



DUANE ARNOLD ENERGY CENTER  
CEDAR RAPIDS, IOWA  
Docket No. 50-331

RADIOLOGICAL ENVIRONMENTAL  
MONITORING PROGRAM (REMP)

ANNUAL REPORT - PART II  
DATA TABULATIONS AND ANALYSES


January 1 to December 31, 2015

Prepared by

ATI ENVIRONMENTAL, Inc.  
Midwest Laboratory

Project No. 8001

Reviewed and  
Approved



---

Bronia Grob, M.S.  
Laboratory Manager

## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
	List of Tables .....	iii
1.0	INTRODUCTION .....	iv
2.0	PROGRAM DEVIATIONS.....	v
3.0	DATA TABLES.....	vi

## LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
1	Airborne particulates and iodine, Location D-3, analyses for gross beta and iodine-131.....	1-1
2	Airborne particulates and iodine, Location D-5, analyses for gross beta and iodine-131.....	2-1
3	Airborne particulates and iodine, Location D-6, analyses for gross beta and iodine-131.....	3-1
4	Airborne particulates and iodine, Location D-7, analyses for gross beta and iodine-131.....	4-1
5	Airborne particulates and iodine, Location D-11, analyses for gross beta and iodine-131.....	5-1
6	Airborne particulates and iodine, Location D-13, analyses for gross beta and iodine-131.....	6-1
7	Airborne particulates and iodine, Location D-15, analyses for gross beta and iodine-131.....	7-1
8	Airborne particulates and iodine, Location D-16, analyses for gross beta and iodine-131.....	8-1
9	Airborne particulates and iodine, Location D-40, analyses for gross beta and iodine-131.....	9-1
10	Airborne particulate composite samples, analysis for gamma-emitting isotopes.....	10-1
11	Ambient gamma radiation by thermoluminescent dosimeters (TLD), quarterly exposure.....	11-1
12	Milk samples, analysis for iodine-131 and gamma emitting isotopes.....	12-1
13	Ground water, Area wells, analysis for gross beta, tritium and gamma-emitting isotopes.....	13-1
14	Vegetation samples, analysis for iodine-131 and gamma-emitting isotopes.....	14-1
16	Surface water samples, analysis for tritium and gamma-emitting isotopes.....	16-1
17	Surface water composites, analysis for strontium-89 and strontium-90.....	17-1
18	Fish samples, analysis for gamma-emitting isotopes .....	18-1
19	River sediment samples, analysis for gamma-emitting isotopes.....	19-1

## 1.0 INTRODUCTION

The following constitutes a supplement to the Annual Report for the Radiological Environmental Monitoring Program conducted at the Duane Arnold Energy Center, Palo, Iowa in 2015. Results of completed analyses are presented in the attached tables.

For information regarding sampling locations, type and frequency of collection, and sample codes, please refer to Part I, Tables 5.3 - 5.5 and Figures 5.1 and 5.2.

All concentrations, except gross beta and airborne iodine, are decay corrected to the time of collection. Airborne I-131 is decayed to the midpoint of the collection period.

The required values for lower limits of detection (LLD) for gamma emitting isotopes are established through the Offsite Dose Assessment Manual (ODAM). Naturally occurring radioisotopes, such as Be-7, K-40 and Ra daughters, are frequently detected, but may not be listed for every sample medium.

## 2.0 PROGRAM DEVIATIONS

Sample Type	Analysis	Location(s)	Collection Date or Period	Comments
SW	H-3/ I-131/ Gamma	D-49	01-19-15	Water frozen.
SW	H-3/ Gamma	D-50	01-19-15	Water frozen.
SW	H-3 / Gamma	D-99	01-19-15	Water frozen.
SW	H-3/ Gamma	D-50	02-18-15	Water frozen.
SW	H-3/ Gamma	D-99	02-18-15	Water frozen.
AP/AI	Gross Beta/ I-131	D-5	04-10-15	No power to sampler.
AP/AI	Gross Beta/ I-131	D-5	04-17-15	Sample no longer available.
AP/AI	Gross Beta/ I-131	D-13	05-01-15	No power to sampler.
AP/AI	Gross Beta/ I-131	D-13	06-25-15	No power to sampler.
AP/AI	Gross Beta/ I-131	D-15	07-11-14	Low volume due to power outage.
TLD	Ambient Gamma	D-39	07-14-15	Missing in field.
SW	H-3/ I-131/Gamma	D-49	10-31-15	CE02088659 documents missed sample. Sample required per ODAM 6.3.2
SW	H-3/Gamma	D-50	10-31-15	CE02088659 documents missed sample. Sample required per ODAM 6.3.2
SW	H-3/Gamma	D-51	10-31-15	CE02088659 documents missed sample. Sample required per ODAM 6.3.2
SW	H-3/I-131/Gamma	D-61	10-31-15	CE02088659 documents missed sample. Sample required per ODAM 6.3.2
SW	Gamma	D-99	10-31-15	CE02088659 documents missed sample. Sample required per ODAM 6.3.2

### 3.0 DATA TABLES

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-3 (Hiawatha)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	240	0.039 ± 0.005	07-07-15	236	0.021 ± 0.004
01-14-15	232	0.026 ± 0.004	07-16-15	353	0.019 ± 0.003
01-23-15	362	0.032 ± 0.003	07-22-15	243	0.020 ± 0.004
01-29-15	235	0.018 ± 0.004	07-29-15	268	0.026 ± 0.004
02-05-15	277	0.005 ± 0.002 <sup>b</sup>	08-07-15	350	0.030 ± 0.003
02-12-15	278	0.037 ± 0.004	08-14-15	275	0.030 ± 0.004
02-19-15	282	0.031 ± 0.004	08-20-15	237	0.040 ± 0.005
02-27-15	313	0.043 ± 0.004	08-27-15	274	0.021 ± 0.004
			09-02-15	232	0.036 ± 0.005
03-07-15	310	0.019 ± 0.004			
03-14-15	277	0.027 ± 0.004	09-11-15	354	0.033 ± 0.004
03-19-15	200	0.022 ± 0.005	09-17-15	236	0.013 ± 0.003
03-27-15	322	0.023 ± 0.003	09-24-15	273	0.021 ± 0.004
04-01-15	202	0.012 ± 0.004	10-01-15	285	0.018 ± 0.003
1st Quarter Mean ± s.d.		0.026 ± 0.011	3rd Quarter Mean ± s.d.		0.025 ± 0.008
04-10-15	351	0.019 ± 0.003	10-08-15	284	0.019 ± 0.003
04-17-15	279	0.025 ± 0.004	10-15-15	288	0.021 ± 0.004
04-23-15	234	0.019 ± 0.004	10-21-15	240	0.032 ± 0.005
05-01-15	298	0.018 ± 0.003	10-31-15	413	0.027 ± 0.003
05-07-15	231	0.025 ± 0.004	11-06-15	241	0.032 ± 0.005
05-16-15	332	0.012 ± 0.003	11-13-15	287	0.029 ± 0.004
05-21-15	190	0.011 ± 0.004	11-19-15	245	0.016 ± 0.004
05-27-15	220	0.015 ± 0.004	11-25-15	243	0.020 ± 0.004
			12-02-15	285	0.031 ± 0.004
06-05-15	310	0.024 ± 0.003			
06-10-15	183	0.029 ± 0.005	12-10-15	330	0.049 ± 0.004
06-17-15	249	0.015 ± 0.003	12-17-15	282	0.017 ± 0.003
06-25-15	287	0.023 ± 0.004	12-23-15	245	0.055 ± 0.006
07-01-15	235	0.026 ± 0.004	12-30-15	66	0.082 ± 0.015 <sup>c</sup>
2nd Quarter Mean ± s.d.		0.020 ± 0.006	4th Quarter Mean ± s.d.		0.033 ± 0.019
Cumulative Average					0.026

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Filter light.

<sup>c</sup> Low volume due to possible power outage. I-131 < 0.036 pCi/m<sup>3</sup> due to low volume.

Table 2. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-5 (Palo)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		0.010
01-08-15	224	0.054 ± 0.005			
01-14-15	246	0.031 ± 0.004			
01-23-15	368	0.032 ± 0.003			
01-29-15	242	0.021 ± 0.004			
02-05-15	286	0.029 ± 0.004			
02-12-15	272	0.048 ± 0.004			
02-19-15	291	0.041 ± 0.004			
02-27-15	322	0.033 ± 0.004			
03-07-15	320	0.032 ± 0.004			
03-14-15	286	0.022 ± 0.004			
03-19-15	206	0.020 ± 0.005			
03-27-15	329	0.022 ± 0.003			
04-01-15	163	0.018 ± 0.005 <sup>c</sup>			
1st Quarter Mean ± s.d.		0.031 ± 0.011			
04-10-15		ND <sup>d</sup>			
04-17-15		ND <sup>d</sup>			
Cumulative Average					0.031

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Filter light.

<sup>c</sup> Low volume due to power loss.

<sup>d</sup> "ND" = no data; see Table 2.0, Program Deviations.



Table 3. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-6 (Center Point)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		0.010
01-08-15	267	0.039 ± 0.004	07-07-15	246	0.022 ± 0.004
01-14-15	264	0.029 ± 0.004	07-16-15	368	0.018 ± 0.003
01-23-15	405	0.028 ± 0.003	07-22-15	251	0.026 ± 0.004
01-29-15	270	0.018 ± 0.003	07-29-15	280	0.023 ± 0.004
02-05-15	324	0.024 ± 0.003	08-07-15	364	0.028 ± 0.003
02-12-15	328	0.037 ± 0.004	08-14-15	287	0.029 ± 0.004
02-19-15	337	0.045 ± 0.004	08-20-15	251	0.033 ± 0.004
02-27-15	377	0.036 ± 0.003	08-27-15	281	0.023 ± 0.004
03-07-15	328	0.031 ± 0.004	09-02-15	231	0.055 ± 0.006
03-14-15	295	0.027 ± 0.004	09-11-15	358	0.035 ± 0.004
03-19-15	212	0.022 ± 0.005	09-17-15	245	0.030 ± 0.004
03-27-15	336	0.025 ± 0.003	09-24-15	274	0.026 ± 0.004
04-01-15	210	0.020 ± 0.004	10-01-15	282	0.035 ± 0.004
<u>1st Quarter Mean ± s.d.</u>		<u>0.029 ± 0.008</u>	<u>3rd Quarter Mean ± s.d.</u>		<u>0.030 ± 0.009</u>
04-10-15	375	0.019 ± 0.003	10-08-15	283	0.028 ± 0.004
04-17-15	300	0.023 ± 0.003	10-15-15	274	0.026 ± 0.004
04-23-15	258	0.017 ± 0.004	10-21-15	238	0.026 ± 0.004
05-01-15	330	0.011 ± 0.003	10-31-15	403	0.023 ± 0.003
05-07-15	252	0.024 ± 0.004	11-06-15	238	0.034 ± 0.005
05-16-15	375	0.011 ± 0.002	11-13-15	213	0.036 ± 0.005
05-21-15	214	0.013 ± 0.004	11-19-15	238	0.024 ± 0.004
05-27-15	249	0.020 ± 0.004	11-25-15	239	0.026 ± 0.004
06-05-15	366	0.019 ± 0.003	12-02-15	280	0.036 ± 0.004
06-10-15	203	0.023 ± 0.005	12-10-15	321	0.060 ± 0.005
06-17-15	287	0.015 ± 0.003	12-17-15	278	0.022 ± 0.004
06-25-15	335	0.020 ± 0.003	12-23-15	240	0.053 ± 0.006
07-01-15	235	0.020 ± 0.004	12-30-15	283	0.025 ± 0.004
<u>2nd Quarter Mean ± s.d.</u>		<u>0.018 ± 0.004</u>	<u>4th Quarter Mean ± s.d.</u>		<u>0.032 ± 0.012</u>
<u>Cumulative Average</u>					<u>0.027</u>

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

Table 4. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-7 (Shellsburg)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		0.010
01-08-15	279	0.037 ± 0.004	07-07-15	236	0.022 ± 0.004
01-14-15	286	0.029 ± 0.004 <sup>b</sup>	07-16-15	353	0.021 ± 0.003
01-23-15	436	0.029 ± 0.003 <sup>b</sup>	07-22-15	241	0.021 ± 0.004
01-29-15	288	0.019 ± 0.003	07-29-15	268	0.027 ± 0.004
02-05-15	286	0.026 ± 0.004	08-07-15	349	0.032 ± 0.004
02-12-15	286	0.043 ± 0.004 <sup>c</sup>	08-14-15	275	0.026 ± 0.004
02-19-15	297	0.024 ± 0.003	08-20-15	243	0.036 ± 0.005
02-27-15	329	0.030 ± 0.003	08-27-15	269	0.026 ± 0.004
03-07-15	325	0.021 ± 0.004	09-02-15	237	0.048 ± 0.005
03-14-15	291	0.026 ± 0.004	09-11-15	349	0.030 ± 0.004
03-19-15	149	0.027 ± 0.007 <sup>d</sup>	09-17-15	241	0.027 ± 0.004
03-27-15	346	0.019 ± 0.003	09-24-15	263	0.021 ± 0.004
04-01-15	217	0.017 ± 0.004	10-01-15	278	0.036 ± 0.004
1st Quarter Mean ± s.d.		0.027 ± 0.007	3rd Quarter Mean ± s.d.		0.029 ± 0.008
04-10-15	385	0.018 ± 0.003	10-08-15	274	0.015 ± 0.003
04-17-15	303	0.022 ± 0.003	10-15-15	270	0.021 ± 0.004
04-23-15	272	0.017 ± 0.003	10-21-15	233	0.023 ± 0.004
05-01-15	339	0.010 ± 0.003	10-31-15	303	0.026 ± 0.004 <sup>e</sup>
05-07-15	257	0.019 ± 0.004	11-06-15	234	0.037 ± 0.005
05-16-15	391	0.009 ± 0.002	11-13-15	276	0.033 ± 0.004
05-21-15	216	0.010 ± 0.003	11-19-15	234	0.024 ± 0.004
05-27-15	254	0.020 ± 0.004	11-25-15	233	0.019 ± 0.004
06-05-15	389	0.012 ± 0.002	12-02-15	275	0.032 ± 0.004
06-10-15	219	0.026 ± 0.005	12-10-15	314	0.054 ± 0.005
06-17-15	270	0.013 ± 0.003	12-17-15	283	0.016 ± 0.003
06-25-15	323	0.024 ± 0.003	12-23-15	245	0.043 ± 0.005
07-01-15	226	0.020 ± 0.004	12-30-15	288	0.031 ± 0.004
2nd Quarter Mean ± s.d.		0.017 ± 0.006	4th Quarter Mean ± s.d.		0.029 ± 0.011
Cumulative Average					0.025

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Low volumes due to power issues.

<sup>c</sup> Low volume due to timer malfunction; timer replaced.

<sup>d</sup> Low volume due to timer issues.

<sup>e</sup> No explanation for low volume.

Table 5. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-11 (Toddville)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	269	0.037 ± 0.004	07-07-15	246	0.024 ± 0.004
01-14-15	263	0.027 ± 0.004	07-16-15	367	0.020 ± 0.003
01-23-15	413	0.025 ± 0.003	07-22-15	252	0.021 ± 0.004
01-29-15	274	0.018 ± 0.003	07-29-15	280	0.027 ± 0.004
02-05-15	326	0.023 ± 0.003	08-07-15	363	0.027 ± 0.003
02-12-15	302	0.040 ± 0.004	08-14-15	270	0.030 ± 0.004
02-19-15	306	0.023 ± 0.003	08-20-15	234	0.030 ± 0.005
02-27-15	339	0.041 ± 0.004	08-27-15	264	0.015 ± 0.003
03-07-15	335	0.020 ± 0.003	09-02-15	226	0.043 ± 0.005
03-14-15	300	0.023 ± 0.004	09-11-15	316	0.026 ± 0.004
03-19-15	216	0.018 ± 0.004	09-17-15	235	0.026 ± 0.004
03-27-15	343	0.023 ± 0.003	09-24-15	267	0.029 ± 0.004
04-01-15	217	0.019 ± 0.004	10-01-15	267	0.036 ± 0.004
1st Quarter Mean ± s.d.		0.026 ± 0.008	3rd Quarter Mean ± s.d.		0.027 ± 0.007
04-10-15	380	0.016 ± 0.003	10-08-15	274	0.016 ± 0.003
04-17-15	306	0.025 ± 0.003	10-15-15	268	0.023 ± 0.004
04-23-15	260	0.020 ± 0.004	10-21-15	230	0.017 ± 0.004
05-01-15	336	0.014 ± 0.003	10-31-15	393	0.020 ± 0.003
05-07-15	261	0.021 ± 0.004	11-06-15	229	0.034 ± 0.005
05-16-15	362	0.010 ± 0.002	11-13-15	287	0.035 ± 0.004
05-21-15	206	0.014 ± 0.004	11-19-15	245	0.021 ± 0.004
05-27-15	242	0.017 ± 0.004	11-25-15	243	0.024 ± 0.004
06-05-15	362	0.016 ± 0.003	12-02-15	286	0.031 ± 0.004
06-10-15	205	0.021 ± 0.005	12-10-15	329	0.047 ± 0.004
06-17-15	289	0.013 ± 0.003	12-17-15	282	0.022 ± 0.004
06-25-15	335	0.019 ± 0.003	12-23-15	246	0.043 ± 0.005
07-01-15	235	0.021 ± 0.004	12-30-15	289	0.025 ± 0.004
2nd Quarter Mean ± s.d.		0.018 ± 0.004	4th Quarter Mean ± s.d.		0.027 ± 0.010
Cumulative Average					0.025

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

Table 6. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-13 (Alburnett)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	360	0.024 ± 0.003	07-07-15	240	0.010 ± 0.003
01-14-15	324	0.022 ± 0.003	07-16-15	360	0.017 ± 0.003
01-23-15	245	0.042 ± 0.005	07-22-15	247	0.017 ± 0.003
01-29-15	373	0.014 ± 0.002	07-29-15	274	0.027 ± 0.004
02-05-15	240	0.025 ± 0.004	08-07-15	356	0.025 ± 0.003
02-12-15	284	0.039 ± 0.004	08-14-15	282	0.024 ± 0.004
02-19-15	289	0.027 ± 0.004	08-20-15	244	0.029 ± 0.004
02-27-15	319	0.033 ± 0.004	08-27-15	277	0.022 ± 0.004
			09-02-15	238	0.048 ± 0.005
03-07-15	316	0.027 ± 0.004			
03-14-15	274	0.029 ± 0.004	09-11-15	359	0.024 ± 0.003
03-19-15	210	0.019 ± 0.005	09-17-15	243	0.022 ± 0.004
03-27-15	333	0.020 ± 0.003	09-24-15	275	0.025 ± 0.004
04-01-15	208	0.013 ± 0.004	10-01-15	288	0.030 ± 0.004
1st Quarter Mean ± s.d.		0.026 ± 0.009	3rd Quarter Mean ± s.d.		0.025 ± 0.009
04-10-15	372	0.014 ± 0.003	10-08-15	288	0.021 ± 0.004
04-17-15	297	0.018 ± 0.003	10-15-15	281	0.022 ± 0.004
04-23-15	98	0.010 ± 0.007 <sup>b</sup>	10-21-15	242	0.023 ± 0.004
05-01-15		ND <sup>c</sup>	10-31-15	411	0.025 ± 0.003
05-07-15	253	0.011 ± 0.003	11-06-15	244	0.035 ± 0.005
05-16-15	369	0.008 ± 0.002	11-13-15	288	0.031 ± 0.004
05-21-15	213	0.008 ± 0.003	11-19-15	244	0.028 ± 0.004
05-27-15	245	0.018 ± 0.004	11-25-15	243	0.027 ± 0.004
			12-02-15	286	0.031 ± 0.004
06-05-15	371	0.014 ± 0.003			
06-10-15	208	0.025 ± 0.005	12-10-15	329	0.058 ± 0.005
06-17-15	67	0.027 ± 0.011 <sup>d</sup>	12-17-15	282	0.019 ± 0.003
06-25-15		ND <sup>e</sup>	12-23-15	245	0.043 ± 0.005
07-01-15	191	0.019 ± 0.004 <sup>f</sup>	12-30-15	274	0.027 ± 0.004
2nd Quarter Mean ± s.d.		0.016 ± 0.006	4th Quarter Mean ± s.d.		0.030 ± 0.011
Cumulative Average					0.024

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Low volume due to power failure. I-131 < 0.041 pCi/m<sup>3</sup> due to low volume.

<sup>c,e</sup> "ND" = no data; see Table 2.0, Program Deviations.

<sup>d</sup> Low volume due to power outage from storms. I-131 < 0.049 pCi/m<sup>3</sup> due to low volume.

<sup>f</sup> Low volume due to recent power restoration; breaker reset.

Table 7. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-15 (On-site, north)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	246	0.046 ± 0.005	07-07-15	241	0.025 ± 0.004
01-14-15	247	0.034 ± 0.004	07-16-15	368	0.011 ± 0.002
01-23-15	360	0.034 ± 0.003	07-22-15	253	0.020 ± 0.004
01-29-15	239	0.024 ± 0.004	07-29-15	278	0.027 ± 0.004
02-05-15	283	0.013 ± 0.003	08-07-15	365	0.027 ± 0.003
02-12-15	311	0.040 ± 0.004	08-14-15	286	0.028 ± 0.004
02-19-15	298	0.029 ± 0.004	08-20-15	257	0.031 ± 0.004
02-27-15	345	0.034 ± 0.003	08-27-15	276	0.020 ± 0.004
			09-02-15	250	0.053 ± 0.005
03-07-15	341	0.031 ± 0.004			
03-14-15	298	0.027 ± 0.004	09-11-15	359	0.031 ± 0.003
03-19-15	218	0.023 ± 0.005	09-17-15	255	0.026 ± 0.004
03-27-15	345	0.024 ± 0.003	09-24-15	274	0.026 ± 0.004
04-01-15	216	0.019 ± 0.004	10-01-15	295	0.034 ± 0.004
<u>1st Quarter Mean ± s.d.</u>		<u>0.029 ± 0.009</u>	<u>3rd Quarter Mean ± s.d.</u>		<u>0.028 ± 0.010</u>
04-10-15	391	0.013 ± 0.002	10-08-15	282	0.021 ± 0.004
04-17-15	300	0.023 ± 0.003	10-15-15	281	0.029 ± 0.004
04-23-15	269	0.020 ± 0.004	10-21-15	217	0.028 ± 0.005 <sup>e</sup>
05-01-15	338	0.018 ± 0.003	10-31-15	412	0.028 ± 0.003
05-07-15	269	0.021 ± 0.004	11-06-15	242	0.040 ± 0.005
05-16-15	363	0.011 ± 0.002	11-13-15	284	0.031 ± 0.004
05-21-15	6	0.142 ± 0.105 <sup>b</sup>	11-19-15	231	0.024 ± 0.004
05-27-15	22	0.065 ± 0.033 <sup>c</sup>	11-25-15	236	0.026 ± 0.005
			12-02-15	278	0.032 ± 0.004
06-05-15	363	0.018 ± 0.003			
06-10-15	205	0.026 ± 0.005	12-10-15	318	0.055 ± 0.005
06-17-15	267	0.001 ± 0.002 <sup>d</sup>	12-17-15	275	0.022 ± 0.004
06-25-15	336	0.020 ± 0.003	12-23-15	244	0.042 ± 0.005
07-01-15	239	0.020 ± 0.004	12-30-15	278	0.023 ± 0.004
<u>2nd Quarter Mean ± s.d.</u>		<u>0.031 ± 0.037</u>	<u>4th Quarter Mean ± s.d.</u>		<u>0.031 ± 0.010</u>
<u>Cumulative Average</u>					<u>0.030</u>

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Power off; storms in area. I-131 result < 0.49 pCi/m<sup>3</sup> due to low volume.

<sup>c</sup> Power outage; I-131 result < 0.097 pCi/m<sup>3</sup> due to low volume.

<sup>d</sup> Low volume due to power outage from storms; filter light.

<sup>e</sup> Low volume due to power outage from storms.

Table 8. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-16 (On-site)

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	241	0.043 ± 0.005	07-07-15	247	0.021 ± 0.004
01-14-15	245	0.035 ± 0.004	07-16-15	379	0.016 ± 0.003
01-23-15	356	0.032 ± 0.003	07-22-15	260	0.019 ± 0.003
01-29-15	235	0.022 ± 0.004	07-29-15	259	0.030 ± 0.004
02-05-15	283	0.027 ± 0.004	08-07-15	339	0.030 ± 0.004
02-12-15	278	0.042 ± 0.004	08-14-15	265	0.027 ± 0.004
02-19-15	272	0.033 ± 0.004	08-20-15	239	0.022 ± 0.004
02-27-15	315	0.047 ± 0.004	08-27-15	258	0.026 ± 0.004
03-07-15	316	0.030 ± 0.004	09-02-15	232	0.046 ± 0.005
03-14-15	272	0.023 ± 0.004	09-11-15	334	0.036 ± 0.004
03-19-15	200	0.023 ± 0.005	09-17-15	237	0.030 ± 0.004
03-27-15	316	0.026 ± 0.004	09-24-15	255	0.025 ± 0.004
04-01-15	198	0.020 ± 0.005	10-01-15	274	0.044 ± 0.005
<u>1st Quarter Mean ± s.d.</u>		<u>0.031 ± 0.009</u>	<u>3rd Quarter Mean ± s.d.</u>		<u>0.029 ± 0.009</u>
04-10-15	359	0.020 ± 0.003	10-08-15	262	0.023 ± 0.004
04-17-15	273	0.028 ± 0.004	10-15-15	262	0.022 ± 0.004
04-23-15	246	0.023 ± 0.004	10-21-15	225	0.032 ± 0.005
05-01-15	329	0.018 ± 0.003	10-31-15	412	0.023 ± 0.003
05-07-15	262	0.021 ± 0.004	11-06-15	242	0.040 ± 0.005
05-16-15	375	0.010 ± 0.002	11-13-15	294	0.034 ± 0.004
05-21-15	208	0.014 ± 0.004	11-19-15	238	0.022 ± 0.004
05-27-15	249	0.012 ± 0.003	11-25-15	243	0.012 ± 0.004
06-05-15	377	0.014 ± 0.003	12-02-15	286	0.034 ± 0.004
06-10-15	215	0.024 ± 0.005	12-10-15	327	0.066 ± 0.005
06-17-15	295	0.012 ± 0.003	12-17-15	284	0.017 ± 0.003
06-25-15	346	0.019 ± 0.003	12-23-15	252	0.043 ± 0.005
07-01-15	247	0.016 ± 0.004	12-30-15	287	0.032 ± 0.004
<u>2nd Quarter Mean ± s.d.</u>		<u>0.018 ± 0.005</u>	<u>4th Quarter Mean ± s.d.</u>		<u>0.031 ± 0.014</u>
<u>Cumulative Average</u>					<u>0.027</u>

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

Table 9. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131<sup>a</sup>.

Location: D-40

Units: pCi/m<sup>3</sup>

Collection: Continuous, weekly exchange.

Date Collected	Volume (m <sup>3</sup> )	Gross Beta	Date Collected	Volume (m <sup>3</sup> )	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-15	246	0.044 ± 0.005	07-07-15	262	0.019 ± 0.004
01-14-15	246	0.023 ± 0.004 <sup>b</sup>	07-16-15	390	0.019 ± 0.003
01-23-15	372	0.033 ± 0.003	07-22-15	266	0.021 ± 0.004
01-29-15	244	0.022 ± 0.004 <sup>c</sup>	07-29-15	298	0.022 ± 0.003
02-05-15	288	0.028 ± 0.004	08-07-15	357	0.022 ± 0.003
02-12-15	284	0.042 ± 0.004	08-14-15	281	0.030 ± 0.004
02-19-15	298	0.042 ± 0.004	08-20-15	252	0.027 ± 0.004
02-27-15	341	0.034 ± 0.004	08-27-15	279	0.029 ± 0.004
03-07-15	341	0.024 ± 0.004	09-02-15	236	0.044 ± 0.005
03-14-15	300	0.016 ± 0.003	09-11-15	368	0.029 ± 0.003
03-19-15	216	0.022 ± 0.005	09-17-15	243	0.039 ± 0.005
03-27-15	346	0.025 ± 0.003	09-24-15	280	0.024 ± 0.004
04-01-15	214	0.019 ± 0.004	10-01-15	286	0.037 ± 0.004
1st Quarter Mean ± s.d.		0.029 ± 0.009	3rd Quarter Mean ± s.d.		0.028 ± 0.008
04-10-15	380	0.011 ± 0.002	10-08-15	282	0.024 ± 0.004
04-17-15	305	0.028 ± 0.004	10-15-15	280	0.028 ± 0.004
04-23-15	259	0.021 ± 0.004	10-21-15	240	0.032 ± 0.005
05-01-15	339	0.018 ± 0.003	10-31-15	409	0.026 ± 0.003
05-07-15	268	0.020 ± 0.004	11-06-15	241	0.033 ± 0.005
05-16-15	387	0.012 ± 0.002	11-13-15	285	0.031 ± 0.004
05-21-15	216	0.011 ± 0.004	11-19-15	242	0.026 ± 0.004
05-27-15	258	0.015 ± 0.003	11-25-15	239	0.023 ± 0.004
06-05-15	382	0.016 ± 0.003	12-02-15	284	0.034 ± 0.004
06-10-15	217	0.026 ± 0.005	12-10-15	325	0.051 ± 0.005
06-17-15	306	0.011 ± 0.003	12-17-15	279	0.020 ± 0.004
06-25-15	356	0.016 ± 0.003	12-23-15	242	0.049 ± 0.005
07-01-15	249	0.005 ± 0.003 <sup>d</sup>	12-30-15	277	0.024 ± 0.004
2nd Quarter Mean ± s.d.		0.016 ± 0.006	4th Quarter Mean ± s.d.		0.031 ± 0.010
Cumulative Average					0.026

<sup>a</sup> Iodine-131 concentrations are < 0.03 pCi/m<sup>3</sup> unless noted otherwise.

<sup>b</sup> Low volume due to low voltage.

<sup>c</sup> Timer replaced.

<sup>d</sup> Filter light.

Table 10. Airborne particulates, analyses for gamma-emitting isotopes.  
Collection: Quarterly Composite

Units: pCi/m<sup>3</sup>

Location		D-3			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
Lab Code	DAP- 1967	DAP- 3810	DAP- 6042	DAP- 7379	
Volume (m <sup>3</sup> )	3530	3399	3615	3449	
Be-7	0.062 ± 0.018	0.074 ± 0.014	0.064 ± 0.014	0.045 ± 0.015	
Mn-54	< 0.0007	< 0.0006	< 0.0008	< 0.0009	
Fe-59	< 0.0017	< 0.0013	< 0.0016	< 0.0013	
Co-58	< 0.0006	< 0.0006	< 0.0011	< 0.0009	
Co-60	< 0.0007	< 0.0006	< 0.0006	< 0.0007	
Zn-65	< 0.0008	< 0.0006	< 0.0015	< 0.0007	
Nb-95	< 0.0011	< 0.0006	< 0.0011	< 0.0015	
Zr-95	< 0.0013	< 0.0015	< 0.0019	< 0.0015	
Ru-103	< 0.0013	< 0.0009	< 0.0010	< 0.0007	
Ru-106	< 0.0054	< 0.0047	< 0.0076	< 0.0093	
Cs-134	< 0.0009	< 0.0008	< 0.0009	< 0.0009	
Cs-137	< 0.0005	< 0.0004	< 0.0009	< 0.0008	
Ce-141	< 0.0013	< 0.0012	< 0.0014	< 0.0021	
Ce-144	< 0.0048	< 0.0039	< 0.0053	< 0.0034	

Location		D-5	
Lab Code	DAP- 1968	ND <sup>a</sup>	
Volume (m <sup>3</sup> )	3553		
Be-7	0.067 ± 0.016		
Mn-54	< 0.0008		
Fe-59	< 0.0017		
Co-58	< 0.0009		
Co-60	< 0.0004		
Zn-65	< 0.0009		
Nb-95	< 0.0015		
Zr-95	< 0.0016		
Ru-103	< 0.0016		
Ru-106	< 0.0052		
Cs-134	< 0.0008		
Cs-137	< 0.0008		
Ce-141	< 0.0012		
Ce-144	< 0.0035		

Location		D-6			
Lab Code	DAP- 1969	DAP- 3811	DAP- 6043	DAP- 7380	
Volume (m <sup>3</sup> )	3953	3779	3716	3527	
Be-7	0.062 ± 0.011	0.068 ± 0.016	0.074 ± 0.015	0.050 ± 0.019	
Mn-54	< 0.0006	< 0.0011	< 0.0007	< 0.0008	
Fe-59	< 0.0016	< 0.0014	< 0.0023	< 0.0014	
Co-58	< 0.0003	< 0.0006	< 0.0007	< 0.0008	
Co-60	< 0.0004	< 0.0004	< 0.0009	< 0.0010	
Zn-65	< 0.0007	< 0.0014	< 0.0015	< 0.0013	
Nb-95	< 0.0006	< 0.0009	< 0.0013	< 0.0009	
Zr-95	< 0.0010	< 0.0007	< 0.0010	< 0.0015	
Ru-103	< 0.0010	< 0.0010	< 0.0013	< 0.0013	
Ru-106	< 0.0042	< 0.0047	< 0.0071	< 0.0075	
Cs-134	< 0.0007	< 0.0008	< 0.0008	< 0.0010	
Cs-137	< 0.0006	< 0.0007	< 0.0010	< 0.0009	
Ce-141	< 0.0011	< 0.0016	< 0.0017	< 0.0024	
Ce-144	< 0.0028	< 0.0036	< 0.0041	< 0.0054	

<sup>a</sup> "ND" = No data; see Table 2.0, Program Deviations, 04/17/15.



Table 10. Airborne particulates, analyses for gamma-emitting isotopes.  
Collection: Quarterly Composite

Units: pCi/m<sup>3</sup>

Location		D-7			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
Lab Code	DAP- 1970	DAP- 3812	DAP- 6044	DAP- 7381	
Volume (m <sup>3</sup> )	3815	3845	3602	3463	
Be-7	0.069 ± 0.016	0.069 ± 0.019	0.070 ± 0.016	0.053 ± 0.014	
Mn-54	< 0.0012	< 0.0009	< 0.0011	< 0.0007	
Fe-59	< 0.0043	< 0.0010	< 0.0026	< 0.0021	
Co-58	< 0.0008	< 0.0007	< 0.0009	< 0.0010	
Co-60	< 0.0011	< 0.0006	< 0.0012	< 0.0007	
Zn-65	< 0.0027	< 0.0014	< 0.0023	< 0.0020	
Nb-95	< 0.0010	< 0.0008	< 0.0022	< 0.0015	
Zr-95	< 0.0021	< 0.0008	< 0.0018	< 0.0022	
Ru-103	< 0.0015	< 0.0008	< 0.0012	< 0.0016	
Ru-106	< 0.0060	< 0.0070	< 0.0072	< 0.0070	
Cs-134	< 0.0012	< 0.0008	< 0.0012	< 0.0013	
Cs-137	< 0.0011	< 0.0009	< 0.0011	< 0.0007	
Ce-141	< 0.0022	< 0.0016	< 0.0017	< 0.0027	
Ce-144	< 0.0056	< 0.0041	< 0.0071	< 0.0052	

Location		D-11			
Lab Code	DAP- 1971	DAP- 3813	DAP- 6045	DAP- 7382	
Volume (m <sup>3</sup> )	3902	3780	3588	3599	
Be-7	0.059 ± 0.014	0.064 ± 0.018	0.061 ± 0.014	0.057 ± 0.015	
Mn-54	< 0.0007	< 0.0009	< 0.0006	< 0.0012	
Fe-59	< 0.0019	< 0.0008	< 0.0014	< 0.0010	
Co-58	< 0.0006	< 0.0003	< 0.0008	< 0.0010	
Co-60	< 0.0006	< 0.0009	< 0.0006	< 0.0005	
Zn-65	< 0.0011	< 0.0016	< 0.0015	< 0.0018	
Nb-95	< 0.0016	< 0.0008	< 0.0010	< 0.0016	
Zr-95	< 0.0018	< 0.0018	< 0.0014	< 0.0020	
Ru-103	< 0.0014	< 0.0005	< 0.0012	< 0.0014	
Ru-106	< 0.0063	< 0.0086	< 0.0055	< 0.0076	
Cs-134	< 0.0009	< 0.0011	< 0.0009	< 0.0009	
Cs-137	< 0.0008	< 0.0005	< 0.0005	< 0.0007	
Ce-141	< 0.0014	< 0.0017	< 0.0013	< 0.0020	
Ce-144	< 0.0045	< 0.0056	< 0.0034	< 0.0057	

Location		D-13			
Lab Code	DAP- 1972	DAP- 3814	DAP- 6046	DAP- 7383	
Volume (m <sup>3</sup> )	3775	2684	3686	3657	
Be-7	0.051 ± 0.011	0.068 ± 0.016	0.064 ± 0.014	0.053 ± 0.011	
Mn-54	< 0.0008	< 0.0012	< 0.0011	< 0.0004	
Fe-59	< 0.0007	< 0.0023	< 0.0025	< 0.0010	
Co-58	< 0.0006	< 0.0012	< 0.0010	< 0.0008	
Co-60	< 0.0004	< 0.0006	< 0.0006	< 0.0006	
Zn-65	< 0.0012	< 0.0014	< 0.0013	< 0.0011	
Nb-95	< 0.0008	< 0.0010	< 0.0011	< 0.0010	
Zr-95	< 0.0010	< 0.0011	< 0.0022	< 0.0015	
Ru-103	< 0.0009	< 0.0011	< 0.0011	< 0.0011	
Ru-106	< 0.0055	< 0.0106	< 0.0055	< 0.0061	
Cs-134	< 0.0008	< 0.0012	< 0.0010	< 0.0007	
Cs-137	< 0.0007	< 0.0009	< 0.0006	< 0.0006	
Ce-141	< 0.0019	< 0.0023	< 0.0022	< 0.0014	
Ce-144	< 0.0036	< 0.0039	< 0.0051	< 0.0046	

Table 10. Airborne particulates, analyses for gamma-emitting isotopes.  
Collection: Quarterly Composite

Units: pCi/m<sup>3</sup>

Location		D-15			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
Lab Code	DAP- 1973	DAP- 3815	DAP- 6047	DAP- 7384	
Volume (m <sup>3</sup> )	3749	3368	3757	3578	
Be-7	0.063 ± 0.015	0.061 ± 0.014	0.085 ± 0.020	0.044 ± 0.010	
Mn-54	< 0.0007	< 0.0008	< 0.0010	< 0.0007	
Fe-59	< 0.0026	< 0.0007	< 0.0028	< 0.0024	
Co-58	< 0.0007	< 0.0003	< 0.0010	< 0.0006	
Co-60	< 0.0008	< 0.0005	< 0.0009	< 0.0002	
Zn-65	< 0.0007	< 0.0006	< 0.0034	< 0.0009	
Nb-95	< 0.0011	< 0.0010	< 0.0017	< 0.0012	
Zr-95	< 0.0010	< 0.0015	< 0.0012	< 0.0010	
Ru-103	< 0.0009	< 0.0012	< 0.0014	< 0.0011	
Ru-106	< 0.0086	< 0.0041	< 0.0059	< 0.0054	
Cs-134	< 0.0009	< 0.0009	< 0.0012	< 0.0007	
Cs-137	< 0.0009	< 0.0003	< 0.0009	< 0.0005	
Ce-141	< 0.0015	< 0.0017	< 0.0026	< 0.0012	
Ce-144	< 0.0037	< 0.0037	< 0.0062	< 0.0033	

Location		D-16			
Lab Code	DAP- 1975	DAP- 3816	DAP- 6048	DAP- 7385	
Volume (m <sup>3</sup> )	3529	3780	3579	3614	
Be-7	0.071 ± 0.022	0.067 ± 0.012	0.085 ± 0.015	0.053 ± 0.013	
Mn-54	< 0.0007	< 0.0007	< 0.0009	< 0.0008	
Fe-59	< 0.0017	< 0.0007	< 0.0016	< 0.0022	
Co-58	< 0.0010	< 0.0007	< 0.0008	< 0.0009	
Co-60	< 0.0006	< 0.0008	< 0.0004	< 0.0004	
Zn-65	< 0.0018	< 0.0015	< 0.0010	< 0.0008	
Nb-95	< 0.0021	< 0.0008	< 0.0008	< 0.0009	
Zr-95	< 0.0017	< 0.0008	< 0.0013	< 0.0012	
Ru-103	< 0.0016	< 0.0012	< 0.0013	< 0.0010	
Ru-106	< 0.0077	< 0.0072	< 0.0063	< 0.0078	
Cs-134	< 0.0010	< 0.0010	< 0.0008	< 0.0007	
Cs-137	< 0.0009	< 0.0010	< 0.0006	< 0.0006	
Ce-141	< 0.0022	< 0.0011	< 0.0018	< 0.0019	
Ce-144	< 0.0058	< 0.0043	< 0.0035	< 0.0043	

Location		D-40			
Lab Code	DAP- 1976	DAP- 3817	DAP- 6049	DAP- 7386	
Volume (m <sup>3</sup> )	3736	3923	3799	3625	
Be-7	0.058 ± 0.016	0.063 ± 0.015	0.090 ± 0.015	0.045 ± 0.013	
Mn-54	< 0.0006	< 0.0007	< 0.0008	< 0.0010	
Fe-59	< 0.0020	< 0.0008	< 0.0016	< 0.0019	
Co-58	< 0.0005	< 0.0005	< 0.0008	< 0.0007	
Co-60	< 0.0008	< 0.0009	< 0.0006	< 0.0007	
Zn-65	< 0.0009	< 0.0013	< 0.0019	< 0.0018	
Nb-95	< 0.0013	< 0.0011	< 0.0007	< 0.0012	
Zr-95	< 0.0017	< 0.0015	< 0.0021	< 0.0014	
Ru-103	< 0.0013	< 0.0012	< 0.0014	< 0.0009	
Ru-106	< 0.0071	< 0.0074	< 0.0080	< 0.0057	
Cs-134	< 0.0010	< 0.0010	< 0.0009	< 0.0009	
Cs-137	< 0.0007	< 0.0008	< 0.0009	< 0.0004	
Ce-141	< 0.0026	< 0.0018	< 0.0017	< 0.0020	
Ce-144	< 0.0050	< 0.0071	< 0.0050	< 0.0039	

Table 11. Ambient gamma radiation as measured by thermoluminescent dosimeters (TLD).  
 Quarterly collection.

Units: mR/91 days

<u>Control Locations</u>	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>
D-1	17.6 ± 0.8	14.3 ± 1.3	16.9 ± 1.1	14.9 ± 1.7
D-2	17.5 ± 0.9	14.2 ± 1.2	13.6 ± 1.3	16.4 ± 2.0
D-3	18.9 ± 1.2	12.1 ± 0.7	16.1 ± 1.4	16.2 ± 1.0
D-5	14.9 ± 0.9	16.9 ± 1.0	13.5 ± 1.6	17.6 ± 1.9
D-6	15.6 ± 0.7	17.6 ± 0.8	14.1 ± 0.8	20.2 ± 1.3
D-7	15.8 ± 0.8	14.6 ± 1.0	13.4 ± 0.9	14.3 ± 1.4
D-8	20.5 ± 0.7	15.6 ± 1.2	17.0 ± 0.9	17.0 ± 2.5
D-10	20.1 ± 0.8	13.9 ± 0.9	17.5 ± 1.2	16.1 ± 1.4
D-11	15.4 ± 1.2	14.5 ± 1.3	13.6 ± 1.5	15.9 ± 2.2
D-13	13.8 ± 0.6	17.2 ± 1.2	11.1 ± 0.8	21.1 ± 1.5
Mean ± s.d.	17.0 ± 2.3	15.1 ± 1.7	14.7 ± 2.1	17.0 ± 2.2
<u>Within 0.5 mi. of Stack</u>				
D-15	15.8 ± 0.8	17.6 ± 0.8	14.4 ± 1.0	18.9 ± 1.0
D-16	14.4 ± 1.0	14.3 ± 1.1	11.8 ± 1.3	16.4 ± 2.3
D-17	21.0 ± 1.0	24.1 ± 0.8	20.2 ± 1.0	26.7 ± 2.0
D-18	17.8 ± 1.2	16.2 ± 0.6	17.9 ± 1.8	17.2 ± 1.2
D-19	17.8 ± 1.3	13.6 ± 0.9	17.0 ± 1.1	15.3 ± 1.7
D-20	21.1 ± 1.0	18.1 ± 1.4	18.3 ± 1.3	20.9 ± 3.0
D-21	19.2 ± 0.9	16.2 ± 0.9	18.9 ± 1.1	17.6 ± 1.4
D-22	21.0 ± 0.9	14.0 ± 0.9	18.1 ± 1.0	19.6 ± 1.4
D-23	13.6 ± 0.6	15.0 ± 0.7	10.5 ± 0.7	19.8 ± 1.4
D-28	19.9 ± 1.4	15.5 ± 0.7	20.3 ± 1.5	25.0 ± 1.5
D-29	23.6 ± 0.8	20.0 ± 0.8	23.3 ± 1.1	26.7 ± 1.7
D-30	17.5 ± 1.1	18.9 ± 1.5	15.4 ± 1.0	25.4 ± 2.0
D-31	20.8 ± 1.7	16.1 ± 0.9	18.1 ± 1.4	23.9 ± 1.8
D-32	25.2 ± 0.8	19.6 ± 1.0	22.4 ± 1.0	24.5 ± 2.0
D-82	18.5 ± 0.8	17.0 ± 0.8	15.4 ± 0.8	18.9 ± 1.4
D-83	15.7 ± 0.6	17.7 ± 0.9	13.1 ± 0.8	18.5 ± 1.9
D-84	21.5 ± 1.1	11.8 ± 0.9	19.2 ± 1.3	17.7 ± 1.5
D-85	17.6 ± 0.6	20.0 ± 0.9	16.7 ± 0.7	20.2 ± 1.8
D-86	21.4 ± 1.4	15.2 ± 1.2	18.5 ± 1.5	17.7 ± 1.7
D-91	17.3 ± 0.9	17.4 ± 1.4	16.7 ± 1.3	19.6 ± 2.3
Mean ± s.d.	19.0 ± 3.0	16.9 ± 2.8	17.3 ± 3.2	20.5 ± 3.6

Table 11. Ambient gamma radiation as measured by thermoluminescent dosimeters (TLD).  
 Quarterly collection. Units: mR/91 days

<u>Within 1.0 mi. of Stack</u>	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>
D-43	16.4 ± 0.8	12.4 ± 1.0	14.5 ± 0.9	20.4 ± 1.7
D-44	18.9 ± 0.8	15.7 ± 0.6	16.9 ± 0.9	23.4 ± 1.2
D-45	16.1 ± 0.8	12.1 ± 0.9	13.9 ± 1.0	18.3 ± 1.7
D-46	19.0 ± 1.0	19.8 ± 0.9	17.2 ± 1.0	23.5 ± 1.6
D-47	23.5 ± 1.0	16.8 ± 1.0	21.2 ± 0.9	21.3 ± 1.4
D-48	19.8 ± 0.9	18.4 ± 1.3	19.6 ± 0.9	24.6 ± 1.6
Mean ± s.d.	18.9 ± 2.7	15.9 ± 3.1	17.2 ± 2.8	21.9 ± 2.4
<u>Within 3.0 mi. of Stack</u>				
D-33	12.3 ± 0.7	11.8 ± 0.6	10.2 ± 0.8	19.0 ± 1.4
D-34	15.4 ± 0.7	12.3 ± 0.7	15.4 ± 1.7	19.1 ± 1.5
D-35	15.9 ± 0.9	13.8 ± 0.8	14.2 ± 0.9	17.2 ± 1.4
D-36	15.7 ± 0.9	13.0 ± 0.7	17.5 ± 0.9	19.0 ± 1.7
D-37	19.3 ± 1.4	18.1 ± 0.8	16.5 ± 1.6	15.1 ± 1.7
D-38	16.7 ± 1.1	12.3 ± 0.9	14.8 ± 1.2	20.8 ± 1.5
D-39	18.3 ± 0.7	ND <sup>a</sup>	14.5 ± 1.0	15.7 ± 1.2
D-40	13.3 ± 0.9	11.1 ± 0.8	11.2 ± 1.1	18.2 ± 1.3
D-41	17.5 ± 0.7	18.0 ± 1.2	16.3 ± 0.9	20.9 ± 1.3
D-42	13.3 ± 0.7	12.5 ± 1.0	10.9 ± 1.0	18.8 ± 1.4
Mean ± s.d.	15.8 ± 2.3	13.7 ± 2.6	14.1 ± 2.5	18.4 ± 1.9
<u>ISFSI Fenceline</u>				
D-161	56.8 ± 1.8	43.1 ± 3.2	49.9 ± 2.3	52.1 ± 5.3
D-162	23.0 ± 1.1	19.4 ± 0.6	20.4 ± 1.5	22.2 ± 2.9
D-163	45.7 ± 1.2	43.1 ± 1.5	43.8 ± 1.1	43.7 ± 2.1
D-164	15.9 ± 0.7	15.5 ± 0.7	17.1 ± 0.8	12.7 ± 2.0
Mean ± s.d.	35.4 ± 19.1	30.3 ± 14.9	32.8 ± 16.5	32.7 ± 18.3

<sup>a</sup>"ND" No data; see Table 2.0, Program Deviations.

Table 12. Milk samples, analyses for iodine-131 and gamma emitting isotopes.  
 Collection: Monthly during non-grazing season (October 1 through April 30); biweekly during grazing season (May 1 through September 30)

Location		D-110					
Date	Lab	Concentration (pCi/L)					
Collected	Code	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
01-13-15	DMI- 111	< 0.5	1308 ± 106	< 4.3	< 3.1	< 9.7	< 3.3
02-03-15	DMI- 432	< 0.2	1295 ± 93	< 2.9	< 3.3	< 11.4	< 3.0
03-10-15	DMI- 954	< 0.3	1376 ± 103	< 3.5	< 3.1	< 13.9	< 3.3
04-23-15	DMI- 1824	< 0.3	1368 ± 108	< 3.7	< 4.3	< 11.0	< 2.3
05-08-15	DMI- 2340	< 0.5	1411 ± 105	< 3.4	< 2.9	< 14.8	< 1.9
05-19-15	DMI- 2485	< 0.3	1352 ± 109	< 3.9	< 2.4	< 16.4	< 1.9
06-04-15	DMI- 2834	< 0.4	1441 ± 116	< 4.3	< 4.0	< 12.6	< 2.3
06-18-15	DMI- 3137	< 0.3	1408 ± 118	< 3.6	< 3.9	< 16.6	< 2.5
06-30-15	DMI- 3388	< 0.5	1353 ± 112	< 3.7	< 2.8	< 21.1	< 4.3
07-15-15	DMI- 3762	< 0.5	1435 ± 105	< 3.6	< 4.1	< 10.3	< 2.4
07-29-15	DMI- 4122	< 0.4	1418 ± 118	< 4.3	< 3.2	< 11.6	< 3.3
08-13-15	DMI- 4499	< 0.3	1273 ± 56	< 1.5	< 2.1	< 6.4	< 1.6
08-26-15	DMI- 4720	< 0.2	1449 ± 100	< 3.0	< 1.8	< 14.3	< 2.6
09-11-15	DMI- 5048	< 0.3	1473 ± 112	< 3.6	< 3.8	< 13.8	< 3.9
09-24-15	DMI- 5322	< 0.2	1439 ± 98	< 3.4	< 3.1	< 12.1	< 3.9
10-14-15	DMI- 5779	< 0.2	1432 ± 99	< 3.4	< 2.9	< 12.4	< 2.3
11-10-15	DMI- 6477	< 0.3	1552 ± 122	< 4.3	< 3.3	< 7.9	< 3.7
12-08-15	DMI- 6917	< 0.2	1353 ± 113	< 3.8	< 3.9	< 15.5	< 1.9

Location		D-138					
Date	Lab	Concentration (pCi/L)					
Collected	Code	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
01-13-15	DMI- 112	< 0.2	1413 ± 117	< 3.3	< 1.9	< 9.0	< 2.4
02-03-15	DMI- 433	< 0.3	1631 ± 112	< 3.7	< 3.0	< 13.8	< 3.5
03-10-15	DMI- 955	< 0.4	1393 ± 105	< 3.4	< 3.6	< 15.8	< 3.4
04-23-15	DMI- 1825	< 0.3	1386 ± 104	< 3.4	< 4.0	< 8.8	< 1.2
05-08-15	DMI- 2341	< 0.3	1405 ± 107	< 3.1	< 3.8	< 11.3	< 1.7
05-19-15	DMI- 2486	< 0.4	1417 ± 111	< 3.3	< 3.7	< 8.8	< 1.5
06-04-15	DMI- 2835	< 0.5	1556 ± 107	< 3.0	< 3.5	< 15.5	< 2.7
06-18-15	DMI- 3138	< 0.3	1459 ± 113	< 3.4	< 3.1	< 16.5	< 2.0
06-30-15	DMI- 3389	< 0.3	1434 ± 115	< 4.0	< 2.8	< 14.3	< 3.5
07-15-15	DMI- 3763	< 0.4	1313 ± 102	< 3.4	< 3.5	< 11.5	< 1.4
07-29-15	DMI- 4123	< 0.3	1273 ± 101	< 3.6	< 3.4	< 12.6	< 1.8
08-13-15	DMI- 4500	< 0.5	1406 ± 100	< 2.6	< 2.0	< 9.2	< 1.0
08-26-15	DMI- 4721	< 0.4	1491 ± 112	< 4.1	< 3.3	< 18.9	< 3.0
09-11-15	DMI- 5049	< 0.3	1342 ± 99	< 3.2	< 3.3	< 14.1	< 1.7
09-24-15	DMI- 5323	< 0.2	1331 ± 105	< 3.7	< 3.7	< 12.2	< 2.4
10-14-15	DMI- 5780	< 0.3	1357 ± 91	< 2.8	< 3.3	< 7.4	< 1.1
11-10-15	DMI- 6478	< 0.4	1493 ± 113	< 4.0	< 3.9	< 12.1	< 2.5
12-08-15	DMI- 6918	< 0.4	1316 ± 112	< 3.9	< 4.0	< 14.2	< 3.6

Table 13. Well water samples, analyses for gamma emitting isotopes iodine-131 and tritium.  
 Collection: Quarterly  
 Units: pCi/L

Location		D-53 Treated Municipal Water			
Lab Code	DWW- 999	DWW- 2870	DWW- 4606	DWW- 6486	
Date Collected	03-09-15	06-04-15	08-20-15	11-09-15	
H-3	< 147	< 147	< 147	< 147	
I-131	< 0.3	< 3.3 <sup>a</sup>	< 0.2	< 0.3	
Mn-54	< 4.5	< 2.2	< 2.9	< 3.0	
Fe-59	< 7.1	< 5.5	< 4.6	< 4.0	
Co-58	< 3.0	< 2.3	< 2.3	< 2.6	
Co-60	< 1.9	< 2.0	< 1.3	< 2.2	
Zn-65	< 2.7	< 4.3	< 2.3	< 3.9	
Nb-95	< 2.0	< 2.0	< 2.5	< 2.9	
Zr-95	< 6.2	< 2.8	< 4.5	< 6.1	
I-131	< 4.0	< 12.6	< 4.6	< 4.7	
Cs-134	< 3.9	< 2.2	< 4.1	< 4.3	
Cs-137	< 2.7	< 1.8	< 2.3	< 3.9	
Ba-140	< 16.8	< 23.5	< 14.9	< 8.6	
La-140	< 2.9	< 3.5	< 4.6	< 1.7	

Location		D-54 Inlet to Municipal Water			
Lab Code	DWW- 1000	DWW- 2871	DWW- 4607	DWW- 6487	
Date Collected	03-09-15	06-04-15	08-20-15	11-09-15	
H-3	< 147	< 147	< 147	< 147	
I-131	< 0.3	< 3.6 <sup>a</sup>	< 0.2	< 0.3	
Mn-54	< 2.4	< 2.0	< 2.9	< 2.9	
Fe-59	< 4.2	< 4.6	< 4.4	< 4.5	
Co-58	< 2.3	< 2.1	< 1.9	< 3.7	
Co-60	< 2.0	< 2.5	< 2.6	< 2.3	
Zn-65	< 5.1	< 2.2	< 8.6	< 5.7	
Nb-95	< 1.6	< 2.4	< 2.2	< 3.5	
Zr-95	< 4.5	< 5.7	< 4.1	< 5.5	
I-131	< 3.9	< 15.4	< 3.8	< 6.3	
Cs-134	< 2.6	< 2.7	< 3.9	< 4.9	
Cs-137	< 2.9	< 3.1	< 3.3	< 4.4	
Ba-140	< 11.5	< 20.2	< 16.5	< 17.9	
La-140	< 2.4	< 6.0	< 1.9	< 1.6	

<sup>a</sup> LLD not reached due to delayed analysis. Analysis not required per ODAM 6.3.2.

Table 13. Well water samples, analyses for gamma emitting isotopes iodine-131 and tritium.

Collection: Quarterly

Units: pCi/L

Location		D-55 On-site Well			
Lab Code	DWW- 1001	DWW- 2872	DWW- 4608	DWW- 6488	
Date Collected	03-09-15	06-04-15	08-20-15	11-09-15	
H-3	< 147	< 147	< 147	< 147	
I-131	< 0.5	< 3.3 <sup>a</sup>	< 0.3	< 0.2	
Mn-54	< 3.2	< 2.0	< 1.4	< 1.9	
Fe-59	< 5.6	< 5.3	< 4.6	< 3.5	
Co-58	< 1.7	< 1.5	< 2.8	< 1.8	
Co-60	< 2.2	< 1.6	< 2.6	< 2.0	
Zn-65	< 5.4	< 3.3	< 5.1	< 2.2	
Nb-95	< 2.6	< 2.1	< 4.0	< 2.5	
Zr-95	< 5.9	< 4.6	< 4.0	< 3.9	
I-131	< 5.4	< 11.9	< 4.5	< 4.1	
Cs-134	< 3.6	< 2.3	< 3.1	< 3.3	
Cs-137	< 2.9	< 2.8	< 2.7	< 2.8	
Ba-140	< 15.5	< 19.4	< 17.6	< 6.2	
La-140	< 5.2	< 6.5	< 2.0	< 4.4	

Location		D-57 Bull Farm			
Lab Code	DWW- 1003	DWW- 2873	DWW- 4609	DWW- 6489	
Date Collected	03-11-15	06-04-15	08-20-15	11-09-15	
H-3	< 147	< 147	< 147	< 147	
I-131	< 0.3	< 3.5 <sup>a</sup>	< 0.3	< 0.3	
Mn-54	< 2.8	< 1.7	< 3.6	< 2.0	
Fe-59	< 1.6	< 5.6	< 5.0	< 2.6	
Co-58	< 2.1	< 2.2	< 3.4	< 2.9	
Co-60	< 1.5	< 1.5	< 1.8	< 1.9	
Zn-65	< 6.6	< 3.2	< 5.2	< 4.6	
Nb-95	< 3.5	< 3.7	< 3.1	< 2.8	
Zr-95	< 5.1	< 3.8	< 5.1	< 4.1	
I-131	< 5.3	< 22.3	< 7.0	< 4.8	
Cs-134	< 3.0	< 2.1	< 3.8	< 2.8	
Cs-137	< 3.3	< 2.1	< 4.4	< 2.3	
Ba-140	< 16.5	< 23.2	< 16.7	< 13.8	
La-140	< 1.4	< 3.6	< 2.6	< 1.5	

<sup>a</sup> LLD not reached due to delayed analysis. Analysis not required per ODAM 6.3.2.

Table 13. Well water samples, analyses for gamma emitting isotopes iodine-131 and tritium.

Collection: Quarterly

Units: pCi/L

Location				
D-58 Franz Farm				
Lab Code	DWW- 1004	DWW- 2874	DWW- 4610	DWW- 6490
Date Collected	03-09-15	06-04-15	08-20-15	11-09-15
H-3	< 147	< 147	< 147	< 147
I-131	< 0.3	< 3.5 <sup>a</sup>	< 0.2	< 0.4
Mn-54	< 2.8	< 2.4	< 2.8	< 1.8
Fe-59	< 4.7	< 6.0	< 4.3	< 4.3
Co-58	< 1.8	< 2.3	< 1.8	< 2.2
Co-60	< 2.4	< 1.9	< 2.7	< 2.1
Zn-65	< 3.4	< 5.2	< 5.6	< 2.9
Nb-95	< 3.5	< 3.6	< 2.7	< 2.4
Zr-95	< 2.3	< 3.1	< 4.0	< 6.0
I-131	< 4.7	< 21.7	< 4.3	< 4.0
Cs-134	< 3.0	< 2.7	< 3.3	< 3.4
Cs-137	< 1.4	< 2.1	< 2.5	< 2.6
Ba-140	< 16.1	< 27.6	< 11.4	< 12.6
La-140	< 3.1	< 5.6	< 3.7	< 5.1

Location				
D-72(C) Van Note Farm				
Lab Code	DWW- 1005	DWW- 2875	DWW- 4611	DWW- 6491
Date Collected	03-11-15	06-04-15	08-20-15	11-09-15
H-3	< 147	< 147	< 147	< 147
I-131	< 0.3	< 3.4 <sup>a</sup>	< 0.2	< 0.2
Mn-54	< 4.0	< 2.1	< 3.4	< 2.7
Fe-59	< 6.8	< 3.1	< 2.7	< 4.3
Co-58	< 3.2	< 1.9	< 1.8	< 1.7
Co-60	< 3.0	< 2.2	< 1.8	< 1.6
Zn-65	< 7.0	< 3.4	< 4.7	< 3.9
Nb-95	< 4.7	< 3.5	< 2.4	< 2.9
Zr-95	< 5.6	< 5.1	< 4.1	< 4.1
I-131	< 6.4	< 14.7	< 4.7	< 4.4
Cs-134	< 4.3	< 2.2	< 3.1	< 3.1
Cs-137	< 3.7	< 1.4	< 2.5	< 3.1
Ba-140	< 11.6	< 29.2	< 14.7	< 14.8
La-140	< 4.3	< 5.4	< 2.9	< 3.1

<sup>a</sup> LLD not reached due to delayed analysis. Analysis not required per ODAM 6.3.2.



Table 14. Vegetation (broadleaf), analyses for iodine-131 and other gamma-emitting isotopes.  
 Collection: Annually  
 Units: pCi/g wet

Location	D-57	D-57	D-118	D-118
Lab Code	DVE- 3764	DVE- 3765	DVE- 3766	DVE- 3767
Date Collected	07-15-15	07-15-15	07-15-15	07-15-15
Sample Type	Green Cabbage	Rhubarb Leaves	Rhubarb Leaves	Rhubarb Leaves
K-40	2.10 ± 0.21	5.27 ± 0.43	4.63 ± 0.41	3.91 ± 0.45
Mn-54	< 0.007	< 0.014	< 0.012	< 0.009
Fe-59	< 0.010	< 0.024	< 0.036	< 0.025
Co-58	< 0.004	< 0.011	< 0.013	< 0.008
Co-60	< 0.008	< 0.014	< 0.013	< 0.012
Zn-65	< 0.013	< 0.026	< 0.025	< 0.018
Nb-95	< 0.006	< 0.013	< 0.010	< 0.013
Zr-95	< 0.012	< 0.018	< 0.025	< 0.030
Ru-103	< 0.006	< 0.014	< 0.016	< 0.013
Ru-106	< 0.033	< 0.12	< 0.108	< 0.067
I-131	< 0.010	< 0.021	< 0.021	< 0.025
Cs-134	< 0.007	< 0.012	< 0.013	< 0.014
Cs-137	< 0.010	< 0.016	< 0.014	< 0.017
Ce-141	< 0.011	< 0.023	< 0.019	< 0.020
Ce-144	< 0.041	< 0.095	< 0.071	< 0.090

Table 15. Vegetation (hay and grain), analyses for gamma-emitting isotopes.  
Collection: Annually  
Units: pCi/g wet

Location	D-16	D-110	D-110
Lab Code	DVE- 5796	DVE- 3768	DVE- 5793
Date Collected	07-14-15	07-14-15	10-14-15
Sample Type	Beans	Grass	Corn
K-40	13.98 ± 0.48	10.20 ± 0.59	2.62 ± 0.24
Mn-54	< 0.008	< 0.011	< 0.006
Fe-59	< 0.027	< 0.031	< 0.014
Co-58	< 0.011	< 0.013	< 0.007
Co-60	< 0.010	< 0.020	< 0.005
Zn-65	< 0.025	< 0.023	< 0.016
Nb-95	< 0.013	< 0.017	< 0.007
Zr-95	< 0.016	< 0.024	< 0.017
Ru-103	< 0.008	< 0.011	< 0.009
Ru-106	< 0.10	< 0.136	< 0.060
I-131	< 0.013	< 0.028	< 0.015
Cs-134	< 0.011	< 0.015	< 0.008
Cs-137	< 0.010	< 0.017	< 0.008
Ce-141	< 0.022	< 0.026	< 0.019
Ce-144	< 0.078	< 0.116	< 0.074

Location	D-138	D-138	D-138
Lab Code	DVE- 3769	DVE- 5794	DVE- 5795
Date Collected	07-15-15	10-14-15	07-14-15
Sample Type	Grass	Corn	Grass
K-40	21.05 ± 0.50	2.38 ± 0.26	15.34 ± 0.60
Mn-54	< 0.014	< 0.008	< 0.014
Fe-59	< 0.025	< 0.020	< 0.029
Co-58	< 0.013	< 0.008	< 0.011
Co-60	< 0.012	< 0.006	< 0.008
Zn-65	< 0.031	< 0.011	< 0.036
Nb-95	< 0.012	< 0.005	< 0.015
Zr-95	< 0.026	< 0.011	< 0.017
Ru-103	< 0.011	< 0.009	< 0.008
Ru-106	< 0.116	< 0.057	< 0.112
I-131	< 0.020	< 0.019	< 0.022
Cs-134	< 0.012	< 0.008	< 0.012
Cs-137	< 0.015	< 0.009	< 0.012
Ce-141	< 0.023	< 0.014	< 0.016
Ce-144	< 0.074	< 0.048	< 0.082

Table 16. Surface water samples, analyses for iodine-131, tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-49

Lab Code	DSW- 643	DSW- 994	DSW- 1832	DSW- 2607	DSW- 3263	
Date Collected	01-19-15	02-18-15	03-11-15	04-22-15	05-27-15	06-26-15
H-3	ND <sup>a</sup>	< 144	< 147	< 153	< 150	< 143
I-131(Chemistry)	-	< 0.3	< 0.3	< 0.4	< 0.4	< 0.3
Mn-54	-	< 1.8	< 1.9	< 2.8	< 2.8	< 2.1
Fe-59	-	< 3.7	< 3.9	< 3.3	< 4.4	< 4.1
Co-58	-	< 2.5	< 2.6	< 3.1	< 1.6	< 2.0
Co-60	-	< 2.7	< 1.4	< 2.2	< 2.4	< 1.7
Zn-65	-	< 5.5	< 4.0	< 3.0	< 5.5	< 2.2
Nb-95	-	< 2.4	< 3.1	< 1.7	< 3.1	< 2.3
Zr-95	-	< 4.3	< 3.7	< 3.6	< 4.9	< 3.4
I-131	-	< 3.7	< 5.3	< 5.3	< 5.0	< 3.3
Cs-134	-	< 3.5	< 3.2	< 2.7	< 3.3	< 2.9
Cs-137	-	< 3.1	< 2.2	< 3.0	< 3.0	< 2.4
Ba-140	-	< 13.7	< 13.4	< 11.1	< 13.7	< 11.1
La-140	-	< 3.2	< 3.1	< 1.5	< 3.2	< 2.0

Lab Code	DSW- 4026	DSW- 4567	DSW- 5317	DSW- 6570	DSW- 7117	
Date Collected	07-21-15	08-18-15	09-25-15	10-31-15	11-13-15	12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143	< 146
I-131(Chemistry)	< 0.2	< 0.4	< 0.2	-	< 0.4	< 0.4
Mn-54	< 3.4	< 2.2	< 3.3	-	< 3.5	< 1.4
Fe-59	< 4.7	< 5.0	< 6.8	-	< 4.4	< 4.0
Co-58	< 3.7	< 2.8	< 1.9	-	< 2.9	< 1.6
Co-60	< 2.3	< 1.7	< 2.6	-	< 3.7	< 1.6
Zn-65	< 4.9	< 4.6	< 5.7	-	< 7.6	< 2.6
Nb-95	< 2.5	< 3.2	< 3.8	-	< 2.4	< 2.9
Zr-95	< 6.3	< 6.2	< 6.4	-	< 5.3	< 5.2
I-131	< 5.7	< 6.4	< 6.6	-	< 4.7	< 5.0
Cs-134	< 4.1	< 3.6	< 4.0	-	< 3.7	< 3.0
Cs-137	< 2.8	< 2.4	< 3.0	-	< 3.4	< 4.2
Ba-140	< 17.1	< 10.3	< 15.3	-	< 13.1	< 9.1
La-140	< 2.6	< 3.1	< 2.0	-	< 2.6	< 3.6

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.

Table 16. Surface water samples, analyses for iodine-131, tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-49

Lab Code	DSW- 643	DSW- 994	DSW- 1832	DSW- 2607	DSW- 3263
Date Collected	02-18-15	03-11-15	04-22-15	05-27-15	06-26-15
H-3	< 144	< 147	< 153	< 150	< 143
I-131(Chemistry)	< 0.3	< 0.3	< 0.4	< 0.4	< 0.3
Mn-54	< 1.8	< 1.9	< 2.8	< 2.8	< 2.1
Fe-59	< 3.7	< 3.9	< 3.3	< 4.4	< 4.1
Co-58	< 2.5	< 2.6	< 3.1	< 1.6	< 2.0
Co-60	< 2.7	< 1.4	< 2.2	< 2.4	< 1.7
Zn-65	< 5.5	< 4.0	< 3.0	< 5.5	< 2.2
Nb-95	< 2.4	< 3.1	< 1.7	< 3.1	< 2.3
Zr-95	< 4.3	< 3.7	< 3.6	< 4.9	< 3.4
I-131	< 3.7	< 5.3	< 5.3	< 5.0	< 3.3
Cs-134	< 3.5	< 3.2	< 2.7	< 3.3	< 2.9
Cs-137	< 3.1	< 2.2	< 3.0	< 3.0	< 2.4
Ba-140	< 13.7	< 13.4	< 11.1	< 13.7	< 11.1
La-140	< 3.2	< 3.1	< 1.5	< 3.2	< 2.0

Lab Code	DSW- 4026	DSW- 4567	DSW- 5317	DSW- 6570	DSW- 7117
Date Collected	07-21-15	08-18-15	09-25-15	11-13-15	12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143
I-131(Chemistry)	< 0.2	< 0.4	< 0.2	-	< 0.4
Mn-54	< 3.4	< 2.2	< 3.3	-	< 3.5
Fe-59	< 4.7	< 5.0	< 6.8	-	< 4.4
Co-58	< 3.7	< 2.8	< 1.9	-	< 2.9
Co-60	< 2.3	< 1.7	< 2.6	-	< 3.7
Zn-65	< 4.9	< 4.6	< 5.7	-	< 7.6
Nb-95	< 2.5	< 3.2	< 3.8	-	< 2.4
Zr-95	< 6.3	< 6.2	< 6.4	-	< 5.3
I-131	< 5.7	< 6.4	< 6.6	-	< 4.7
Cs-134	< 4.1	< 3.6	< 4.0	-	< 3.7
Cs-137	< 2.8	< 2.4	< 3.0	-	< 3.4
Ba-140	< 17.1	< 10.3	< 15.3	-	< 13.1
La-140	< 2.6	< 3.1	< 2.0	-	< 2.6

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.

Table 16. Surface water samples, analyses for tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-50

Lab Code	01-19-15	02-18-15	DSW- 995 03-11-15	DSW- 1833 04-22-15	DSW- 2608 05-27-15	DSW- 3264 06-26-15
H-3	ND <sup>a</sup>	ND <sup>a</sup>	< 147	< 153	< 150	< 143
Mn-54	-	-	< 1.9	< 2.9	< 2.2	< 2.3
Fe-59	-	-	< 3.6	< 6.0	< 4.2	< 3.5
Co-58	-	-	< 2.0	< 2.4	< 4.2	< 2.7
Co-60	-	-	< 2.3	< 1.9	< 1.9	< 1.9
Zn-65	-	-	< 4.9	< 5.3	< 7.8	< 4.0
Nb-95	-	-	< 2.8	< 3.9	< 3.4	< 1.7
Zr-95	-	-	< 4.4	< 5.7	< 5.8	< 4.6
I-131	-	-	< 3.3	< 5.9	< 6.1	< 5.0
Cs-134	-	-	< 2.3	< 4.5	< 3.5	< 3.3
Cs-137	-	-	< 2.8	< 4.2	< 3.3	< 1.8
Ba-140	-	-	< 11.7	< 21.2	< 19.0	< 12.9
La-140	-	-	< 2.1	< 2.7	< 3.6	< 2.0

Lab Code	DSW- 4027 07-21-15	DSW- 4568 08-18-15	DSW- 5318 09-25-15	10-31-15	DSW- 6571 11-13-15	DSW- 7118 12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143	< 146
Mn-54	< 1.8	< 4.3	< 2.9	-	< 3.7	< 2.3
Fe-59	< 2.0	< 4.0	< 3.7	-	< 4.2	< 3.0
Co-58	< 2.4	< 3.5	< 3.0	-	< 4.8	< 2.8
Co-60	< 1.8	< 3.0	< 1.5	-	< 2.6	< 1.1
Zn-65	< 4.9	< 5.2	< 6.4	-	< 8.5	< 5.0
Nb-95	< 2.3	< 3.7	< 3.7	-	< 3.3	< 2.9
Zr-95	< 5.6	< 6.4	< 3.6	-	< 5.0	< 4.8
I-131	< 3.4	< 7.8	< 4.4	-	< 9.1	< 4.2
Cs-134	< 3.1	< 4.1	< 4.0	-	< 4.5	< 2.7
Cs-137	< 1.3	< 3.2	< 4.1	-	< 4.1	< 2.8
Ba-140	< 14.0	< 15.9	< 8.9	-	< 10.8	< 12.1
La-140	< 2.3	< 2.2	< 3.3	-	< 3.2	< 3.9

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.

Table 16. Surface water samples, analyses for tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-51

Lab Code	DSW- 219	DSW- 644	DSW- 996	DSW- 1834	DSW- 2609	DSW- 3265
Date Collected	01-19-15	02-18-15	03-11-15	04-22-15	05-27-15	06-26-15
H-3	< 173	< 144	< 147	< 153	< 150	< 143
Mn-54	< 1.7	< 3.3	< 2.3	< 4.2	< 3.0	< 2.1
Fe-59	< 3.5	< 5.0	< 1.6	< 2.8	< 3.6	< 3.4
Co-58	< 2.4	< 2.9	< 2.1	< 3.2	< 2.2	< 1.7
Co-60	< 2.5	< 3.0	< 1.3	< 2.2	< 2.2	< 1.8
Zn-65	< 3.1	< 5.9	< 5.0	< 6.6	< 5.4	< 4.0
Nb-95	< 1.7	< 2.9	< 3.5	< 3.8	< 2.9	< 3.2
Zr-95	< 4.6	< 5.7	< 4.1	< 6.0	< 4.5	< 3.7
I-131	< 5.1	< 5.0	< 5.4	< 7.9	< 5.0	< 4.2
Cs-134	< 2.2	< 3.4	< 3.7	< 4.0	< 3.0	< 3.1
Cs-137	< 2.8	< 2.3	< 3.6	< 4.6	< 3.1	< 2.7
Ba-140	< 12.7	< 13.3	< 17.8	< 25.9	< 15.1	< 15.3
La-140	< 3.3	< 2.4	< 4.2	< 1.8	< 1.3	< 3.1

Lab Code	DSW- 4028	DSW- 4569	DSW- 5319		DSW- 6572	DSW- 7119
Date Collected	07-21-15	08-18-15	09-25-15	10-31-15	11-13-15	12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143	< 146
Mn-54	< 2.3	< 2.3	< 3.8	-	< 3.9	< 1.9
Fe-59	< 3.3	< 3.1	< 4.7	-	< 3.8	< 3.3
Co-58	< 2.2	< 2.8	< 3.9	-	< 4.0	< 2.7
Co-60	< 2.0	< 3.1	< 3.4	-	< 1.5	< 2.3
Zn-65	< 4.3	< 5.3	< 8.9	-	< 6.3	< 2.7
Nb-95	< 2.3	< 2.3	< 3.6	-	< 4.1	< 2.7
Zr-95	< 3.5	< 5.3	< 8.1	-	< 5.4	< 3.7
I-131	< 3.5	< 5.1	< 9.8	-	< 6.7	< 5.1
Cs-134	< 3.1	< 4.4	< 5.1	-	< 4.0	< 2.9
Cs-137	< 2.8	< 5.1	< 2.8	-	< 4.2	< 3.1
Ba-140	< 9.1	< 22.9	< 19.2	-	< 13.6	< 11.5
La-140	< 1.6	< 2.0	< 4.0	-	< 1.9	< 2.2

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.

Table 16. Surface water samples, analyses for iodine-131, tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-61

Lab Code	DSW- 220	DSW- 645	DSW- 997	DSW- 1835	DSW- 2610	DSW- 3266
Date Collected	01-19-15	02-18-15	03-11-15	04-22-15	05-27-15	06-26-15
H-3	< 173	< 144	< 147	< 153	< 150	< 143
I-131(Chemistry)	< 0.4	< 0.3	< 0.3	< 0.4	< 0.3	< 0.3
Mn-54	< 1.9	< 2.9	< 2.1	< 3.1	< 1.6	< 2.7
Fe-59	< 3.5	< 7.2	< 3.6	< 5.9	< 2.9	< 2.9
Co-58	< 1.8	< 2.4	< 2.1	< 3.1	< 1.7	< 2.0
Co-60	< 2.2	< 2.5	< 2.1	< 3.3	< 1.2	< 2.4
Zn-65	< 3.2	< 4.8	< 4.0	< 3.7	< 2.0	< 3.6
Nb-95	< 2.4	< 2.8	< 2.9	< 2.6	< 2.0	< 2.2
Zr-95	< 4.1	< 4.7	< 3.8	< 5.1	< 4.5	< 3.1
I-131	< 4.0	< 3.2	< 4.5	< 7.5	< 5.1	< 4.9
Cs-134	< 2.8	< 3.6	< 3.5	< 4.7	< 3.2	< 3.0
Cs-137	< 3.2	< 3.1	< 3.1	< 3.7	< 2.1	< 3.2
Ba-140	< 13.3	< 10.7	< 10.4	< 20.4	< 13.8	< 11.3
La-140	< 2.7	< 2.7	< 1.5	< 3.8	< 1.9	< 1.2
Lab Code	DSW- 4029	DSW- 4570	DSW- 5320		DSW- 6573	DSW- 7120
Date Collected	07-21-15	08-18-15	09-25-15	10-31-15	11-13-15	12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143	< 146
I-131(Chemistry)	< 0.5	< 0.4	< 0.2	-	< 0.3	< 0.5
Mn-54	< 3.6	< 2.4	< 2.1	-	< 2.0	< 2.2
Fe-59	< 3.5	< 3.5	< 4.7	-	< 4.0	< 3.9
Co-58	< 3.1	< 2.4	< 2.2	-	< 3.2	< 1.4
Co-60	< 3.2	< 2.6	< 2.1	-	< 1.9	< 1.7
Zn-65	< 1.7	< 3.7	< 3.2	-	< 3.7	< 2.8
Nb-95	< 4.4	< 3.4	< 3.5	-	< 3.0	< 2.7
Zr-95	< 4.6	< 6.9	< 5.5	-	< 3.9	< 5.6
I-131	< 6.0	< 5.6	< 5.9	-	< 6.1	< 4.3
Cs-134	< 4.4	< 3.8	< 3.6	-	< 3.2	< 2.7
Cs-137	< 4.0	< 4.0	< 2.3	-	< 3.8	< 2.4
Ba-140	< 15.6	< 11.7	< 15.9	-	< 10.2	< 12.7
La-140	< 1.5	< 2.4	< 5.2	-	< 2.5	< 3.2

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.

Table 16. Surface water samples, analyses for tritium and gamma-emitting isotopes.

Collection: Monthly  
 Units: pCi/L  
 Location: D-99

Lab Code	01-19-15	02-18-15	DSW- 998 03-11-15	DSW- 1993 04-22-15	DSW- 2611 05-27-15	DSW- 3267 06-26-15
H-3	ND <sup>a</sup>	ND <sup>a</sup>	< 147	< 153	< 150	< 143
Mn-54	-	-	< 3.0	< 3.5	< 1.6	< 2.9
Fe-59	-	-	< 5.1	< 6.8	< 3.2	< 3.4
Co-58	-	-	< 2.6	< 1.5	< 1.7	< 2.1
Co-60	-	-	< 2.6	< 2.5	< 1.6	< 3.2
Zn-65	-	-	< 3.1	< 7.5	< 5.1	< 3.7
Nb-95	-	-	< 3.4	< 2.7	< 3.5	< 1.9
Zr-95	-	-	< 5.0	< 3.6	< 3.2	< 7.0
I-131	-	-	< 7.0	< 7.9	< 5.0	< 7.5
Cs-134	-	-	< 3.2	< 3.8	< 3.0	< 2.7
Cs-137	-	-	< 1.9	< 3.3	< 3.0	< 4.3
Ba-140	-	-	< 17.9	< 22.2	< 9.5	< 18.1
La-140	-	-	< 2.6	< 2.5	< 3.2	< 1.4

Lab Code	DSW- 4030 07-21-15	DSW- 4571 08-18-15	DSW- 5321 09-25-15	10-31-15	DSW- 6574 11-13-15	DSW- 7121 12-16-15
H-3	< 147	< 147	< 150	ND <sup>a</sup>	< 143	< 146
Mn-54	< 2.2	< 2.3	< 4.1	-	< 3.6	< 2.1
Fe-59	< 5.5	< 1.9	< 7.7	-	< 4.5	< 5.2
Co-58	< 3.4	< 1.9	< 4.2	-	< 3.1	< 1.6
Co-60	< 2.5	< 1.4	< 2.3	-	< 2.2	< 2.4
Zn-65	< 2.6	< 3.4	< 4.2	-	< 5.1	< 6.0
Nb-95	< 1.9	< 3.1	< 3.6	-	< 2.1	< 1.5
Zr-95	< 5.4	< 3.0	< 3.8	-	< 6.0	< 2.7
I-131	< 3.9	< 4.8	< 7.4	-	< 7.0	< 4.5
Cs-134	< 4.1	< 3.2	< 4.1	-	< 4.0	< 2.6
Cs-137	< 3.5	< 2.0	< 3.1	-	< 3.7	< 2.0
Ba-140	< 14.4	< 16.4	< 22.5	-	< 18.1	< 12.5
La-140	< 2.0	< 3.2	< 1.9	-	< 2.4	< 3.1

<sup>a</sup> ND = No data; see Table 2.0, Program Deviations.



Table 17. Surface water, analysis for strontium.  
 Collection: Quarterly composites of monthly samples.  
 Units: pCi/L

Location				
D-49				
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	DSW-1655	DSW-3309	DSW-5331	DSW-7130
Sr-89	< 0.79	< 0.54	< 0.55	< 0.70
Sr-90	< 0.52	< 0.50	< 0.49	< 0.54

Location				
D-61				
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	DSW-1656	DSW-3310	DSW-5332	DSW-7131
Sr-89	< 0.74	< 0.55	< 0.65	< 0.78
Sr-90	< 0.46	< 0.50	< 0.53	< 0.58

Table 18. Fish, analyses of edible portion for gamma-emitting isotopes.

Collection: Semiannually

Units: pCi/g wet

Location				
Upstream, D-49				
Lab Code	DF- 2836	DF- 2837	DF- 5789	DF- 5790
Date Collected	05-22-15	05-22-15	09-28-15	09-28-15
Sample Type	Cyprinus Carpio	Carpoides Sp.	Cyprinus Carpio	Carpoides Sp.
K-40	3.25 ± 0.70	3.30 ± 0.38	3.43 ± 0.40	3.73 ± 0.40
Mn-54	< 0.028	< 0.016	< 0.014	< 0.014
Fe-59	< 0.055	< 0.036	< 0.045	< 0.045
Co-58	< 0.022	< 0.017	< 0.018	< 0.012
Co-60	< 0.017	< 0.010	< 0.012	< 0.014
Zn-65	< 0.035	< 0.020	< 0.016	< 0.017
Nb-95	< 0.048	< 0.030	< 0.025	< 0.024
Zr-95	< 0.036	< 0.030	< 0.033	< 0.018
Ru-103	< 0.046	< 0.017	< 0.028	< 0.024
Ru-106	< 0.26	< 0.11	< 0.17	< 0.13
Cs-134	< 0.026	< 0.014	< 0.014	< 0.016
Cs-137	< 0.027	< 0.016	< 0.018	< 0.015
Ce-141	< 0.053	< 0.032	< 0.038	< 0.025
Ce-144	< 0.14	< 0.065	< 0.077	< 0.059

Location				
Downstream, D-61				
Lab Code	DF- 2839	DF- 2840	DF- 5791	DF- 5792
Date Collected	05-22-15	05-22-15	09-28-15	09-28-15
Sample Type	Cyprinus Carpio	Carpoides Sp.	Cyprinus Carpio	Carpoides Sp.
K-40	3.12 ± 0.39	3.13 ± 0.43	3.41 ± 0.40	3.53 ± 0.44
Mn-54	< 0.012	< 0.015	< 0.015	< 0.013
Fe-59	< 0.047	< 0.044	< 0.021	< 0.036
Co-58	< 0.022	< 0.024	< 0.013	< 0.016
Co-60	< 0.009	< 0.010	< 0.008	< 0.012
Zn-65	< 0.011	< 0.029	< 0.031	< 0.032
Nb-95	< 0.017	< 0.020	< 0.017	< 0.032
Zr-95	< 0.039	< 0.046	< 0.025	< 0.034
Ru-103	< 0.017	< 0.026	< 0.023	< 0.026
Ru-106	< 0.11	< 0.16	< 0.11	< 0.15
Cs-134	< 0.017	< 0.018	< 0.016	< 0.016
Cs-137	< 0.010	< 0.023	< 0.009	< 0.016
Ce-141	< 0.045	< 0.058	< 0.044	< 0.050
Ce-144	< 0.076	< 0.11	< 0.085	< 0.12

Table 19. River sediment, analysis for gamma-emitting isotopes.

Collection: Semiannually

Units: pCi/g dry

Location	D-50 (Plant Intake, Control)	
Lab Code	DBS- 4774	DBS- 6575
Date Collected	08-25-15	11-13-15
K-40	7.52 ± 0.43	7.65 ± 0.43
Mn-54	< 0.014	< 0.013
Fe-59	< 0.034	< 0.023
Co-58	< 0.018	< 0.015
Co-60	< 0.011	< 0.009
Zn-65	< 0.039	< 0.030
Nb-95	< 0.020	< 0.028
Zr-95	< 0.026	< 0.028
Ru-103	< 0.016	< 0.012
Ru-106	< 0.11	< 0.088
Cs-134	< 0.011	< 0.013
Cs-137	< 0.011	< 0.012
Ce-141	< 0.044	< 0.042
Ce-144	< 0.086	< 0.094

Location	D-51 (Discharge)	
Lab Code	DBS- 4775	DBS- 6576
Date Collected	08-25-15	11-13-15
K-40	7.80 ± 0.49	7.70 ± 0.38
Mn-54	< 0.010	< 0.014
Fe-59	< 0.070	< 0.044
Co-58	< 0.022	< 0.010
Co-60	< 0.014	< 0.007
Zn-65	< 0.044	< 0.034
Nb-95	< 0.026	< 0.018
Zr-95	< 0.033	< 0.016
Ru-103	< 0.032	< 0.012
Ru-106	< 0.12	< 0.080
Cs-134	< 0.013	< 0.011
Cs-137	< 0.015	< 0.013
Ce-141	< 0.064	< 0.039
Ce-144	< 0.13	< 0.076

Table 19. River sediment, analysis for gamma-emitting isotopes.  
 Collection: Semiannually  
 Units: pCi/g dry

Location	D-107A (North Drainage Ditch)		
Lab Code	DBS- 3394	DBS- 4776	DBS- 6577
Date Collected	06-30-15	08-25-15	11-13-15
K-40	3.32 ± 0.34	5.89 ± 0.42	6.75 ± 0.42
Mn-54	< 0.012	< 0.014	< 0.014
Fe-59	< 0.021	< 0.035	< 0.032
Co-58	< 0.014	< 0.020	< 0.017
Co-60	< 0.011	< 0.011	< 0.009
Zn-65	< 0.023	< 0.032	< 0.033
Nb-95	< 0.010	< 0.029	< 0.021
Zr-95	< 0.017	< 0.043	< 0.026
Ru-103	< 0.013	< 0.026	< 0.019
Ru-106	< 0.11	< 0.065	< 0.074
Cs-134	< 0.012	< 0.012	< 0.009
Cs-137	< 0.011	< 0.012	< 0.012
Ce-141	< 0.024	< 0.051	< 0.042
Ce-144	< 0.094	< 0.091	< 0.093