27E-06	0.00E+00
				TOTAL =	1.04E-03
S-Area	221-S Personnel Area (Zone 2)	U-234	6.50E-08	2.77E-07	7.02E-08
		U-238	5.56E-08	2.43E-07	5.18E-08
		Am-241	0.00E+00	3.41E-08	8.48E-08
				TOTAL =	2.07E-07
	291-S Vit. Process (Zone 1)	U-234	8.05E-08	3.00E-07	7.63E-08
		U-238	7.29E-08	2.49E-07	5.30E-08
		Am-241	2.76E-08	2.76E-08	6.88E-08
				TOTAL =	1.98E-07

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
S-Area	511-S Low Pt. Pump Pit	U-234	1.96E-08	4.84E-08	1.23E-08
		U-238	2.19E-08	4.15E-08	8.83E-09
		Pu-238	0.00E+00	4.32E-09	1.19E-08
		Am-241	0.00E+00	4.40E-09	1.10E-08
				TOTAL =	4.40E-08
	512-S Late Wash	U-234	7.91E-10	1.89E-09	4.79E-10
		U-238	5.46E-10	1.25E-09	2.67E-10
		Am-241	0.00E+00	2.65E-10	6.61E-10
				TOTAL =	1.41E-09
Tritium	232-H (200ft)	H-3 (el)	6.40E+01	2.22E+02	3.12E-07
		H-3	2.65E+02	1.21E+03	4.25E-03
				TOTAL =	4.25E-03
	233-H	H-3 (el)	8.90E+01	6.05E+02	8.49E-07
		H-3	1.70E+02	3.60E+02	1.26E-03
				TOTAL =	1.26E-03
	234-H	H-3	1.31E+02	1.05E+03	3.67E-03
				TOTAL =	3.67E-03
	238-H	H-3	2.40E+01	1.47E+02	5.16E-04
				TOTAL =	5.16E-04

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Discharge Point Summary Report
July 2019

Area	Discharge Point	Nuclide	Quantity Released (Ci)	YTD Released (Ci)	YTD TED (mrem)
Tritium	264-H	H-3 (el)	6.00E+00	1.20E+01	1.68E-08
		H-3	0.00E+00	7.57E+02	2.66E-03
		Th-228	0.00E+00	1.73E-09	3.43E-09
		Th-230	0.00E+00	2.42E-09	1.83E-09
		Th-232	0.00E+00	1.70E-09	2.12E-09
		U-234	0.00E+00	1.47E-09	2.88E-10
		U-238	0.00E+00	1.01E-09	1.64E-10
		Gross B	1.59E-07	3.81E-06	0.00E+00
		Gross A	5.13E-08	2.85E-07	0.00E+00
				TOTAL =	2.66E-03
Z-Area	210-Z Building Stack	U-234	0.00E+00	7.69E-09	2.05E-09
		U-238	0.00E+00	9.99E-09	2.24E-09
				TOTAL =	4.29E-09
	Z201-SSRT	Pu-238	0.00E+00	1.89E-12	5.22E-12
		Am-241	0.00E+00	2.77E-12	6.93E-12
				TOTAL =	1.22E-11

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Concentrations in Site Stacks
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = A-Area							
735-A Stack	Co-60	4.95E-16	6.41E-16	5.88E-16	2.82E-16	1.20E-10	4.90E-06
	Cs-137	-1.95E-16	7.84E-16	-1.87E-17	2.60E-16	9.80E-11	0.00E+00
	Gross B	3.07E-15	1.11E-15	1.97E-15	3.27E-16	0.00E+00	0.00E+00
	Gross A	1.41E-16	2.98E-16	2.92E-16	1.37E-16	0.00E+00	0.00E+00
				Sum of Fractions:			4.90E-06
				Sum of Fractions Excluding H-3:			4.90E-06
773-A B Stack	Co-60	-5.86E-16	8.40E-16	-1.58E-16	2.40E-16	1.20E-10	0.00E+00
	Cs-137	-7.92E-16	8.06E-16	6.71E-17	2.44E-16	9.80E-11	6.85E-07
	Gross B	2.01E-15	9.94E-16	8.65E-16	2.73E-16	0.00E+00	0.00E+00
	Gross A	1.34E-16	2.82E-16	1.77E-16	1.07E-16	0.00E+00	0.00E+00
				Sum of Fractions:			6.85E-07
				Sum of Fractions Excluding H-3:			6.85E-07
773-A C Stack	Co-60	2.42E-16	6.90E-16	-2.50E-17	2.34E-16	1.20E-10	0.00E+00
	Cs-137	-1.26E-15	7.19E-16	-2.67E-16	2.40E-16	9.80E-11	0.00E+00
	Gross B	-3.06E-17	7.84E-16	1.21E-15	2.78E-16	0.00E+00	0.00E+00
	Gross A	-1.29E-16	8.27E-17	2.77E-16	1.20E-16	0.00E+00	0.00E+00
				Sum of Fractions:			0.00E+00
				Sum of Fractions Excluding H-3:			0.00E+00
776-A Stack	Co-60	5.45E-15	9.18E-15	6.74E-16	3.58E-15	1.20E-10	5.61E-06
	Cs-137	-1.91E-14	9.34E-15	-4.14E-15	3.63E-15	9.80E-11	0.00E+00
	Gross B	1.72E-14	1.30E-14	1.25E-14	4.03E-15	0.00E+00	0.00E+00
	Gross A	-1.89E-15	1.21E-15	3.37E-15	1.70E-15	0.00E+00	0.00E+00
				Sum of Fractions:			5.61E-06
				Sum of Fractions Excluding H-3:			5.61E-06
791-A Sandfilter Discharge	Co-60	-1.38E-15	2.42E-15	-4.08E-17	6.09E-16	1.20E-10	0.00E+00
	I-129	6.73E-15	1.88E-15	4.19E-15	5.01E-16	3.80E-11	1.10E-04
	Cs-137	1.91E-15	2.48E-15	1.02E-15	6.34E-16	9.80E-11	1.04E-05
	Gross B	6.93E-15	2.88E-15	4.47E-15	6.95E-16	0.00E+00	0.00E+00
	Gross A	1.64E-18	6.61E-16	3.70E-16	2.41E-16	0.00E+00	0.00E+00
				Sum of Fractions:			1.21E-04
				Sum of Fractions Excluding H-3:			1.21E-04
Area = C-Area							
C-Area Main Stack (148')	H-3	3.70E-07	N/A	3.72E-07	N/A	2.10E-07	1.77E+00
				Sum of Fractions:			1.77E+00
				Sum of Fractions Excluding H-3:			0.00E+00

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Concentrations in Site Stacks
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = F-Area							
235-F Sandfilter Discharge	Co-60	9.00E-16	3.36E-15	2.82E-15	8.64E-16	1.20E-10	2.35E-05
	Cs-137	3.29E-15	3.15E-15	-9.48E-17	8.74E-16	9.80E-11	0.00E+00
	U-234	1.08E-16	2.70E-17	1.61E-16	9.12E-18	4.00E-13	4.03E-04
	U-235	1.05E-17	1.32E-17	1.71E-17	4.38E-18	4.50E-13	3.79E-05
	U-238	1.63E-16	3.31E-17	1.64E-16	8.99E-18	4.70E-13	3.48E-04
	Np-237	1.63E-17	1.78E-17	4.31E-18	4.15E-18	8.10E-14	5.32E-05
	Pu-238	5.17E-17	2.07E-17	6.95E-17	7.02E-18	3.70E-14	1.88E-03
	Pu-239	1.73E-16	3.66E-17	4.88E-17	5.93E-18	3.40E-14	1.44E-03
	Am-241	2.78E-17	1.54E-17	4.80E-18	2.98E-18	4.10E-14	1.17E-04
	Cm-244	1.29E-17	1.39E-17	2.44E-18	3.40E-18	6.90E-14	3.54E-05
	Sr-89/90	-1.64E-16	1.39E-15	1.08E-15	3.48E-16	2.50E-11	4.33E-05
	Gross B	7.88E-15	7.18E-15	1.47E-14	1.96E-15	0.00E+00	0.00E+00
	Gross A	4.54E-18	1.69E-15	2.56E-15	7.42E-16	0.00E+00	0.00E+00
					Sum of Fractions:		4.38E-03
					Sum of Fractions Excluding H-3:		4.38E-03
Area = F-Area							
291-F Stack Isokinetic	Co-60	5.28E-15	4.64E-15	1.65E-15	1.48E-15	1.20E-10	1.37E-05
	I-129*	1.31E-13	8.02E-15	8.23E-14	1.53E-15	3.80E-11	2.17E-03
	Cs-137	4.65E-15	5.45E-15	1.02E-14	1.69E-15	9.80E-11	1.04E-04
	U-234	3.73E-15	2.84E-16	1.83E-14	4.77E-16	4.00E-13	4.57E-02
	U-235	2.47E-16	6.19E-17	1.26E-15	5.05E-17	4.50E-13	2.80E-03
	U-238	4.66E-15	3.33E-16	2.67E-14	6.57E-16	4.70E-13	5.67E-02
	Np-237	2.81E-17	2.26E-17	1.03E-16	1.12E-17	8.10E-14	1.27E-03
	Pu-238	3.70E-16	6.51E-17	1.12E-15	4.57E-17	3.70E-14	3.02E-02
	Pu-239	1.20E-14	1.08E-15	6.07E-14	2.06E-15	3.40E-14	1.78E+00
	Am-241	6.00E-16	8.52E-17	3.60E-15	9.97E-17	4.10E-14	8.78E-02
	Cm-244	2.59E-17	2.63E-17	4.60E-17	8.21E-18	6.90E-14	6.67E-04
	Sr-89/90	9.33E-16	2.58E-15	5.94E-15	6.51E-16	2.50E-11	2.37E-04
	Gross B	2.43E-14	1.30E-14	8.81E-14	4.17E-15	0.00E+00	0.00E+00
	Gross A	1.51E-14	6.10E-15	1.19E-13	4.36E-15	0.00E+00	0.00E+00
					Sum of Fractions:		2.01E+00
					Sum of Fractions Excluding H-3:		2.01E+00
	* sum of the average conc. of primary & secondary I-129 canisters						
772-1F Stack	Co-60	1.21E-14	1.95E-14	8.53E-15	5.28E-15	1.20E-10	7.11E-05
	Cs-137	-2.88E-14	2.08E-14	-1.90E-15	5.44E-15	9.80E-11	0.00E+00
	Gross B	7.09E-14	1.96E-14	3.50E-14	4.50E-15	0.00E+00	0.00E+00
	Gross A	1.54E-14	8.83E-15	5.70E-15	1.90E-15	0.00E+00	0.00E+00
					Sum of Fractions:		7.11E-05
					Sum of Fractions Excluding H-3:		7.11E-05

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Concentrations in Site Stacks
July 2019

		--- Report Month ---		---- 12 Month ----			
Discharge Point	Nuclide	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = F-Area							
772-4F Stack	Co-60	-3.30E-16	9.80E-16	-1.89E-16	2.65E-16	1.20E-10	0.00E+00
	Cs-137	-1.34E-15	1.01E-15	1.11E-16	2.77E-16	9.80E-11	1.14E-06
	U-234	9.76E-17	1.38E-17	5.52E-17	2.99E-18	4.00E-13	1.38E-04
	U-235	9.28E-18	5.08E-18	4.99E-18	1.13E-18	4.50E-13	1.11E-05
	U-238	7.25E-17	1.19E-17	5.67E-17	2.94E-18	4.70E-13	1.21E-04
	Pu-238	2.77E-18	3.96E-18	3.41E-17	2.66E-18	3.70E-14	9.20E-04
	Pu-239	7.11E-18	3.97E-18	2.36E-17	2.04E-18	3.40E-14	6.93E-04
	Am-241	2.00E-17	6.83E-18	1.92E-17	1.85E-18	4.10E-14	4.68E-04
	Cm-244	1.82E-18	2.93E-18	-2.18E-19	7.24E-19	6.90E-14	0.00E+00
	Sr-89/90	1.62E-16	3.03E-16	1.13E-16	8.14E-17	2.50E-11	4.52E-06
	Gross B	1.26E-15	1.61E-15	1.69E-15	4.36E-16	0.00E+00	0.00E+00
	Gross A	1.43E-15	8.15E-16	2.03E-16	1.55E-16	0.00E+00	0.00E+00
					Sum of Fractions:		2.36E-03
					Sum of Fractions Excluding H-3:		2.36E-03
Area = H-Area							
291-H Stack Isokinetic	Co-58	0.00E+00	0.00E+00	7.55E-15	4.01E-15	1.70E-09	4.44E-06
	Co-60	1.43E-15	1.67E-15	2.74E-16	4.17E-16	1.20E-10	2.28E-06
	Ru-106	0.00E+00	0.00E+00	-1.40E-14	5.03E-15	5.60E-11	0.00E+00
	I-129*	2.41E-12	9.41E-14	2.02E-12	2.44E-14	3.80E-11	5.31E-02
	Cs-137	2.14E-14	3.08E-15	1.38E-14	6.70E-16	9.80E-11	1.40E-04
	U-234	1.42E-16	2.13E-17	1.15E-16	5.37E-18	4.00E-13	2.87E-04
	U-235	6.11E-18	9.10E-18	6.15E-18	1.94E-18	4.50E-13	1.37E-05
	U-238	1.09E-16	1.87E-17	8.40E-17	4.50E-18	4.70E-13	1.79E-04
	Np-237	1.22E-17	9.14E-18	5.42E-18	2.01E-18	8.10E-14	6.69E-05
	Pu-238	3.57E-16	3.69E-17	1.18E-15	2.72E-17	3.70E-14	3.19E-02
	Pu-239	1.46E-16	2.28E-17	5.36E-16	1.46E-17	3.40E-14	1.58E-02
	Am-241	2.21E-17	1.05E-17	6.42E-17	4.10E-18	4.10E-14	1.57E-03
	Cm-244	8.97E-19	6.50E-18	1.11E-17	2.04E-18	6.90E-14	1.61E-04
	Sr-89/90	1.35E-14	1.18E-15	9.37E-15	2.63E-16	2.50E-11	3.75E-04
	Gross B	3.62E-14	4.95E-15	3.30E-14	1.25E-15	0.00E+00	0.00E+00
	Gross A	-1.96E-17	8.59E-16	1.62E-15	3.84E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.04E-01
					Sum of Fractions Excluding H-3:		1.04E-01

* sum of the average conc. of primary & secondary I-129 canisters

JULY 2019 MONTHLY RADIOACTIVE RELEASES REPORT

Airborne Emissions
Concentrations in Site Stacks
July 2019

Discharge Point	Nuclide	--- Report Month --- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	---- 12 Month ---- Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = H-ETP							
241-81H ETP Process Stack	Co-60	0.00E+00	0.00E+00	-1.78E-15	1.29E-15	1.20E-10	0.00E+00
	Cs-137	0.00E+00	0.00E+00	2.16E-15	1.39E-15	9.80E-11	2.21E-05
	U-234	0.00E+00	0.00E+00	4.36E-17	1.29E-17	4.00E-13	1.09E-04
	U-235	0.00E+00	0.00E+00	-7.19E-20	8.09E-20	4.50E-13	0.00E+00
	U-238	0.00E+00	0.00E+00	2.66E-17	1.07E-17	4.70E-13	5.67E-05
	Pu-238	0.00E+00	0.00E+00	1.17E-18	4.22E-18	3.70E-14	3.16E-05
	Pu-239	0.00E+00	0.00E+00	6.52E-18	5.08E-18	3.40E-14	1.92E-04
	Am-241	0.00E+00	0.00E+00	1.70E-17	8.73E-18	4.10E-14	4.15E-04
	Cm-244	0.00E+00	0.00E+00	-2.21E-18	2.21E-18	6.90E-14	0.00E+00
	Sr-89/90	0.00E+00	0.00E+00	-2.89E-17	2.82E-16	2.50E-11	0.00E+00
	Gross B	0.00E+00	0.00E+00	9.70E-15	2.78E-15	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	1.50E-15	1.29E-15	0.00E+00	0.00E+00
					Sum of Fractions:		8.26E-04
					Sum of Fractions Excluding H-3:		8.26E-04
241-84H ETP Lab Stack	Co-60	0.00E+00	0.00E+00	1.93E-15	7.60E-15	1.20E-10	1.61E-05
	Cs-137	0.00E+00	0.00E+00	-1.16E-16	7.59E-15	9.80E-11	0.00E+00
	U-234	0.00E+00	0.00E+00	2.78E-16	7.65E-17	4.00E-13	6.95E-04
	U-235	0.00E+00	0.00E+00	2.41E-17	2.46E-17	4.50E-13	5.36E-05
	U-238	0.00E+00	0.00E+00	3.83E-16	9.24E-17	4.70E-13	8.16E-04
	Pu-238	0.00E+00	0.00E+00	1.75E-17	1.76E-17	3.70E-14	4.74E-04
	Pu-239	0.00E+00	0.00E+00	3.01E-18	2.14E-17	3.40E-14	8.85E-05
	Am-241	0.00E+00	0.00E+00	1.15E-16	5.31E-17	4.10E-14	2.81E-03
	Cm-244	0.00E+00	0.00E+00	0.00E+00	2.21E-17	6.90E-14	0.00E+00
	Sr-89/90	0.00E+00	0.00E+00	-1.94E-16	1.56E-15	2.50E-11	0.00E+00
	Gross B	0.00E+00	0.00E+00	1.17E-14	1.22E-14	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	-3.75E-15	1.93E-15	0.00E+00	0.00E+00
					Sum of Fractions:		4.95E-03
					Sum of Fractions Excluding H-3:		4.95E-03
Area = H-Tank Farm							
241-278H CAUSTIC EXTRACTION	Co-60	1.24E-15	1.98E-15	8.21E-16	1.09E-15	1.20E-10	6.84E-06
	Cs-137	-1.64E-15	1.98E-15	5.03E-15	1.41E-15	9.80E-11	5.14E-05
	U-234	6.59E-17	1.88E-17	9.87E-17	1.32E-17	4.00E-13	2.47E-04
	U-235	-4.09E-18	3.81E-18	6.93E-18	4.49E-18	4.50E-13	1.54E-05
	U-238	6.93E-17	1.84E-17	8.87E-17	1.17E-17	4.70E-13	1.89E-04
	Pu-238	1.01E-17	7.84E-18	1.05E-17	5.37E-18	3.70E-14	2.84E-04
	Pu-239	-1.80E-18	7.43E-18	1.79E-18	3.41E-18	3.40E-14	5.26E-05
	Am-241	1.14E-17	1.10E-17	2.25E-17	6.56E-18	4.10E-14	5.50E-04
	Cm-244	4.79E-18	4.80E-18	1.14E-19	1.53E-18	6.90E-14	1.65E-06
	Sr-89/90	-9.59E-17	6.59E-16	2.02E-16	3.52E-16	2.50E-11	8.09E-06
	Gross B	-1.61E-16	2.77E-15	3.00E-15	1.70E-15	0.00E+00	0.00E+00
	Gross A	4.56E-16	9.59E-16	-3.31E-16	4.27E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.41E-03
					Sum of Fractions Excluding H-3:		1.41E-03
241-2H Mercury Stack	Co-60	0.00E+00	0.00E+00	1.31E-15	1.15E-15	1.20E-10	1.09E-05
	Cs-137	0.00E+00	0.00E+00	4.30E-16	1.14E-15	9.80E-11	4.39E-06
	Gross B	0.00E+00	0.00E+00	3.98E-15	1.10E-15	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	7.79E-17	3.10E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.53E-05
					Sum of Fractions Excluding H-3:		1.53E-05

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		--- Report Month ---		---- 12 Month ----			
Discharge Point	Nuclide	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	Ave. Conc. (uCi/mL)	Error Estimate (uCi/mL)	DOE DCS (uCi/mL)	Fraction of DCS
Area = K-Area							
K-Area Main Stack (148')	H-3	3.67E-07	N/A	3.64E-07	N/A	2.10E-07	1.74E+00
	Co-60	2.14E-15	4.34E-15	1.11E-15	1.62E-15	1.20E-10	9.24E-06
	Cs-137	9.89E-15	4.21E-15	2.76E-15	1.64E-15	9.80E-11	2.81E-05
	Gross B	1.68E-14	4.20E-15	1.71E-14	1.77E-15	0.00E+00	0.00E+00
	Gross A	3.49E-15	2.02E-15	3.47E-15	9.61E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.74E+00
					Sum of Fractions Excluding H-3:		3.74E-05
KIS Facility	Co-60	1.28E-15	2.60E-15	3.72E-16	1.27E-15	1.20E-10	3.10E-06
	Cs-137	5.53E-15	2.80E-15	4.22E-17	1.36E-15	9.80E-11	4.31E-07
	Th-228	8.57E-17	2.69E-17	9.25E-17	1.80E-17	9.40E-14	9.84E-04
	Th-230	3.36E-16	5.78E-17	2.55E-16	2.59E-17	2.80E-13	9.12E-04
	Th-232	1.64E-16	3.58E-17	1.31E-16	1.68E-17	1.60E-13	8.21E-04
	U-234	1.01E-16	2.79E-17	1.16E-16	1.51E-17	4.00E-13	2.90E-04
	U-235	2.97E-18	1.07E-17	1.07E-17	6.15E-18	4.50E-13	2.38E-05
	U-238	9.12E-17	2.84E-17	1.04E-16	1.44E-17	4.70E-13	2.22E-04
	Np-237	-1.09E-17	7.76E-18	-5.39E-18	2.62E-18	8.10E-14	0.00E+00
	Pu-238	1.55E-17	1.17E-17	2.24E-17	7.51E-18	3.70E-14	6.05E-04
	Pu-239	7.02E-18	8.48E-18	5.59E-18	3.99E-18	3.40E-14	1.64E-04
	Am-241	-4.25E-19	4.79E-19	-3.11E-19	2.16E-18	4.10E-14	0.00E+00
	Cm-244	0.00E+00	9.21E-18	0.00E+00	4.50E-18	6.90E-14	0.00E+00
	Sr-89/90	8.94E-16	9.26E-16	4.73E-16	3.85E-16	2.50E-11	1.89E-05
	Gross B	5.44E-15	4.78E-15	2.99E-15	2.08E-15	0.00E+00	0.00E+00
	Gross A	2.14E-15	2.07E-15	2.03E-15	1.08E-15	0.00E+00	0.00E+00
					Sum of Fractions:		4.04E-03
					Sum of Fractions Excluding H-3:		4.04E-03
Area = L-Area							
L-Area Disassembly	H-3	3.69E-07	N/A	3.63E-07	N/A	2.10E-07	1.73E+00
	Co-60	2.39E-14	2.24E-14	1.05E-14	1.05E-14	1.20E-10	8.74E-05
	Cs-137	2.64E-14	2.14E-14	5.60E-15	1.12E-14	9.80E-11	5.72E-05
	Gross B	2.86E-13	3.54E-14	2.98E-13	1.77E-14	0.00E+00	0.00E+00
	Gross A	3.98E-14	1.63E-14	3.12E-14	7.58E-15	0.00E+00	0.00E+00
					Sum of Fractions:		1.73E+00
					Sum of Fractions Excluding H-3:		1.45E-04
L-Area Main Stack (148')	H-3	3.59E-07	N/A	3.65E-07	N/A	2.10E-07	1.74E+00
	Co-60	-8.03E-16	7.94E-15	2.97E-15	3.72E-15	1.20E-10	2.47E-05
	Cs-137	7.63E-15	8.83E-15	7.30E-15	3.81E-15	9.80E-11	7.45E-05
	Gross B	3.24E-14	9.14E-15	3.11E-14	3.86E-15	0.00E+00	0.00E+00
	Gross A	1.13E-15	2.40E-15	4.37E-15	1.72E-15	0.00E+00	0.00E+00
					Sum of Fractions:		1.74E+00
					Sum of Fractions Excluding H-3:		9.92E-05

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Area = S-Area							
221-S Personnel Area (Zone 2)	Co-60	-4.35E-14	2.73E-14	1.21E-15	1.50E-14	1.20E-10	1.01E-05
	Cs-137	-2.84E-14	2.60E-14	-1.97E-14	1.57E-14	9.80E-11	0.00E+00
	U-234	9.28E-16	2.75E-16	1.19E-15	1.67E-16	4.00E-13	2.98E-03
	U-235	2.46E-17	1.04E-16	1.48E-16	7.10E-17	4.50E-13	3.29E-04
	U-238	7.93E-16	2.51E-16	1.03E-15	1.52E-16	4.70E-13	2.20E-03
	Pu-238	3.29E-16	1.57E-16	1.39E-16	6.71E-17	3.70E-14	3.76E-03
	Pu-239	6.81E-17	6.82E-17	5.49E-17	3.36E-17	3.40E-14	1.61E-03
	Am-241	3.13E-16	1.74E-16	3.71E-16	9.50E-17	4.10E-14	9.05E-03
	Cm-244	0.00E+00	1.00E-16	-3.04E-17	4.15E-17	6.90E-14	0.00E+00
	Sr-89/90	1.71E-16	9.21E-15	1.23E-14	5.69E-15	2.50E-11	4.91E-04
	Gross B	1.13E-13	5.26E-14	5.20E-14	2.44E-14	0.00E+00	0.00E+00
	Gross A	6.97E-15	1.47E-14	6.15E-15	9.03E-15	0.00E+00	0.00E+00
				Sum of Fractions:			2.04E-02
Area = S-Area							
291-S Vit. Process (Zone 1)	Co-60	-4.44E-14	3.02E-14	-4.35E-15	1.71E-14	1.20E-10	0.00E+00
	Cs-137	3.18E-14	3.11E-14	3.34E-14	1.88E-14	9.80E-11	3.41E-04
	U-234	1.34E-15	3.39E-16	1.70E-15	2.23E-16	4.00E-13	4.26E-03
	U-235	-4.83E-18	5.40E-18	1.07E-16	6.91E-17	4.50E-13	2.38E-04
	U-238	1.21E-15	3.28E-16	1.42E-15	2.01E-16	4.70E-13	3.03E-03
	Pu-238	1.74E-16	1.51E-16	2.37E-16	1.07E-16	3.70E-14	6.40E-03
	Pu-239	1.87E-16	1.49E-16	3.18E-17	7.97E-17	3.40E-14	9.35E-04
	Am-241	4.59E-16	2.06E-16	2.72E-16	8.98E-17	4.10E-14	6.63E-03
	Cm-244	0.00E+00	9.69E-17	-1.62E-17	5.19E-17	6.90E-14	0.00E+00
	Sr-89/90	-3.19E-15	1.07E-14	-2.14E-16	5.55E-15	2.50E-11	0.00E+00
	Gross B	9.12E-14	5.63E-14	4.28E-14	2.79E-14	0.00E+00	0.00E+00
	Gross A	-7.94E-15	5.07E-15	8.38E-15	1.12E-14	0.00E+00	0.00E+00
				Sum of Fractions:			2.18E-02
				Sum of Fractions Excluding H-3:			2.18E-02
511-S Low Pt. Pump Pit	Co-60	-7.21E-15	2.67E-14	-1.41E-14	1.54E-14	1.20E-10	0.00E+00
	Cs-137	-2.37E-14	2.77E-14	-1.05E-14	1.60E-14	9.80E-11	0.00E+00
	U-234	1.24E-15	3.11E-16	1.44E-15	1.84E-16	4.00E-13	3.60E-03
	U-235	2.36E-17	1.01E-16	7.60E-17	6.84E-17	4.50E-13	1.69E-04
	U-238	1.38E-15	3.24E-16	1.01E-15	1.52E-16	4.70E-13	2.14E-03
	Pu-238	2.27E-16	1.41E-16	2.50E-16	8.78E-17	3.70E-14	6.76E-03
	Pu-239	-5.30E-17	5.31E-17	4.26E-17	6.18E-17	3.40E-14	1.25E-03
	Am-241	1.87E-16	1.27E-16	2.68E-16	8.69E-17	4.10E-14	6.53E-03
	Cm-244	6.95E-17	6.96E-17	2.22E-17	3.93E-17	6.90E-14	3.22E-04
	Sr-89/90	8.11E-15	9.53E-15	1.09E-14	5.33E-15	2.50E-11	4.37E-04
	Gross B	4.70E-14	4.71E-14	3.86E-14	2.41E-14	0.00E+00	0.00E+00
	Gross A	7.06E-15	1.49E-14	4.39E-15	8.24E-15	0.00E+00	0.00E+00
				Sum of Fractions:			2.12E-02
				Sum of Fractions Excluding H-3:			2.12E-02

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Area = S-Area							
512-S Late Wash	Co-60	2.08E-15	2.02E-15	9.02E-16	8.64E-16	1.20E-10	7.52E-06
	Cs-137	-4.08E-16	2.24E-15	5.74E-16	9.24E-16	9.80E-11	5.86E-06
	U-234	6.94E-17	1.81E-17	4.92E-17	7.99E-18	4.00E-13	1.23E-04
	U-235	1.23E-17	1.01E-17	7.96E-18	3.54E-18	4.50E-13	1.77E-05
	U-238	4.79E-17	1.67E-17	4.76E-17	7.90E-18	4.70E-13	1.01E-04
	Pu-238	3.67E-18	9.34E-18	9.62E-18	3.86E-18	3.70E-14	2.60E-04
	Pu-239	1.33E-17	7.75E-18	8.05E-18	3.45E-18	3.40E-14	2.37E-04
	Am-241	-1.55E-18	1.74E-18	8.27E-18	3.59E-18	4.10E-14	2.02E-04
	Cm-244	-3.27E-18	3.27E-18	-5.24E-18	2.24E-18	6.90E-14	0.00E+00
	Sr-89/90	5.52E-16	6.49E-16	4.46E-16	2.85E-16	2.50E-11	1.78E-05
	Gross B	-7.18E-16	2.80E-15	6.49E-16	1.23E-15	0.00E+00	0.00E+00
	Gross A	4.76E-16	9.99E-16	8.81E-16	6.13E-16	0.00E+00	0.00E+00
					Sum of Fractions:		9.72E-04
					Sum of Fractions Excluding H-3:		9.72E-04
Area = Tritium							
232-H Line 1&2 Stack (200ft)	H-3 (el)	1.45E-06	N/A	7.54E-07	N/A	2.10E-03	3.59E-04
	H-3	6.02E-06	N/A	3.86E-06	N/A	2.10E-07	1.84E+01
					Sum of Fractions:		1.84E+01
					Sum of Fractions Excluding H-3:		0.00E+00
233-H	H-3 (el)	9.20E-07	N/A	9.05E-07	N/A	2.10E-03	4.31E-04
	H-3	1.76E-06	N/A	4.33E-07	N/A	2.10E-07	2.06E+00
					Sum of Fractions:		2.06E+00
					Sum of Fractions Excluding H-3:		0.00E+00
234-H	H-3 (el)	0.00E+00	N/A	0.00E+00	N/A	2.10E-03	0.00E+00
	H-3	7.24E-07	N/A	8.10E-07	N/A	2.10E-07	3.86E+00
					Sum of Fractions:		3.86E+00
					Sum of Fractions Excluding H-3:		0.00E+00
238-H	H-3	6.27E-07	N/A	5.34E-07	N/A	2.10E-07	2.54E+00
					Sum of Fractions:		2.54E+00
					Sum of Fractions Excluding H-3:		0.00E+00

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Area = Tritium							
264-H	H-3 (el)	1.28E-07	N/A	9.06E-08	N/A	2.10E-03	4.31E-05
	H-3	0.00E+00	N/A	2.80E-06	N/A	2.10E-07	1.34E+01
	Cr-51	0.00E+00	0.00E+00	-3.38E-15	4.62E-15	9.40E-08	0.00E+00
	Co-58	0.00E+00	0.00E+00	-2.36E-16	4.36E-16	1.70E-09	0.00E+00
	Co-60	5.91E-16	1.21E-15	1.40E-15	3.31E-16	1.20E-10	1.17E-05
	Se-75	0.00E+00	0.00E+00	5.11E-16	5.72E-16	2.80E-09	1.82E-07
	Ru-106	0.00E+00	0.00E+00	8.02E-14	4.48E-14	5.60E-11	1.43E-03
	Cs-137	-1.91E-15	1.34E-15	-3.94E-16	3.40E-16	9.80E-11	0.00E+00
	Th-228	0.00E+00	0.00E+00	9.78E-17	1.39E-17	9.40E-14	1.04E-03
	Th-230	0.00E+00	0.00E+00	1.02E-16	1.11E-17	2.80E-13	3.63E-04
	Th-232	0.00E+00	0.00E+00	8.17E-17	9.29E-18	1.60E-13	5.11E-04
	U-234	0.00E+00	0.00E+00	5.82E-17	6.75E-18	4.00E-13	1.45E-04
	U-235	0.00E+00	0.00E+00	5.85E-18	2.24E-18	4.50E-13	1.30E-05
	U-238	0.00E+00	0.00E+00	5.01E-17	6.21E-18	4.70E-13	1.07E-04
	Np-237	0.00E+00	0.00E+00	-9.74E-19	1.50E-18	8.10E-14	0.00E+00
	Pu-238	0.00E+00	0.00E+00	1.15E-17	3.20E-18	3.70E-14	3.11E-04
	Pu-239	0.00E+00	0.00E+00	3.49E-18	2.01E-18	3.40E-14	1.03E-04
	Am-241	0.00E+00	0.00E+00	-1.68E-19	1.40E-18	4.10E-14	0.00E+00
	Cm-244	0.00E+00	0.00E+00	2.39E-19	1.28E-18	6.90E-14	3.47E-06
	Gross B	7.39E-15	1.82E-15	1.40E-14	4.72E-16	0.00E+00	0.00E+00
	Gross A	2.39E-15	1.07E-15	1.75E-15	2.08E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.34E+01
					Sum of Fractions Excluding H-3:		4.04E-03
Area = Z-Area							
210-Z Building Stack	Co-60	0.00E+00	0.00E+00	3.15E-15	1.25E-14	1.20E-10	2.62E-05
	Cs-137	0.00E+00	0.00E+00	4.13E-15	1.23E-14	9.80E-11	4.21E-05
	U-234	0.00E+00	0.00E+00	8.51E-16	1.32E-16	4.00E-13	2.13E-03
	U-235	0.00E+00	0.00E+00	1.75E-16	6.60E-17	4.50E-13	3.89E-04
	U-238	0.00E+00	0.00E+00	9.06E-16	1.33E-16	4.70E-13	1.93E-03
	Pu-238	0.00E+00	0.00E+00	9.84E-17	5.35E-17	3.70E-14	2.66E-03
	Pu-239	0.00E+00	0.00E+00	2.86E-17	3.68E-17	3.40E-14	8.40E-04
	Am-241	0.00E+00	0.00E+00	4.16E-16	1.30E-16	4.10E-14	1.01E-02
	Cm-244	0.00E+00	0.00E+00	-8.09E-17	5.55E-17	6.90E-14	0.00E+00
	Sr-89/90	0.00E+00	0.00E+00	1.31E-15	3.23E-15	2.50E-11	5.22E-05
	Gross B	0.00E+00	0.00E+00	5.02E-14	2.02E-14	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	7.27E-15	8.24E-15	0.00E+00	0.00E+00
					Sum of Fractions:		1.82E-02
					Sum of Fractions Excluding H-3:		1.82E-02
Z201-SSRT	Co-60	0.00E+00	0.00E+00	1.65E-15	8.41E-16	1.20E-10	1.37E-05
	Cs-137	0.00E+00	0.00E+00	-3.51E-16	8.95E-16	9.80E-11	0.00E+00
	U-234	0.00E+00	0.00E+00	1.68E-16	1.77E-17	4.00E-13	4.21E-04
	U-235	0.00E+00	0.00E+00	1.98E-17	6.27E-18	4.50E-13	4.41E-05
	U-238	0.00E+00	0.00E+00	2.51E-16	2.24E-17	4.70E-13	5.33E-04
	Pu-238	0.00E+00	0.00E+00	2.75E-17	5.57E-18	3.70E-14	7.42E-04
	Pu-239	0.00E+00	0.00E+00	5.20E-16	4.29E-17	3.40E-14	1.53E-02
	Am-241	0.00E+00	0.00E+00	3.08E-17	6.63E-18	4.10E-14	7.51E-04
	Cm-244	0.00E+00	0.00E+00	1.13E-18	2.52E-18	6.90E-14	1.64E-05
	Sr-89/90	0.00E+00	0.00E+00	3.73E-16	2.68E-16	2.50E-11	1.49E-05
	Gross B	0.00E+00	0.00E+00	2.55E-15	1.35E-15	0.00E+00	0.00E+00
	Gross A	0.00E+00	0.00E+00	1.13E-15	6.47E-16	0.00E+00	0.00E+00
					Sum of Fractions:		1.78E-02
					Sum of Fractions Excluding H-3:		1.78E-02

Addendum September 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019- 00396

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through August of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no significantly elevated concentrations have been detected.

The following is additional information as of beginning of September 2019:

In the last 6 months to date (January 2019-July 3, 2019) there have been no significantly elevated concentrations, and there has been an overall decreasing trend in the DCS sum of fractions since elevations were first recorded in early 2017. For example, the average concentration for Pu-239 in 2018 was 9.54E-02 pCi/Cu M while for January through June 2019 it has been 3.79E-02 pCi/Cu M. This trend is the same seen for other actinides and gross alpha/beta in the laboratory results. Additionally, the weekly Radiological Protection Department probes (as recorded on Attachment 8.5 of Procedure 221-F-52404) for alpha indicate that the weekly release values have been well below 5 μCi in the 2019 calendar year to date (8/27/2019).

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004). The improvements that have been made to the facility and the investigation activities that were discussed can be found in the previous Addendums (SRNS-J2600-2019-00303).

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test started on May 6th and was completed on May 13th in accordance to Appendix E of 40 CFR 52. The report was submitted to regulators and the results were accepted by DHEC on June 19, 2019.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation. A summary of the evaluation can be found in the previous Addendums (SRNS-J2600-2019-00303).

Addendum August 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00350

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through July of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no significantly elevated concentrations have been detected.
The following is additional information as of beginning of August 2019:

In the last 6 months to date (January 2019-July 3, 2019) there have been no significantly elevated concentrations, and there has been an overall decreasing trend in the DCS sum of fractions since elevations were first recorded in early 2017. For example, the average concentration for Pu-239 in 2018 was 9.54E-02 pCi/Cu M while in the last 6 months it has been 3.79E-02 pCi/Cu M. This trend is the same seen for other actinides and gross alpha/beta.

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004). The improvements that have been made to the facility and the investigation activities that were discussed can be found in the previous Addendums (SRNS-J2600-2019-00303).

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test started on May 6th and was completed on May 13th in accordance to Appendix E of 40 CFR 52. The report was submitted to regulators and the results were accepted by DHEC on June 19, 2019.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation. A summary of the evaluation can be found in the previous Addendums (SRNS-J2600-2019-00303).

Addendum July 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00303

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through June of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no significantly elevated concentrations have been detected.
The following is additional information as of beginning of July 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The continued sporadic elevated releases of actinides at 291-F was likely the cause of the spike in radionuclide concentration at Burial Ground North (BGN) during the month of June 2018. Winds during these months are dominantly from the West/South West, which potentially transported any airborne radionuclides from 291-F towards the BGN air station. Conversely, the predominant wind direction during the 291-F November 2018 elevation was from the North East so no correlation could be made with the BGN station concentrations. The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To

minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test started on May 6th and was completed on May 13th in accordance to Appendix E of 40 CFR 52. The report was submitted to regulators and the results were accepted by DHEC on June 19, 2019.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the

nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum June 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00259

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through May of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no elevated concentrations have been detected.
The following is additional information as of beginning of June 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The continued sporadic elevated releases of actinides at 291-F was likely the cause of the spike in radionuclide concentration at Burial Ground North (BGN) during the month of June 2018. Winds during these months are dominantly from the West/South West, which potentially transported any airborne radionuclides from 291-F towards the BGN air station. Conversely, the predominant wind direction during the 291-F November 2018 elevation was from the North East so no correlation could be made with the BGN station concentrations. The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To

minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test started on May 6th and was completed on May 13th in accordance to Appendix E of 40 CFR 52. The report will be submitted to regulators within 30 days of the last traverse.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the

nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum May 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00225

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through April of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no elevated concentrations have been detected.
The following is additional information as of beginning of April 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test started on May 6th and is scheduled to be complete on May 13th in accordance to Appendix E of 40 CFR 52.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack

results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum April 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00172

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through March of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper. Since November 2018, no elevated concentrations have been detected.
The following is additional information as of beginning of April 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow. Due to the replacement of the totalizer, a Relative Accuracy Test is currently scheduled for the end of April in accordance to Appendix E of 40 CFR 52.

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack

results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum March 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00121

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January through February of 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st , 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. The report was completed & published on December 10th, 2018. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper.
The following is additional information as of beginning of March 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On January 21, 2019, Fan #1 in the F-Canyon Exhaust (CAEX) System went out of service (OOS) during a scheduled Preventative Maintenance (PM) activity when the damper failed. As of the first week of February, it remained OOS. Fan # 1 was returned to service on February 21, 2019.

On March 7, 2019, the totalizer circuit board failed upon completion of a periodic loss of power test. As a result, when power was returned the totalizer (display reader) went blank. There was still flow through the system and signal was still being sent to the transmitter, but there was no means to read the flow rates. On March 8, 2019—24 hours later—a like-for-like digital display reader was installed and set up to receive the electrical signals from the transmitter. The replacement totalizer was verified to be functioning properly. However, since there was no means to verify isokinetic flow between when the digital display reader went down until the issue was resolved or totalize the flow value for the week with the permitted device, the March 5th through March 11th sample must be assumed non-isokinetic. To account for the span of time lost in the totalizer reading for the week, the sand filter magnehelic gauge will be used to help calculate total stack flow

The facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk. The facility held a meeting on March 11, 2019 to brief DOE EQMD on the evaluation.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum February 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00064

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, January through December of 2018 and January 2019. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The annual camera inspection was completed on November 1st, 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. The report was completed & published on December 10th, 2018. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper.
The following is additional information as of beginning of February 2019:

As discussed in previous months reports, a report from SRNL (SRNL-TR-2018-00116) was conducted on the characterization of the material on the filter papers from the 291-F Stack Sampler. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. See previous Addenda for more information (January 2019 addendum, SRNS-J2600-2019-00004).

Improvements have been made to the facility including but not limited to reducing sample flow rate to achieve isokinetic rather than super-isokinetic sampling, re-insulation and replacement of heat tracing on the sample lines, installation of a properly sized sample flow rotameter, proper orientation of stack flow transmitter and the addition of a thermal blanket to reduce the temperature sensitivity of the transmitter (See Addendum SRNS-J2220-2018-00234 for details). Corrective maintenance (CMs) has also been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028). Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Investigation activities to determine the cause of the exceedances from the 291-F Stack initially included a planned entry into the Canyon Exhaust Tunnel to evaluate removal of some known legacy contamination that was discharged from the Recycle Vessel Vent system observed during an entry in 2007 (See previous Addendum SRNS-J2220-2018 for more details). To minimize the risk of a puff out the stack caused by tunnel remediation activities while the fans were running, the facility was waiting on a new Safety Basis revision to be able to turn off the canyon fans during the entry. In the interim, the facility planned to return to a 2-fan configuration (See previous Addendum SRNS-J2220-2018-00271 for more detail). For NESHAP compliance, a Relative Accuracy Test (RAT) with a 2-fan configuration was completed on October 29, 2018, submitted to DHEC on November 27, 2018 and accepted by DHEC in December 2018.

On January 21, 2019, Fan #1 in the F-Canyon Exhaust (CAEX) System went out of service (OOS) during a scheduled Preventative Maintenance (PM) activity when the damper failed. As of the first week of February, it remained OOS. While awaiting arrangements by Operations to return Fan #1 to functionality, the facility evaluated the benefit of moving forward with a planned entry into the Canyon Exhaust Tunnel or the 2-fan configuration exercise through evaluation of the associated risk.

Evaluation:

Radiological emissions from the 291-F Stack significantly increased from historic values in December 2016. The Facility has completed several activities to evaluate and address this condition. The emissions have been intermittent in nature with monthly totals varying by orders of magnitude from month to month. A review of the emission levels compared against canyon exhaust fan configurations did not show any correlation. A similar review of the area's rainfall totals likewise did not show any correlation. Several samples captured by the stack's Isokinetic Sampling System were analyzed by the Savannah River National Laboratory. It was determined that the contamination was neither sand nor any constituent of concrete, so it was not from degradation of the exhaust tunnel. The material was mixed uranyl-plutonyl phosphate which is likely from legacy material contaminating the tunnel. The sampling rake and tubing was flushed to ensure the captured contamination was from the 291-F exhaust stream and it was not legacy contamination within the sampling piping. While contamination levels appear to have decreased post-flushing, the levels did not return to levels seen prior to December 2016. Aerosol efficiency testing of the Facility's sand filter has shown no degradation of that system. The likely source of the elevated emissions is legacy contamination located in the exhaust tunnel downstream of the sand filter. The material was observed in this area of the exhaust tunnel during a structural integrity inspection of the tunnel in 2007 and was located at the base of an exhaust port of a ventilation system with a flow path that was re-routed in the 1990's. If the legacy material is to be removed, the canyon exhaust fans will need to be turned off to prevent a potential large release to the environment as contamination will likely be entrained in the ventilation air stream as the legacy material is disturbed. If the canyon exhaust fans are turned off for a significant period to allow for remediation, there is risk of local contamination escaping the F-Canyon as the building is not airtight. Because there is a risk associated with either remediation option, an evaluation of the current airborne emission levels is warranted.

The current sum of fractions value is less than 4. The DCS limits as calculated by DOE in DOE-STD-1196-2011 are derived at the point of discharge and do not account for attenuation along the pathway before reaching the receptor. The 291-F Stack is 9.4 kilometers from the nearest offsite receptor. Utilizing ALARA principles to determine the safest path forward shows the associated risks (ie worker exposure, release of contamination) with remediating the legacy contamination is higher than no remediation and leaving the stack in a stable condition until closure of the facility. There is no current plan to enter into the Canyon Exhaust Tunnel.

The 2-fan configuration exercise was intended to evaluate the potential to minimize emissions on a temporary basis downgrading the canyon ventilation system. However, stack results indicate a full year of lower emissions, excluding the week following the sample probe camera inspection, and there is no longer a valid reason to enter a 2-fan configuration.

The monthly emissions will continue to be monitored and if there is a significant increase in the trend, the option of remediating the legacy contamination will be re-evaluated.

Addendum January 2019 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2019-00004

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through December of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of beginning of January 2019:

As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also sent to SRNL. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018 (SRNS-J2600-2018-00124). The report (SRNL-TR-2018-00116, Rev 0) was published December 13th, 2018. The report details that the sampler deposits on the filter paper were uranyl and plutonyl phosphates. These are legacy constituents expected from the Canyon separations process.

In an effort to troubleshoot the exceedances from the 291-F Stack, the facility plans to return to a 2-fan configuration (see SRNS-J2220-2018-00271 for more detail). In preparation for changing to a 2-fan configuration, the facility revised the Relative Accuracy Test (RAT) procedure for the 291-F Stack. As of the end of September, the revision for the procedure was approved and published in document control. In tandem, the facility provided the scope of work for the RAT scheduled for 4QY18 to DHEC to keep them informed of the changes being made prior to performing the test. This notice was submitted on September 5th, 2018; no comments were received in response. The RAT was completed on October 29, 2018. The official RAT report was submitted to DHEC on November 27th. As of December, 2018DHEC has accepted the RAT report. Arrangements are being made with Operations on setting up preventative maintenance in preparation for placing the exhaust ventilation system to a temporary 2-fan configuration. Radcon is evaluating additional source monitoring while in a 2-fan configuration such as photographing sample papers and using a counter probe on the unofficial sample when the official weekly sample is pulled.

The annual camera inspection was completed on November 1 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. The report was completed & published on December 10th, 2018. Following the camera inspection, the weekly sample taken on November 5th, 2018, had elevated concentrations for Pu-238, Pu-239 and Cs-137. These actinides had not been elevated since mid-2017. It is suspected that due to the camera inspection debris was disturbed and knocked loose onto the filter paper.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal to determine if it is air tight is useful to investigation. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

Corrective maintenance (CMs) has been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028).

Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum December 2018 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2018-00124

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through November of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of December 2018:

As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also sent to SRNL. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018. SRNL completed their assessment and sent engineering and facility management an updated draft on August 16th of the previous revision of the report distributed on June 28th, 2018 (this previous draft was only the results from the first sample batch of filter papers from October 2017). After reviewing the report in September, the facility requested additional discussion and analysis be completed on the eight sample papers that were sent up in the second batch within the final report. These updates were implemented, completed, and accepted by the facility early December with no additional comments. The report (SRNL-TR-2018-00116, Rev 0) is projected to be published no later than mid-January 2019.

In an effort to troubleshoot the exceedances from the 291-F Stack, the facility plans to return to a 2-fan configuration (see SRNS-J2220-2018-00271, July 2018 addendum for more detail). In preparation for changing to a 2-fan configuration, the facility revised the Relative Accuracy Test (RAT) procedure for the 291-F Stack. As of the end of September, the revision for the procedure was approved and published in document control. In tandem, the facility provided the scope of work for the RAT scheduled for 4QY18 to DHEC to keep them informed of the changes being made prior to performing the test. This notice was submitted on September 5th, 2018; no comments were received in response. The RAT was completed on October 29, 2018. The official RAT report was submitted to DHEC on November 27th. Once the facility is notified that DHEC has accepted the RAT report, the facility will commence scheduling a transition to a 2-fan configuration. The annual camera inspection was completed in November 2018. The inspection revealed no visual obstructions in the isokinetic stack nozzles. The report will be completed & published by end of December.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal to determine if it is air tight is useful to investigation. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

Corrective maintenance (CMs) has been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028).

Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found

summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum November 2018 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2018-00119

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through October of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of November 2018: As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also sent to SRNL. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018. SRNL completed their assessment and sent engineering and facility management an updated draft on August 16th of the previous revision of the report distributed on June 28th, 2018 (this previous draft was only the results from the first sample batch of filter papers from October 2017). After reviewing the report in September, the facility requested additional discussion and analysis be completed on the eight sample papers that were sent up in the second batch within the final report. These updates were implemented and completed in mid-November 2018.

In an effort to troubleshoot the exceedances from the 291-F Stack, the facility plans to return to a 2-fan configuration (see SRNS-J2220-2018-00271, July 2018 addendum for more detail). In preparation for changing to a 2-fan configuration, the facility revised the Relative Accuracy Test (RAT) procedure for the 291-F Stack. As of the end of September, the revision for the procedure was approved and published in document control. In tandem, the facility provided the scope of work for the RAT scheduled for 4QY18 to DHEC to keep them informed of the changes being made prior to performing the test. This notice was submitted on September 5th, 2018; no comments were received in response. The RAT was completed on October 29, 2018. The data is in review and the official RAT report will be submitted to DHEC by the end of November. Once the facility is notified that DHEC has accepted the RAT report, the facility will commence scheduling a transition to a 2-fan configuration.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal to determine if it is air tight is useful to investigation. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

Corrective maintenance (CMs) has been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028).

Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum October 2018 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2018-00061

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through September of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of October 2018:

As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also sent to SRNL. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018. SRNL has completed their assessment and sent engineering and facility management an updated draft on August 16th of the previous revision of the report distributed on June 28th, 2018 (this previous draft was only the results from the first sample batch of filter papers from October 2017). Engineering and facility management completed reviewing the report and submitted their edits on September 17th, 2018. Engineering also relayed its concerns that only limited analysis was completed on the eight sample papers that were sent up in the second batch. SRNL has been asked to provide additional discussion within the final report that the material on the sample papers was similar to the two initial samples in the first batch of filter papers to determine if it is likely originating from the same source.

In an effort to troubleshoot the exceedances from the 291-F Stack, the facility plans to return to a 2-fan configuration (see SRNS-J2220-2018-00271, July 2018 addendum for more detail). In preparation for changing to a 2-fan configuration, the facility revised the Relative Accuracy Test (RAT) procedure for the 291-F Stack. As of the end of September, the revision for the procedure has been approved and published in document control. In tandem, the facility provided the scope of work for the RAT scheduled for 4QY18 to DHEC to keep them informed of the changes being made prior to performing the test. This notice was submitted on September 5th, 2018; no comments have been received in response as of October 1, 2018. Once the facility is notified that DHEC has accepted the RAT report, the facility will commence transition to a 2-fan configuration.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal to determine if it is air tight is useful to investigation. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

Corrective maintenance (CMs) has been performed on the isokinetic sample lines on 291-F Stack to ensure legacy contamination was not being captured on the weekly filter paper and interfering with a representative air emissions sample. See September addendum for the completed summary of this effort (SRNS-J2600-2018-00028).

Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. The monitoring reports for samples taken in late 2017 can be found summarized in the June 2018 Addendum (SRNS-J2220-2018-00234), and the continued analysis for information up through April 2018 can been seen abbreviated in the August 2018 Addendum

(SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum September 2018 DCSSOF Exceedance Investigation Report for 291-F Stack SRNS-J2600-2018-00028

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through August of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-00234) addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of September 2018:

As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also sent to SRNL. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018. As of the beginning of August 2018, the alpha scans on the filter paper samples were completed. For a confirmatory identification, the samples were sent to be tested using the Scanning Electron Microscope. SRNL has completed their assessment and sent engineering and facility management an updated draft on August 16th of the previous revision of the report distributed on June 28th, 2018 (this previous draft was only the results from the first sample batch of filter papers from October 2017). Engineering and facility management has been circulating a hardcopy of the draft to develop one edited copy of the report to SRNL for publication.

In an effort to troubleshoot the exceedances from the 291-F Stack, the facility plans to change to a 2-fan configuration (see SRNS-J2220-2018-00271, July 2018 addendum for more detail). In preparation for changing to a 2-fan configuration, the facility is working to revise the Relative Accuracy Test (RAT) procedure for the 291-F Stack. As of the beginning of September, the revision for the procedure has been routed and is in the review process. In tandem, the facility has provided the scope of work for the RAT scheduled for 4QY18 to DHEC to keep them informed of the changes being made prior to performing the test. This notice has been developed and the information was submitted on September 5th, 2018. Once the facility is notified that DHEC has accepted the RAT, the facility will commence going into a 2-fan configuration.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal as air tight is useful to investigate. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

On June 19th, 2017, the Upper Isokinetic Line on the 291-F Stack was flushed with Radiac Wash in an attempt to address the trend of high dose readings on the sample paper however, manipulation of the inlet ball valve above the upper sample chamber was not considered necessary at the time. On June 7th, 2018, visible particles were found on a clean filter sample paper after a RadCon Inspector manipulated the ball valve while obtaining a sample. It's therefore suspected that some contamination may remain in the ball valve. The follow-up of the flushing of the Upper Isokinetic Line on the 291-F stack (WO #00671764) was completed on August 23rd, 2018. The facility strove to flush any contamination that may have been held up in the ball valve just upstream of the Upper Isokinetic Sample Chamber. The ball valve is used to isolate the sample chamber during the weekly filter paper changeouts. This evolution was intended to ensure any radioactive material captured on the sample filter paper was from the

previous week's stack emission and not legacy contamination that was present on the ball valve and released during the manipulation of the valve.

Additional mitigative measures have been made due to the elevated actinide results from the 291-F Stack including taking a series of samples from the nearby Burial Ground North (BGN) air surveillance location. A summary of their monitoring reports for samples taken in late 2017 can be found in the June 2018 Addendum (SRNS-J2220-2018-00234) and the information on their continued analysis for up through April 2018 can been seen abbreviated in the August 2018 Addendum (SRNS-J2220-2018-00309). The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum August 2018 DCSSOF Exceedance Investigation Report for 291-F Stack – SRNS-J2220-2018-00309

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through June of 2018. Previous MRRRs discuss the initial memorandum and addenda. For more information the June 2018 (SRNS-J2220-2018-0234) addenda contains a timeline of events associated with the 291-F stack elevated release. Since the 12 month-sum of fractions peaked in March 2018 it has been steadily decreasing. The following is additional information as of August 2018:

As discussed in previous monthly reports, the facility shipped two initial samples of the filter paper from the lower isokinetic sampler to SRNL for characterization in October 2017 and obtained eight additional samples over several months in the beginning of 2018 which were also to sent to SRNL. The official report publication is waiting until the analysis on these samples is completed. The eight additional samples were collected to increase the sample size for more empirical and representative results on the characterization of the material on the filter papers. These samples were shipped to SRNL on May 30th, 2018. While waiting on these additional sample (sent in May 2018) assessments to be completed, engineering and facility management provided comments to the current draft (distributed on June 28th, 2018) of SRNL's F-Area Filter Paper Analysis with the results from the first sample batch from October 2017. As of the beginning of August 2018, the alpha scans on the filter paper samples were completed. For a confirmatory identification, the samples were sent to be tested using the SEM, which has been down and only recently returned to operation.

In an effort to trouble shoot the exceedances from the 291-F Stack, the facility plans to change to a 2-fan configuration (see SRNS-J2220-2018-00271, July 2018 addendum for more detail). In preparation for changing to a 2-fan configuration, the facility is working to revise the Relative Accuracy Test (RAT) procedure for the 291-F Stack. In tandem, the facility will provide the scope of work for the RAT scheduled for 3QY18 to DHEC to keep them informed of the changes being made prior to performing the test. Once this is complete and the facility is notified that DHEC has accepted the RAT, the facility will commence going into a 2-fan configuration.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal as air tight is useful to investigate. The Old Sand Filter (294-F) entry will not be scheduled until after the change to a 2-fan configuration, since the entry requires a 2-fan configuration system set up.

On June 19th, 2017, the Upper Isokinetic Line on the 291-F Stack was flushed with Radiac Wash in attempt to address the trend of high dose readings on the sample paper however, manipulation of the inlet ball valve above the upper sample chamber was not considered necessary at the time. Consequently, on June 7th, 2018, visible particles were found on a clean filter sample paper after a RadCon Inspector manipulated the ball valve while obtaining a sample. It's therefore suspected that some contamination may remain in the ball valve. The follow-up of the flushing of the Upper Isokinetic Line on the 291-F stack (WO #00671764) is scheduled for the end of August.

Additional mitigative measures for air surveillance program have been made due to the elevated actinide results from the 291-F Stack. A series of samples taken in late 2017 from the nearby Burial Ground North (BGN) air surveillance location was analyzed for alpha-specific radionuclides and strontium and a report was provided in April 2018 (See June 2018 Addendum, SRNS-J2220-2018-00234, for more detail). Sample Data Management (SDM) continues to

evaluate alpha-specific analytes and strontium 90 collected from the Burial Ground North (BGN) air station. The air surveillance results for the start of the 2nd quarter of 2018 have concluded that the gamma analytes and gross A/B have returned within normal ranges. As of the beginning of August 2018, the lab testing of the samples pulled in March through April 2018 returned with detection readings two magnitudes lower (for Americium 241 and Plutonium 239) than that of the concentrations detected in the samples pulled in September 2017. There was also a small detection of Plutonium 238, and a slightly elevated detection of Strontium 90 for the samples collected on April 2018, but the Sr-90 is within the 10-year trend for that location. The Sample Data Management (SDM) will continue to monitor the BGN station until the exceedances with 291-F Stack is resolved.

Addendum July 2018 DCSSOF Exceedance Investigation Report for 291-F Stack – SRNS-J2220-2018-00271

The **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through June of 2018. Previous MRRRs discuss the initial memorandum and addenda. The June 2018 addenda contains a timeline of events associated with the 291-F stack elevated release. The following is additional information as of July 2018:

As discussed in previous monthly reports facility obtained additional samples over several months in the beginning of 2018 to send to SRNL, so the official report publication is waiting until the analysis on these samples is completed. Eight additional samples were collected to increase the sample size for more empirical and representative results. These samples were shipped to SRNL on May 30th, 2018. While waiting on the additional samples assessment to be completed, engineering and facility management will review and make edits/comments to the current draft of SRNL's F-Area Filter Paper Analysis with the results from the first samples. The latest draft of the report was sent to the proper F-Area distribution by SRNL on June 28th, 2018. The analysis additional filter samples is expected to be completed in approximately 3 to 4 weeks from the first week of July 2018.

In April 2018, F Area Operations and Engineering began reevaluating information and analyses gathered since elevated emissions first occurred from the 291-F Stack in November 2016. The team postulated possible effects based on changes made to the F Canyon ventilation exhaust fan configuration. The Facility changed from to 2 to 1 fan operation in May 2016. While F-Area Operations and engineering still plan to change to a 2-fan configuration, this action has been postponed due to DHEC permitting conditions on the flow rate limits. SRS Part 70 Air Quality Permit TV 0080-0041 states, "On a semiannual basis, the permittee shall perform and report to the BAQ results of continuous measurement system performance tests. The permitee shall verify the continuous gas volumetric flow rate measurements system performance per Relative Accuracy (RA) test procedure described in Appendix E of 40 CFR 52." The 40 CFR Part 52, Appendix E protocol requires that the semi-annual to annual Relative Accuracy Test (RAT) of the equipment be conducted over a range of flow rates expected to occur during normal operations. The RAT accepted by DHEC for 291-F (completed in January 2018) was performed in a one-fan configuration, restricting/limiting the flow rate range conditions of that of a one-fan configuration until which time the RAT is completed again. As such, the 2-fan configuration change will be scheduled with the next RAT in 3QCY18.

There are plans to enter the Old Sand Filter (294-F). The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal as air tight is useful to investigate. This work is being planned and will be scheduled after the remaining lower hazard work is completed.

On June 19th, 2017, the Upper Isokinetic Line on the 291-F Stack was flushed with Radiac Wash in attempt to address the trend of high dose readings on the sample paper however, manipulation of the inlet ball valve above the upper sample chamber was not considered necessary at the time. Consequently, on June 7th, 2018, visible particles were found on a clean filter sample paper after a RadCon Inspector manipulated the ball valve while obtaining a sample. It's therefore suspected that some contamination may remain in the ball valve. A follow-up flushing (WO #00671764) is planned to ensure the future samples taken on the Upper Isokinetic Sampler accurately represent what is being emitted from the 291-F stack.

Sample Data Management (SDM) continues to evaluate alpha-specific analytes at Burial Ground North (BGN). The air surveillance results for the start of the 2nd quarter of 2018 has been ordered. It has been concluded that the gamma analytes and gross A/B have returned within normal ranges. However, as of the beginning of July 2018, the lab testing of actinides (alpha-specific radionuclides) has not been completed.

Addendum June 2018 & Full Timeline DCSOF Preliminary Exceedance Investigation Report for 291-F Stack - SRNS-J2220-2018-00234

As discussed in previous monthly reports, the **291-F stack** rolling 12-month sum of fractions first exceeded 1.00 in February 2017, which was published in the February 2017 MRRR on April 13th, 2017. In accordance with 3Q-18.5, *Radiological Effluent Monitoring, Reporting and Environmental ALARA Process*, the ECA submitted an exceedance investigation memorandum on May 8th, 2017 to the Environmental ALARA Committee chairperson (SRNS-J2220-2017-00067). Addenda were subsequently submitted in June through December of 2017, and January through May of 2018. Previous MRRRs discuss the initial memorandum and addenda. The following is a timeline of events associated with the 291-F stack elevated release.

The initial exceedance investigation indicated that moisture due to condensation was likely the primary contributor to super-isokinetic sampling that impacted the elevated analytical results at the 291-F Stack. This position was supported by the air surveillance data review and windrose modeling, however condensate as the primary contributor was soon dismissed. In July 2017 a corrective action was initiated to decontaminate the sample lines and re-insulate the sample lines to raise the temperature in the sample line above dew point. The camera inspection was also completed in July. For the camera inspection, the heat tracing was removed, which is anticipated to have led to the condensate. This is backed by the fact that all signs of moisture from condensate stopped after decontamination and the return of the heat tracing. At this time condensate was eliminated as a contributor.

Concurrently, starting in July 2017, the analytical data was being reviewed by facility personnel, and by August 2017, it indicated debris plugging the static pressure line was not of the magnitude to cause the increased analytical results seen in the stack. Therefore, there was still some other reason for the increase that had not been resolved, though the camera inspection (July 2017) concluded that the issue did not stem from visible plugging of the upper sampling rake.

As the investigation moved forward, there were visual signs in October's continued investigation that the filters had sand or other particulate material on them, so plans to enter both the Sand Filter and the Stack Exhaust Tunnel to investigate their potential contribution to elevated releases were underway through December 2017. Due to the complexity and safety concerns of the job and the fact that they had not been performed for several years, it took time to make extensive updates to the procedures, get confined space permits, and design/construct the hut for entry into the Sand Filter. This led to a target date of entry into the Sand Filter by for the end of January 2018, and an entry to the Stack Tunnel was planned to proceed in March 2018.

However, on October 23, 2017, the 291-F stack flow transmitter and volume totalizer was malfunctioning and placed out of service, and the replacement of the 291-F transmitter became the facility's top priority. It is unknown why the transmitter was malfunctioning, though it is known that the replacement transmitter was temperature sensitive. Since this is a PIC 2 stack where continuous flow measurement is required, SRS notified SCDHEC of the flow measurement device downtime. During this downtime, stack volumes were estimated based on a flow gauge located in the air exhaust tunnel during the monitor downtime. However, this alternate flow measurement location is not a regulator-approved location. As such, releases were revisited for the 2017 annual reporting purposes. This ensured that conservative values are used for the source's emissions, Subpart H dose input values, and PIC level determination for this reporting period.

The replacement transmitter was installed along with a thermal blanket on January 9th, 2018. The thermal blanket is used to mitigate the transmitter's temperature sensitivity; this was added to the new transmitter since sensitivity to temperature was impacting the recalibration of the sensor. The required 168-hour relative accuracy test was performed between January 10 and January 18, 2018. Results indicated that the stack flow accuracy is within the limits required per 40 CFR 52, Appendix E.

Sand Filter (294-1F) entry was performed and completed on February 6th, 2018, and the inspection showed no indications that the Sand Filter (294-1F) was contributing to the increased

emissions from 291-F Stack. The Stack Exhaust Tunnel entry, however, was postponed because the entry required a containment hut with portable HEPA-filtered copus blowers to exhaust the hut. F-Area does not have a portable HEPA exhauster to install, so alternative ventilation for the hut was being considered. And by the end of March (March 22, 2018), discussions revisited the scope and timing of the entry into the 291-F Stack Exhaust Tunnel due to waiting on the official results from the special samples of the filter paper sent to SRNL

To better characterize what was being visually spotted on the filter (whether it was sand particles or something else), the facility began the process of getting ready to ship samples of the filter paper from the lower isokinetic sampler to SRNL for characterization tests in October 2017. Samples were transferred to SRNL by December 2017. By January 2018, SRNL provided some preliminary results, but they were still inconclusive. SRNL worked to eliminate interferences coming from the sample media; the filter paper itself was interfering with the results, so a blank filter as a control group was sent over. SRNL also removed particulates from the filter paper to help evaluate if the contaminants were primarily associated with sand or concrete degradation products.

The scope and timing of the Stack Tunnel entry were based on the assumption that there was a potential subsidence and the material of concern was sand or concrete. However, preliminary results from SRNL were received on the special samples from 291-F Isokinetic Lower Sampler (preliminary results on 7 March 2018) which indicated that none of the contaminants were from sand, concrete degradation or spalling, and that much of the material appears to be a mixture of Sodium Nitrate and a Hydrated Alkali Uranyl Phosphate called meta-ankoleite. The facility obtained additional samples over several months to send to SRNL, so the official report publication will hold off until the analysis on these samples is completed. Eight additional samples have been collected to increase the sample size for more empirical and representative results. These samples were shipped to SRNL on May 30th, 2018.

As a result of discussions with SRNL researchers on the samples sent and tested at their labs, further evaluation of the issues with entering the Stack Exhaust Tunnel determined that the most effective way of ensuring that we identify the source of the material being released from the stack is to execute a sampling plan during the entry. However, the scope of the activity was determined to have possible repercussions of disturbing the material while sampling, resulting in the increase of personnel exposure and increase the release of highly radioactive material from the stack to the atmosphere. To mitigate this risk and reduce the ALARA and personnel safety concerns, it was determined that it's best to perform this evolution with the Canyon Exhaust fans off. The upcoming F-Canyon Complex Documented Safety Analysis for Interim Operation (DSAIO) and Technical Safety Requirements (TSR) Rev. 0, which is s downgrade the Canyon Exhaust fans to General Service (GS). This will allow them to turn off the fans with no consequence to the safety basis. Therefore, the tunnel entry will be rescheduled after the Safety Basis revision is complete. Weekly meetings are currently being held to plan the upcoming tunnel entry. Also, Engineering is gathering additional historical and analytical data for their evaluation.

In April 2018, F Area Operations and Engineering began reevaluating information and analyses gathered since elevated emissions first occurred from the 291-F Stack in November 2016. The team postulated possible effects based on changes made to the F Canyon ventilation exhaust fan configuration. The Facility changed from to 2 to 1 fan operation in May 2016. Engineering and Operations are evaluating returning back to a 2-fan configuration. Engineering will also evaluate ventilation flow changes that may have impacted the exhaust flow path. There was a briefing on this action discussed with SRNS Engineering Leadership on May 31, 2018. The feedback from this briefing was positive about the prospect of evaluating the low risk contributors to the emissions exceedances such as the fan configuration before going after higher risk ones such as entering the Tunnel. Engineering tracked the fan configuration changes—when switching from one fan to the other, there are moments when both fans are running—in the past and compared it to the spikes from the stack. This data showed a trend that short-term 2-fan configuration does not corollate with the spikes from the stack. By returning to a 2-fan configuration for an approximately 3 to 4 month run time, we may be able to eliminate flow path as a possible contributor to the exceedances by probing daily during the 2-fan configuration. If returning to 2-fan configuration stops the exceedances, then it can be postulated that the contaminates may be coming

from the flow path out the stack created by a 1-fan configuration at which time Engineering can focus its investigation efforts on flow patterns. If the return to 2-fan configuration does nothing to change the current exceedances from the stack, flow patterns can be ruled out as a contributor. There is another meeting being scheduled for June 2018 to brief the customer on the fan configuration plans before actions move forward to implement the change.

Also, investigations began reviewing revisions made to the procedure for sampling and collecting from the 291-F Stack. A revision to the procedure had been made around the same time elevated release began. This revision included instructions on the leak check. The purpose of the leak check was to ensure the sample chamber was leak tight. Therefore, it was tested to determine that the action of opening and closing the valve had not been depositing contaminants onto the filter paper. On April 30th, 2018, Radiological Control began swiping the valve for contaminates and testing to see if the valve was the source of contamination. Nothing probed due to local valving, so procedural revisions was eliminated as a contributor.

Due to the sensitivity of this investigation, while all possible contributors are being assessed, more than one variable should not be changed at a time to prevent sudden changes to the system. Therefore, there are plans to enter the Old Sand Filter (294-F), but an entry date is to be determined after the results of the fan configuration change are complete. The Old Sand Filter (294-F) is sealed off, but since it is downstream of the current, in-use Sand Filter (294-1F; inspected in February 2018), an inspection of the seal as air tight is useful to investigate.

The following additional mitigative measures for air surveillance program have been made due to elevated actinide results from the 291-F stack. Samples from the nearby Burial Ground North (BGN) air surveillance location were analyzed for alpha-specific radionuclides and strontium. The additional analyses were performed on samples from seven 2017 sample periods coinciding with 291-F elevated concentration. The additional analyses revealed some elevated concentrations, primarily of Pu-239 and Am-241 from BGN during the sample period that coincided with the September 18-25, 2017 291-F elevations. Sample Data Management (SDM) requested that the Atmospheric Technologies Group (ATG) provide weather patterns for the impacted period during the period where elevated radionuclide concentrations were noted at the Burial Ground and the 291-F stack.

As wind was primarily toward the west-southwest during this time, additional analyses were performed on the filters from D-Area and Jackson barricade air surveillance stations. SDM then requested that ATG perform modeling to determine if there were any correlation between the elevated concentrations of the air stations and the 291-F stack. SRNL provided a report on April 23, 2018. The SRNL report states that releases from the 291-F stack likely contributed to the measurements at the BGN sampler, although the model did not confirm the high measurements at BGN. SDM continues to evaluate alpha-specific analytes at BGN until the 291-F elevations are resolved. SDM issued SRNS-J2230-2018-00010, "Results of Special Analyses of Air Surveillance Glass Fiber Filters and Meteorological Modeling" on May 17, 2018 summarizing the air surveillance results, modeling results, uncertainties, conclusions, and recommendations. It was concluded that while a detectable amount of actinides (alpha-specific radionuclides) was found, it was not at a level that would contribute a significant dose to the public. Modeling suggested that at least part of radionuclides could be traced to the 291-F stack discharge point. SDM will continue isotopic analysis at the BGN station for every filter sample collected until the issue with 291-F stack is resolved.