DUKE ENERGY®

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

Docket 50-302
Operating License No. DPR-72

ITS 5.7.1.1(b)
ODCM 6.6

May 14, 2014
3F0514-05

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

Subject: Crystal River Unit 3 – 2013 Annual Radiological Environmental Operating Report

Dear Sir:

Duke Energy Florida, Inc. hereby provides the 2013 Annual Radiological Environmental Operating Report for Crystal River Unit 3 (CR-3) in accordance with the CR-3 Improved Technical Specifications (ITS), Section 5.7.1.1(b) and Section 6.6 of the Offsite Dose Calculation Manual (ODCM). The data provided in the attached report is consistent with the objectives outlined in the ODCM and includes all radiological environmental samples taken during the report period from January 1, 2013 through December 31, 2013.

Also attached to this report are two corrected pages pertaining to the 2010 Annual Radiological Environmental Operating Report. The errors on these two pages were due to transpositional errors that when corrected, were insignificant. The corrected values are highlighted in bold type. These transpositional errors were documented in the CR-3 Corrective Action Program in Condition Report 671434.

This letter establishes no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Dan Westcott, Manager, Nuclear Regulatory Affairs, at (352) 563-4796.

Sincerely,

Blair P. Wunderly
Plant Manager
Crystal River Nuclear Plant

BPW/ff

Attachment: 2013 Annual Radiological Environmental Operating Report

xc: NRR Project Manager
Regional Administrator, Region I

IE25

DUKE ENERGY FLORIDA, INC.

DOCKET NUMBER 50 - 302 / LICENSE NUMBER DPR - 72

ATTACHMENT

2013 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

2013

DUKE ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

Prepared By: Rudy Pinner 05/05/2014
Sr. Scientist

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INTRODUCTION

This report is submitted as required by Technical Specification 5.7.1.1(b) to the Crystal River Facility Operating License No. DPR-72, and Section 6.6 of the Offsite Dose Calculation Manual.

The following information is required to be included in this report:

- Data Summaries
- Interpretations
- Unachievable LLDs
- An analysis of trends
- An assessment of any observed impact of plant operation on the environment

  NOTE: If harmful effects or evidence of irreversible damage are detected by the monitoring, the report shall provide an analysis of the problem and a planned course of action to correct it.

- Summarized and tabulated results of all radiological environmental samples taken during the report period, in the format of Radiological Assessment Branch Technical Position, Revision 1, November, 1979.

  NOTE: If some results are not available for inclusion, the report shall note and explain the reason for the missing results. The missing results shall be submitted as soon as possible in a supplementary report.

- A summary description of the Radiological Environmental Monitoring Program.
- A map of all sampling locations keyed to a table giving distances and directions from the reactor.
- Land-use census results.
- Interlaboratory Comparison Program results.
- A discussion of airborne sample station availability.
- Results of any unplanned release or spill of radioactive material that could have the potential to contaminate the groundwater as reported to maintain compliance with the groundwater protection initiative (NEI 07-07).

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.

I. SUMMARY DESCRIPTION OF THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The analytical results of the Crystal River Unit 3 (CR-3) operational Radiological Environmental Monitoring Program (REMP) for 2013 are contained in this report. The operational program began on January 1, 1977 just prior to initial criticality, which was achieved on January 14, 1977.

Sampling of the facility environs is performed by the State of Florida Department of Health, Bureau of Radiation Control. The State also performs the required analyses, participates in the Interlaboratory Comparison Program, and performs the annual land-use census. Prior to 1990, the program was split between the Department of Health and the University of Florida. The transition to the State performing all of the program's sampling and analyses in 1990 is evident in several of the trend graphs, most notably oysters and carnivorous fish, and is due to the State using less sensitive measurement techniques for several of the pathways which were formerly evaluated by the University of Florida.

Sample station locations are given in Table I-1 and Figures I-2, I-3, I-4, and I-5. Sample frequency and analysis type may be determined from Table I-2. Figure I-1 illustrates the relevant exposure pathways. Regarding waterborne pathways, the groundwater area of the Crystal River site is too saline to be used as a source of drinking water, hence there is no credible drinking water uptake pathway. Additionally, the Florida aquifer groundwater flows in a west-southwest direction across the site toward the Gulf of Mexico and since the locale of the site is along the coast, there is no downstream public impact regarding groundwater.

Except for air sample gross beta results and direct radiation measurements, most of the analytical results are below the lower limit of detection (LLD) of the sample. Sample LLDs are generally much lower than the required "a priori" LLD. When measurable results are reported, the values are also usually less than the required "a priori" LLD.

In 2011 there were positively measured results of iodine and cesium airborne concentrations during the period of March 22 through April 12th for almost all sampling stations including the control station. These measurements are a direct result of the earthquake and tsunami event at the Dai-Ichi, Fukushima nuclear plants following the March 11, 2011 Tohoku event in Japan. These measurements are not related to Crystal River Unit 3 activities. The Japanese event also affected broad leaf vegetation sample media throughout the year as long-lived radionuclides (Cs-137) were released at Fukushima multiple times. The vegetation measurements in 2013 are still affected by the Fukushima event due to the long-lived radionuclides deposited.

The results of the 2013 REMP have been compared to previous years' results. This comparison, in part illustrated by the trend graphs of Section IV, shows no evidence of consistent long-term increasing trends in any of the sample media. However, radioactive material is routinely quantified in sediment samples which are taken in the discharge canal near the liquid release discharge point. In general, these results verify the effectiveness of in-plant measures for controlling radioactive releases.

Trend graphs illustrate the mean measured concentration of a particular radionuclide for the year. When measurable results are not obtained, the highest sample LLD is plotted. LLD and measured values are plotted on the same line to best illustrate any trend. As shown on each graph's legend, any measured value is noted by a text box, unless all values trended are measured values for that particular parameter.

Statistical summary pages are provided for each medium or pathway. Measured values are reported in terms of a mean and range. In addition, the number of measured values versus samples obtained is reported. For example, in the following entry;

15 (249/256)
(4 - 35)

the "All Indicator Locations" column would be interpreted as indicating a mean measured value of 15, with measured values ranging from 4 to 35. (249/256) means that out of 256 samples, 249 were measured values.

TABLE I-1

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

SAMPLE STATION LOCATIONS

SAMPLE MEDIA	STATION ID	DIRECTION	APPROX. DISTANCE (Miles)
TLD – on-site	C60	N	0.88
	C61	NNE	0.92
	C62	NE	1.17
	C63	ENE	0.87
	C64	E	0.80
	C65	ESE	0.33
	C66	SE	0.36
	C67	SSE	0.33
	C68	S	0.27
	C69	SSW	0.31
	C41	SW	0.43
	C70	WSW	0.74
	C71	WNW	0.58
	C72	NW	0.30
	C73	NNW	0.74
	C27	W	0.41
TLD – off-site	C18	N	5.3
	C03	NNE	4.89
	C04	NE	5.95
	C74	ENE	5.13
	C75	E	3.99
	C76	ESE	5.61
	C08	SE	5.66
	C77	SSE	3.39
	C09	S	3.23
	C78	WSW	4.59
	C14G	W	2.53
	C01	NW	4.8
	C79	NNW	4.97
	C47-Control	ESE	78
	C07*	ESE	7.67
	C40*	E	3.48
	C46*	N	0.37

*TLDs not required by ODCM. Deployed at air sample locations.

TABLE I-1 (CONT'D)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

SAMPLE STATION LOCATIONS

SAMPLE MEDIA	STATION ID	DIRECTION	DISTANCE (Miles)
AIR	C07	ESE	7.7
	C18	N	5.3
	C40	E	3.5
	C41	SW	0.4
	C46	N	0.4
	C47-Control	ESE	78
SEAWATER	C14H	NW	0.1
	C14G	W	2.5
	C13-Control	WSW	4.6
GROUND WATER	C40-Control	E	3.6
SITE GROUND WATER	CR3-2	E	0.1
	CR3-4	SSE	0.086
	CR3-5	SSW	0.051
	CR3-6S	W	0.038
	CR3-6D	W	0.038
	CR3-7	WNW	0.060
	CR3-8	WNW	0.073
	CR3-9	NW	0.1
	CR3-10	NNE	0.1
DRINKING WATER	C07-Control	ESE	7.4
	C10-Control	ESE	6.0
	C18-Control	N	5.3
SHORELINE SEDIMENT	C09-Control	S	3.2
	C14H	NW	0.1
	C14M	W	1.2
	C14G	W	2.5
FISH & OYSTERS	C29	W	2.5
	C30-Control	WSW	3.4
BROAD LEAF VEGETATION	C48A	N	0.4
	C48B	ENE	0.9
	C47-Control	ESE	78
WATERMELON	C04	NE	13
CITRUS	C19	ENE	9.6

TABLE I-2

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

SAMPLING AND ANALYSIS PROGRAM

SAMPLE MEDIA	# OF STATIONS	FREQUENCY	ANALYSIS		LLD[1]
TLD	33*	Quarterly	γ Dose		---
Air Iodine	6	Weekly	I-131		0.07[g] pCi/m^3
Air Particulate	6	Weekly	Gross ß		0.01
		Quarterly	γ Spec :	Cs-134	0.05[e]
				Cs-137	0.06[e]
Seawater	3	Monthly	Tritium		2000[b] pCi/L
		Monthly	γ Spec :	Mn-54	15
				Fe-59	30
				Co-58	15
				Co-60	15
				Zn-65	30
				Zr-Nb-95	15[c]
				I-131	1[f]
				Cs-134	15
				Cs-137	18
				Ba-La-140	15[c]
Ground Water	1	Semiannual	Tritium		2000[b] pCi/L
		Semiannual	γ Spec :	[2]	[2]
Site Ground Water[6]	9	Quarterly	Tritium		2000[b] pCi/L
		Quarterly	γ Spec :	[2]	[2]
Drinking Water	3	Quarterly	Tritium		2000[b] pCi/L
		Quarterly	γ Spec :	[2]	[2]
Shoreline Sediment	4	Semiannual	γ Spec :	Cs-134	150 pCi/kg
				Cs-137	180

*Includes 3 stations which are not required by the ODCM
[1]The maximum "a priori" LLD
[2]Same as Seawater γ Spec
[6]Additional 2 stations reported that are not required by the ODCM
[b]LLD for drinking water. If no drinking water pathway exists, a value of 3000 pCi/L may be used
[c]The specified LLD is for an equilibrium mixture of parent and daughter nuclides which contain 15 pCi/L of the parent nuclide
[e]LLDs apply only to quarterly composite gamma spectral analysis, not to analyses of single particulate filters
[f]LLD for drinking water. If no drinking water pathway exists, the LLD of the gamma isotopic analysis may be used
[g]LLD for I-131 applies to a single weekly filter

TABLE I-2 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

SAMPLING AND ANALYSIS PROGRAM

SAMPLE MEDIA	# OF STATIONS	FREQUENCY	ANALYSIS		LLD[1]
Carnivorous Fish and Oysters	2	Quarterly	γ Spec :	Mn-54	130 pCi/kg
				Fe-59	260
				Co-58	130
				Co-60	130
				Zn-65	260
				Cs-134	130
				Cs-137	150
Broad Leaf Vegetation	3	Monthly[3]	γ Spec :	I-131	60 pCi/kg
				Cs-134	60
				Cs-137	80
Watermelon	1	Annual[4]	γ Spec :	[5]	[5]
Citrus	1	Annual[4]	γ Spec :	[5]	[5]

[1]The maximum "a priori" LLD
[3]When available
[4]During harvest
[5]Same as broad leaf vegetation

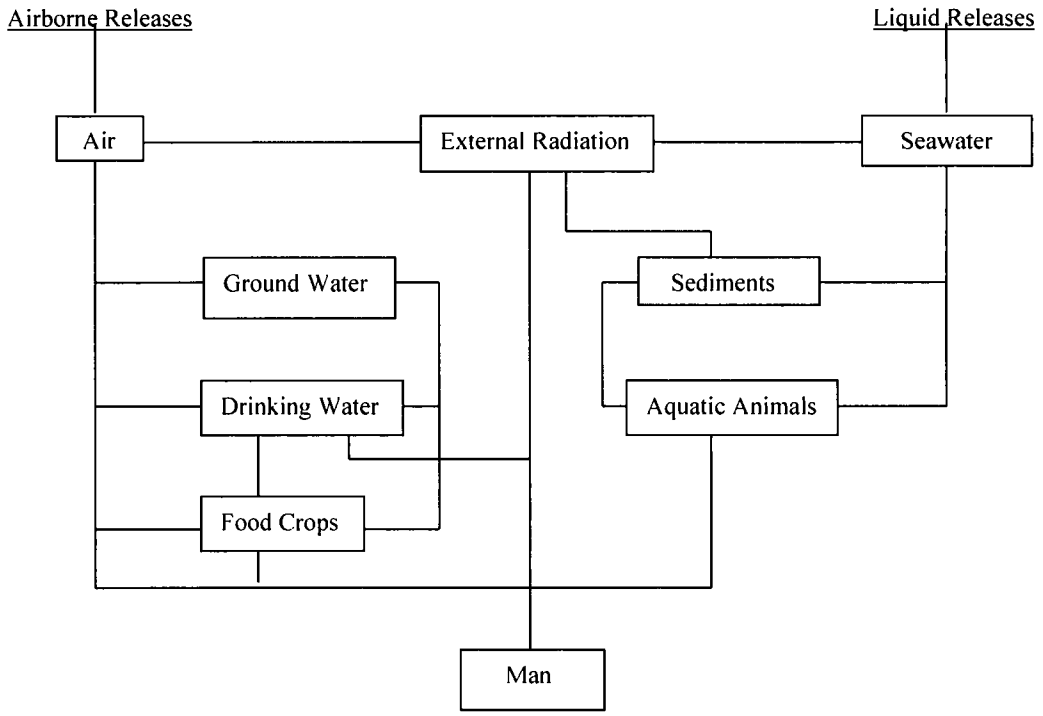


FIGURE I-1: Environmental Media and Exposure Pathways

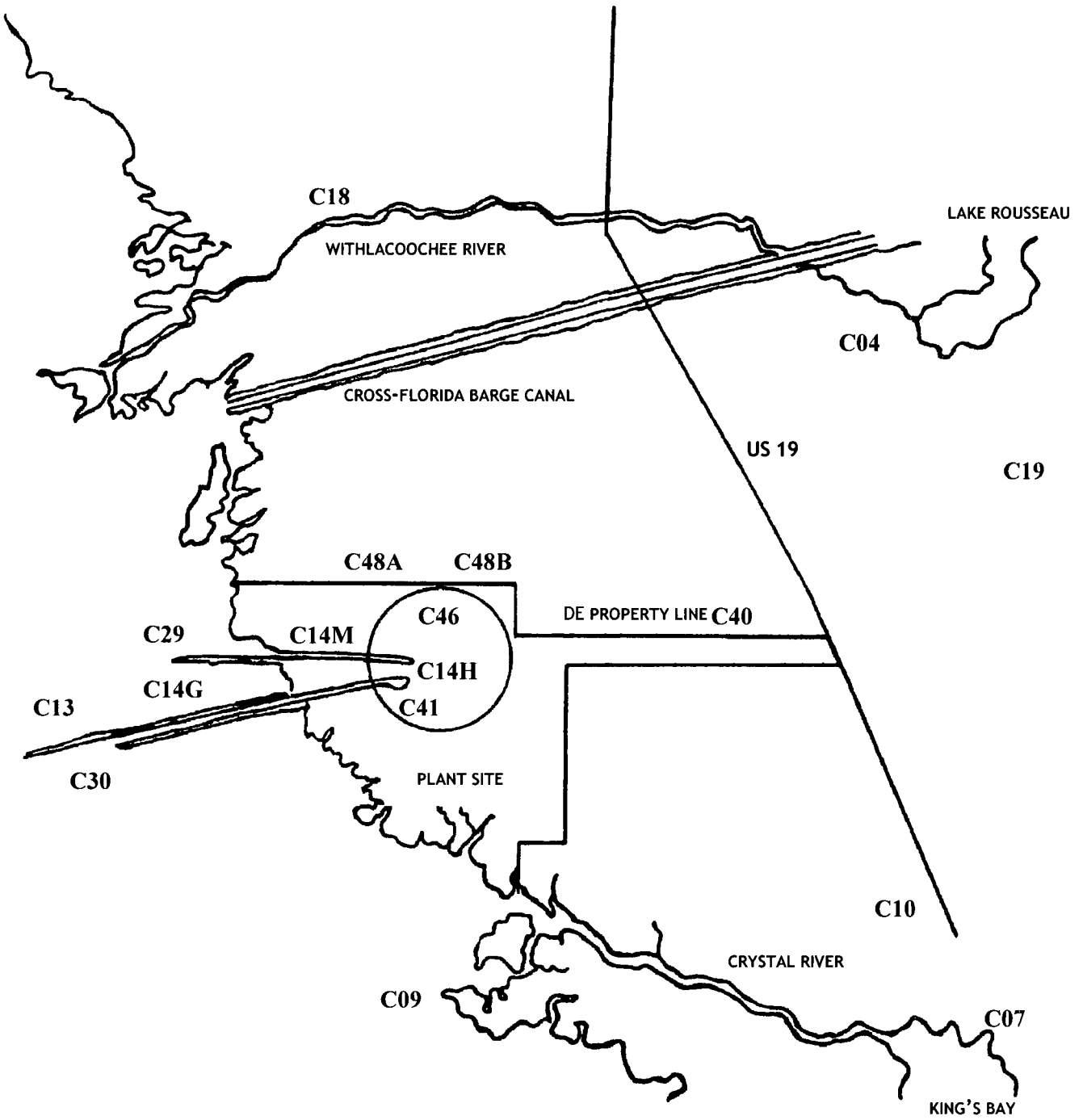


FIGURE I-2: Environmental Monitoring Sample Stations (non-TLDs)

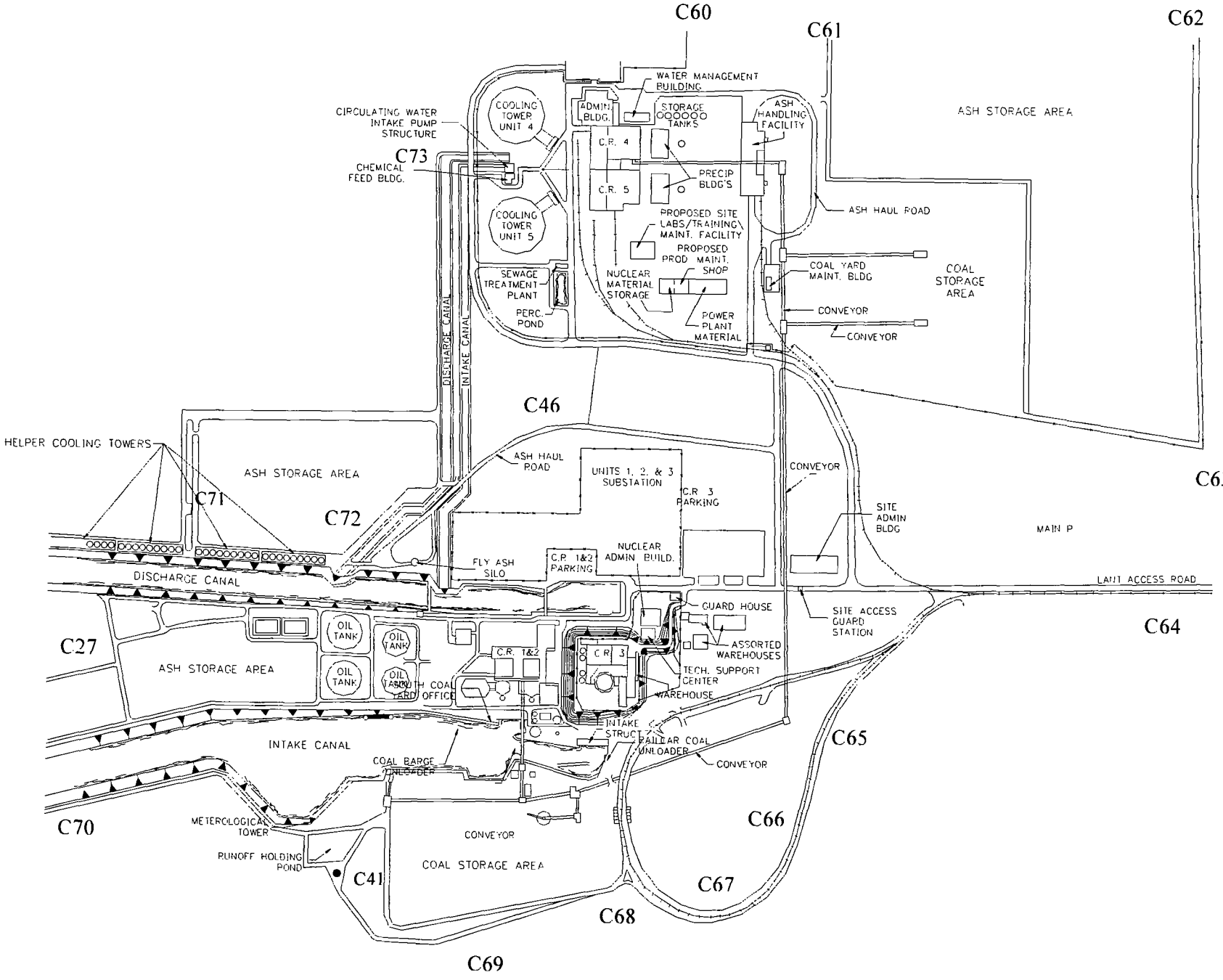


FIGURE I-3: Environmental Monitoring TLD Locations (on site)

8

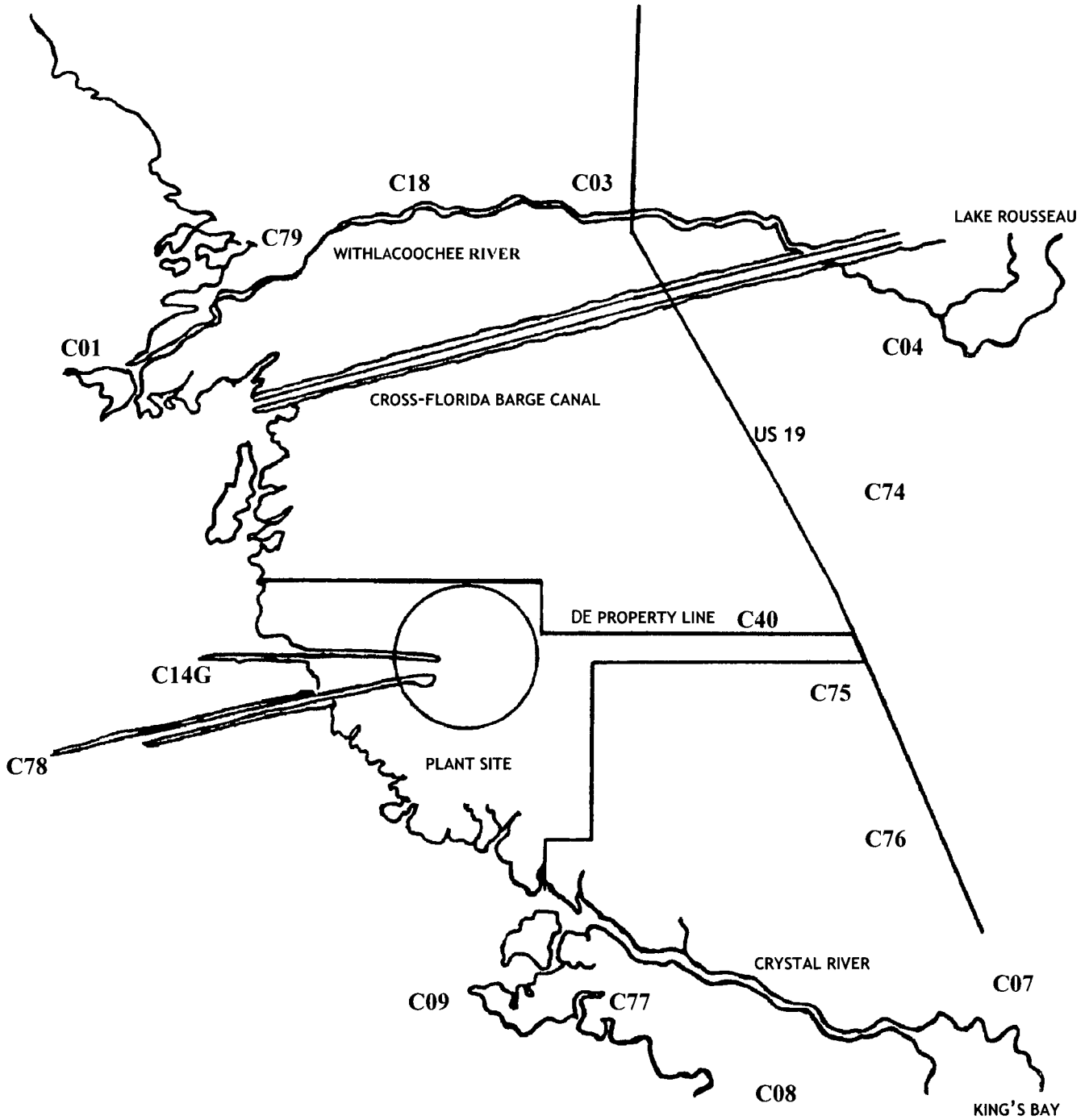
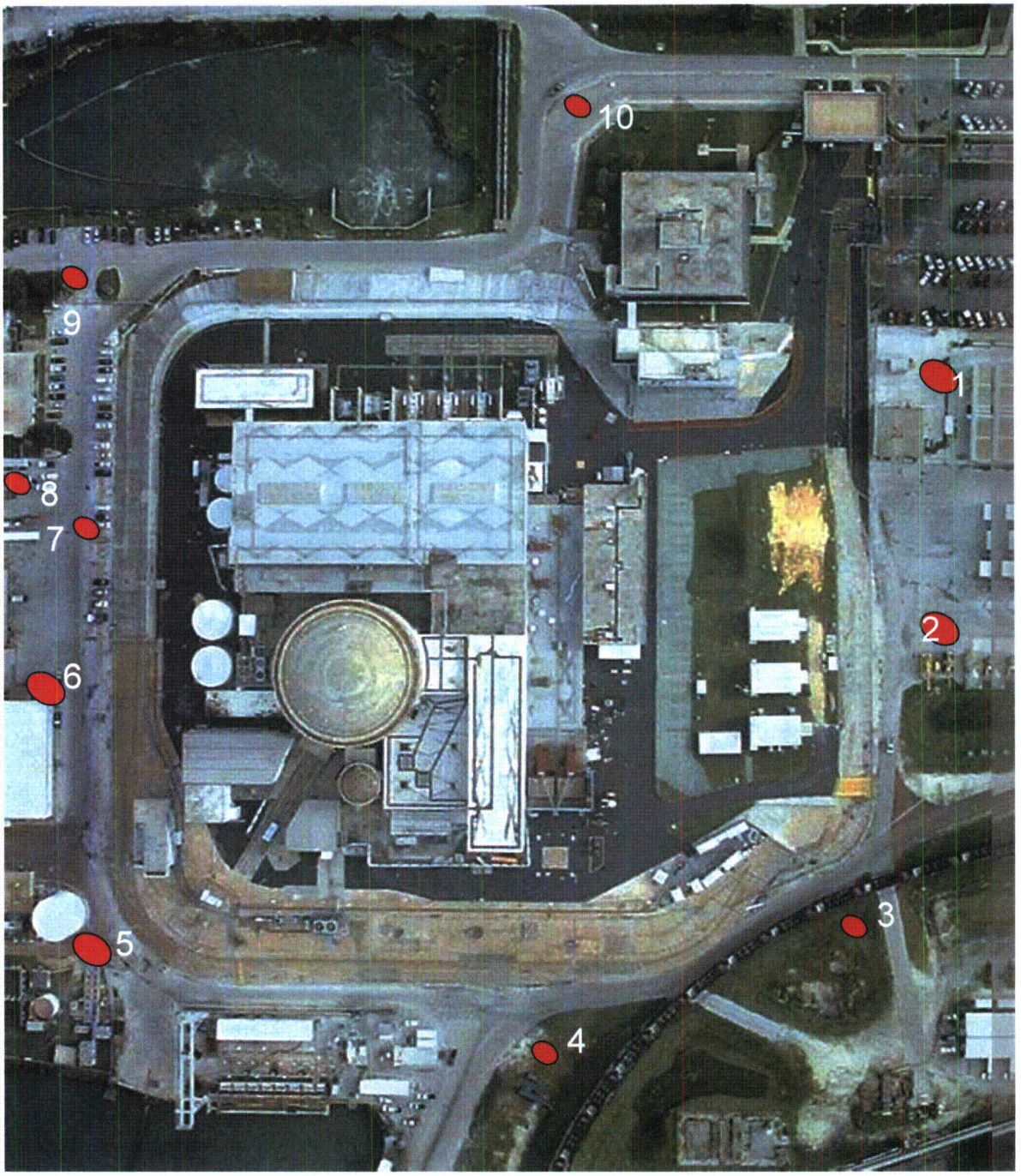


FIGURE I-4: Environmental Monitoring TLD Locations (off site)

Figure I-5: CR3 Groundwater Monitoring Well Locations
Deep Wells Are Also Installed at #'s 1, 3, 6



II. LAND-USE CENSUS

A land-use census was conducted during June through August. The purpose of this census is to identify the nearest residences, vegetable gardens, and potential milk-producing animals within a five mile radius of the nuclear plant. The distance in miles and bearing in degrees for each receptor type in each of the sixteen sectors is summarized below.

SECTOR	NEAREST RESIDENCE	NEAREST GARDEN (A)	NEAREST MILK ANIMAL
N	4.5 @ 2°	*	*
NNE	4.6 @ 15°	5.0 @15°	*
NE	3.8 @ 54°	*	*
ENE	3.4 @ 60°	4.4 @ 63° 4.5 @ 58°	*
E	2.4 @ 92°	*	*
ESE	4.2 @ 102°	4.7 @ 103°	*
SE	4.9 @ 133°	*	*
SSE	3.5 @ 149°	*	*
S	*	*	*
SSW	*	*	*
SW	*	*	*
WSW	*	*	*
W	*	*	*
WNW	*	*	*
NW	4.8 @ 321°	*	*
NNW	4.6 @ 339°	*	*

(A) - Only gardens with an estimated total area of 500 square feet, or more, and producing green leafy vegetables are considered.

* No suitable sites were located within 5 miles.

III. FLORIDA DEPARTMENT OF HEALTH - INTERLABORATORY COMPARISON PROGRAM DATA

The EPA crosscheck program ceased operation at the end of 1998. To meet the requirements for a crosscheck program, the Florida Department of Health participates in the Department of Energy's Mixed-Analyte Performance Evaluation Program (MAPEP). The following units are used for each of the four media:

Air Filters: Bq/sample
Soil: Bq/Kg
Vegetation: Bq/sample
Water: Bq/L

Analytical performance is based on historical analytical capabilities for individual analyte/matrix pairs.
Acceptable performance is designated by an "A".
Acceptable with warning is designated by a "W".
Performance which is not acceptable is designated by an "N".

Results for May 2013:

Media	Nuclide	Result	% Bias	Acceptance Range	Flag
Air	Cs-134	1.7	-4.5	1.25 – 2.31	A
Air	Mn-54	4.8	12.7	2.98 – 5.54	A
Air	Co-57	2.2	-6.8	1.65 – 3.07	A
Air	Zn-65	3.6	15.0	2.19 – 4.07	A
Soil	Co-60	695	0.6	484 – 898	A
Soil	Cs-134	795	-10.4	621 – 1153	A
Soil	Zn-65	1077	8.2	697 – 1294	A
Soil	Cs-137	603	2.7	411 – 763	A
Vegetation	Co-57	7.9	-9.0	6.08 – 11.28	A
Vegetation	Co-60	5.8	-0.9	4.10 – 7.61	A
Vegetation	Cs-137	6.2	-9.8	4.81 – 8.93	A
Vegetation	Zn-65	6.3	0.8	4.38 – 8.13	A
Water	H-3	489	-3.6	355 – 659	A
Water	Mn-54	29.8	8.8	19.2 – 35.6	A
Water	Zn-65	34.7	14.1	21.3 – 39.5	A
Water	Co-57	32.1	3.9	21.6 – 42.0	A
Water	Co-60	20.7	5.8	13.69 – 25.43	A
Water	Cs-134	25.6	4.9	17.1 – 31.7	A

FLORIDA DEPARTMENT OF HEALTH - INTERLABORATORY COMPARISON PROGRAM DATA, cont'd

Results for November 2013:

Media	Nuclide	Result	% Bias	Acceptance Range	Flag
Air	Cs-137	2.8	3.7	1.9 – 3.5	A
Air	Mn-54	3.7	5.7	2.5 – 4.6	A
Air	Co-57	3.1	-8.8	2.4 – 4.4	A
Air	Co-60	2.2	-4.3	1.6 – 3.0	A
Air	Zn-65	3.1	14.8	1.9 – 3.5	A
Soil	Mn-54	731	8.5	472 – 876	A
Soil	Co-60	492	9.1	316 – 586	A
Soil	Co-57	1317.05	0.1	921 – 1711	A
Soil	K-40	700	10.6	443 – 823	A
Soil	Cs-137	1061	8.6	684 – 1270	A
Vegetation	Mn-54	7.2	-8.6	5.52 – 10.24	A
Vegetation	Zn-65	2.5	-4.9	1.84 – 3.42	A
Vegetation	Cs-134	5.0	-3.8	3.64 – 6.76	A
Vegetation	Cs-137	6.0	-9.1	4.62 – 8.58	A
Water	Co-60	24.6	4.3	16.51 – 30.65	A
Water	Cs-134	32.3	7.7	21.0 – 39.0	A
Water	Cs-137	34.6	9.5	22.1 – 41.1	A
Water	Zn-65	39.7	14.7	24.2 – 45.0	A

IV-A. AIRBORNE PATHWAY

Air samples are taken at five locations in the vicinity of the plant. The control location is 78 miles ESE of the plant, at the Department of Health, State Bureau of Radiation Control in Orlando.

Table IV-A.1 provides a statistical summary of the analytical results for 311 gross beta samples and 312 iodine samples.

Tables IV-A.2 and IV-A.3 provide the results for each weekly air sample.

In 2013, three hundred eleven particulate samples were analyzed for gross beta activity, all of which had measurable activity. The average indicator concentration was 16 pCi/1000 m^3 with a range of 5 to 38 pCi/1000 m^3. The average indicator concentration since 1996 was in the range of 14 to 20 pCi/1000 m^3. The control location concentration for 2013 averaged 14 pCi/1000 m^3, with a range of 7 to 33 pCi/1000 m^3.

In 2013, three hundred twelve samples were analyzed for iodine activity, with none having measurable activity. The highest iodine LLD was 0.04 pCi/m^3. There were no anomalies with the iodine samples for the year.

Quarterly composite data are summarized in Table IV-A.4. In 2013, measurable quantities of cesium were not identified in any particulate filter sample. The highest cesium LLD was 1.5 pCi/1000 m^3 for cesium 137.

The 2013 airborne sample data is comparable with previous year's sample data with exception of samples collected in 2011 during the March and April time frame where airborne particulate and iodine samples were affected by the Fukushima earthquake and tsunami event that occurred on March 11, 2011. Those sample data were thoroughly discussed in the 2011 Annual Radiological Environmental Operating Report submitted for Crystal River Unit 3.

There was one instance of a non-collected airborne sample (particulate only) for the year 2013, due to a misplaced filter retention filter ring that allowed the particulate filter to fall out of the filter holder. Additionally, there were several instances of air sampler partial run times as follows:

1. In June, station C-18 was down for 39.0 hours due to a failed lightening arrestor on the feeder line.
2. In August, station C-07 was down for 168 hours due to a misplaced filter retention ring that allowed the particulate filter to fall out of the filter holder.
3. In September, station C-46 was down for 65.0 hours due to an unknown power outage.

The remaining 3 sample stations were in service 100% of the time, with exception of filter changes and air pump/gas meter replacements. The yearly percentages of down times for the 3 stations are as follows:

C07	1.92%
C18	0.45%
C46	0.74%

The air sample station's down times are documented in the plant Corrective Action Program (CAP) under Condition Reports (CRs) 614183, 628746, and 623672.

TABLE IV-A.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	LOCATION WITH HIGHEST MEAN MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIRBORNE IODINE	γ Spec 312						
(pCi/m^3)	I-131	0.04	<LLD	--	<LLD	<LLD	0
AIRBORNE PARTICULATES	Gross ß 311	4.0	16 (259/259) (5–38)	C40 3.6 @ 90°	17 (52/52) (6–38)	14 (52/52) (7–33)	0
(pCi/1000m^3 for Gross ß, pCi/1000m^3 for γ Spec)	γ Spec 24						
	Cs-134	1.7	<LLD	--	--	<LLD	0
	Cs-137	1.5	<LLD	--	--	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-A.2

DUKE ENERGY FLORIDA, INC. - CR3 – 2013

pCi/m^3 IODINE - 131 IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Jan-13	<0.02	<0.02	<0.03	<0.02	<0.02	<0.02
08-Jan-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
15-Jan-13	<0.02	<0.03	<0.03	<0.03	<0.03	<0.03
22-Jan-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
05-Feb-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
12-Feb-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19-Feb-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
26-Feb-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
05-Mar-13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
12-Mar-13	<0.04	<0.03	<0.04	<0.04	<0.04	<0.03
19-Mar-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
25-Mar-13	<0.04	<0.04	<0.04	<0.03	<0.03	<0.03

TABLE IV-A.2 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/m^3 IODINE - 131 IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Apr-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
09-Apr-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
16-Apr-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
23-Apr-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
30-Apr-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06-May-13	<0.04	<0.03	<0.04	<0.03	<0.04	<0.04
14-May-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
21-May-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
28-May-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
04-Jun-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
11-Jun-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
18-Jun-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
25-Jun-13	<0.01	<0.02(A)	<0.01	<0.01	<0.01	<0.01

(A) Power failure to sample hut. Power restored later the same day. Estimated run time 129 out of 168 hours.

TABLE IV-A.2 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/m^3 IODINE - 131 IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Jul-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10-Jul-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
16-Jul-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
23-Jul-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
30-Jul-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
07-Aug-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
13-Aug-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
20-Aug-13	<0.03	<0.03	<0.03	<0.03	<0.02(A)	<0.03
28-Aug-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
03-Sep-13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
10-Sep-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
16-Sep-13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
24-Sep-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

(A) Low sample volume due to unknown power outage. Estimated run time 95.3 out of 169.8 hours.

TABLE IV-A.2 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/m^3 IODINE - 131 IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
01-Oct-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
07-Oct-13	<0.04	<0.04	<0.04	<0.03	<0.04	<0.03
15-Oct-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
21-Oct-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
29-Oct-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
05-Nov-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
12-Nov-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
19-Nov-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
26-Nov-13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
03-Dec-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
10-Dec-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
16-Dec-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
23-Dec-13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

TABLE IV-A.3

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/1000m^3 GROSS ß IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Jan-13	31	24	38	20	20	33
08-Jan-13	23	28	24	30	25	16
15-Jan-13	11	14	12	9	8	7
22-Jan-13	18	19	13	17	19	15
22-Jan-13	18	19	13	38	19	15
05-Feb-13	20	21	21	17	22	18
12-Feb-13	18	19	18	18	14	15
19-Feb-13	13	23	17	18	21	13
26-Feb-13	22	19	19	18	21	12
05-Mar-13	19	27	26	25	19	24
12-Mar-13	13	9	17	14	19	18
19-Mar-13	23	22	19	23	21	23
25-Mar-13	14	21	20	19	16	14
Average:	19	20	20	20	19	17

TABLE IV-A.3 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/1000m^3 GROSS ß IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Apr-13	22	21	19	22	19	11
09-Apr-13	25	19	16	17	15	20
16-Apr-13	16	18	13	17	13	13
23-Apr-13	10	8	15	13	12	12
30-Apr-13	13	9	12	10	12	11
06-May-13	10	10	12	13	8	11
14-May-13	20	19	19	21	10	16
21-May-13	26	24	30	23	22	18
28-May-13	17	21	18	22	21	15
04-Jun-13	14	11	13	10	13	9
11-Jun-13	9	10	8	9	8	8
18-Jun-13	16	9	13	14	11	13
25-Jun-13	12	16(A)	13	13	7	14
Average	15	14	14	14	13	13

(A) Power failure to sample hut. Power restored later that same day. Estimated run time 129 out of 168 hours.

TABLE IV-A.3 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/1000m^3 GROSS ß IN AIR

	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
02-Jul-13	8	8	8	8	10	10
10-Jul-13	11	11	12	10	9	10
16-Jul-13	5	7	4	7	7	9
23-Jul-13	8	9	6	9	6	8
30-Jul-13	22	22	23	23	25	20
07-Aug-13	20	21	17	12	18	15
13-Aug-13	15	18	17	19	12	16
20-Aug-13	10	8	13	12	13(A)	8
28-Aug-13	0(B)	11	12	7	11	10
03-Sep-13	19	18	21	17	20	13
10-Sep-13	17	16	17	17	18	13
16-Sep-13	14	16	14	11	15	12
24-Sep-13	13	14	17	15	12	14
Average	12	14	14	13	14	12

(A) Sampler run time reduced due to unknown power failure. Estimated run time 95.3 out of 169.8 hours.
(B) No particulate filter installed upon arrival due to incorrect installation of filter retaining ring.

TABLE IV-A.3 (Cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/1000m^3 GROSS ß IN AIR

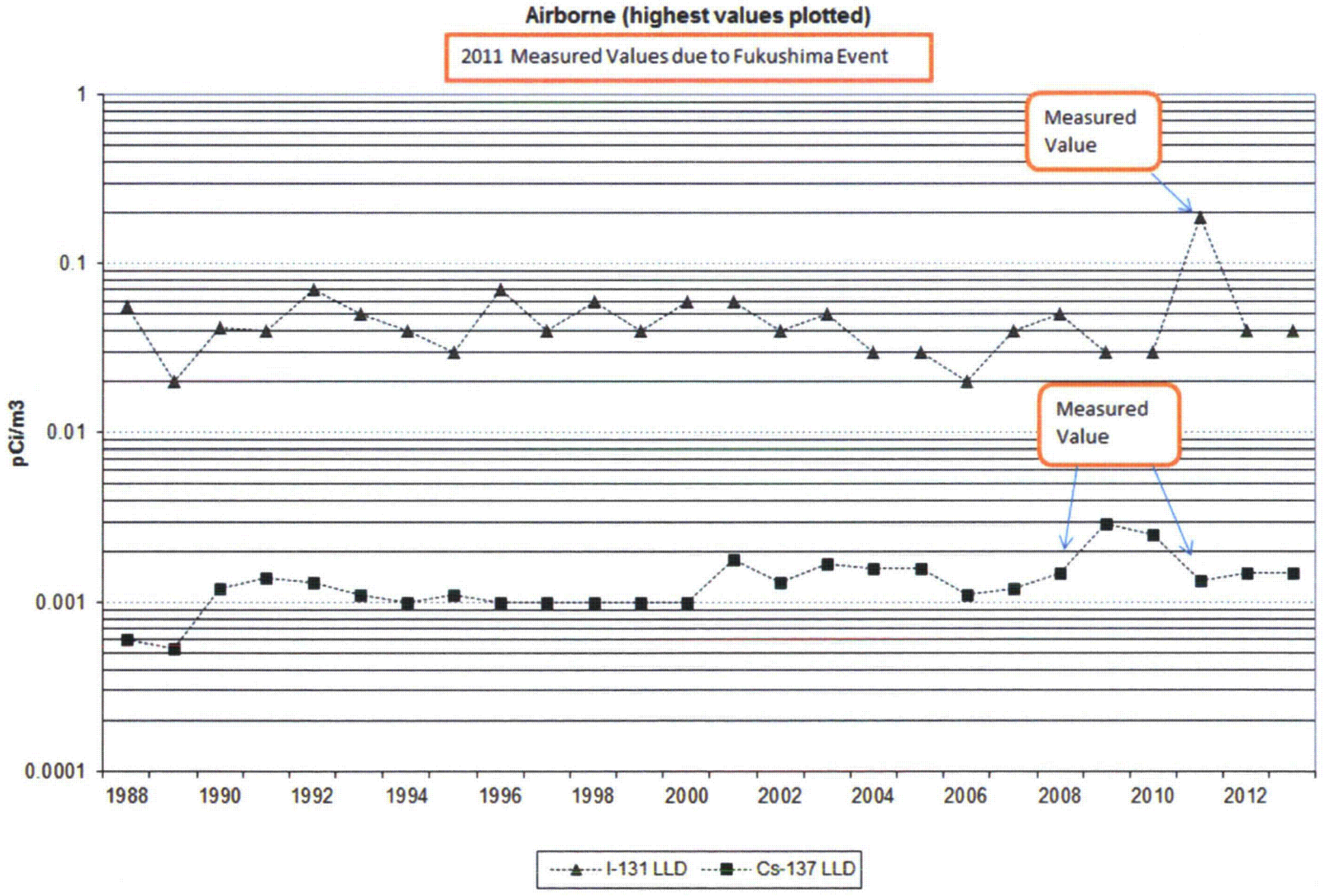
	SAMPLE SITE					
Collection Date	C07	C18	C40	C41	C46	C47
01-Oct-13	9	11	13	10	9	10
07-Oct-13	10	15	13	13	13	14
15-Oct-13	8	11	10	10	9	7
21-Oct-13	12	19	18	19	10	10
29-Oct-13	24	28	22	26	26	26
05-Nov-13	20	24	25	32	22	26
12-Nov-13	15	16	18	16	16	13
19-Nov-13	12	15	16	16	10	14
26-Nov-13	15	15	16	15	8	10
03-Dec-13	11	13	16	16	14	13
10-Dec-13	8	13	13	8	11	13
16-Dec-13	16	18	26	23	17	20
23-Dec-13	15	17	17	16	17	18
30-Dec-13	23	15	13	10	13	10
Average	14	16	17	16	14	15

TABLE IV-A.4

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/1000m^3 γ EMITTERS IN QUARTERLY COMPOSITES OF AIR PARTICULATES

STATION	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
C07	Be-7	137	100	81	121
	K-40	<18	<8	<8	<95
	Cs-134	<1.4	<1.0	<1.3	<1.2
	Cs-137	<1.4	<0.9	<1.4	<1.1
C18	Be-7	140	115	108	121
	K-40	<19	<8	<19	<8
	Cs-134	<1.2	<1.1	<1.4	<1.0
	Cs-137	<1.2	<1.0	<1.4	<0.8
C40	Be-7	112	80	93	134
	K-40	<7	<7	<8	<10
	Cs-134	<1.0	<1.0	<1.4	<1.3
	Cs-137	<1.0	<0.8	<1.2	<1.3
C41	Be-7	125	109	95	36
	K-40	<8	<19	<8	<12
	Cs-134	<1.0	<1.0	<1.2	<1.1
	CS-137	<1.0	<1.3	<1.1	<1.3
C46	Be-7	118	85	84	105
	K-40	<9	<18	<7	<18
	Cs-134	<1.2	<1.1	<1.2	<1.0
	Cs-137	<1.5	<1.0	<1.0	<1.0
C47	Be-7	124	99	97	113
	K-40	<8	<8	<18	<18
	Cs-134	<1.1	<1.2	<1.3	<1.1
	Cs-137	<0.9	<1.3	<1.6	<1.1


Airborne (highest values plotted)
2011 Measured Values due to Fukushima Event
Measured Value
Measured Value
pCi/m3
1
0.1
0.01
0.001
0.0001
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
I-131 LLD
Cs-137 LLD

IV-B. DIRECT RADIATION

Direct radiation measurements (using TLDs) were taken at seventeen locations (stations C60 through C73 and station C27) within one mile of the plant, at fifteen locations ranging from 2.8 to 6.3 miles from the plant, and at one control location 78 miles from the site. One-hundred and thirty-two TLDs were collected during 2013.

Table IV-B provides a statistical summary of the analytical results for 132 TLDs sampled throughout the year.

Table IV-B.1 provides the results of the individual TLD measurements.

The highest on-site dose was 65 mrem/yr at station C71 (WNW at 3600 feet). Station C71 was relocated in 1992 due to construction of the helper cooling towers on the former site. The new location has a higher background radiation level due to being closer to the storage pond for Units 4 & 5 fly ash, which produces a higher external radiation component than normal levels of natural background. The second highest on-site dose was 51 mrem/yr at station C65 (ESE at 1584 feet).

The highest off-site dose was 46 mrem/yr at station C40 (east at 3.5 miles). The control station (C47) average dose was 46 mrem/yr. The average for all stations (except control) was 37 mrem/yr for 2013, 41 mrem/yr for 2012, and 46 mrem/yr for 2011. Direct radiation results are similar to previous years and show no change of significance. There is, however, a slight decreasing trend of average dose for all stations (except control) as seen by the trend chart at the end of this section of the report. The only item of note that may be associated with this condition is the fact that the Florida Department of Health (which deploys, collects, and reads TLDs for the Crystal River Site) has recently (in 2012) changed their method of calibrating TLD Element Correction Factors (ECFs). The decreasing trend results have been evaluated by the DOH and the TLD reader vendor. The DOH's methods have been found to be technically sound and quality control checks performed on the TLD reader system are well within the established limits. TLD results will continue to be trended and evaluated as more data becomes available.

This TLD trend has been documented in CR-3's corrective action program under condition report 684849.

There were no missing or unanalyzed TLDs during this evaluation period.

TABLE IV-B

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION (mrem/yr)	γ DOSE, 132	15	37 (128/128) (26 - 65)	C71 0.6 @ 296°	59 (4/4) (55 - 65)	46 (4/4) (39 - 52)	0

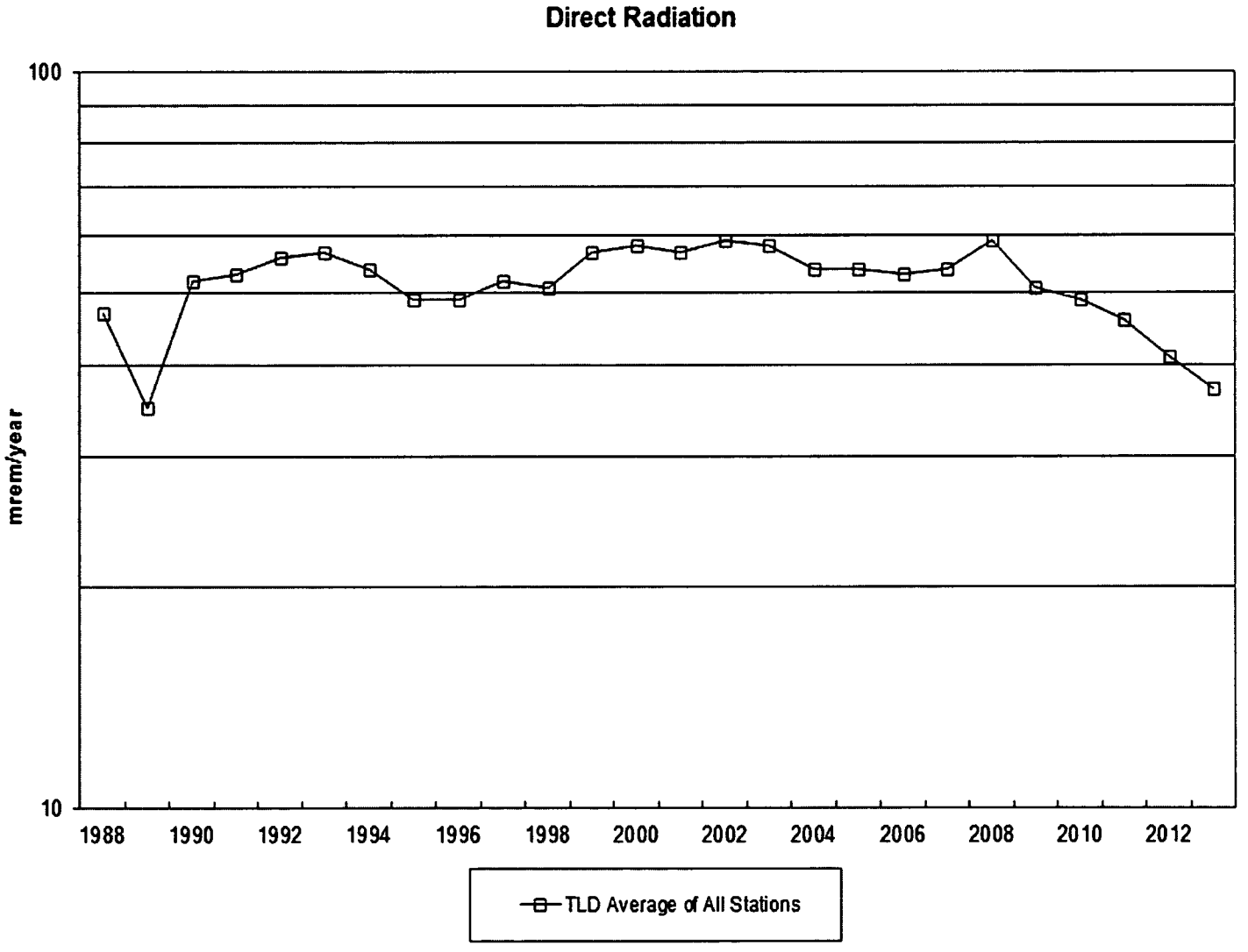
TABLE IV-B.1

DUKE ENERGY FLORIDA, INC. - CR-3 - 2013

mrem/yr γ Dose

TLD STATION	Quarter	1	2	3	4
CO1		43	36	29	28
CO3		32	36	31	29
CO4		29	36	28	29
CO7*		28	34	29	28
CO8		26	33	28	27
C09		28	35	29	27
C14G		35	41	36	34
C18		33	39	31	31
C27		41	48	42	38
C40*		42	46	40	39
C41		39	45	38	36
C46*		38	44	38	36
C47 (CONTROL)		46	52	48	39
C60		36	43	35	33
C61		38	45	40	37
C62		45	48	43	42
C63		39	46	38	37
C64		37	43	36	34
C65		43	51	44	42
C66		39	44	39	38
C67		42	47	39	40
C68		38	44	38	37
C69		40	46	39	39
C70		42	46	40	40
C71		60	65	56	55
C72		39	44	39	40
C73		37	41	36	34
C74		27	33	28	27
C75		36	42	35	32
C76		32	38	33	31
C77		33	38	34	33
C78		29	33	28	27
C79		32	38	32	31

*TLDs not required by the ODCM.


Direct Radiation
100
10
mrem/year
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
TLD Average of All Stations

IV-C. WATERBORNE PATHWAY

To evaluate the waterborne pathway, samples are taken of seawater, ground water, drinking water, and shoreline sediment.

1. Monthly seawater grab samples are taken at two locations in the discharge canal (C14G and C14H) and at one control location (C13) near the mouth of the intake canal.
   In 2013, of twenty-four indicator samples, five had measurable tritium at an average concentration of 162 pCi/L, with a range of 93 to 322 pCi/L. The sample with the highest concentration of tritium was obtained in October at station C14H near the beginning of the discharge canal. The seawater tritium activity is consistent with the concentration of tritium in the liquid waste stream and the release times of waste tanks. CR-3 was in Refuel 16 outage at the time of sampling with reduced dilution due to no circulating water pumps running. Plant raw water pumps were providing the dilution flow. In 2013 there were no control station samples with measurable tritium concentrations.

   In 2012, five of twenty four indicator samples contained measurable tritium with an average concentration of 162 pCi/L. The 2012 control station samples had three samples with measurable tritium concentrations at an average of 107 pCi/L.

   Gamma spectral analysis was performed on thirty-six samples, none of which showed measurable amounts of the gamma emitters of interest.

   Table IV-C.1 provides a statistical summary of the seawater tritium and gamma spectroscopy results.

   Table IV-C.1.a provides the results of the monthly samples.

2. Semiannual ground water samples are taken at one location, station C40, located approximately 3.5 miles east of CR-3. Gamma spectral and tritium analyses are performed on both samples.
   In 2013, all results were less than the detection limits. Since plant startup, all results, except for the results of one 1985 tritium analysis, have been less than LLD. The required sensitivity for measuring tritium in ground water is 2000 pCi/L. Analysis of ground water in the vicinity of CR-3 is done at a sensitivity of approximately 150 pCi/L for tritium and less than 10 pCi/L for select gamma emitters.

   Table IV-C.2 provides a statistical summary of the groundwater tritium and gamma spectroscopy results.

   Table IV-C.2.a provides the results of the semi-annual samples.

3. Quarterly site ground water samples are taken at thirteen locations surrounding the perimeter of the CR-3 protected area. Periodically five of these ground water wells have shown indications of very low levels of tritium on the west-southwest side of the plant. It is believed that this tritium is the result of a leak in the Station Drain Tank (SDT-1) to the settling pond discharge line that occurred in 1998. This discharge line has recently been leak tested and it is leak free. There are no other know leaking plant components.
   In 2013 the wells that have shown measurable amounts of tritium range from 101 to 556 pCi/L. These wells have been sampled additionally on a monthly basis to develop trend data. This increased sampling information is shown as supplemental data. Along with these wells, two other wells that are not presently part of the REMP have been sampled that are on either side (north and south) of the plant settling ponds (percolation ponds). In 2013 these two wells are showing measurable amounts of tritium in the range of 95 to 254 pCi/L, which are a result of plant discharges from the SDT-1. These discharges are being minimized through operational focus. The positively measured tritium values are below the reporting criteria of the ODCM and the NEI 07-07 Ground Water Protection Initiative Guidelines. There have been no measurable amounts of gamma emitting radionuclides in any of these wells. There have been no measurable amounts of hard-to-detect (HTD) radionuclides in any of these wells with exception of trace levels of gross alpha, which is expected, given the naturally occurring limestone strata that surrounds the Florida aquifer. It should be noted that site ground water flows in a west-southwest direction toward the Gulf of Mexico. This flow was re-verified in 2006 with a new ground water flow study performed by a certified hydro-geologist as part of the NEI Ground Water Protection Initiative. In 2012 another groundwater flow study was performed to evaluate groundwater flow post installation of CR Units 4 & 5 clean air scrubber system. This scrubber system utilizes significant groundwater from the Florida aquifer. The flow study confirmed that the groundwater flow, and direction of flow, has not been altered due to the installation and operation of the clean air scrubber system.

Additionally, the groundwater at the CR3 site is too saline for use as a potable water source, hence there is no drinking water uptake pathway at the Crystal River site.

Table IV-C.3. provides a statistical summary of the groundwater tritium and gamma spectroscopy results.

Table IV-C.3.a.1 provides the results of the quarterly samples.

Table IV-C.3.a.2 provides the results of the monthly supplemental samples.

4. Monthly non-REMP required well samples were collected as discussed in item #3 above. Two wells were sampled. These two wells are located on the north side and the south side of the site percolation ponds. The information is discussed above. Both of these wells showed no measurable amounts of any other radionuclides of interest. The tritium concentration in these wells, discussed in item #3 above, have decreased significantly due to a focused reduction in the number of discharges from the station drain tank (SDT-1) to the site settling ponds (percolation ponds).

   Table IV-C.4 provides a statistical summary of the groundwater tritium and gamma spectroscopy results.

   Table IV-C.4.a. provides the results of the monthly supplemental non-REMP required samples.

5. Quarterly drinking water samples are drawn from three locations: the Crystal River City Hall (C07), the Days Inn Motel (C10), and the Yankeetown City Well (C18). All samples were collected and analyzed for gamma emitters and tritium.
   In 2013, none of the samples yielded measurable activities of tritium or the required gamma emitters. The measurement sensitivity for drinking water samples are the same as those for ground water samples.

   Since the beginning of sampling, the drinking water samples have not had any other positive-measured radionuclides of interest detected.

   Table IV-C.5 provides a statistical summary of the drinking water tritium and gamma spectroscopy results.

   Table IV-C.5.a provides the results of the quarterly samples.

6. Semiannual shoreline sediment samples are taken at three indicator locations in the discharge canal (C14H, C14M, C14G) and one control location (C09) at Fort Island Gulf Beach. The plant discharge canal is the primary liquid effluent release pathway from CR-3.

   In 2013, of the six indicator samples, two had measurable amounts of cesium-137 with an average concentration of 8.5 pCi/kg and a range of 8 to 9 pCi/kg. There were no measurable amounts of cobalt-60 in any of the shoreline sediment samples.

   In 2012 three samples had measurable amounts of cesium-137 with an average of 28 pCi/kg and a range of 19 to 35 pCi/kg. Also there were three samples with measurable amounts of cobalt-60 with a concentration range of 14 to 24 pCi/kg.

   In 2011 two samples had measurable amounts of cesium-137 with an average of 26 pCi/kg and a range of 14 to 37 pCi/kg. Also there were three samples with measurable amounts of cobalt-60 with a concentration range of 11 to 65 pCi/kg.

   In 2010 the average cesium-137 concentration at the indicator locations was 19 pCi/kg.

   In 2009, the average cesium-137 concentration at the indicator locations was 24 pCi/kg.

   In 2008, the average cesium-137 concentration at the indicator locations was 25 pCi/kg.

   The average cobalt-60 concentration at the indicator locations ranged from 30 to 389 pCi/kg from 1998 through 2007.

The 2013 shoreline sediment results are similar to previous years' results with exception of there being no measurable cobalt-60 in any of the sediment samples. None of the samples taken at Fort Island Gulf Beach, the control location station C09, indicated measurable amounts of cobalt or cesium.

Table IV-C.6 provides a statistical summary of the shoreline sediment gamma spectroscopy results.

Table IV-C.6.a provides the results of the semi-annual samples.

7. Additional samples taken in 2013 but not required by the ODCM: Site Settling Ponds

   Annual sediment samples were collected at four locations in the site settling ponds. Cs-137 was detected in two of the four samples in concentrations ranging from 6 to 8 pCi/kg. There were no measurable amounts of Co-60 or Cs-134 in any of the samples.

   Annual surface water samples were collected at two locations in the site settling ponds. The tritium concentration was < LLD of 140 pCi/L in both samples. All of the pond surface water samples showed no measurable amounts of any other radionuclides of interest.

   Table IV-C.7 provides the results of the settling pond samples.

8. There were no unmonitored spills or releases of radioactive material in 2013 that could have the potential to contaminate the ground water per the guidelines of the Nuclear Energy Institute Ground Water Protection Initiative – Final Guidance Document 07-07. As such, there were no communiqués issued to state, local, or regulatory agencies.

TABLE IV-C.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEAWATER (pCi/L)	Tritium, 36	169	162(5/24) (93-322)	C14H 0.1 @ 0°	202 (3/12) (<LLD-322)	<LLD	0
	γ Spec, 36						
	Mn-54	6	<LLD	--	--	<LLD	0
	Fe-59	14	<LLD	--	--	<LLD	0
	Co-58	6	<LLD	--	--	<LLD	0
	Co-60	8	<LLD	--	--	<LLD	0
	Zn-65	11	<LLD	--	--	<LLD	0
	Zr-Nb-95	10	<LLD	--	--	<LLD	0
	I-131	11	<LLD	--	--	<LLD	0
	Cs-134	6	<LLD	--	--	<LLD	0
	Cs-137	7	<LLD	--	--	<LLD	0
	Ba-La-140	15	<LLD	--	--	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-C.1.a
DUKE ENERGY FLORIDA, INC. - CR3 - 2013
pCi/L γ EMITTERS AND TRITIUM IN SEAWATER

STATION	MONTH	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
C13	JAN	<169	262±31	<3	<3	<8	<7	<10	<7	<9	<5	<4	<5
	FEB	<142	242±30	<5	<5	<7	<7	<11	<10	<10	<5	<6	<8
	MAR	<141	264±30	<4	<5	<10	<8	<11	<9	<7	<5	<6	<8
	APR	<138	25±236	<3	<3	<6	<4	<7	<5	<4	<5	<4	<7
	MAY	<138	308±50	<6	<5	<14	<8	<11	<10	<7	<6	<7	<11
	JUN	<138	299±51	<4	<4	<8	<6	<9	<7	<4	<4	<5	<15
	JUL	<136	239±26	<4	<4	<8	<7	<9	<8	<9	<4	<5	<5
	AUG	<138	251±21	<3	<3	<6	<3	<6	<5	<4	<3	<3	<7
	SEP	<134	28±130	<5	<5	<9	<8	<13	<10	<6	<5	<6	<10
	OCT	<148	327±23	<3	<3	<6	<3	<6	<5	<3	<3	<3	<9
	NOV	<143	254±21	<3	<3	<5	<3	<6	<5	<3	<3	<3	<10
	DEC	<139	254±24	<4	<4	<8	<6	<9	<8	<5	<4	<5	<14
C14G	JAN	<169	267±32	<4	<3	<9	<7	<7	<8	<8	<5	<4	<6
	FEB	<142	217±28	<5	<6	<12	<7	<11	<10	<11	<5	<6	<8
	MAR	<168	282±32	<5	<5	<11	<7	<11	<9	<6	<4	<7	<9
	APR	<138	253±11	<1	<2	<3	<2	<3	<3	<5	<1	<1	<3
	MAY	<139	280±20	<3	<3	<6	<3	<7	<4	<3	<2	<3	<6
	JUN	<138	309±26	<2	<2	<4	<2	<5	<4	<2	<3	<2	<7
	JUL	93±44	255±30	<5	<4	<10	<8	<10	<9	<10	<5	<6	<8
	AUG	<138	200±28	<4	<4	<9	<7	<10	<8	<6	<5	<6	<13
	SEP	109±27	258±26	<4	<5	<9	<7	<11	<9	<6	<4	<5	<11
	OCT	<148	249±28	<5	<5	<10	<8	<10	<8	<6	<5	<5	<9
	NOV	<143	235±14	<2	<2	<5	<3	<5	<4	<4	<2	<2	<3
	DEC	<139	226±23	<5	<4	<7	<5	<8	<8	<5	<4	<5	<14

TABLE IV-C.1a (CONT'D)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN SEAWATER

STATION	MONTH	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
C14H	JAN	158±47	253±34	<3	<4	<8	<6	<10	<7	<9	<4	<5	<6
	FEB	<142	249±30	<5	<5	<11	<7	<10	<9	<11	<5	<5	<9
	MAR	<168	200±18	<3	<3	<6	<3	<6	<5	<3	<3	<3	<6
	APR	<141	187±16	<3	<3	<7	<3	<7	<5	<3	<3	<3	<9
	MAY	<139	306±33	<5	<4	<11	<8	<10	<8	<6	<4	<6	<10
	JUN	<138	268±53	<4	<3	<8	<6	<9	<7	<5	<4	<4	<13
	JUL	<136	288±23	<3	<3	<7	<6	<7	<6	<7	<3	<4	<6
	AUG	<138	271±30	<5	<5	<10	<8	<10	<8	<6	<5	<6	<10
	SEP	127±44	151±23	<5	<4	<9	<7	<10	<8	<6	<5	<6	<11
	OCT	322±50	197±18	<3	<3	<6	<3	<6	<5	<3	<3	<3	<10
	NOV	<143	252±21	<3	<2	<6	<3	<5	<5	<3	<2	<3	<9
	DEC	<139	210±19	<2	>3	<6	<3	<7	<5	<3	<3	<3	<10

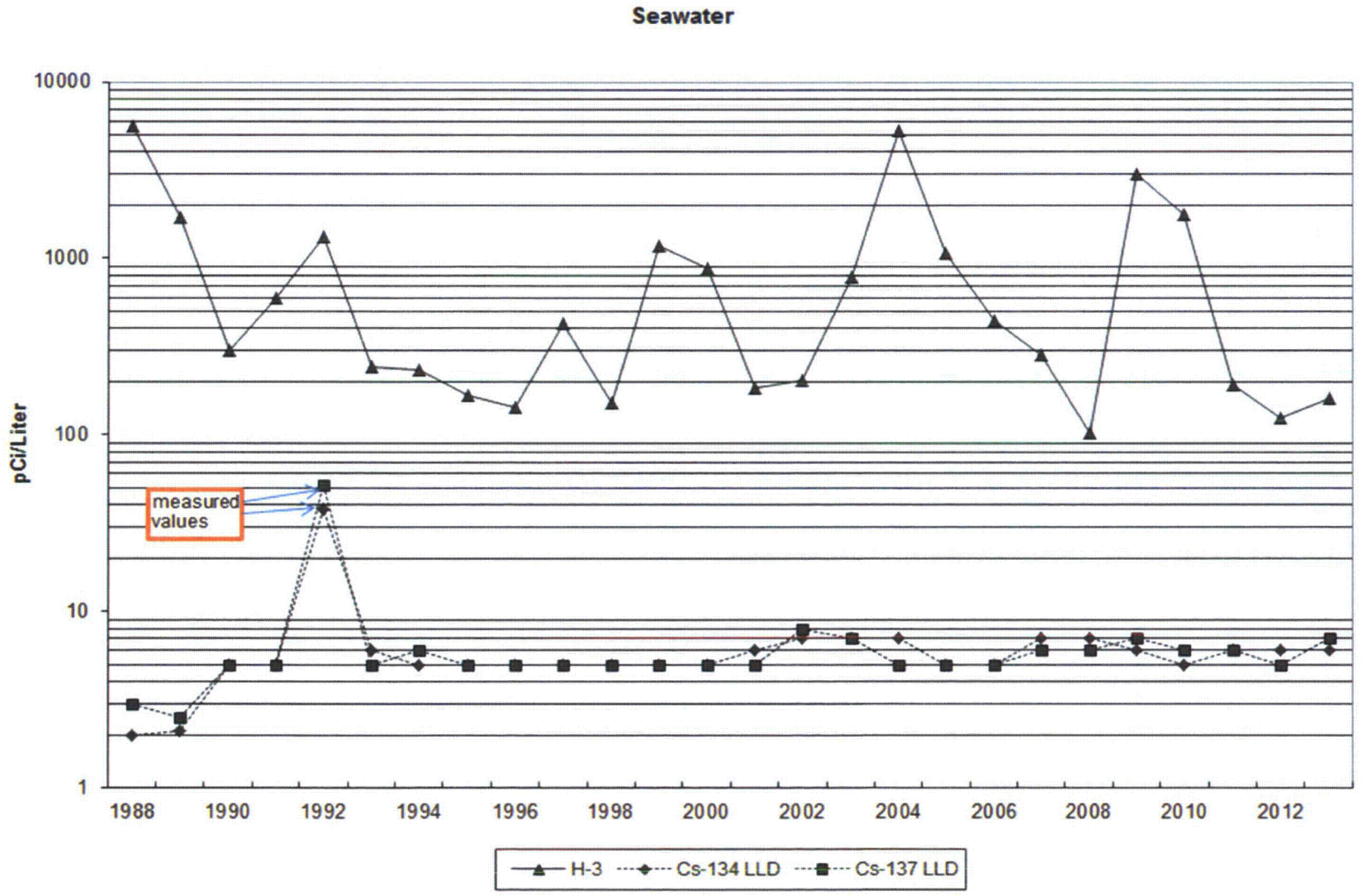

Seawater
10000
1000
100
10
1
pCi/Liter
measured values
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
H-3
Cs-134 LLD
Cs-137 LLD

TABLE IV-C.2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GROUND WATER[2] (pCi/L)	Tritium, 2	142	<LLD	--	--	<LLD	0
	γ Spec, 2						
	Mn-54	2	<LLD	--	--	<LLD	0
	Fe-59	5	<LLD	--	--	<LLD	0
	Co-58	2	<LLD	--	--	<LLD	0
	Co-60	3	<LLD	--	--	<LLD	0
	Zn-65	5	<LLD	--	--	<LLD	0
	Zr-Nb-95	4	<LLD	--	--	<LLD	0
	I-131	3	<LLD	--	--	<LLD	0
	Cs-134	3	<LLD	--	--	<LLD	0
	Cs-137	3	<LLD	--	--	<LLD	0
	Ba-La-140	5	<LLD	--	--	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.
[2]There is no drinking water uptake pathway at the Crystal River site.

TABLE IV-C.2.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN GROUND WATER

STATION	NUCLIDE	FIRST HALF	SECOND HALF
C40	H-3	<142	<141
	Mn-54	<2	<1
	Fe-59	<5	<3
	Co-58	<2	<1
	Co-60	<3	<1
	Zn-65	<5	<3
	Zr-Nb-95	<4	<2
	I-131	<3	<2
	Cs-134	<3	<1
	Cs-137	<3	<1
	Ba-La-140	<5	<3
	K-40	<29	<16

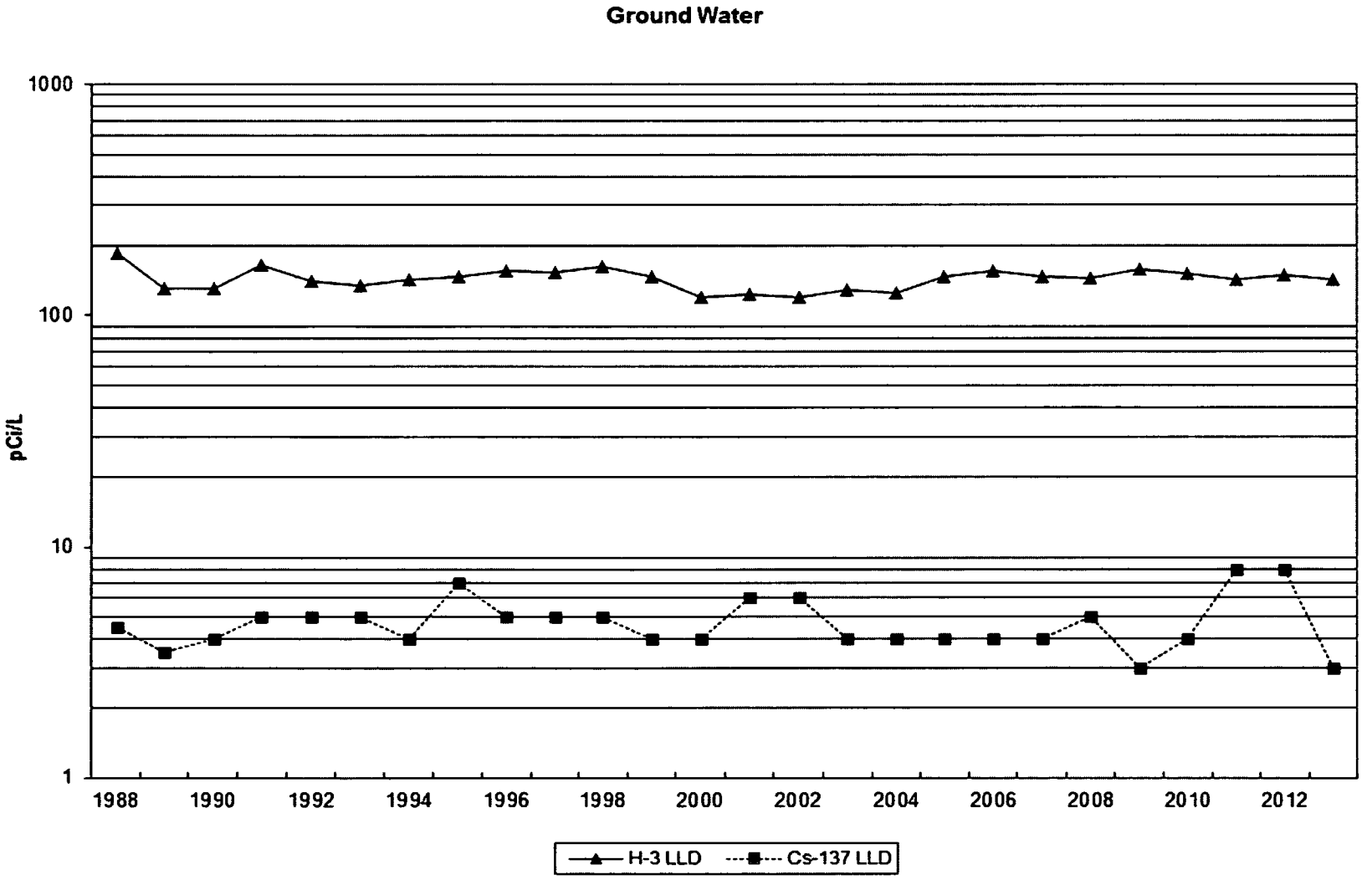

Ground Water
1000
100
10
1
pCi/L
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
H-3 LLD
Cs-137 LLD

TABLE IV-C.3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL (NUMBER)[2] OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	LOCATION WITH HIGHEST MEAN MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
CR3 SITE GROUND WATER (pCi/L)	Tritium 88	168	225 (46/88) (101-556)	CR3-5 0.051 mi.@225°	435(12/12) (275-556)	CR3-2 110(1/4) (LLD-110)	0
	γ Spec 88						
	Mn-54	6	<LLD	--	--	<LLD	0
	Fe-59	13	<LLD	--	--	<LLD	0
	Co-58	6	<LLD	--	--	<LLD	0
	Co-60	8	<LLD	--	--	<LLD	0
	Zn-65	14	<LLD	--	--	<LLD	0
	Zr-Nb-95	11	<LLD	--	--	<LLD	0
	I-131	9	<LLD	--	--	<LLD	0
	Cs-134	7	<LLD	--	--	<LLD	0
	Cs-137	7	<LLD	--	--	<LLD	0
	Ba-La-140	15	<LLD	--	--	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.
[2]Includes extra samples collected for data trending.

TABLE IV-C.3.a.1

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-1D	01-03	128±47	<38	<3	<3	<5	<3	<5	<4	<5	<3	<2	<4
	04-01	151±47	<76	<5	<6	<13	<7	<11	<11	<7	<6	<5	<14
	07-01	<136	<51	<3	<3	<6	<5	<8	<6	<5	<3	<4	<6
	10-08	<147	<46	<3	<3	<6	<4	<7	<6	<5	<3	<3	<7
CR3-1S	01-03	<142	<61	<5	<4	<8	<7	<8	<7	<8	<4	<4	<7
	04-01	<142	57	<4	<4	<9	<6	<8	<7	<5	<4	<5	<13
	07-01	128±45	36	<3	<4	<6	<3	<7	<5	<4	<3	<3	<7
	10-08	<143	31	<3	<3	<6	<3	<6	<5	<4	<3	<3	<5
CR3-2	01-03	<142	<60	<4	<3	<9	<4	<12	<7	<8	<4	<5	<7
	04-01	<141	<72	<6	<6	<11	<6	<14	<11	<8	<6	<6	<15
	07-01	110±44	<26	<2	<2	<4	<2	<5	<4	<3	<3	<3	<5
	10-08	<147	<45	<4	<4	<7	<4	<7	<6	<5	<4	<4	<9

TABLE IV-C.3.a.1

DUKE ENERGY FLORIDA, INC. - CR3 – 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-3D	01-15	91±44	<49	<4	<3	<7	<4	<8	<6	<4	<3	<4	<14
	04-01	<139	<89	<6	<6	<12	<7	<13	<11	<8	<7	<6	<15
	07-01	<136	32±8	<3	<3	<7	<4	<7	<5	<7	<3	<3	<5
	10-08	<147	30±5	<2	<2	<4	<2	<4	<4	<3	<2	<2	<4
CR3-3S	01-15	<137	<38	<3	<3	<5	<3	<7	<5	<3	<3	<3	<10
	04-01	<142	<75	<4	<4	<7	<4	<10	<6	<4	<5	<4	<10
	07-01	<136	<30	<2	<3	<6	<3	<6	<5	<5	<3	<2	<5
	10-08	<147	<40	<3	<3	<5	<3	<6	<6	<3	<3	<3	<7
CR3-4	01-03	<142	<33	<2	<3	<6	<2	<6	<5	<5	<2	<2	<5
	04-01	<139	<88	<6	<5	<10	<8	<12	<9	<7	<5	<6	<14
	07-01	135±45	<46	<3	<3	<6	<5	<7	<5	<4	<3	<4	<6
	10-08	<147	<41	<3	<3	<7	<4	<6	<5	<4	<3	<3	<6

TABLE IV-C.3.a.1

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-5	01-03	275±50	60±25	<4	<4	<10	<8	<7	<7	<9	<5	<4	<5
	04-01	411±53	<74	<3	<4	<8	<4	<7	<6	<4	<4	<4	<13
	07-01	431±53	<71	<4	<4	<9	<6	<8	<7	<6	<4	<5	<9
	10-08	480±54	<94	<5	<5	<12	<7	<12	<9	<7	<5	<6	<12
CR3-6S	01-03	<142	<37	<3	<3	<5	<3	<6	<4	<5	<2	<2	<5
	04-01	<141	<73	<4	<4	<8	<5	<9	<7	<4	<5	<4	<13
	07-01	130±45	<49	<3	<3	<7	<5	<6	<5	<4	<3	<4	<8
	10-08	<147	<48	<3	<3	<6	<3	<8	<6	<4	<3	<4	<8
CR3-6D	01-03	118±46	185±29	<4	<4	<11	<6	<9	<7	<9	<4	<5	<8
	04-01	<141	252±37	<3	<3	<6	<4	<7	<5	<3	<4	<4	<5
	07-01	133±45	207±33	<2	<2	<4	<2	<4	<4	<3	<2	<2	<3
	10-08	<147	175±25	<6	<5	<11	<7	<13	<8	<8	<5	<5	<11

TABLE IV-C.3.a.1(cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-7	01-03	118±46	<29	<2	<3	<6	<2	<5	<4	<4	<2	<3	<4
	04-01	204±48	<10	<1	<1	<3	<1	<3	<2	<4	<1	<1	<3
	07-01	180±46	<47	<4	<3	<6	<3	<6	<6	<4	<3	<3	<8
	10-08	238±48	<72	<5	<5	<10	<7	<11	<10	<7	<6	<6	<10
CR3-8	01-03	101±46	<32	<3	<3	<6	<3	<6	<5	<5	<3	<3	<5
	04-01	112±33	33±2	<4	<4	<7	<4	<8	<6	<5	<4	<4	<12
	07-01	233±48	<19	<3	<2	<5	<3	<5	<4	<3	<3	<3	<7
	10-08	154±45	25±10	<3	<3	<6	<4	<7	<6	<5	<4	<4	<7
CR3-9	01-03	128±47	59±19	<3	<4	<7	<5	<6	<6	<6	<4	<4	<4
	04-01	<139	50±17	<2	<2	<5	<2	<4	<4	<7	<3	<2	<5
	07-01	<136	<31	<4	<4	<6	<3	<8	<6	<4	<3	<4	<12
	10-08	<143	<53	<3	<3	<7	<4	<7	<5	<4	<3	<3	<8

TABLE IV-C.3.a.1(cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-10	01-03	<142	<28	<2	<2	<5	<3	<5	<5	<6	<2	<2	<4
	04-01	<138	<76	<5	<6	<13	<7	<11	<11	<7	<6	<5	<14
	07-01	<136	<51	<3	<3	<6	<5	<8	<6	<5	<3	<4	<6
	10-08	<147	<46	<3	<3	<6	<4	<7	<6	<5	<3	<3	<7

TABLE IV-C.3.a.2

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER (SUPPLEMENTAL DATA)

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-5	02-06	431±54	45±18	<3	<3	<6	<3	<9	<5	<5	<4	<4	<5
	03-08	480±55	<73	<5	<6	<12	<8	<12	<10	<8	<5	<7	<8
	05-02	400±52	<39	<2	<2	<4	<4	<5	<4	<3	<2	<3	<4
	06-04	404±53	<48	<4	<4	<7	<4	<8	<6	<4	<4	<4	<13
	08-07	556±56	<52	<3	<3	<8	<4	<7	<6	<4	<4	<4	<12
	09-03	530±55	41±11	<3	<3	<6	<5	<7	<6	<5	<3	<4	<7
	11-06	512±56	<55	<3	<3	<7	<5	<7	<5	<4	<3	<4	<11
	12-05	312±50	44±13	<4	<4	<8	<6	<8	<8	<5	<4	<5	<13
CR3-6S	02-06	<142	26±13	<3	<3	<5	<2	<5	<5	<5	<2	<3	<4
	03-08	143±46	<66	<4	<4	<9	<6	<9	<7	<7	<4	<5	<7
	05-02	108±26	78±15	<3	<3	<5	<3	<6	<4	<3	<3	<3	<5
	06-04	153±46	98±20	<3	<4	<7	<4	<7	<7	<5	<4	<3	<11
	08-07	125±46	<34	<2	<2	<5	<3	<5	<4	<3	<2	<3	<6
	09-03	135±45	<51	<4	<4	<6	<3	<7	<6	<4	<3	<4	<7
	11-06	<143	<40	<3	<3	<5	<3	<6	<5	<4	<3	<3	<7
	12-05	<139	28±11	<4	<4	<8	<5	<9	<8	<5	<4	<4	<14

TABLE IV-C.3.a.2(cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER (SUPPLEMENTAL DATA)

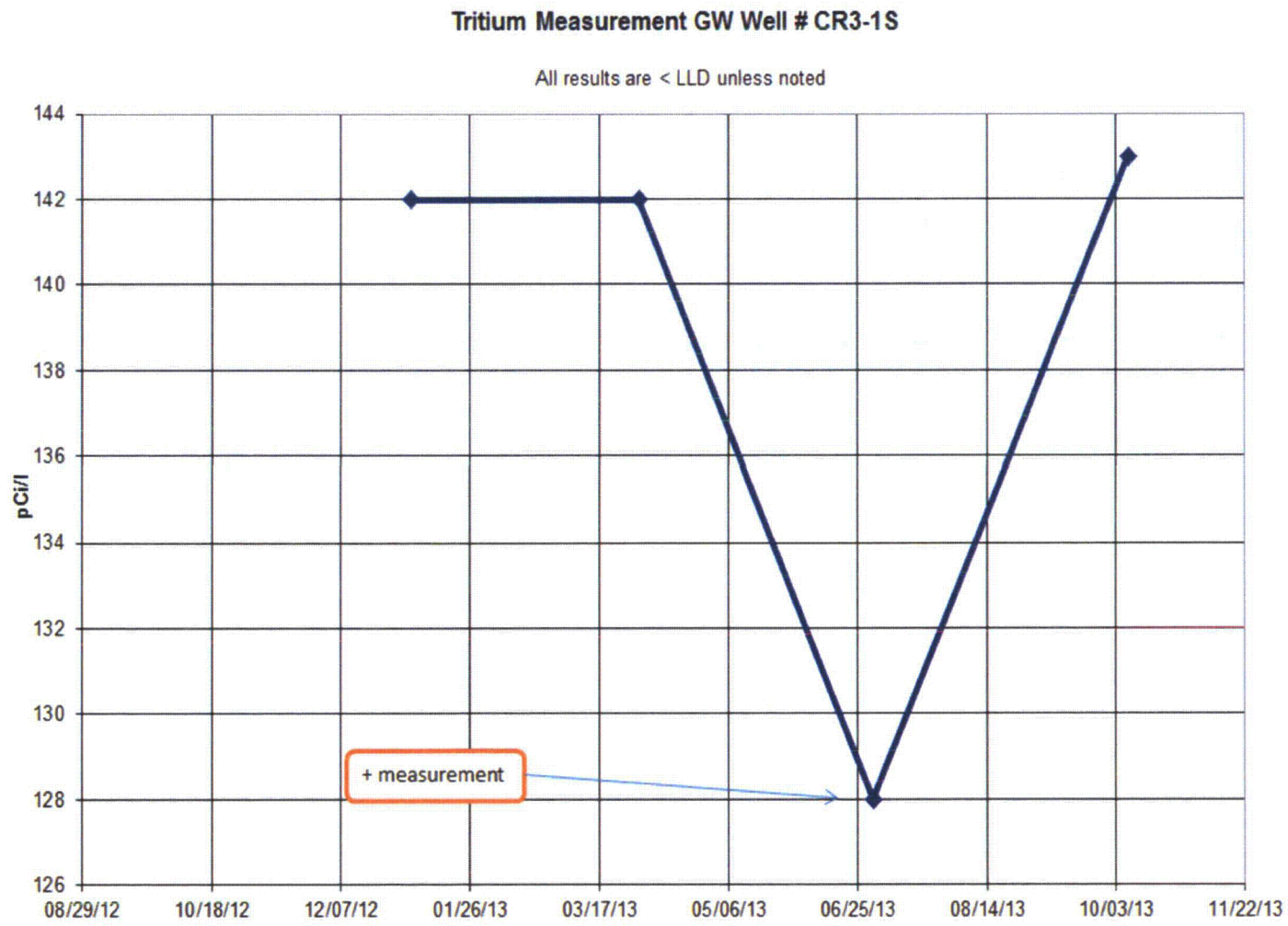
STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-7	02-06	<142	<37	<3	<2	<5	<2	<5	<5	<4	<2	<2	<4
	03-08	<168	<43	<3	<3	<6	<3	<7	<5	<5	<3	<3	<6
	05-02	126±27	<36	<2	<2	<4	<3	<5	<4	<3	<2	<3	<3
	06-04	131±46	29±5	<2	<2	<4	<2	<5	<3	<2	<2	<2	<7
	08-07	241±49	<42	<3	<3	<7	<3	<8	<6	<4	<3	<3	<11
	09-03	133±45	<79	<5	<5	<9	<7	<10	<10	<7	<5	<5	<10
	11-06	181±48	<40	<3	<3	<6	<3	<8	<5	<4	<3	<3	<12
	12-05	<139	<46	<3	<3	<6	<3	<7	<5	<4	<3	<4	<11
CR3-8	02-06	126±47	<38	<3	<3	<6	<3	<5	<4	<5	<3	<3	<5
	03-08	180±47	<45	<3	<3	<6	<3	<8	<6	<5	<3	<3	<6
	05-02	181±47	<12	<2	<2	<3	<2	<3	<3	<2	<2	<2	<3
	06-04	121±27	<43	<3	<3	<6	<5	<7	<6	<4	<4	<4	<13
	08-07	197±48	<48	<3	<4	<6	<3	<7	<6	<4	<4	<4	<13
	09-03	203±46	<51	<4	<4	<8	<4	<9	<7	<5	<4	<4	<9
	11-06	102±27	<52	<4	<4	<7	<4	<9	<6	<5	<4	<4	<12
	12-05	137±46	<48	<4	<4	<8	<4	<8	<6	<5	<4	<4	<13

TABLE IV-C.3.a.2(cont'd)

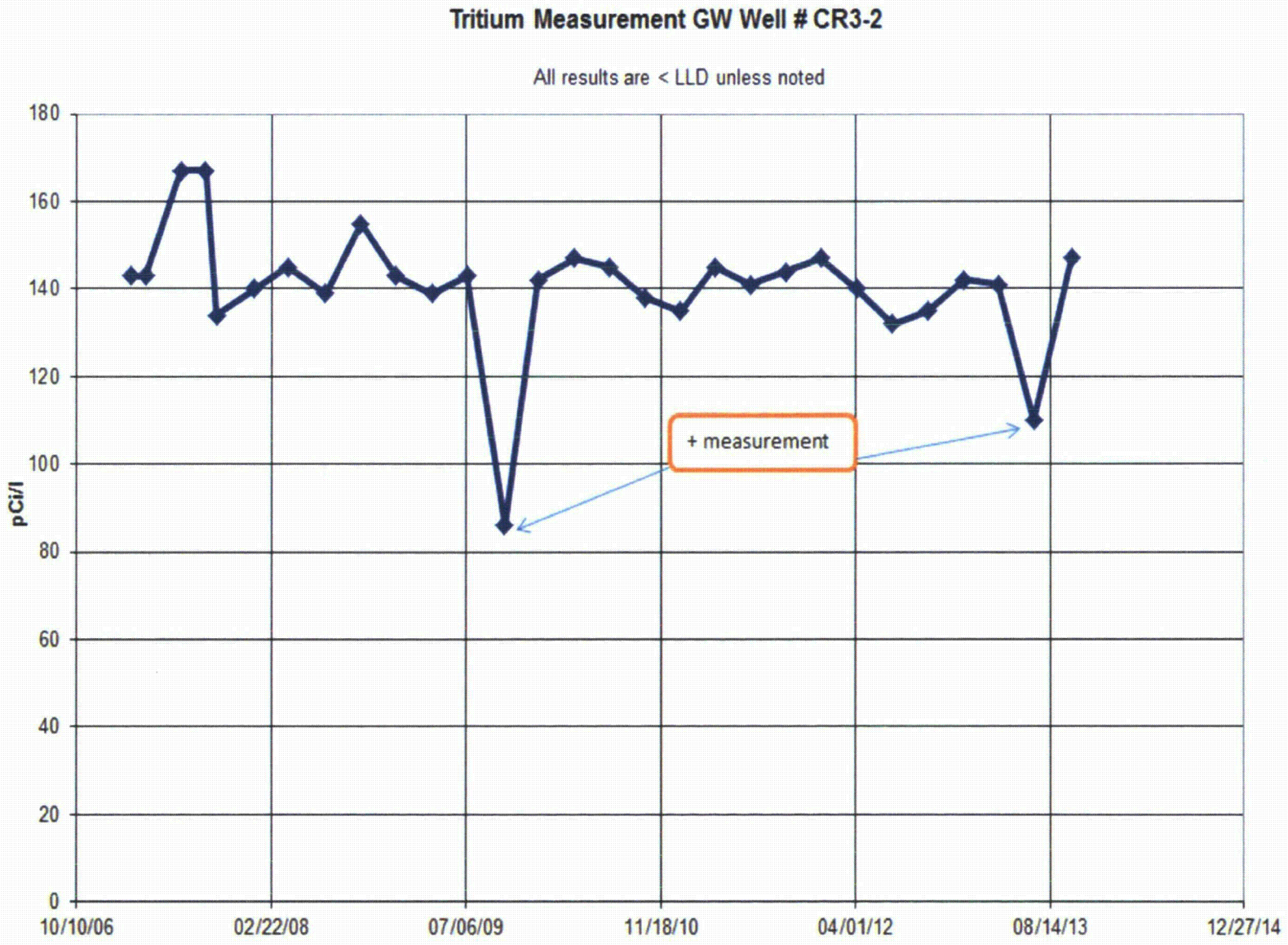
DUKE ENERGY FLORIDA, INC. - CR3 - 2013

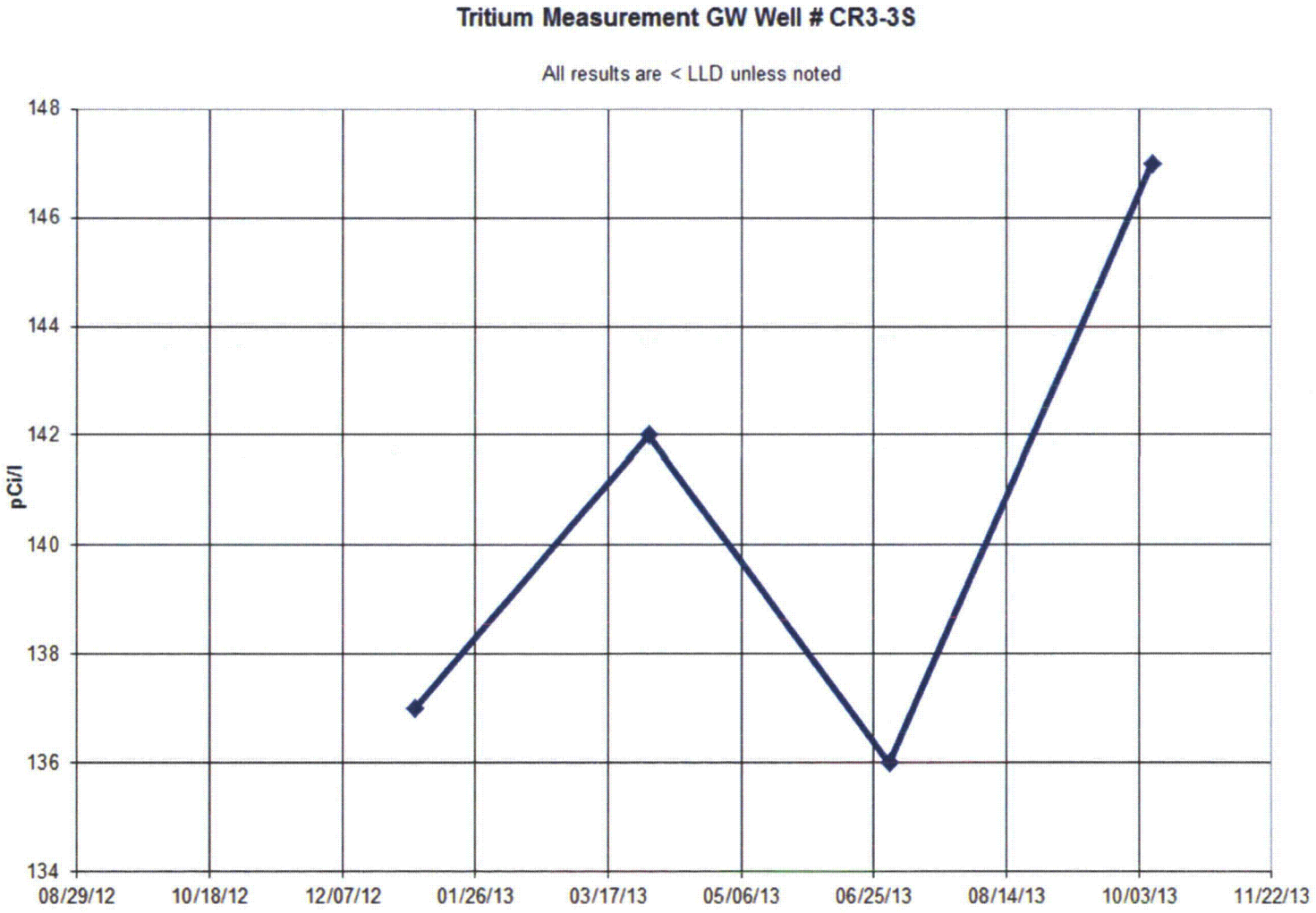
pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER (SUPPLEMENTAL DATA)

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
CR3-9	02-06	<142	<38	<3	<3	<5	<3	<6	<4	<5	<2	<2	<4
	03-08	<140	<48	<3	<3	<6	<3	<6	<6	<5	<3	<3	<5
	05-02	<139	37±11	<2	<2	<5	<3	<5	<4	<3	<2	<3	<5
	06-04	<138	57±10	<4	<3	<7	<3	<8	<6	<4	<4	<3	<14
	08-07	<138	<47	<3	<3	<7	<4	<7	<6	<4	<3	<4	<14
	09-03	<134	<47	<3	<3	<5	<3	<6	<6	<4	<3	<3	<6
	11-06	<143	32±8	<3	<3	<7	<4	<8	<6	<4	<3	<4	<11
	12-05	<139	33±10	<3	<3	<6	<4	<7	<6	<4	<3	<4	<9

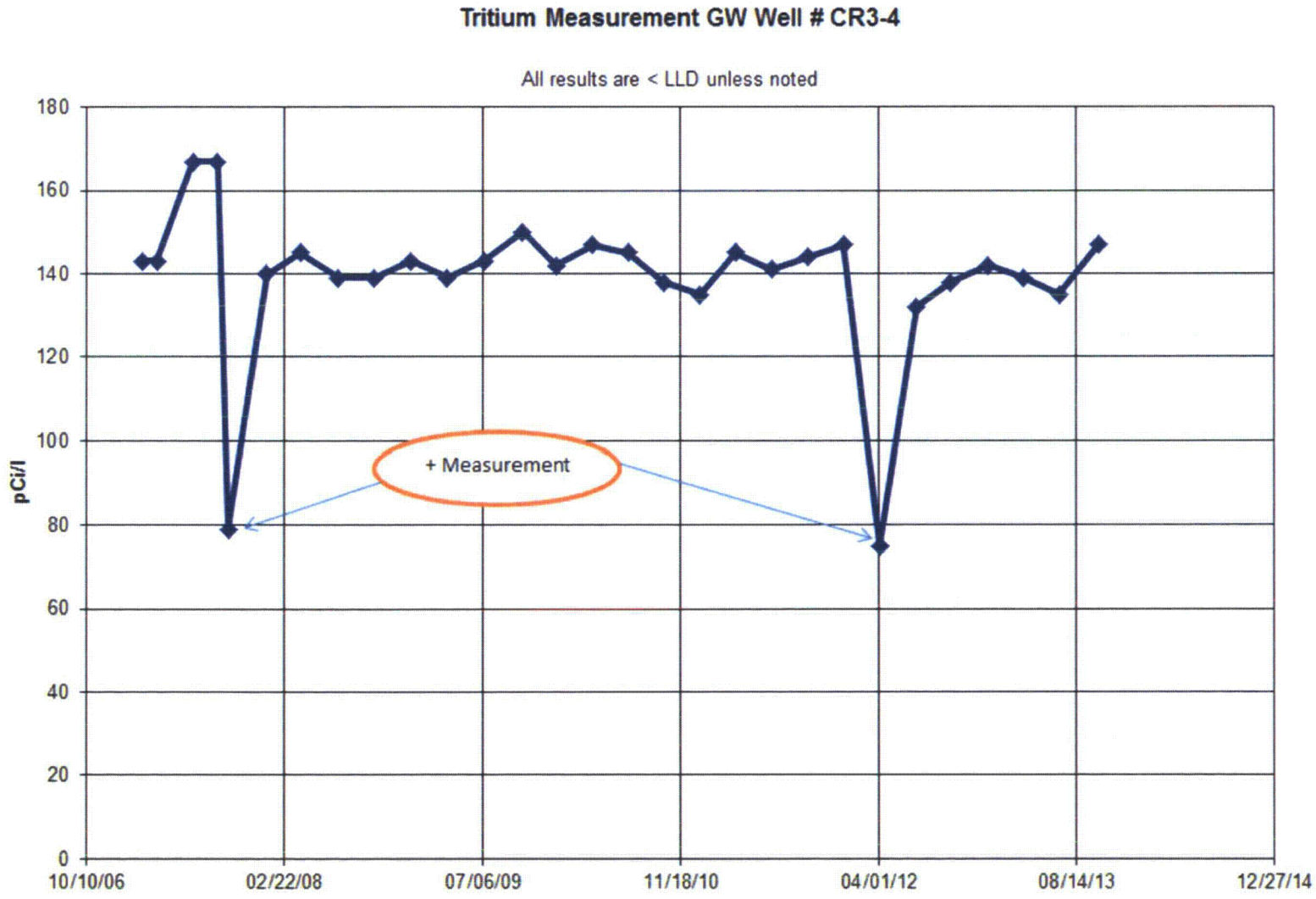

Tritium Measurement GW Well # CR3-1S
All results are < LLD unless noted
144
142
140
138
136
134
132
130
128
126
pCi/l
08/29/12
10/18/12
12/07/12
01/26/13
03/17/13
05/06/13
06/25/13
08/14/13
10/03/13
11/22/13
+ measurement

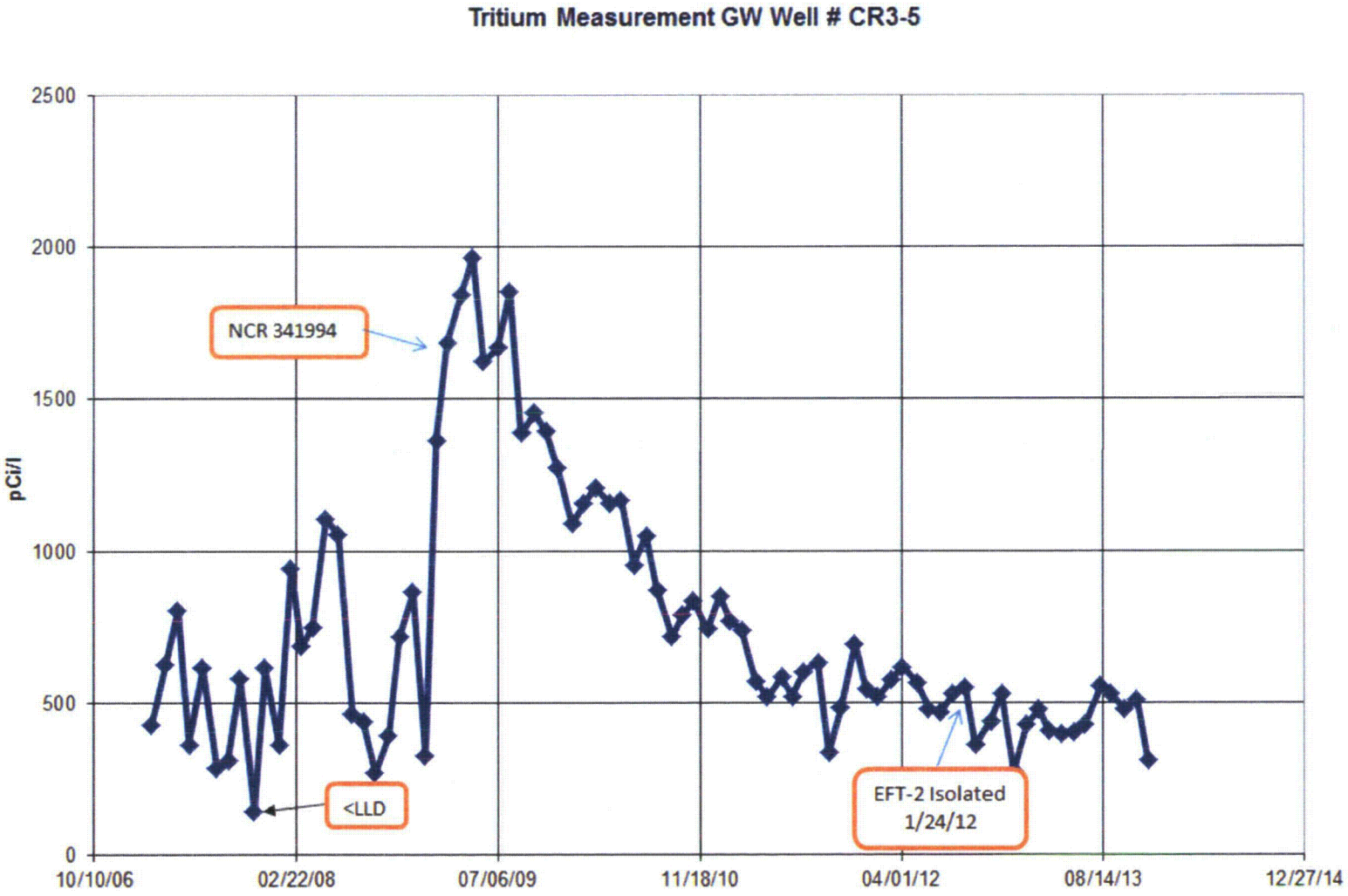

Tritium Measurement GW Well # CR3-1D
All results are < LLD unless noted
155
150
145
140
135
130
125
pCi/l
+ measurement
08/29/12
10/18/12
12/07/12
01/26/13
03/17/13
05/06/13
06/25/13
08/14/13
10/03/13
11/22/13

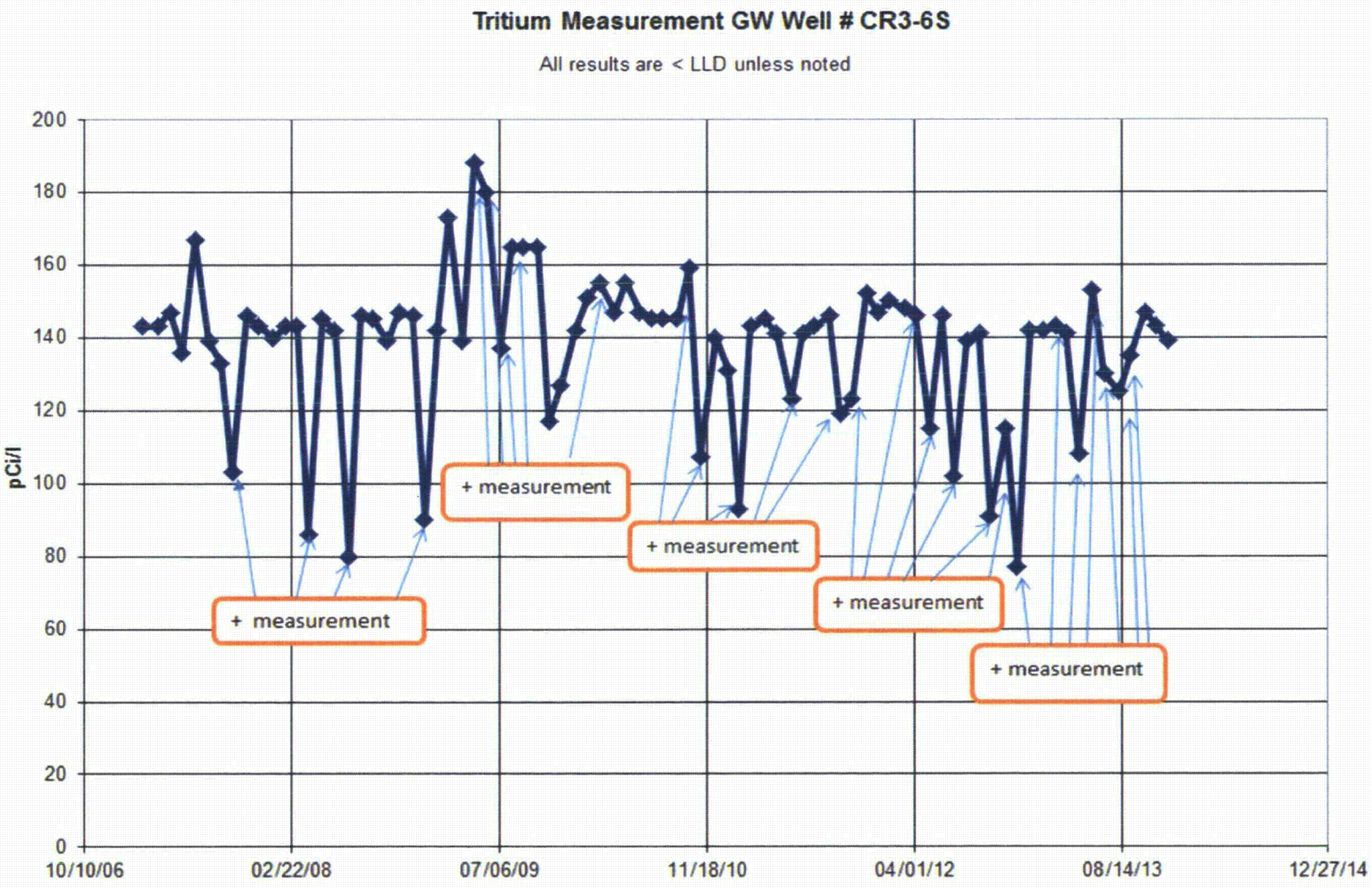

Tritium Measurement GW Well # CR3-2
All results are < LLD unless noted
pCi/l
180
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ measurement

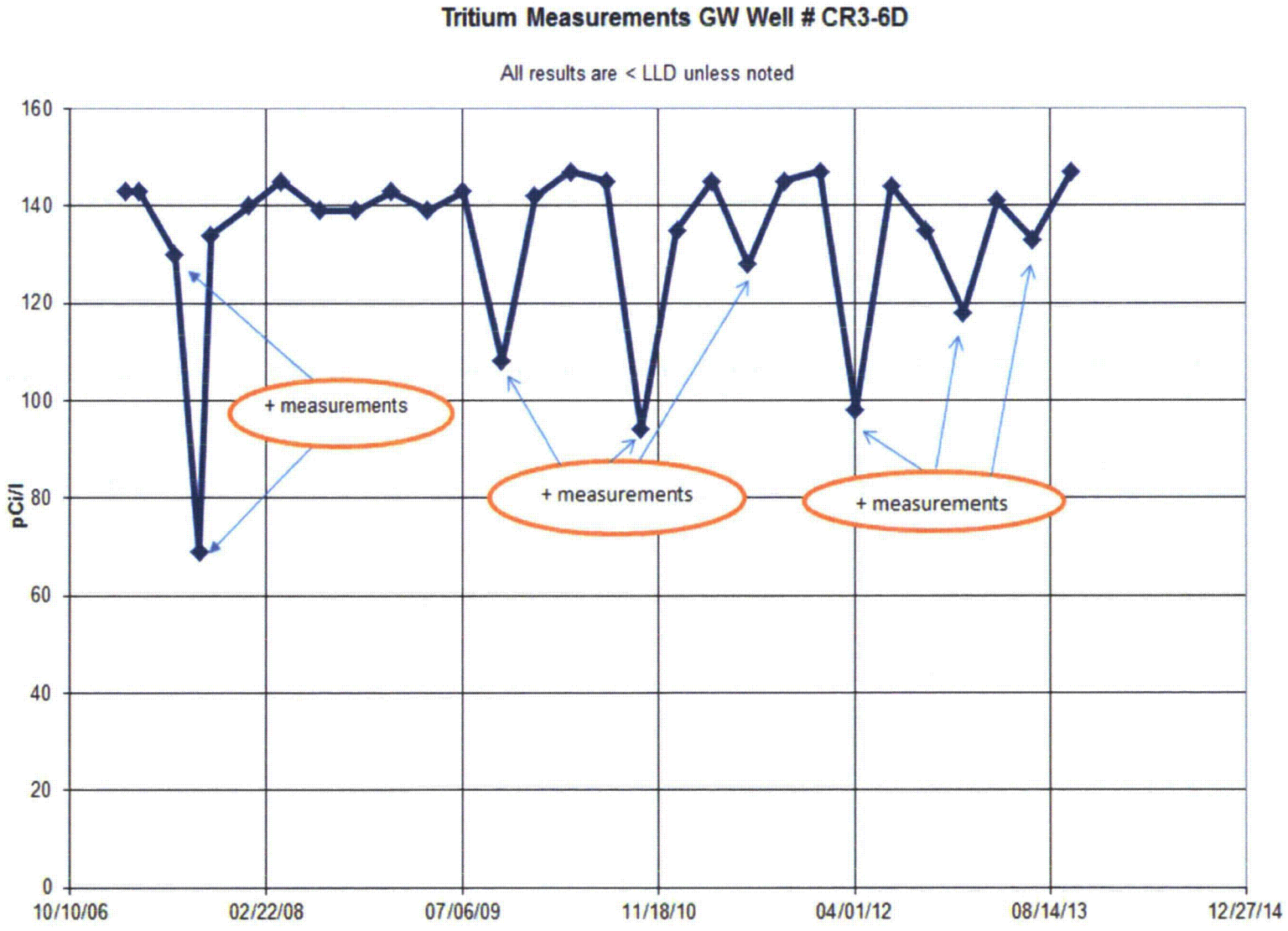

Tritium Measurement GW Well # CR3-3S
All results are < LLD unless noted
pCi/l
148
146
144
142
140
138
136
134
08/29/12
10/18/12
12/07/12
01/26/13
03/17/13
05/06/13
06/25/13
08/14/13
10/03/13
11/22/13

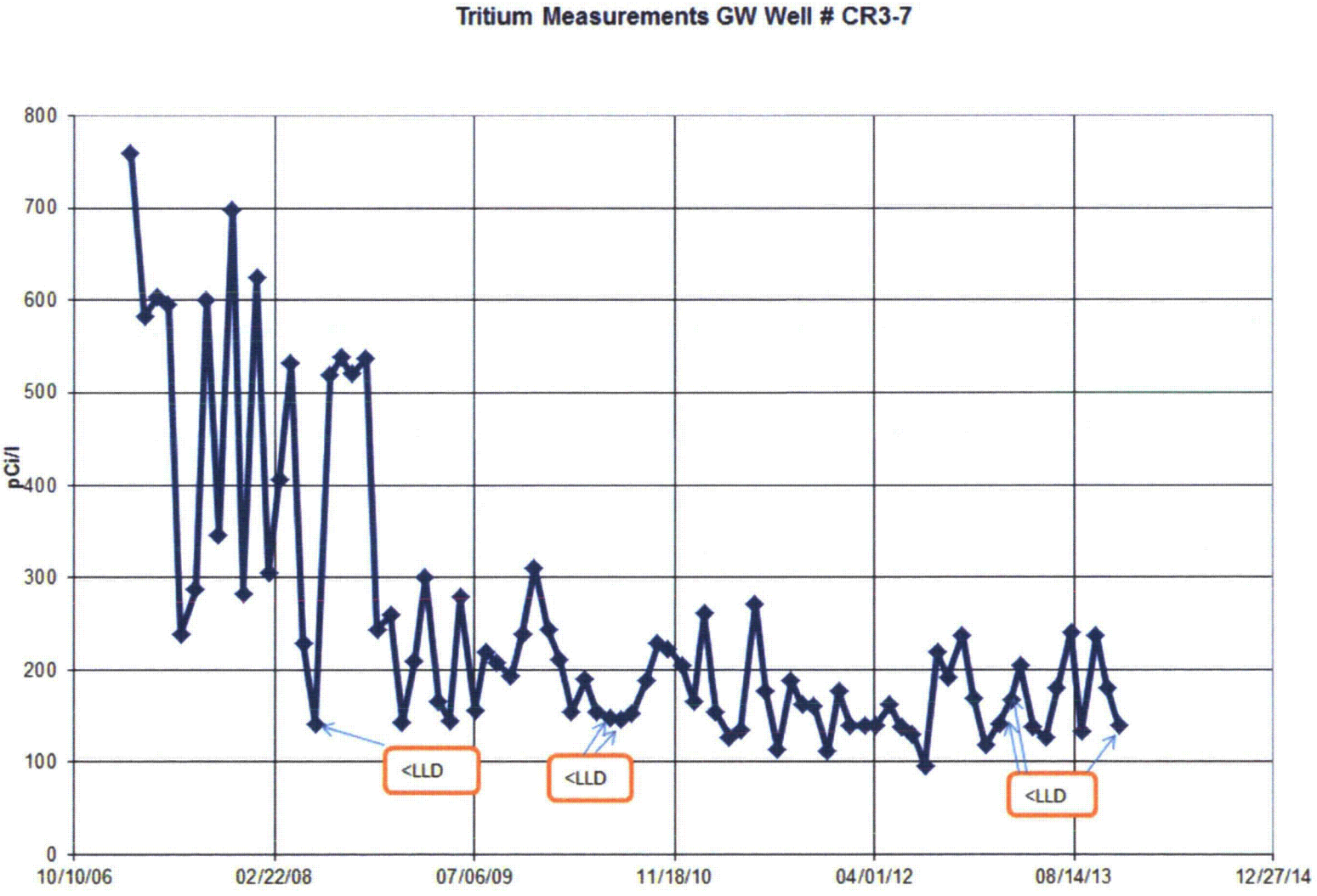

Tritium Measurement GW Well # CR3-3D
All results are < LLD unless noted
+ measurement
pCi/l
160
140
120
100
80
60
40
20
0
08/29/12
10/18/12
12/07/12
01/26/13
03/17/13
05/06/13
06/25/13
08/14/13
10/03/13
11/22/13

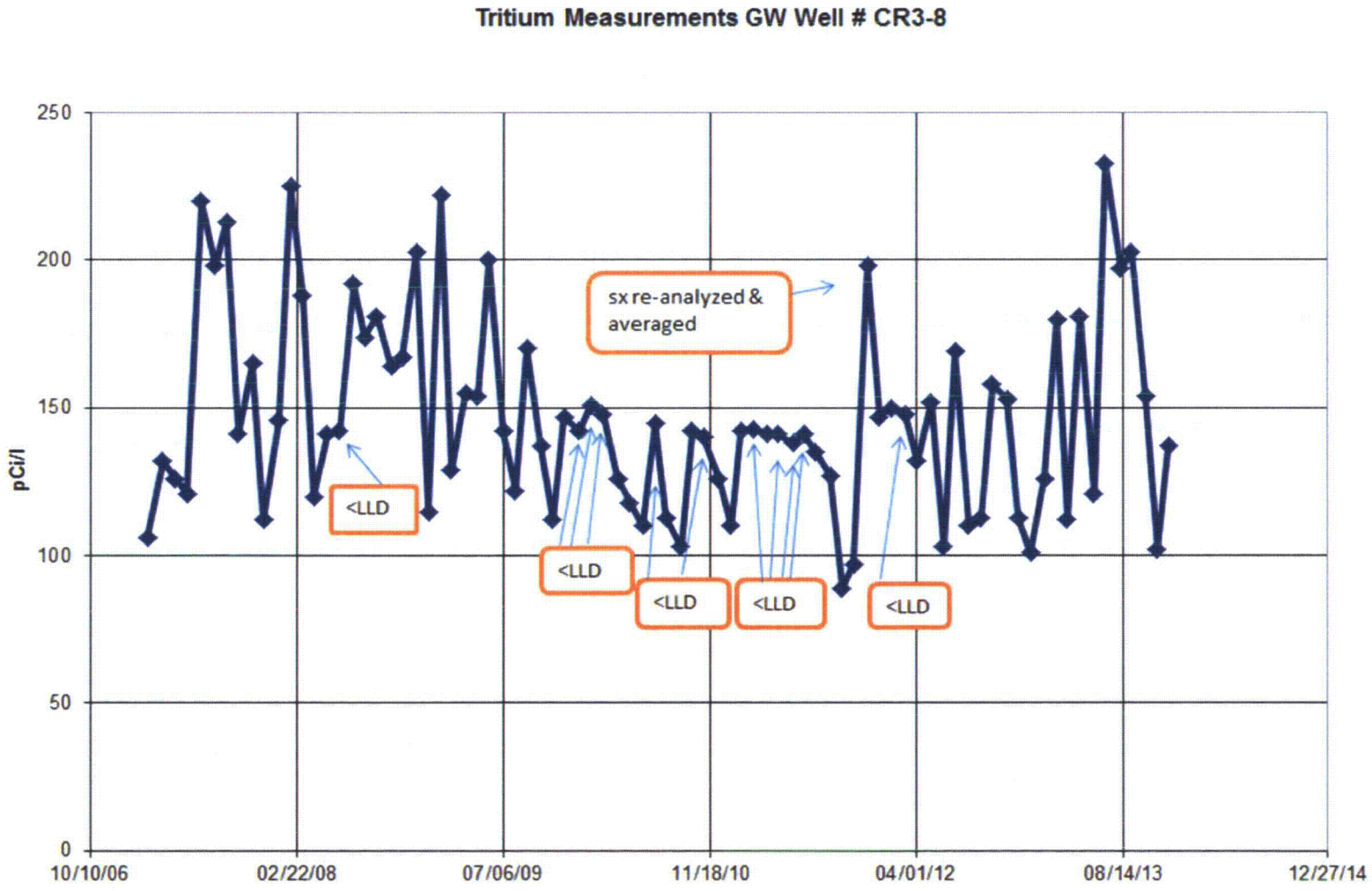

Tritium Measurement GW Well # CR3-4
All results are < LLD unless noted
pCi/l
180
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ Measurement

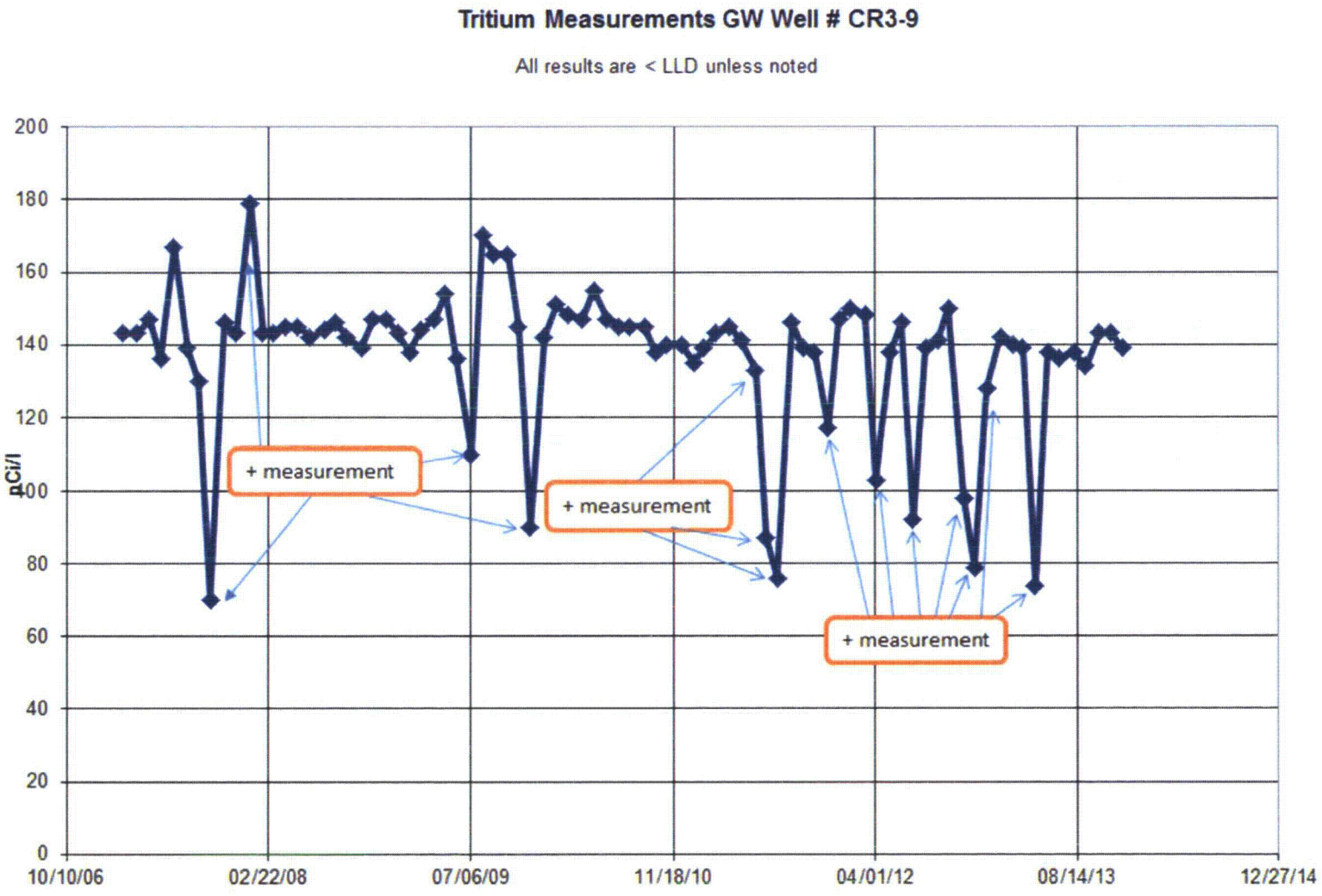

Tritium Measurement GW Well # CR3-5
2500
2000
1500
1000
500
0
pCi/l
NCR 341994
<LLD
EFT-2 Isolated
1/24/12
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14


Tritium Measurement GW Well # CR3-6S
All results are < LLD unless noted
pCi/l
200
180
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ measurement
+ measurement
+ measurement
+ measurement
+ measurement


Tritium Measurements GW Well # CR3-6D
All results are < LLD unless noted
pCi/l
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ measurements
+ measurements
+ measurements


Tritium Measurements GW Well # CR3-7
pCi/l
800
700
600
500
400
300
200
100
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
<LLD
<LLD
<LLD


Tritium Measurements GW Well # CR3-8
250
200
150
100
50
0
pCi/l
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
sx re-analyzed & averaged
<LLD
<LLD
<LLD
<LLD
<LLD


Tritium Measurements GW Well # CR3-9
All results are < LLD unless noted
pCi/l
200
180
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ measurement
+ measurement
+ measurement

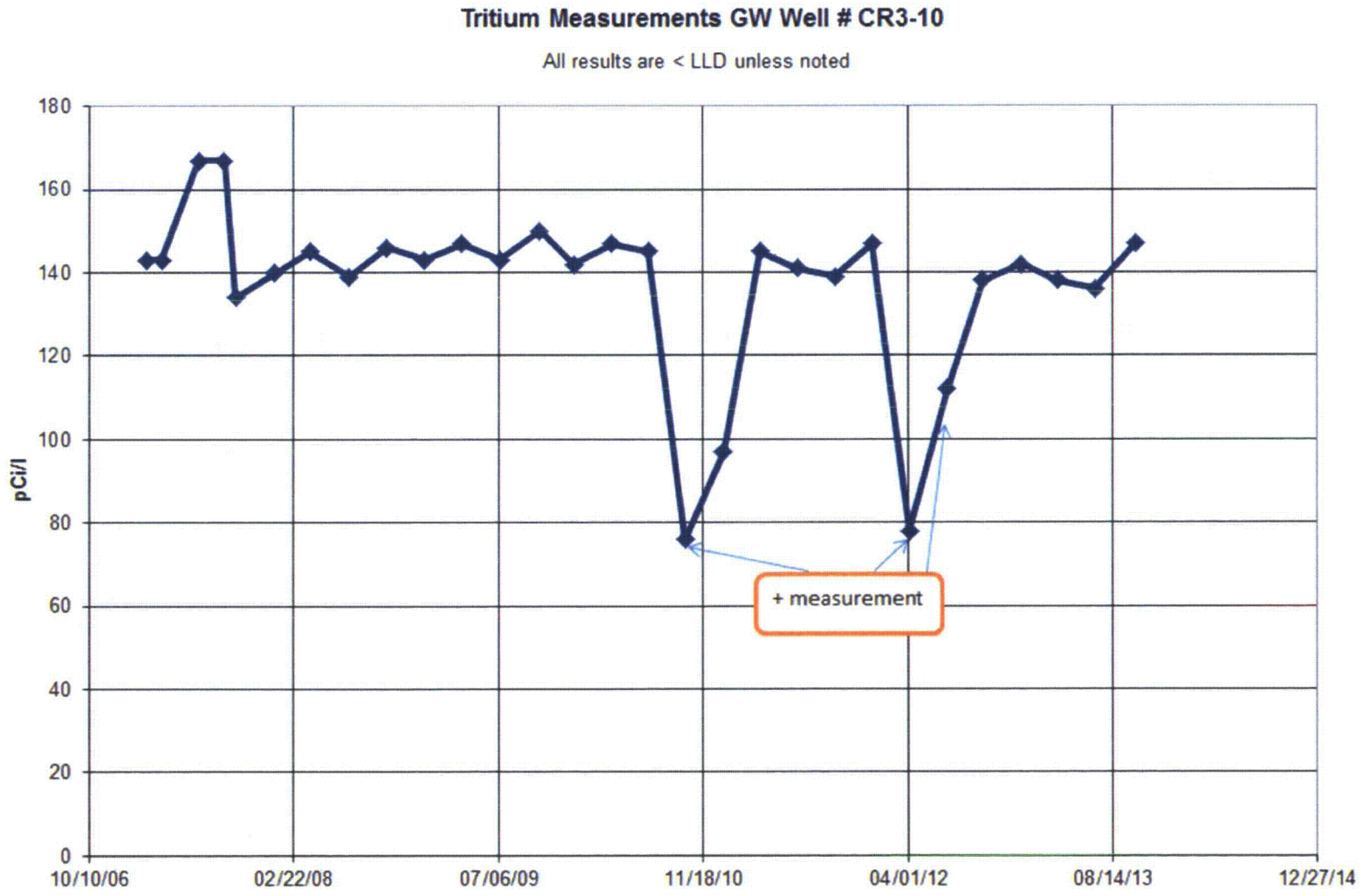

Tritium Measurements GW Well # CR3-10
All results are < LLD unless noted
pCi/l
180
160
140
120
100
80
60
40
20
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
+ measurement

TABLE IV-C.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
*CR3 SITE GROUND WATER (pCi/L) *	Tritium 24	168	163 (12/24) (95-254)	MWC-27 0.40 mi.@285°	168 (5/12) (101-182)	CR3-2 <LLD	0
	γ Spec 24						
	Mn-54	6	<LLD	-	-	<LLD	0
	Fe-59	11	<LLD	-	-	<LLD	0
	Co-58	5	<LLD	-	-	<LLD	0
	Co-60	8	<LLD	-	-	<LLD	0
	Zn-65	12	<LLD	-	-	<LLD	0
	Zr-Nb-95	10	<LLD	-	-	<LLD	0
	I-131	9	<LLD	-	-	<LLD	0
	Cs-134	6	<LLD	-	-	<LLD	0
	Cs-137	6	<LLD	-	-	<LLD	0
	Ba-La-140	15	<LLD	-	-	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.
*Non-REMP required samples

TABLE IV-C.4.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER (SUPPLEMENTAL DATA)

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
MWC-27*	01-03	150±47	<36	<2	<3	<5	<3	<6	<4	<5	<2	<3	<5
	02-06	208±49	<35	<2	<3	<5	<3	<5	<5	<5	<2	<3	<5
	03-08	101±45	<63	<5	<5	<10	<7	<12	<10	<9	<5	<6	<8
	04-01	254±49	<71	<3	<3	<7	<4	<8	<7	<5	<4	<4	<9
	05-02	<139	41±15	<3	<3	<6	<3	<6	<5	<4	<3	<3	<6
	06-04	<138	<44	<3	<3	<6	<4	<7	<6	<4	<4	<4	<9
	07-01	<136	<48	<3	<4	<8	<4	<8	<6	<4	<4	<4	<8
	08-07	125±46	26±7	<4	<3	<6	<3	<8	<6	<4	<3	<4	<10
	09-03	<134	<43	<3	<3	<7	<3	<7	<6	<5	<3	<4	<7
	10-08	<143	<79	<6	<5	<11	<8	<11	<10	<8	<6	<6	<12
	11-06	<143	<46	<3	<3	<7	<3	<7	<6	<5	<4	<4	<9
	12-05	<139	<48	<4	<4	<7	<4	<8	<6	<4	<4	<4	<13

*= These wells are not officially included in the REMP and are located on either side (north and south) of the site percolation ponds.

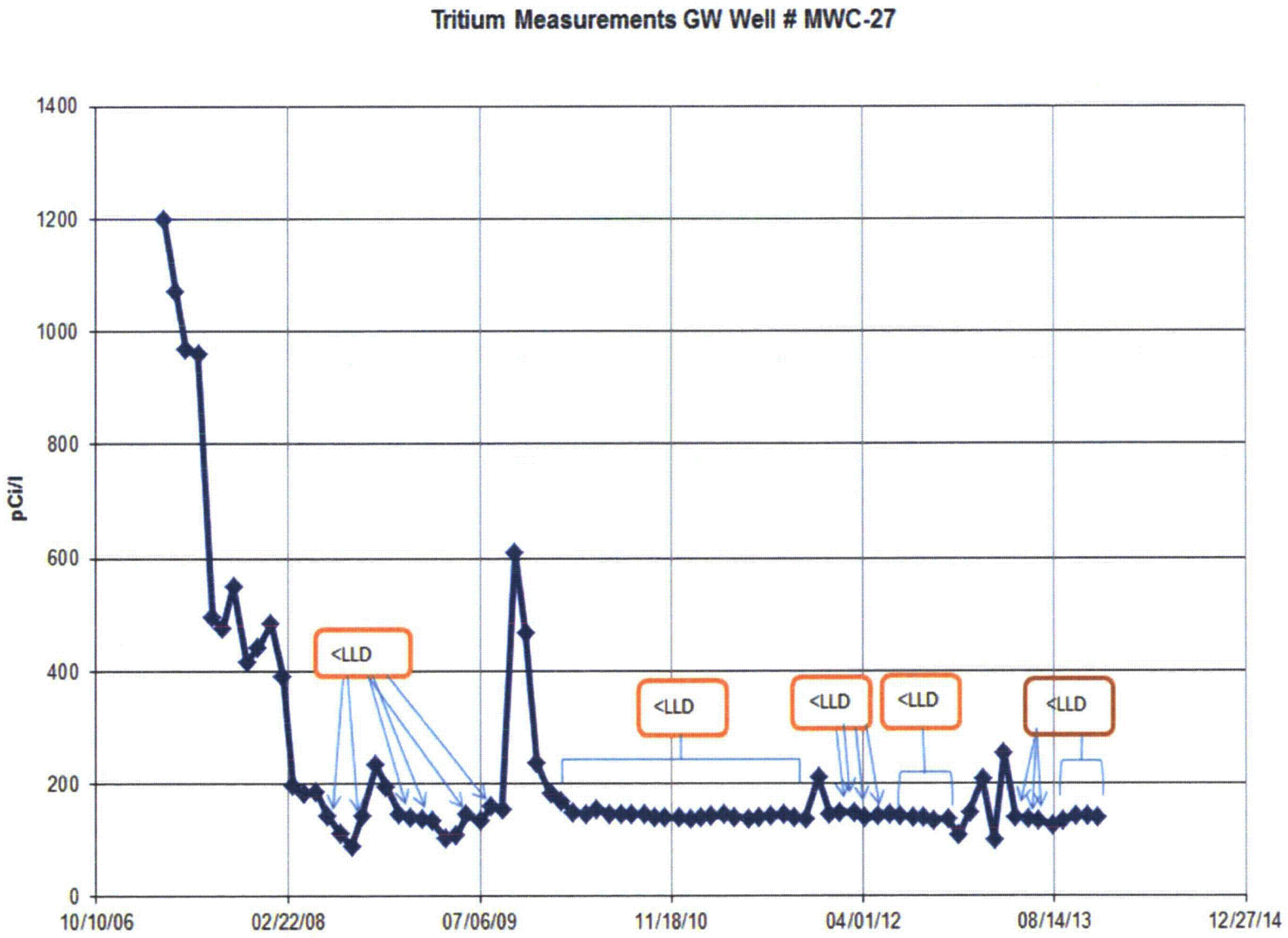
TABLE IV-C.4.a(cont'd)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN CR3 SITE GROUND WATER (SUPPLEMENTAL DATA)

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
MWC-IF2*	01-03	135±46	<27	<2	<2	<4	<2	<4	<4	<4	<2	<2	<3
	02-06	<168	<34	<3	<2	<5	<3	<5	<4	<5	<3	<3	<4
	03-08	133±46	<43	<3	<3	<7	<3	<7	<5	<5	<3	<3	<6
	04-01	181±47	<45	<3	<3	<7	<3	<7	<6	<4	<3	<3	<9
	05-02	<135	22±3	<1	<1	<3	<1	<3	<2	<2	<1	<1	<3
	06-04	<138	59±22	<4	<4	<8	<4	<9	<7	<4	<5	<5	<15
	07-01	208±47	<71	<4	<4	<8	<6	<10	<7	<5	<4	<5	<9
	08-07	95±45	17±3	<1	<1	<3	<1	<3	<2	<2	<1	<2	<4
	09-03	150±45	<80	<5	<5	<10	<7	<11	<9	<7	<5	<5	<8
	10-08	218±46	<50	<3	<3	<7	<3	<7	<6	<4	<3	<4	<7
	11-06	<143	<38	<3	<4	<6	<3	<7	<5	<4	<3	<4	<9
	12-05	<139	<47	<3	<3	<6	<4	<7	<5	<4	<3	<3	<12

*= These wells are not officially included in the REMP and are located on either side (north and south) of the site percolation ponds.


Tritium Measurements GW Well # MWC-27
pCi/l
1400
1200
1000
800
600
400
200
0
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14
<LLD
<LLD
<LLD
<LLD
<LLD

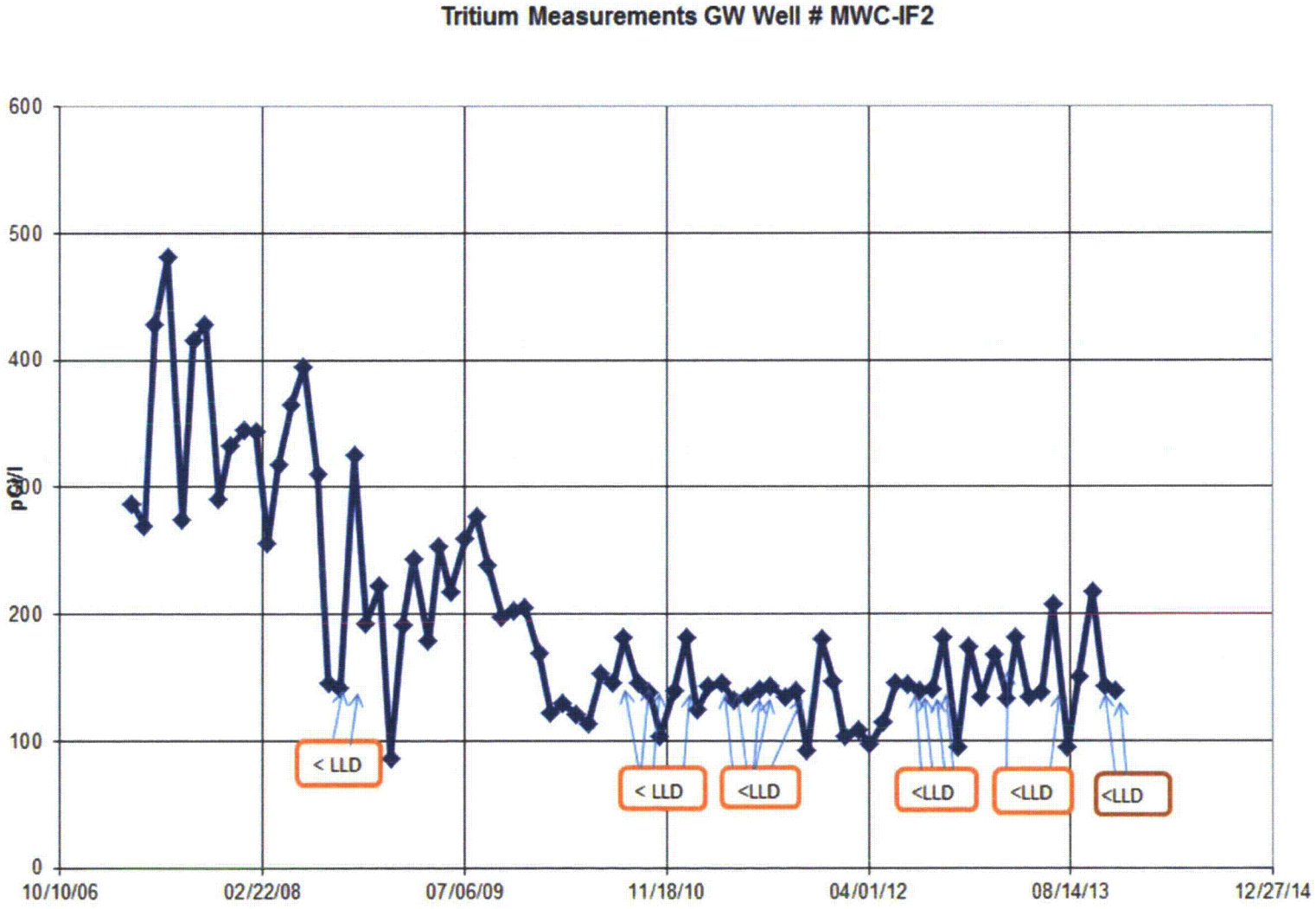

Tritium Measurements GW Well # MWC-IF2
600
500
400
300
200
100
0
pCi/l
< LLD
< LLD
<LLD
<LLD
<LLD
<LLD
10/10/06
02/22/08
07/06/09
11/18/10
04/01/12
08/14/13
12/27/14

TABLE IV-C.5

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DRINKING WATER (pCi/L)	Tritium 12	142	<LLD	-	-	<LLD	0
	γ Spec 12						
	Mn-54	4	<LLD	-	-	<LLD	0
	Fe-59	8	<LLD	-	-	<LLD	0
	Co-58	4	<LLD	-	-	<LLD	0
	Co-60	7	<LLD	-	-	<LLD	0
	Zn-65	9	<LLD	-	-	<LLD	0
	Zr-Nb-95	8	<LLD	-	-	<LLD	0
	I-131	8	<LLD	-	-	<LLD	0
	Cs-134	5	<LLD	-	-	<LLD	0
	Cs-137	5	<LLD	-	-	<LLD	0
	Ba-La-140	11	<LLD	-	-	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-C.5.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN DRINKING WATER

STATION	DATE	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
C07	01-02	<142	<67	<4	<4	<7	<7	<8	<6	<8	<5	<4	<6
	04-09	<138	<33	<2	<2	<5	<3	<5	<4	<5	<2	<3	<4
	07-02	<136	<50	<3	<4	<8	<6	<7	<6	<7	<4	<4	<7
	10-07	<135	<40	<3	<3	<5	<4	<6	<5	<4	<3	<3	<8
C10	01-02	<142	<27	<2	<2	<4	<2	<5	<4	<4	<2	<2	<3
	04-09	<139	<33	<3	<3	<6	<3	<7	<4	<3	<3	<3	<11
	07-02	<136	<19	<2	<2	<3	<2	<3	<3	<3	<2	<2	<3
	10-07	<135	<42	<3	<3	<6	<4	<6	<5	<4	<3	<3	<6
C18	01-10	<142	<68	<3	<4	<8	<7	<9	<8	<8	<5	<5	<6
	04-09	<139	<30	<3	<3	<6	<3	<6	<5	<3	<3	<3	<10
	07-02	<136	<37	<3	<3	<6	<4	<6	<5	<6	<3	<3	<5
	10-07	<135	<20	<2	<1	<4	<2	<3	<3	<2	<2	<2	<5

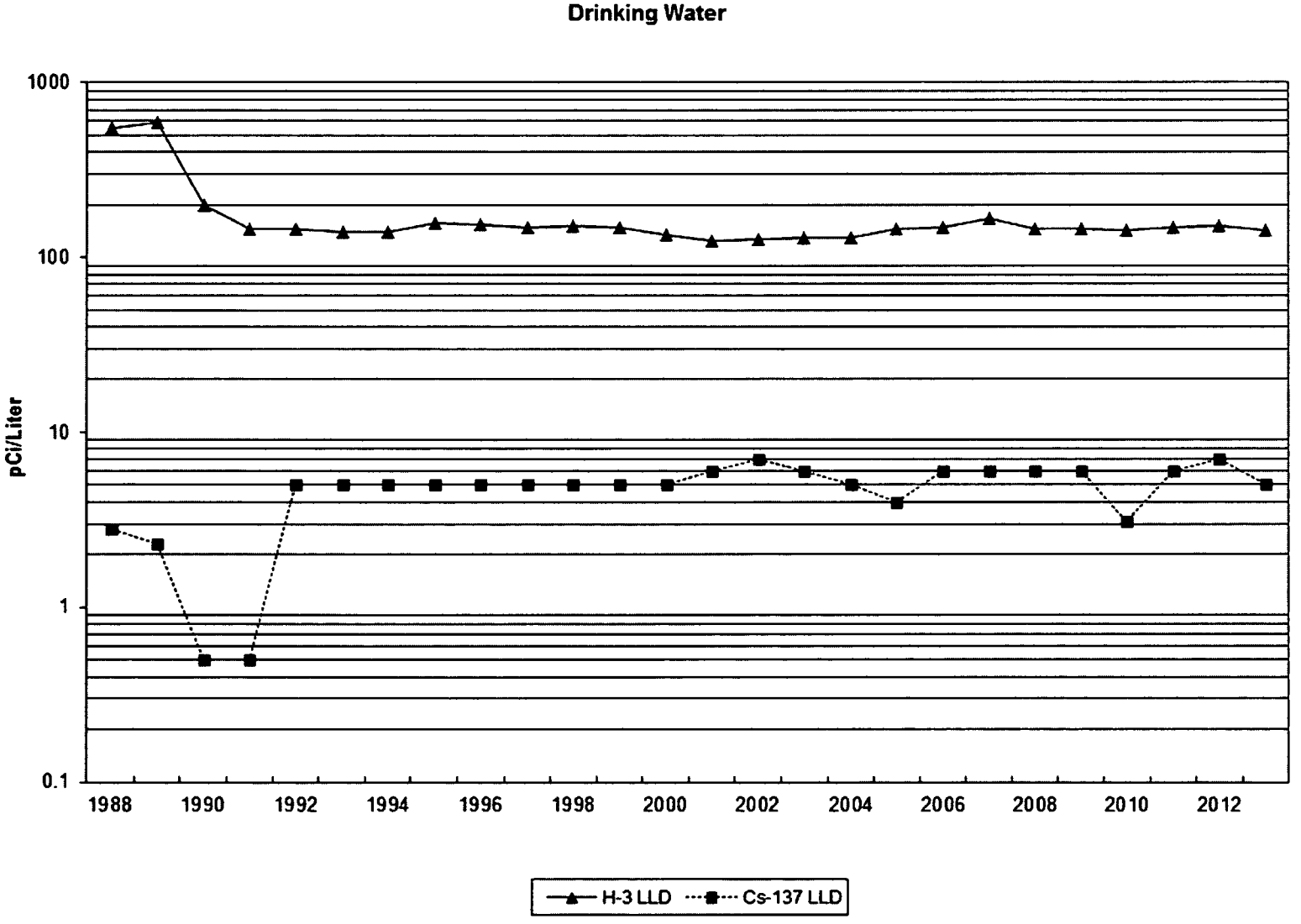

Drinking Water
1000
100
10
1
0.1
pCi/Liter
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
H-3 LLD
Cs-137 LLD

TABLE IV-C.6

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SHORELINE SEDIMENT	γ Spec 8						
(pCi/kg)	Cs-134	13	<LLD	—	—	<LLD	0
	Cs-137	14	8.5 (2/6) (8-9)	C14M 1.2 mi. @ 270°	8.5 (2/2) (8-9)	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-C.6.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg γ EMITTERS IN SHORELINE SEDIMENT

STATION	PERIOD	Co-58	Co-60	Cs-134	Cs-137	K-40	Ra-226
C09	First Half	<10	<11	<9	<11	52±26	323±50
	Second Half	<6	<6	<7	<7	163±23	304±34
C14H	First Half	<15	<14	<13	<16	619±50	2810±142
	Second Half	<7	<7	<7	<8	176±25	550±46
C14M	First Half	<10	<11	<10	9±2	446±39	1232±152
	Second Half	<13	<15	<11	8±3	276±41	1661±100
C14G	First Half	<13	<12	<11	<11	242±31	1534±168
	Second Half	<14	<16	<13	<14	88±31	1935±110

C09 is the control station at Ft. Island Beach. C14H, C14M, & C14G are discharge canal stations.

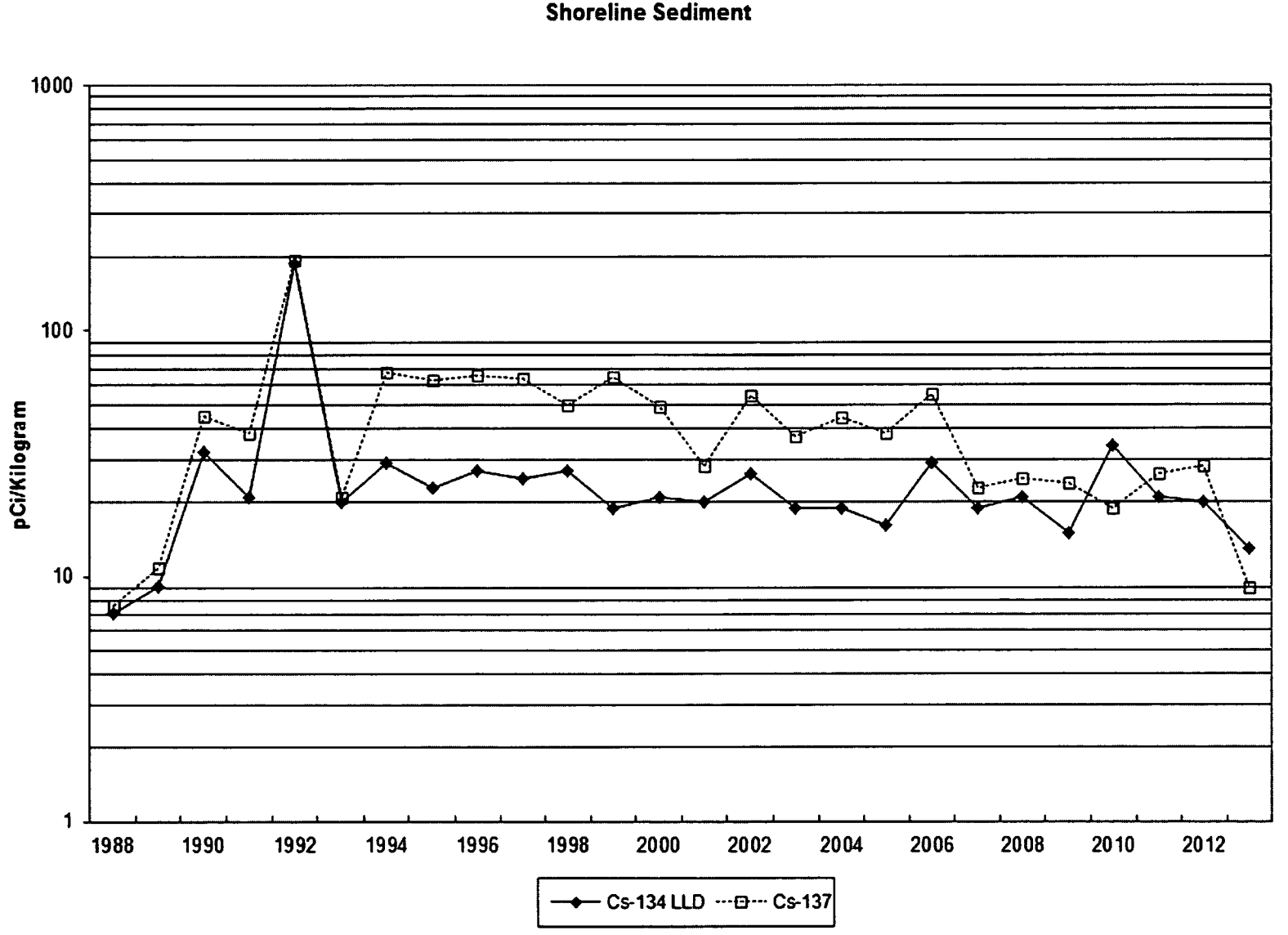

Shoreline Sediment
1000
100
10
1
pCi/Kilogram
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Cs-134 LLD
Cs-137

TABLE IV-C.7 SUPPLEMENTAL DATA

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/L γ EMITTERS AND TRITIUM IN SITE SETTLING PONDS SURFACE WATER

STATION	MONTH	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
31NE	DEC	<140	<36	<3	<3	<6	<3	<5	<4	<3	<3	<3	<11
32NE	DEC	<140	<45	<3	<3	<6	<4	<6	<5	<3	<3	<3	<10

pCi/kg γ EMITTERS IN SITE SETTLING PONDS SEDIMENT

STATION	MONTH	Co-58	Co-60	Cs-134	Cs-137	K-40	Ra-226
31NE	DEC	<9	<10	<9	6±2	1349±73	1941±127
31NW	DEC	<10	<14	<11	<13	644±56	1037±104
32NE	DEC	<6	<6	<6	8±2	105±20	690±50
32NW	DEC	<10	<13	<10	<13	299±41	693±64

IV-D. INGESTION PATHWAY

To evaluate the ingestion pathway, samples are taken of fish, oysters, broad leaf vegetation, citrus, and watermelon.

1. Quarterly carnivorous fish samples were taken at two locations: C29 at the end of the discharge canal, and C30, the control location, near the mouth of the intake canal.
   In 2013, none of the required radionuclides were found in measurable quantities. The highest cesium-137 LLD for station C29 was 32 pCi/kg. Naturally occurring potassium-40 was quantified in all eight samples at an average concentration of 2427 pCi/kg.

   In 2012, none of the radionuclides of interest were identified in measurable quantities.

   In 2011, none of the radionuclides of interest were identified in measurable quantities.

   In 2010, none of the radionuclides of interest were identified in measurable quantities.

   In 2009, none of the radionuclides of interest were identified in measurable quantities.

   Table IV-D.1 provides a statistical summary of the carnivorous fish gamma spectroscopy results.

   Table IV-D.1.a provides the results of the quarterly samples.

2. Quarterly oyster samples were taken at the same locations as fish samples, C29 and C30.
   In 2013, none of the required radionuclides were found in measurable quantities. Additionally, silver-110m was not quantified in any sample.

   In 2012, of the isotopes required to be evaluated, one sample from station C29 indicated measurable amounts of cesium-137 at a concentration of 22 pCi/L. This value was statistically positive, but is in the range of the analytical LLD. Also, silver-110m was not quantified in any sample.

   In 2011, silver-110m was quantified in two samples at C29 with an average concentration of 19 pCi/kg and a range of 14 to 23 pCi/kg. There were no other radionuclides of interest identified in any oyster samples in 2011.

   In 2010, silver-110m was not quantified in any oyster samples collected. There were no other radionuclides of interest identified in any oyster samples in 2010.

   In 2009, silver-110m was quantified in one sample at location C29 near the end of the discharge canal, at a concentration of 20 pCi/kg. There were no other radionuclides of interest identified in any oyster samples in 2009.

   Table IV-D.2 provides a statistical summary of the oyster gamma spectroscopy results.

   Table IV-D.2.a provides the results of the quarterly samples.

3. Monthly broad leaf vegetation samples were taken at two indicator locations, C48A and C48B, and one control location, C47.

   In 2013, fifteen of twenty four indicator samples had measurable amounts of cesium-137 with an average concentration of 75 pCi/kg and a range of 5 to 147 pCi/kg. The control station (C47) located in Orlando, Fl. also had measurable amounts of cesium-137. In twelve of twelve control station samples there were measurable amounts of cesium-137 at an average concentration of 86 pCi/kg and a range of 14 to 258 pCi/kg. The cesium-137 values are similar in concentration as compared to samples collected in 2012 which experienced radionuclide deposition as a result of the Fukushima earthquake event and are not a result of the operation of CR3.

   In 2012, thirteen of twenty four indicator samples had measurable amounts of cesium-137 with an average concentration of 86 pCi/kg and a range of 18 to 172 pCi/kg. The control station (C47) located in Orlando, Fl. also had measurable amounts of cesium-137. In eight of twelve control

station samples there were measurable amounts of cesium-137 at an average concentration of 57 pCi/kg and a range of 16 to 201 pCi/kg. The cesium-137 values are similar in concentration as compared to samples collected in 2011 which experienced radionuclide deposition as a result of the Fukushima earthquake event and are not a result of the operation of CR3.

In 2011, eighteen of twenty four indicator samples had measurable amounts of cesium-137 with an average concentration of 76 pCi/kg and a range of 6 to 233 pCi/kg. Two of twenty four indicator samples also had measurable amounts of iodine-131 with an average of 232 pCi/kg and a range of 195-269 pCi/kg. The control station also had measurable amounts of iodine-131 and cesium-137. In seven of twenty one control station samples, there was measurable I-131 at an average concentration of 324 pCi/kg and a range of 13-1397 pCi/kg. In seventeen of twenty one control station samples there was measurable cesium-137 at an average concentration of 61 pCi/kg and a range of 7 to 182 pCi/kg. Nine extra control samples were collected at the Orlando station location. These positive-measured radionuclides were a result of the Fukushima earthquake and tsunami event that occurred in 2011 and were not from the operation of CR3.

In 2010, five of twenty-four indicator samples had measurable amounts of cesium-137 with an average concentration of 66 pCi/kg and a range of 9 to 153 pCi/kg. This is higher than the levels found in 2009, but lower than in 2007 and 2008. It is believed the 2007 and 2008 spike was due to possible collection of wire grass mixed into the sample, which has a greater uptake rate of cesium as compared to other broad-leafed media. Additionally in 2010, eight of twelve control station samples had measurable amounts of cesium-137 with an average concentration of 21 pCi/kg and a range of 9 to 31 pCi/kg. During 2009 due to construction activities at the Crystal River Unit 4 & 5 site, the area where broad leaf vegetation was being collected at station C48A was removed. A new location in the same north sector was located near the air sample station C46. During 2010, also due to construction activities at the Crystal River Units 4 & 5 site, the area where broadleaf vegetation was being collected at station C48B became inaccessible. A new location in the ENE sector was located near the transmission power line corridor right of way, just NE of the mariculture center. This sector has the same D/Q value as the N and NNE sectors and is allowed by the ODCM.

Table IV-D.3 provides a statistical summary of the broad leaf vegetation gamma spectroscopy results.
Table IV-D.3.a provides the results of the monthly samples.

4. In 2013 watermelon samples were collected at station C04. None of the required radionuclides were found in measurable quantities. Citrus samples were taken at station C19. None of the required radionuclides were found in measurable quantities in the citrus samples with exception of Cs-137 at a concentration of 86 pCi/kg. It is not unusual to periodically see Cs-137 in citrus samples due to widespread deposition of Cs-137 from fallout due to past weapons testing.

   In 2012 one watermelon sample was collected at station C04. This sample had no measurable quantities of radionuclides of interest. Citrus samples were taken at station C19. There were no measurable quantities of radionuclides of interest in the citrus samples.

   In 2011 two watermelon samples were collected at station C04. One sample had a measurable amount of cesium-137 at a concentration of 14 pCi/kg. All other radionuclides of interest were < LLD. Citrus samples were taken at station C19. There were no measurable quantities of radionuclides of interest in the citrus samples.

   In 2010 watermelon samples were collected at station C04. None of the required radionuclides were found in measurable quantities. Citrus samples were taken at station C19. None of the required radionuclides were found in measurable quantities in the citrus samples with exception of Cs-137 at a concentration of 71 pCi/kg.

   In 2008 and again in 2009, there were no watermelon samples available at station C04. In these 2 years, due to crop rotation, there were no locally grown watermelons found in any areas nearby the facility and no local commercial harvest performed.

   Table IV-D.4 provides a statistical summary of the watermelon and citrus gamma spectroscopy results.
   Table IV-D.4.a provides the results of the semi-annual samples.

TABLE IV-D.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
CARNIVOROUS FISH	γ Spec 8						
(pCi/kg)	Mn-54	30	<LLD	-	-	<LLD	0
	Fe-59	71	<LLD	-	-	<LLD	0
	Co-58	30	<LLD	-	-	<LLD	0
	Co-60	44	<LLD	-	-	<LLD	0
	Zn-65	72	<LLD	-	-	<LLD	0
	Cs-134	39	<LLD	-	-	<LLD	0
	Cs-137	37	<LLD	-	-	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-D.1.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg γ EMITTERS IN CARNIVOROUS FISH

STATION	QUARTER	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	K-40
C29	1	<21	<17	<46	<23	<46	<22	<22	2995±596
	2	<35	<30	<71	<44	<72	<39	<37	1894±254
	3	<30	<28	<52	<43	<68	<25	<32	1776±197
	4	<25	<25	<63	<36	<57	<30	<28	1963±207
C30	1	<28	<26	<56	<40	<63	<28	<31	2625±215
	2	<21	<16	<38	<20	<39	<23	<19	2395±476
	3	<25	<28	<56	<40	<60	<26	<32	3036±246
	4	<20	<18	<40	<19	<47	<22	<20	2730±175

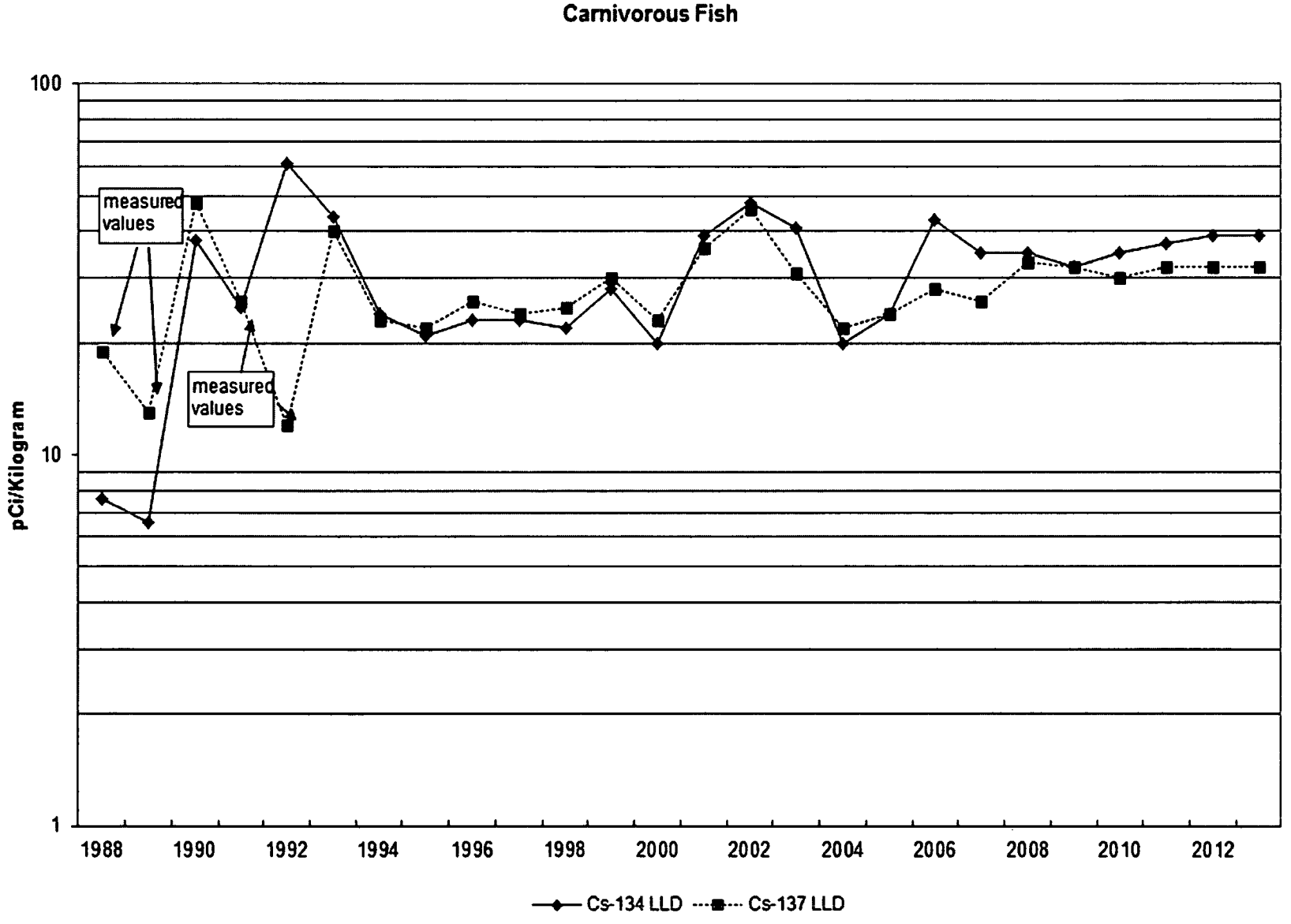

Carnivorous Fish
100
10
1
pCi/Kilogram
measured values
measured values
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Cs-134 LLD
Cs-137 LLD

TABLE IV-D.2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
OYSTERS (pCi/kg)	γ Spec 8						
	Mn-54	28	<LLD	-	-	<LLD	0
	Fe-59	61	<LLD	-	-	<LLD	0
	Co-58	27	<LLD	-	-	<LLD	0
	Co-60	41	<LLD	-	-	<LLD	0
	Zn-65	64	<LLD	-	-	<LLD	0
	Cs-134	26	<LLD	-	-	<LLD	0
	Cs-137	33	<LLD	-	-	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-D.2.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg γ EMITTERS IN OYSTERS

STATION	QUARTER	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	K-40
C29	1	<28	<27	<61	<41	<57	<26	<33	798±128
	2	<19	<18	<41	<18	<44	<20	<20	879±116
	3	<22	<25	<58	<35	<46	<20	<21	698±124
	4	<20	<18	<38	<22	<40	<19	<21	1018±103
C30	1	<27	<25	<55	<27	<64	<25	<29	1187±213
	2	<11	<10	<22	<13	<25	<12	<12	1364±203
	3	<17	<18	<37	<16	<41	<20	<16	583±75
	4	<18	<18	<38	<19	<46	<21	<21	1064±105

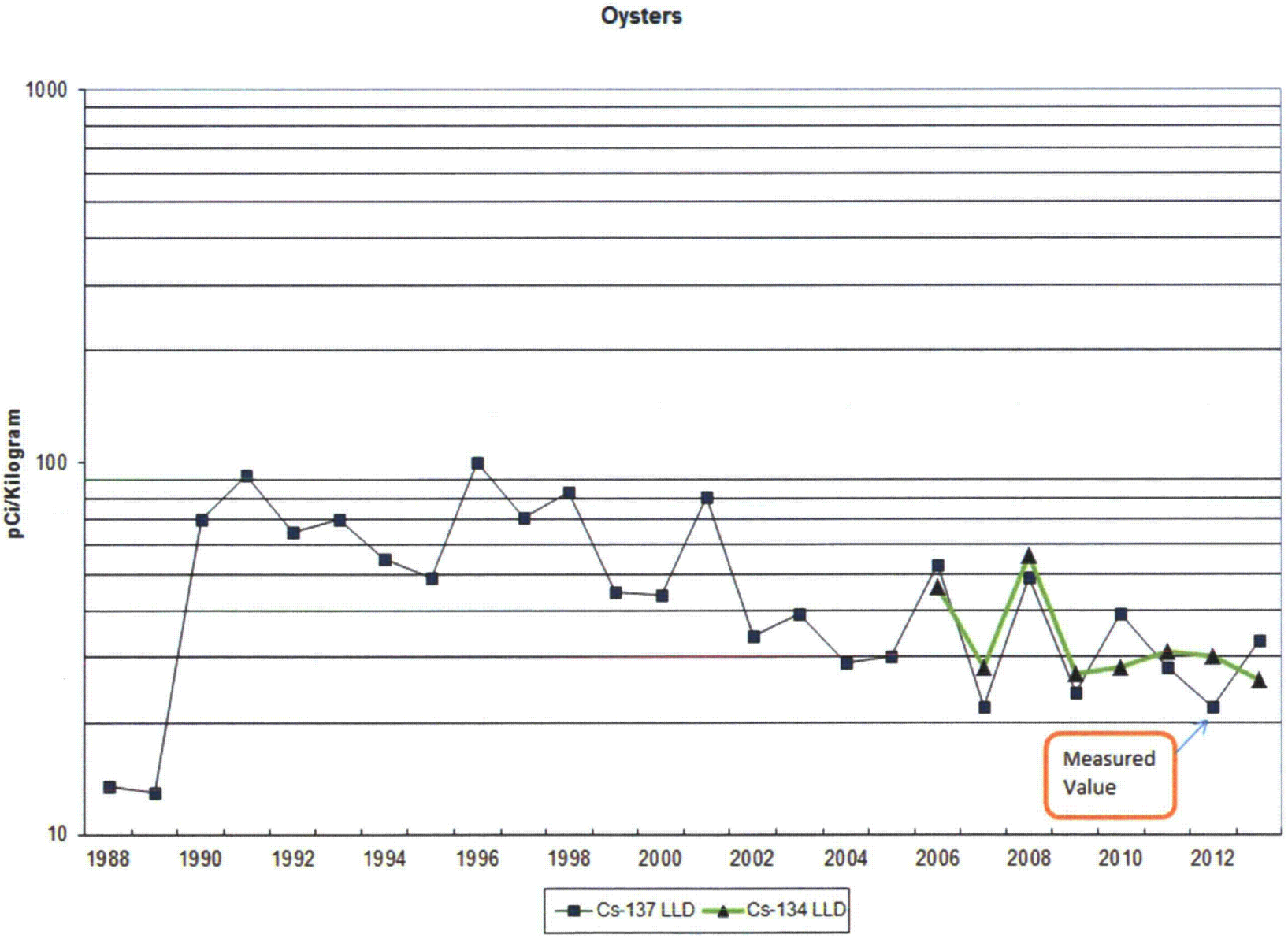

Oysters
1000
100
10
pCi/Kilogram
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Measured Value
Cs-137 LLD
Cs-134 LLD

TABLE IV-D.3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
BROAD LEAF VEGETATION (pCi/kg)	γ Spec 36						
	I-131	50	<LLD	_	_	<LLD	0
	Cs-134	22	<LLD	_	_	<LLD	0
	Cs-137[2]	20	75 (15/24) (5-147)	C48B 0.9 @ 73°	92(12/12) (54-147)	86 (12/12) (14-258)	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

[2]The elevated Cs-137 values are not associated with the operation of CR3 and are a direct result of the Fukushima earthquake and tsunami event that occurred in 2011.

TABLE IV-D.3.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C47	JAN	<23	<15	30±6	3627±149
	FEB	<21	<15	43±9	2455±167
	MAR	<24	<22	14±8	4431±231
	APR	<22	<17	91±9	3353±222
	MAY	<14	<8	95±11	3288±231
	JUN	<10	<7	150±6	1625±168
	JUL	<26	<13	139±8	2579±147
	AUG	<16	<13	56±5	2837±148
	SEP	<26	<14	258±11	2033±123
	OCT	<14	<10	17±2	2746±127
	NOV	<12	<9	99±5	2153±107
	DEC	<16	<13	37±4	2429±130
C48A	JAN	<12	<7	<7	1591±192
	FEB	<25	<18	<20	3162±200
	MAR	<27	<19	<17	3875±201
	APR	<17	<17	19±8	4569±226
	MAY	<11	<12	<11	3864±191
	JUN	<12	<17	<19	3198±220
	JUL	<20	<11	<17	2870±151
	AUG	<9	<9	<10	3456±150
	SEP	<22	<12	10±3	3653±168
	OCT	<50	<13	<14	4020±184
	NOV	<13	<9	5±2	3686±160
	DEC	<13	<9	<14	2889±125

TABLE IV-D.3.a (CONT'D)

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C48B	JAN	<14	<7	54±3	2446±176
	FEB	<25	<20	101±10	2482±184
	MAR	<26	<16	104±12	3510±204
	APR	<16	<15	62±6	3093±166
	MAY	<18	<21	109±12	2969±247
	JUN	<14	<13	93±11	2278±176
	JUL	<12	<8	147±12	1866±170
	AUG	<15	<12	84±7	3419±168
	SEP	<15	<8	40±3	2138±106
	OCT	<14	<8	96±5	2982±132
	NOV	<11	<9	95±5	2941±134
	DEC	<11	<9	114±6	2439±117

The elevated Cs-137 values are a direct result of the Fukushima earthquake and tsunami event that occurred in 2011 and are not associated with CR-3 operation.

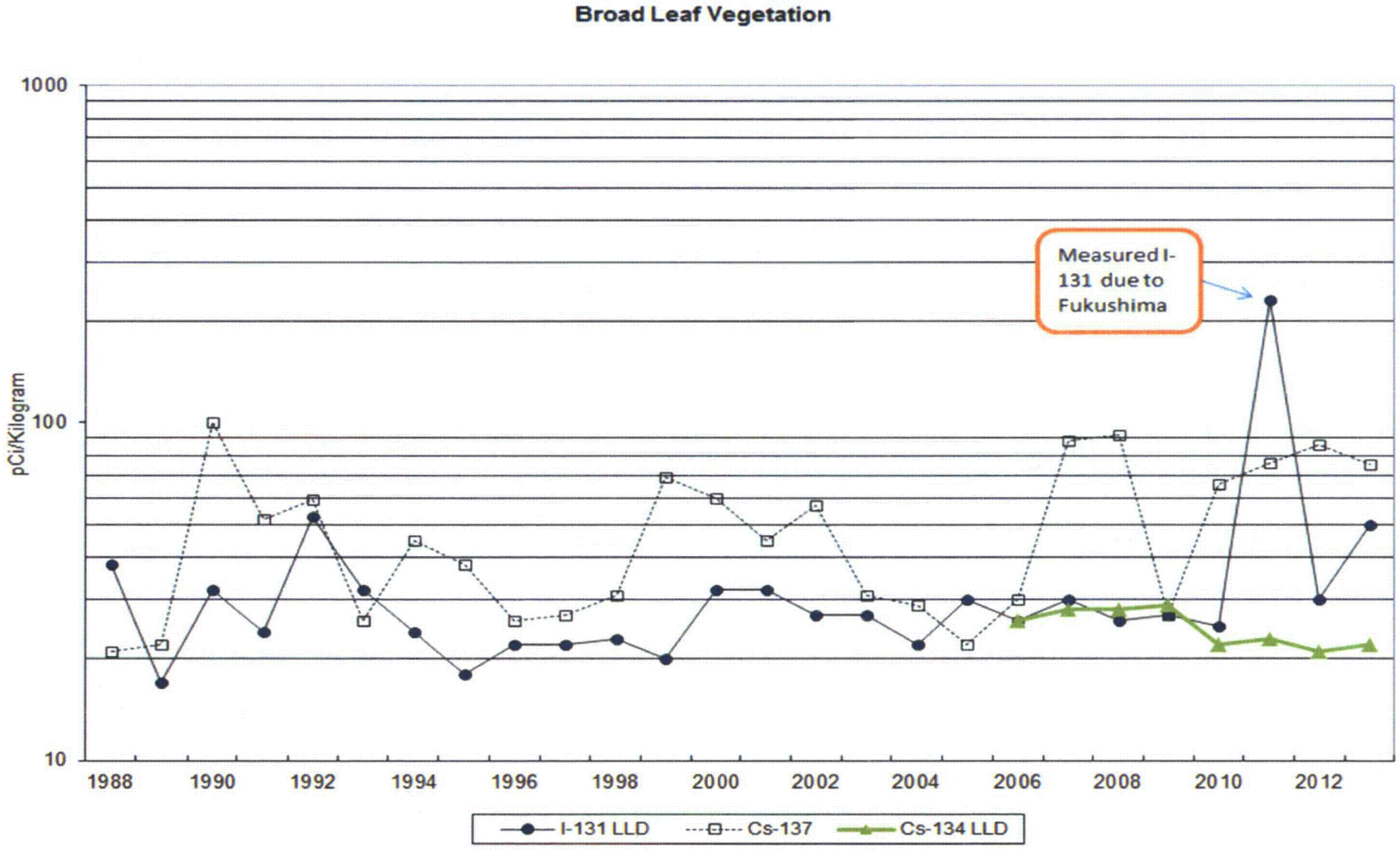

Broad Leaf Vegetation
1000
100
10
pCi/Kilogram
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Measured I-131 due to Fukushima
I-131 LLD
Cs-137
Cs-134 LLD

TABLE IV-D.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2013**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	LOCATION WITH HIGHEST MEAN MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATERMELON (pCi/kg)	γ Spec 1						
	I-131	4	< LLD	_	_	None	0
	Cs-134	5	< LLD	_	_	None	0
	Cs-137	3	< LLD	_	_	None	0
CITRUS (pCi/kg)	γ Spec 1						
	I-131	6	<LLD	_	_	None	0
	Cs-134	5	<LLD	_	_	None	0
	Cs-137	10	86(1/1) (86)	C19 9.6 mi. @ 30°	86(1/1) (86)	None	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

TABLE IV-D.4.a

DUKE ENERGY FLORIDA, INC. - CR3 - 2013

pCi/kg OF γ EMITTERS IN WATERMELON AND CITRUS

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C04 – Watermelon	June	<4	<5	<3	1654±66
C19 – Citrus	January	<6	<5	86±5	1190±57

Supplemental Corrected Report
to the

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

2010

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

Prepared By: Rudy Pinner 5/15/2014
Sr. Scientist

Discussion concerning this supplemental report.

Only the pages that had errors are included in this supplemental report. Corrected values are in bold type. The errors were a result of transposition mistakes. The corrections are insignificant. The needed corrections are documented in condition report 671434.

TABLE IV-C.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 **DOCKET NO. 50-302**

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2010**

MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)[1]	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SHORELINE SEDIMENT	γ Spec 8						
(pCi/kg)	Cs-134	34	<LLD	—	—	<LLD	0
	Cs-137	36	**21** (4/6) (10-29)	**C14M** **1.2mi @ 270°**	**22** (2/2) (**18-26**)	<LLD	0

[1]The "a priori" LLD which meets or exceeds the requirements of Table 2-9 of the CR-3 ODCM.

Note: Bold values are corrected.

CORRECTED TABLE IV-C.4.a

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2010

pCi/kg γ EMITTERS IN SHORELINE SEDIMENT

STATION	PERIOD	Co-58	Co-60	Cs-134	Cs-137	K-40	Ra-226
C09	First Half	<10	<12	<14	<13	482±80	1001±129
	Second Half	<9	<7	<9	<8	241±24	384±35
C14H	First Half	<13	<13	<14	29±3	1507±73	1313±177
	Second Half	<11	<11	<16	10±4	591±77	2179±106
C14M	First Half	<11	26±4	**<14**	**26±6**	**1132±80**	**1469±125**
	Second Half	<17	53±8	**<21**	**18±8**	**794±103**	**1433±152**
C14G	First Half	<10	<10	<11	<11	167±22	1297±114
	Second Half	**<25**	<33	<34	<36	833±141	1115±306

C09 is the control station at Ft. Island Beach. C14H, C14M, & C14G are discharge canal stations.

Note: Bold values are corrected.