



Crystal River Nuclear Plant  
15760 W. Power Line Street  
Crystal River, FL 34428

Docket 50-302  
Operating License No. DPR-72

10 CFR 50.36a(a)(2)  
ITS 5.7.1.1(c)

April 7, 2015  
3F0415-01

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

Subject: Crystal River Unit 3 – 2014 Annual Radioactive Effluent Release Report

Dear Sir:

Duke Energy Florida, Inc., hereby provides the 2014 Radioactive Effluent Release Report for Crystal River Unit 3 (CR-3) in accordance with 10 CFR 50.36a(a)(2) and the CR-3 Improved Technical Specifications (ITS), Section 5.7.1.1(c). The attached report includes a summary of the quantities of radioactive liquid and gaseous effluents, and solid waste released from the CR-3 site during 2014. The material provided is consistent with the objectives outlined in the Off-Site Dose Calculation Manual (ODCM) and the Process Control Program (PCP), and is in conformance with 10 CFR 50, Appendix I, Section IV.B.1.

The CR-3 ITS, Section 5.6.2.3, requires submittal of licensee initiated changes to the ODCM as part of the Radioactive Effluent Release Report for the period of the report in which any changes were made. The ODCM and the PCP were not revised in 2014.

No new regulatory commitments are made in this letter

If you have any questions regarding this submittal, please contact Mr. Phil Rose, Lead Engineer, Nuclear Regulatory Affairs, at (352) 563-4883.

Sincerely,

Blair P. Wunderly  
Plant Manager  
Crystal River Nuclear Plant

BPW/ff

Attachment: 2014 Annual Radioactive Effluent Release Report

xc: NRR Project Manager  
Regional Administrator, Region I

JE48  
NRR

**DUKE ENERGY FLORIDA, INC.**

**DOCKET NUMBER 50 - 302 / LICENSE NUMBER DPR - 72**

**ATTACHMENT**

**2014 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

**ANNUAL RADIOACTIVE EFFLUENT  
RELEASE REPORT  
2014**



**DUKE ENERGY FLORIDA, INC  
CRYSTAL RIVER UNIT 3**

**Facility Operating License No. DPR-72**

**Docket No. 50-302**

Prepared By: **Rudy Pinner** *Rudy Pinner*  
Sr. Scientist

Approved By: **Bryant Akins** *Bryant Akins*  
Manager Radiation Protection & Chemistry

Date: **02-26-2015**

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## INTRODUCTION

This report is submitted as required by the Offsite Dose Calculation Manual, section 6.5, and Technical Specifications 5.6.2.3.3 and 5.7.1.1.c.

The scope of this report includes:

- A summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant.
- Quarterly and annual dose summaries.
- A list and description of unplanned releases to unrestricted areas.
- A description of any changes to the:
  - Process Control Program (PCP), and
  - Offsite Dose Calculation Manual (ODCM).
- Significant changes to any radioactive waste treatment system.
- A list of new dose calculation location changes identified by the annual land-use census.
- Information relating to effluent monitors or required supporting instrumentation being inoperable for 30 or more days.
- Information required to be included in this report per NEI 07-07 Industry Ground Water Protection Initiative-Final Guidance Document issued in August 2007.

**Note for reporting purposes, N/D = Not Detected.**

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Table 1A - Regulatory Guide 1.21

#### Gaseous Effluents - Summation of All Releases Unit: 3

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Est. Total % Error
<b>A. Fission &amp; Activation Gases</b>						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+01
2. Average Release Rate for Period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>B. Iodines</b>						
1. Total Iodine-131	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+01
2. Average Release Rate for Period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>C. Particulates</b>						
1. Particulates with half-lives > 8 days	Curies	7.65E-08	0.00E+00	0.00E+00	0.00E+00	3.00E+01
2. Average Release Rate for Period	uCi/sec	9.84E-09	0.00E+00	0.00E+00	0.00E+00	
3. Gross Alpha Radioactivity	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>D. Tritium</b>						
1. Total Release	Curies	2.70E-01	4.02E-01	4.36E-01	2.45E-01	3.00E+01
2. Average Release Rate for Period	uCi/sec	3.47E-02	5.12E-02	5.49E-02	3.08E-02	

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Table 1B - Regulatory Guide 1.21

### Gaseous Effluents - Elevated Batch Mode Unit: 3

(This Table Does Not Apply to Crystal River Unit 3)

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Gases</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Iodines</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Particulates</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>H-3</b>	Curies	N/D	N/D	N/D	N/D
<b>Gross Alpha</b>	Curies	N/D	N/D	N/D	N/D

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Table 1B – (Continued) Regulatory Guide 1.21

#### Gaseous Effluents - Elevated Continuous Mode Unit: 3

(This Table Does Not Apply to Crystal River Unit 3)

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Gases</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Iodines</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Particulates</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>H-3</b>	Curies	N/D	N/D	N/D	N/D
<b>Gross Alpha</b>	Curies	N/D	N/D	N/D	N/D

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Table 1C - Regulatory Guide 1.21

### Gaseous Effluents - Ground Batch Mode Unit: 3

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Gases</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Iodines</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Particulates</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>H-3</b>	Curies	N/D	N/D	N/D	N/D
<b>Gross Alpha</b>	Curies	N/D	N/D	N/D	N/D

**EFFLUENT and WASTE DISPOSAL REPORT-2014**

**Table 1C – (Continued) Regulatory Guide 1.21**

**Gaseous Effluents - Ground Continuous Mode  
Unit: 3**

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Gases</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Iodines</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Particulates</b>					
Cs-137	Curies	7.65E-08	N/D	N/D	N/D
Total	Curies	7.65E-08	N/D	N/D	N/D
<b>H-3</b>	Curies	2.70E-01	4.02E-01	4.36E-01	2.45E-01
<b>Gross Alpha</b>	Curies	N/D	N/D	N/D	N/D

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Table 2A - Regulatory Guide 1.21

#### Liquid Effluents - Summation of All Releases Unit: 3

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Est. Total % Error
<b>A. Fission &amp; Activation Products</b>						
1. Total Release (not including tritium, gases, alpha)	Curies	2.12E-02	5.22E-04	2.46E-02	6.36E-03	2.50E+01
2. Average diluted concentration during period	uCi/ml	8.71E-11	2.12E-12	9.30E-11	3.25E-11	
3. Percent of Applicable Limit	%	2.96E-04	3.84E-06	2.08E-04	5.91E-05	
<b>B. Tritium</b>						
1. Total Release	Curies	1.73E+01	9.33E+00	7.80E-01	6.56E+00	3.00E+01
2. Average diluted concentration during period	uCi/ml	7.09E-08	3.95E-08	2.95E-09	3.36E-08	
3. Percent of Applicable Limit	%	7.09E-04	3.95E-04	2.95E-05	3.36E-04	
<b>C. Dissolved and Entrained Gases</b>						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
2. Average diluted concentration during period	uCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<b>D. Gross Alpha Radioactivity</b>						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+01
<b>E. Waste Volume Released (Pre-Dilution)</b>						
	Liters	3.96E+06	2.15E+06	1.62E+06	1.54E+06	1.00E+01
<b>F. Dilution Water Volume During Period</b>						
	Liters	2.44E+11	2.36E+11	2.64E+11	1.95E+11	1.00E+01

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Table 2B - Regulatory Guide 1.21

#### Liquid Effluents - Batch Mode

**Unit: 3**

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Products</b>					
Mn-54	Curies	9.10E-05	N/D	2.35E-05	4.26E-06
Fe-55	Curies	7.70E-04	N/D	1.25E-03	1.76E-04
Co-60	Curies	1.00E-02	1.49E-04	3.94E-03	1.92E-03
Ni-63	Curies	4.92E-03	3.00E-04	1.52E-02	3.77E-03
Sr-89	Curies	N/D	N/D	2.18E-05	N/D
Sr-90	Curies	N/D	N/D	2.99E-05	N/D
Ag-110m	Curies	4.56E-04	N/D	N/D	N/D
Sb-125	Curies	1.29E-03	3.60E-05	1.56E-04	1.44E-05
Cs-134	Curies	1.01E-04	N/D	5.82E-05	5.04E-06
Cs-137	Curies	3.60E-03	3.70E-05	3.87E-03	4.68E-04
<b>Total</b>	<b>Curies</b>	<b>2.12E-02</b>	<b>5.22E-04</b>	<b>2.46E-02</b>	<b>6.36E-03</b>
<b>Dissolved and Entrained Gases</b>					
<b>Total</b>	<b>Curies</b>	<b>N/D</b>	<b>N/D</b>	<b>N/D</b>	<b>N/D</b>
<b>H-3</b>	<b>Curies</b>	<b>1.73E+01</b>	<b>9.33E+00</b>	<b>7.80E-01</b>	<b>6.56E+00</b>
<b>Gross Alpha</b>	<b>Curies</b>	<b>N/D</b>	<b>N/D</b>	<b>N/D</b>	<b>N/D</b>

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Table 2B - (Continued) Regulatory Guide 1.21

#### Liquid Effluents - Continuous Mode Unit: 3

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
<b>Fission &amp; Activation Products</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>Dissolved and Entrained Gases</b>					
Total	Curies	N/D	N/D	N/D	N/D
<b>H-3</b>	Curies	N/D	N/D	N/D	N/D
<b>Gross Alpha</b>	Curies	N/D	N/D	N/D	N/D

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Regulatory Guide 1.21

### Gaseous Batch Release Summary

Unit: 3

	Jan - Jun	Jul - Dec
Number of Batch Releases	0	0
Total Time Period for Batch Releases	0.00E+00 min	0.00E+00 min
Maximum Time Period for a Batch Release	0.00E+00 min	0.00E+00 min
Average Time Period for a Batch Release	0.00E+00 min	0.00E+00 min
Minimum Time Period for a Batch Release	0.00E+00 min	0.00E+00 min

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Regulatory Guide 1.21

### Liquid Batch Release Summary

Unit: 3

	Jan - Jun	Jul - Dec
Number of Batch Releases	68	33
Total Time Period for Batch Releases	1.12E+04 min	5.94E+03 min
Maximum Time Period for a Batch Release	4.12E+02 min	6.60E+02 min
Average Time Period for a Batch Release	1.65E+02 min	1.80E+02 min
Minimum Time Period for a Batch Release	4.70E+01 min	5.00E+01 min
Average Stream Flow During Release Periods	3.44E+05 gpm	2.81E+05 gpm

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Regulatory Guide 1.21

### Gaseous Abnormal Release Summary

Unit: 3

	Jan - Jun	Jul - Dec
Number of Abnormal Releases	0	0
Total Time Period for Abnormal Releases	0.00E+00 min	0.00E+00 min
Maximum Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Average Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Minimum Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Total Activity for Abnormal Releases	0.00E+00 Ci	0.00E+00 Ci

# **EFFLUENT and WASTE DISPOSAL REPORT-2014**

## **Regulatory Guide 1.21**

### **Liquid Abnormal Release Summary**

**Unit: 3**

	<b>Jan - Jun</b>	<b>Jul - Dec</b>
Number of Abnormal Releases	0	0
Total Time Period for Abnormal Releases	0.00E+00 min	0.00E+00 min
Maximum Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Average Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Minimum Time Period for an Abnormal Release	0.00E+00 min	0.00E+00 min
Total Activity for Abnormal Releases	0.00E+00 Ci	0.00E+00 Ci

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Regulatory Guide 1.21

### Gaseous NNG Organ Dose

Unit: 3

Receptor Name: Infant Max Ind NW at 1.34 km

	1 <sup>st</sup> Quarter		2 <sup>nd</sup> Quarter		3 <sup>rd</sup> Quarter		4 <sup>th</sup> Quarter		Calendar Year	
Organ	Dose	% of ODCM Limit	Dose	% of ODCM Limit						
Bone	6.77E-05	9.02E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.28E-04	2.19E-03
Liver	6.81E-05	9.08E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.28E-04	2.19E-03
Total Body	6.55E-05	8.73E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.26E-04	2.17E-03
Thyroid	6.53E-05	8.71E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.25E-04	2.17E-03
Kidney	6.61E-05	8.81E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.26E-04	2.17E-03
Lung	6.56E-05	8.75E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.26E-04	2.17E-03
GI-Lli	6.53E-05	8.71E-04	9.66E-05	1.29E-03	1.05E-04	1.40E-03	5.88E-05	7.84E-04	3.25E-04	2.17E-03

Maximum Organ was LIVER.

# EFFLUENT and WASTE DISPOSAL REPORT-2014

## Regulatory Guide 1.21

### Liquid Organ & Whole Body Dose

Unit: 3

Receptor Name: Adult W at 1.34 km

1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Calendar Year
-------------------------	-------------------------	-------------------------	-------------------------	---------------

Organ	Dose	% of ODCM Limit								
Bone	2.44E-03	4.88E-02	4.36E-05	8.73E-04	8.52E-04	1.70E-02	9.10E-04	1.82E-02	4.25E-03	4.25E-02
Liver	3.98E-04	7.97E-03	4.07E-06	8.14E-05	1.31E-04	2.62E-03	9.18E-05	1.84E-03	6.25E-04	6.25E-03
Total Body	1.44E-04	9.59E-03	2.30E-06	1.54E-04	5.06E-05	3.37E-03	3.85E-05	2.57E-03	2.35E-04	7.84E-03
Thyroid	1.23E-06	2.46E-05	2.98E-07	5.96E-06	1.38E-08	2.75E-07	2.78E-07	5.57E-06	1.82E-06	1.82E-05
Kidney	6.67E-06	1.33E-04	5.62E-07	1.12E-05	4.14E-06	8.28E-05	7.46E-07	1.49E-05	1.21E-05	1.21E-04
Lung	1.33E-04	2.66E-03	3.86E-07	7.73E-06	3.88E-05	7.77E-04	1.69E-05	3.37E-04	1.89E-04	1.89E-03
GI-Li	2.91E-04	5.82E-03	1.45E-06	2.91E-05	5.60E-05	1.12E-03	4.19E-05	8.39E-04	3.90E-04	3.90E-03

#### Liquid Effluent Dose Limits

Total Body: 1.5 mrem/quarter, 3 mrem/year  
 Any Organ: 5 mrem/quarter, 10 mrem/year

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Regulatory Guide 1.21

### Liquid App I Dose Assessment Unit: 3

#### Adult W at 1.34km

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<b>Maximum Organ Dose</b>	mRem	2.44E-03	4.36E-05	8.52E-04	9.10E-04	4.25E-03
<b>ODCM Limit</b>	mRem	5.00	5.00	5.00	5.00	10.00
<b>% of ODCM Limit</b>	%	4.88E-02	8.73E-04	1.70E-02	1.80E-02	4.25E-02

Maximum Organ was Bone

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<b>Total Body</b>	mRem	1.44E-04	2.30E-06	5.06E-05	3.85E-05	2.35E-04
<b>ODCM Limit</b>	mRem	1.50	1.50	1.50	1.50	3.00
<b>% of ODCM Limit</b>	%	9.59E-03	1.54E-04	3.37E-03	2.57E-03	7.84E-03

## EFFLUENT and WASTE DISPOSAL REPORT-2014

### Regulatory Guide 1.21

### App I Dose Assessment

### Unit: 3

#### Airborne Noble Gas Doses Child Site Boundary NW at 1.34 km

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<b>Beta Air</b>	mRad	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>ODCM Limit</b>	mRad	10.00	10.00	10.00	10.00	20.00
<b>% of ODCM Limit</b>	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<b>Gamma Air</b>	mRad	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>ODCM Limit</b>	mRad	5.00	5.00	5.00	5.00	10.00
<b>% of ODCM Limit</b>	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

#### Gaseous Release Dose Summary

**Note:** There were no noble gases released in 2014 due to the extended plant shutdown from refueling outage 16 that began in September 2009. The plant remains shutdown in mode 7 (defueled) for all of 2010, 2011, 2012, 2013, and 2014 due to reactor building containment concrete wall delamination issues.

Due to the decision to decommission the plant, the facility will remain permanently defueled.

#### Gaseous Effluent Dose Limits

Gamma Air Dose: 5 mrad/quarter, 10 mrad/year  
 Beta Air Dose: 10 mrad/quarter, 20 mrad/year  
 Any Organ: 7.5 mrem/quarter, 15 mrem/year

**TABLE 3**  
**EFFLUENT and WASTE DISPOSAL REPORT-2014**  
**SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**

**A. SOLID WASTE SHIPPED OFFSITE FOR PROCESSING OR BURIAL (Non-irradiated fuel)**

1. Type of waste		Unit	12 month period	Est. Total Error %		
a.	Spent resins, filter sludges, evaporator bottoms, etc.	m3	2.30E+01	25		
		Ci	1.54E+02			
b.	Dry compressible waste, contaminated equipment, etc.	m3	6.33E+02	25		
		Ci	2.11E-01			
c.	Irradiated components, control rods, etc.	m3	0.00E+00	25		
		Ci	0.00E+00			
d.	Other (describe): Combined DAW package	m3	0.00E+00	25		
		Ci	0.00E+00			
2. Estimate of major nuclide composition (by type of waste in %)*						
a.	Fe-55	4.36	Co-60	19.29	Cs-137	13.10
	Sb-125	0.29	Ni-63	60.29	Sr-90	0.07
	Mn-54	0.17	Ni-59	0.39	Ce-144	0.03
	C-14	1.50	Cs-134	0.40	Ag-110m	0.10
b.	C-14	8.92	Ni-63	35.11	Zn-65	0.07
	Fe-55	6.98	Mn-54	1.23	Ag-110m	0.07
	Co-60	41.66	Cs-137	4.26	Ce-144	0.03
	Sb-125	0.86	Cs-134	0.23	Zr-95	0.07
	Co-57	0.04	Co-58	0.31	Nb-95	0.16
c.	N/A		N/A		N/A	
d.	N/A		N/A		N/A	

\* Curie values and principle radionuclides are estimates based on a combination of direct and indirect methods.

**3. Solid Waste Disposition**

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
(Trucking Shipments)		
02	Hittman Transport Services	Energy Solutions
04	Landstar Ranger	Energy Solutions
21	Hittman Transport services	Energy Solutions Services, Inc.
06	Hittman Transportation	Energy Solutions Services, Inc.
02	Landstar Ranger	Energy Solutions Services, Inc.
01	Hittman Transportation	Erwin Resin Solutions, LLC

**B. IRRADIATED FUEL SHIPMENTS (Disposition)**

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
0	N/A	N/A

## Unplanned Releases

There were no unplanned releases in 2014.

## Radioactive Waste Treatment Systems

There were no significant changes to the radioactive waste treatment systems in 2014. Due to the lengthy shutdown of Crystal River Unit 3, liquid waste volume and radioactivity concentration had continued to decrease until the decision to retire CR3 and begin decommissioning was made in February of 2013. As part of the preparation to place the unit in SAFSTOR, liquid waste inventory of all systems no longer required to support spent fuel cooling have been processed and discharged as liquid wastes, where possible. The liquid waste demineralizers were recharged with new condensate resin that was previously loaded into the condensate demineralizers to support the plant restart from the refuel 16 outage. This resin is a 2:1 cation to anion macroporous gel mixture of Ambersep 200H cation resin and IRN78 anion resin. This resin has performed extremely well while processing higher activity waste tanks including reactor coolant and borated refueling water. The liquid waste processing demineralizers and filters were sluiced and recharged several times to support processing the large volume of water as systems are drained and abandoned to support reaching the SAFSTOR configuration.

## Annual Land Use Census

The 2014 land-use census did not identify any new dose calculation locations.

## Effluent Monitor Instrument Operability

For the year 2014 the main gaseous effluent pathway is the auxiliary building ventilation exhaust system. Radiation monitor RM-A2N is the effluent monitor for this pathway. This monitor remains in service and has two back up compensatory monitors RM-A4 and RM-A8, which sample various locations of the auxiliary building. There were no Reactor Building Purge evolutions performed in 2014.

The liquid effluent pathways are the primary plant liquid waste stream, which is monitored by radiation monitor RM-L2, and the secondary plant liquid waste stream, which is monitored by radiation monitor RM-L7. These liquid radiation monitors remain operable.

As system abandonment continues so the plant can reach the prescribed SAFSTOR configuration, various radiation monitors are also being removed from service as they no longer can perform their design function due to they either have no radioactive source term to monitor or the system they originally were designed to monitor is no longer in service. The monitors taken out of service are as follows:

### (Liquids)

- RM-L1, Reactor Coolant Letdown monitor
- RM-L3, Nuclear Services Closed Cycle Cooling monitor
- RM-L5, Decay Heat-A Closed Cycle Cooling monitor

### (Gaseous)

- RM-A3, Waste Gas Sampling Area Ventilation monitor
- RM-A5, Control Complex Ventilation monitor
- RM-A6, Reactor Building Containment monitor
- RM-A7, Nuclear Sample Room Ventilation
- RM-A11, Waste Gas Decay Tank Discharge monitor
- RM-A12, Condenser Offgas monitor

### **Meterology Instrumentation Evaluation**

During 2014 the yearly instrumentation data recovery for all meterology tower instruments has remained in the range of > or = 95.7%. The 2014 lower level joint frequency distribution MET data recovery rate was 98.4% based on review of OSI PI data by Murray and Trettel. Actual meterological tower data is available and is maintained at the Crystal River site. The actual meterological data is not provided in this report as is allowed by the ODCM.

### **Offsite Dose Calculation Manual (ODCM) Changes**

The ODCM was not revised in 2014 or 2013. A major change to the ODCM is planned for 2015 which will support various system abandonments as the facility is configured for SAFSTOR.

### **Process Control Program (PCP) Changes**

The PCP was not revised in 2014.

### **Emergency Feed Pump 2 & Steam Releases**

Due to the fact that the plant has not operated since September of 2009, the emergency feed pump has not operated, nor has there been any secondary plant steam releases that need to be evaluated for radioactive constituents.

Based on the decision to retire and decommission CR-3, the emergency feed pump 2 will never operate again and there will be no steam releases.

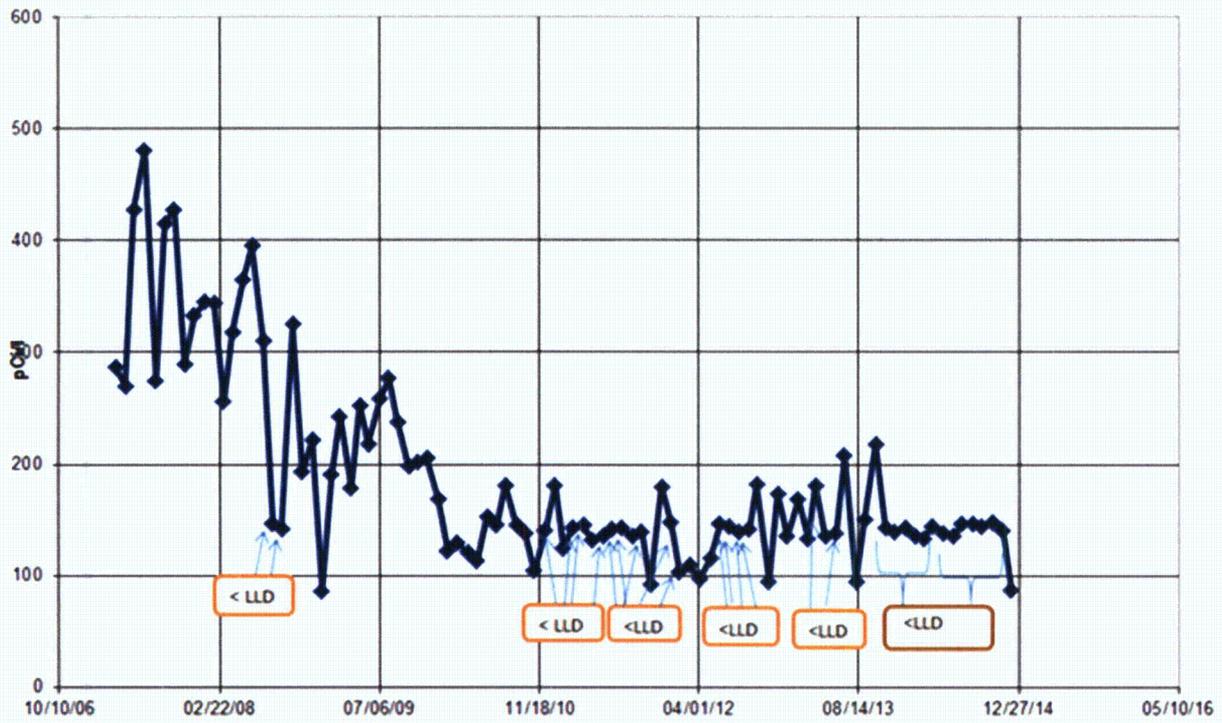
### **Carbon-14 Evaluation**

During the entire year of 2014, Crystal River Unit 3 has been in a cold shutdown, defueled mode. The plant was taken off line in September of 2009 for refueling outage 16. In 2009, the primary plant was degassed, the reactor building was purged of radioactivity, waste gas decay tanks were released, a construction opening was made in the side of the reactor building containment wall, and both once through steam generators were replaced. Since the plant has been in cold shutdown for the entire years of 2010 through 2014 due to reactor building containment wall concrete delamination issues, there is no source term generation for carbon-14 production. Since the decision to retire the facility has been announced, there will be no C-14 source term generated ever again at CR-3.

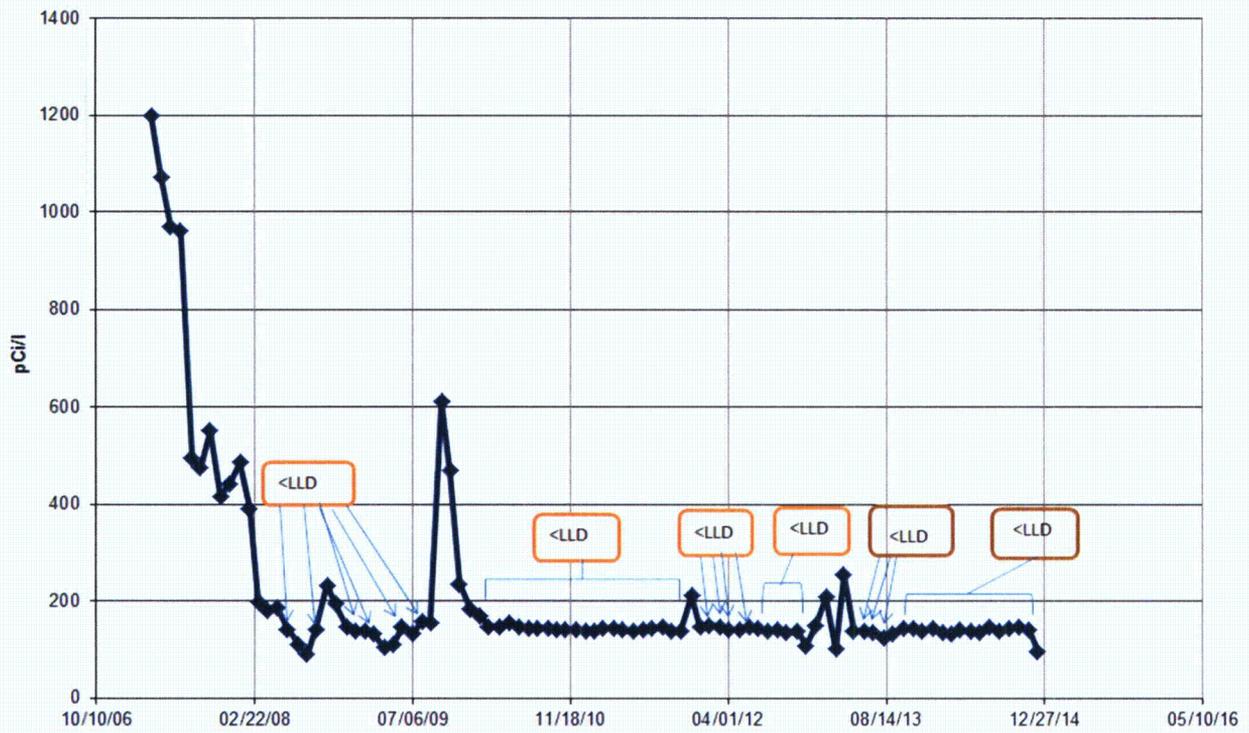
### **Nuclear Electric Institute (NEI) Required Information**

The following environmental data is being included in this report per objective 2.4.b.i and 2.4.b.ii of NEI 07-07 Industry Ground Water Protection Initiative, as this groundwater well data is used to assist in evaluation of groundwater at the site, but is not officially included in the Radiological Environmental Monitoring Program (REMP) or the Offsite Dose Calculation Manual (ODCM). These 2 graphs are of tritium measurements in units of pCi/l, taken from groundwater monitoring wells located west of CR-3 on either side (north and south) of the site settling ponds. There are many other groundwater monitoring wells included in the REMP that are used for evaluating the groundwater in the vicinity of the CR-3 site. These 2 wells are providing supplemental information. The LLD for tritium measurement of these environmental well samples is ~150 pCi/l.

Tritium Measurements GW Well # MWC-IF2



Tritium Measurements GW Well # MWC-27



### **Additional Information**

On February 5, 2013, Duke Energy announced that a decision has been made to permanently retire Crystal River Unit 3. The decision was made due to the high cost of repair and risk associated with repairing the containment building's delaminated concrete wall. The company is working to develop a comprehensive decommissioning plan and intends to place the facility in SAFSTOR for the immediate future and eventual dismantling. The plant staff (called decommissioning transition organization) is working to shutdown and abandon as many systems as possible, by removing energy sources, lubrications, greases, electrical, and system fluids to prepare the unit for SAFSTOR and eventual dismantlement.