Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: ITS 5.7.1.1(b)

May 8, 2006
3F0506-02

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

Subject: Crystal River Unit 3 – 2005 Annual Radiological Environmental Operating Report

Dear Sir:

Florida Power Corporation, doing business as Progress Energy Florida, Inc., hereby submits the 2005 Annual Radiological Environmental Operating Report for Crystal River Unit 3 (CR-3) in accordance with the CR-3 Improved Technical Specifications, 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, 2005 through December 31, 2005.

If you have any questions regarding this submittal, please contact Mr. Paul Infanger, Supervisor, Licensing and Regulatory Programs at (352) 563-4796.

Sincerely,

J. A. Franke
Plant General Manager

JAF/ff

Attachment

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Power Line Street
Crystal River, FL 34428

IE25
A009

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 / LICENSE NUMBER DPR-72

ATTACHMENT

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT 2005

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

2005

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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

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 2005 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 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 programs sampling and analysis 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, -3, and -4. Sample frequency and analysis type may be determined from Table I-2. Figure I-1 illustrates the relevant exposure pathways.

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.

The results of the 2005 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 key, shaded boxes indicate LLD values, while open boxes indicate measured values.

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, the following entry

15 (249/256)
(4 - 35)

in 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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

SAMPLE STATION LOCATIONS

SAMPLE MEDIA	STATION ID	DIRECTION	APPROX. DISTANCE (Miles)
TLD	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
	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)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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
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	NNE	0.9
	C47-Control	ESE	78
WATERMELON	C04	NE	13
CITRUS	C19	ENE	9.6

TABLE I-2

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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 pCi/m^3
Air Particulate	6	Weekly	Gross ß		0.01
		Quarterly	γ Spec :	Cs-134	0.05
				Cs-137	0.06
Seawater	3	Monthly	Tritium		3000 pCi/L
		Monthly	γ Spec :	Mn-54	15
				Fe-59	30
				Co-58	15
				Co-60	15
				Zn-65	30
				Zr-Nb-95	15
				I-131	1
				Cs-134	15
				Cs-137	18
				Ba-La-140	15
Ground Water	1	Semiannual	Tritium		2000 pCi/L
		Semiannual	γ Spec :	[2]	[2]
Drinking Water	3	Quarterly	Tritium		2000 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
[3]When available
[4]During harvest
[5]Same as broad leaf vegetation

TABLE I-2 (Cont'd)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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
[2]Same as Seawater γ Spec
[3]When available
[4]During harvest
[5]Same as broad leaf vegetation

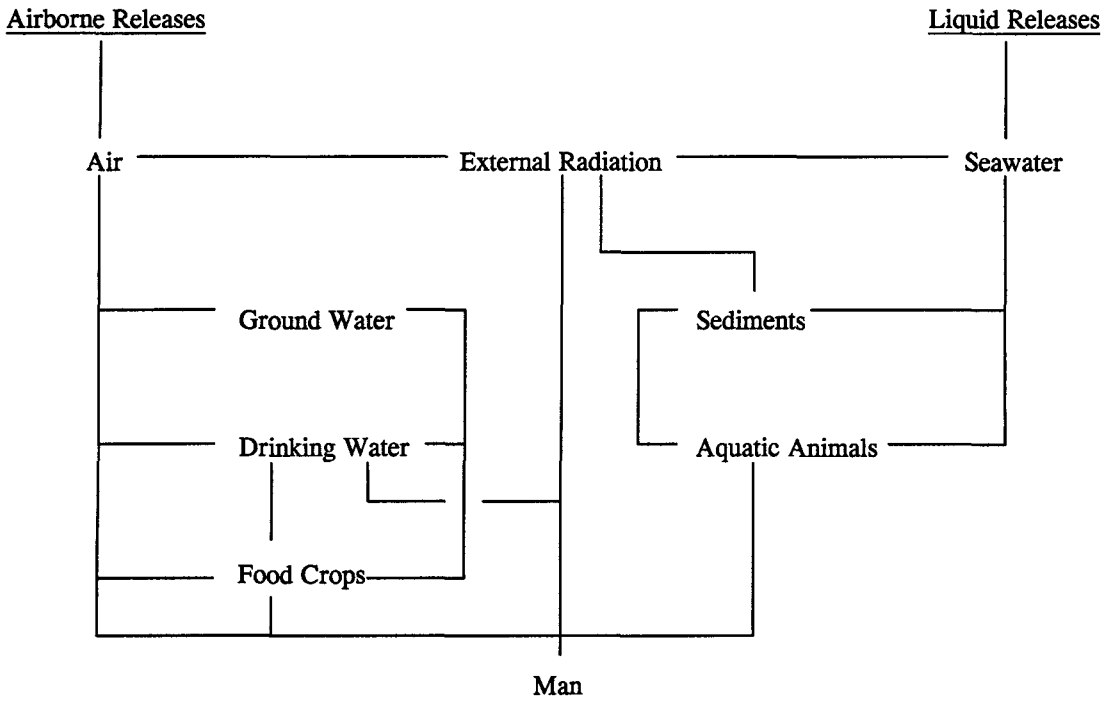


FIGURE I-1: Environmental Media and Exposure Pathways

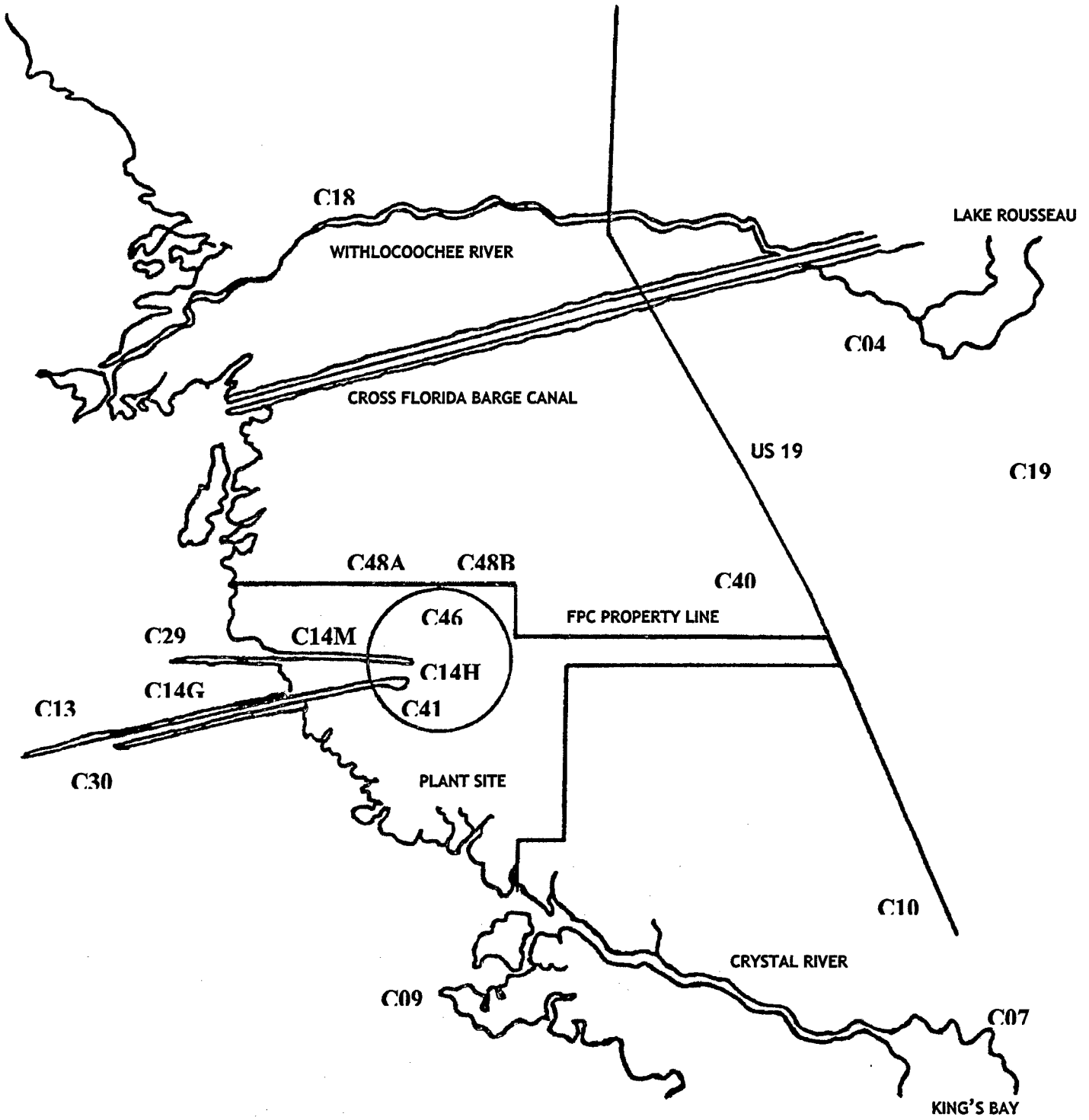


FIGURE I-2: Environmental Monitoring Sample Stations (non-TLDs)

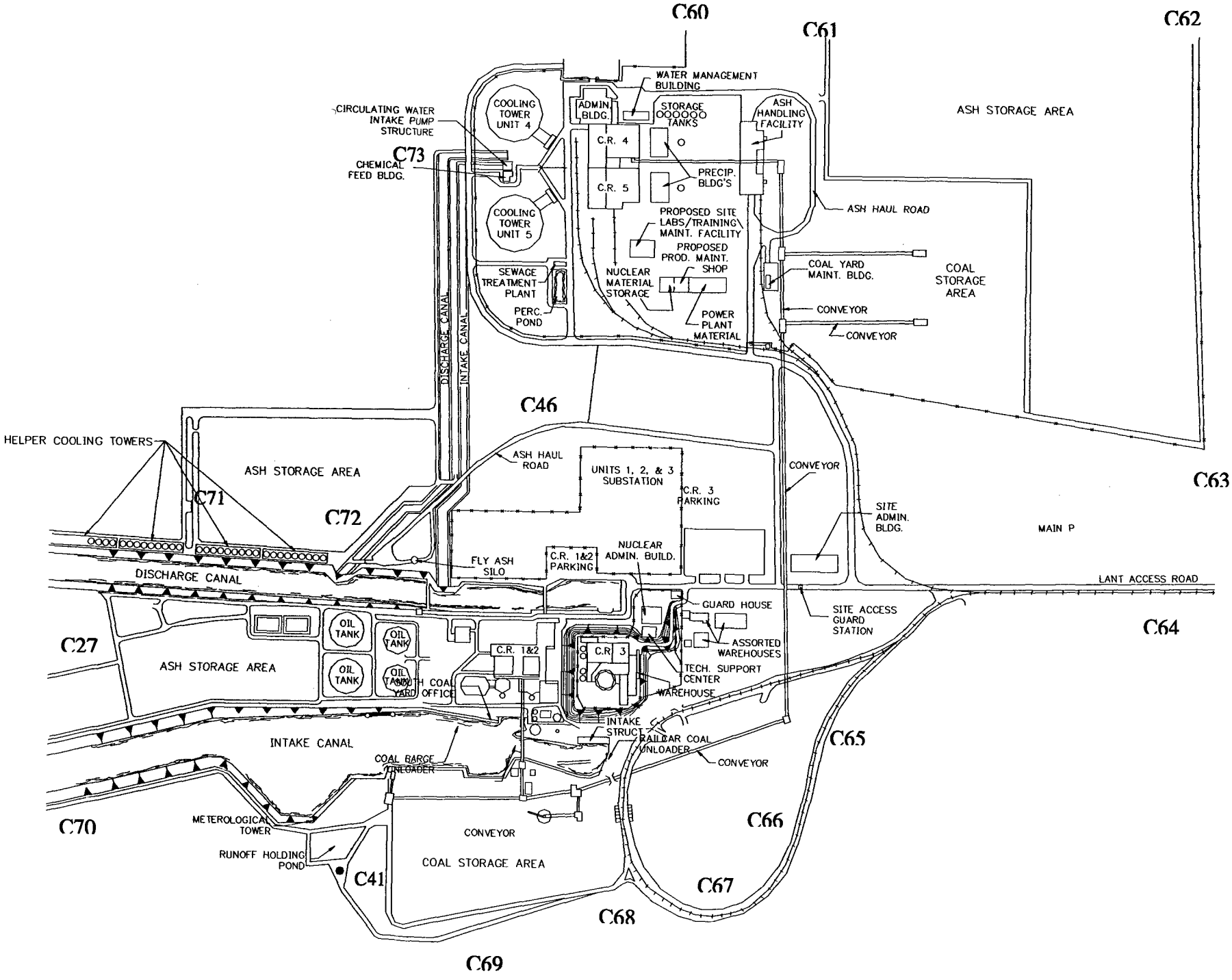


FIGURE I-3: Environmental Monitoring TLD Locations (on site)

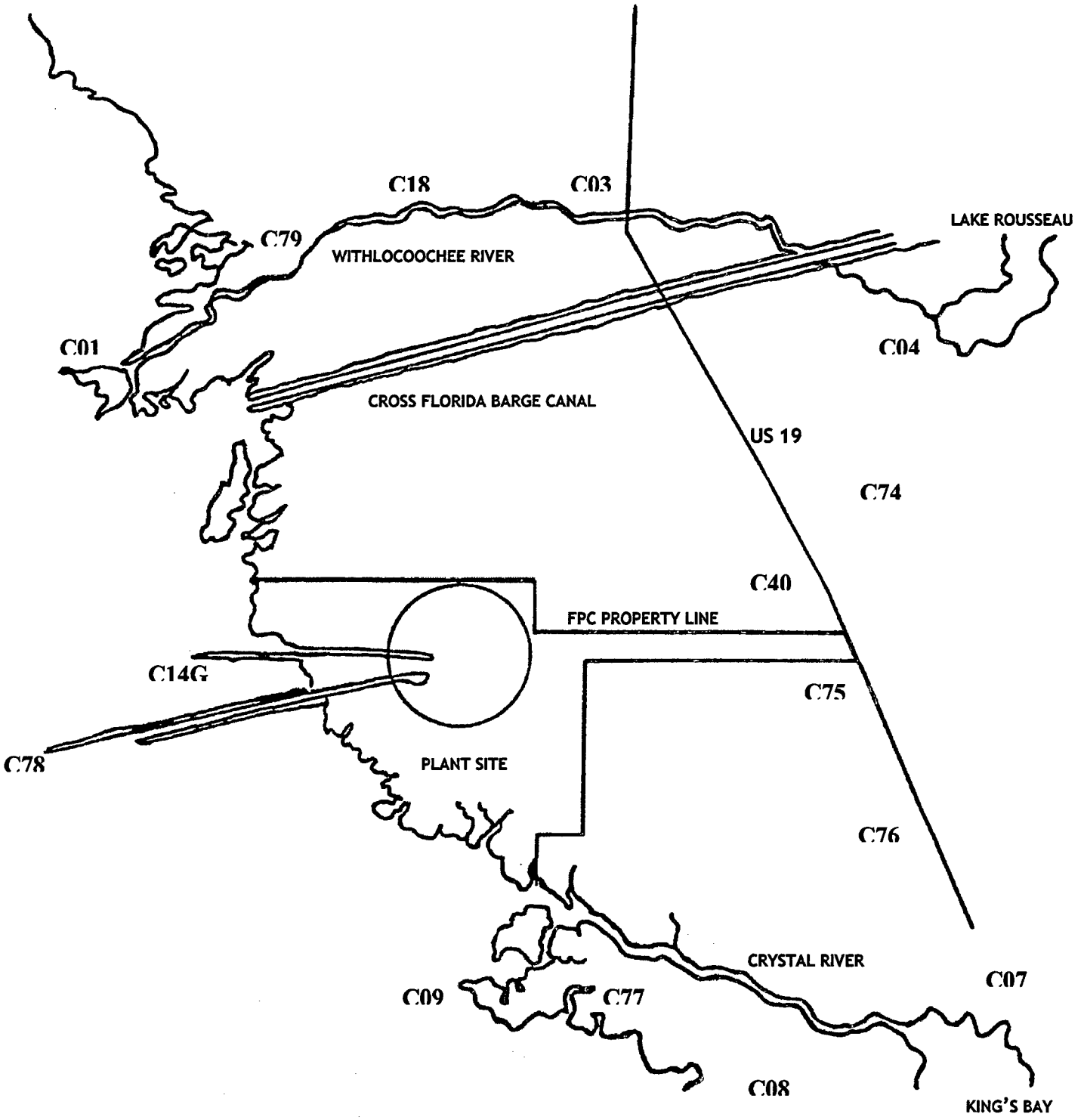


FIGURE I-4: Environmental Monitoring TLD Locations (off site)

II. LAND-USE CENSUS

A land-use census was conducted during July. 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	NEAREST MILK ANIMAL
N	4.46 @ 2°	4.77 @ 2°	*
NNE	3.95 @ 15°	4.88 @ 17°	*
NE	3.84 @ 54°	*	*
ENE	3.43 @ 60°	*	*
E	2.40 @ 92°	*	*
ESE	4.24 @ 102°		*
SE	4.90 @ 133°	*	*
SSE	3.53 @ 149°	*	*
S	*	*	*
SSW	*	*	*
SW	*	*	*
WSW	*	*	*
W	*	*	*
WNW	*	*	*
NW	4.77 @ 323°	*	*
NNW	4.60 @ 339°	*	*

* No suitable sites were located within 5 miles.

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 February 2005:

Media	Nuclide	Result	% Bias	Acceptance Range	Flag
Air	Cs-134	2.94	-16.2	2.6 - 4.56	A
Air	Cs-137	2.44	8.0	1.58 - 2.94	A
Air	Gross Beta	0.35	17.8	0.15 - 0.45	A
Soil	Cs-134	763	0.5	531.30 - 986.70	A
Soil	Cs-137	368	16.8	220.50 - 409.50	A
Vegetation	Cs-134	3.39	-32.2	3.50 - 6.50	A
Vegetation	Cs-137	4.00	-27.0	2.88 - 5.34	A
Water	H-3	302.8	8.1	196.00 - 364.00	A
Water	Mn-54	334.2	1.0	231.70 - 430.30	A
Water	Co-60	251.9	0.4	175.70 - 326.30	A
Water	Zn-65	533.0	7.5	347.20 - 644.80	A
Water	Cs-134	114.7	-9.7	88.90 - 165.10	A
Water	Cs-137	325.6	-1.9	232.40 - 431.60	A

Results for August 2005:

Media	Nuclide	Result	% Bias	Acceptance Range	Flag
Air	Cs-134	4.04	4.9	2.70 - 5.01	A
Air	Cs-137	3.55	9.9	2.26 - 4.20	A
Air	Gross Beta	0.95	14.9	0.55 - 1.22	A
Soil	Cs-134	570	0.4	397.60 - 738.40	A
Soil	Cs-137	499	13.7	307.30 - 570.70	A
Vegetation	Cs-134	3.75	-8.31	2.86 - 5.32	A
Vegetation	Cs-137	4.74	-12.71	3.80 - 7.06	A
Water	H-3	556.4	5.6	368.90 - 685.10	A
Water	Mn-54	420.7	0.6	292.60 - 543.40	A
Water	Co-60	261.0	0.0	182.70 - 339.30	A
Water	Zn-65	351.5	6.5	231.00 - 429.00	A
Water	Cs-134	166.9	-0.1	116.90 - 217.10	A
Water	Cs-137	326.4	-2.0	233.10 - 432.90	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 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.

Three hundred and eleven particulate samples were analyzed for gross beta activity, all of which had measurable activity. The average indicator concentration was 17 pCi/1000 m^3 with a range of 5 to 47 pCi/1000 m^3. The average indicator concentration since 1996 was in the range of 15 to 17 pCi/1000 m^3. The control location concentration for 2005 averaged 17 pCi/1000 m^3, with a range of 8 to 43 pCi/1000 m^3.

Three hundred and twelve samples were analyzed for iodine activity, with none having measurable activity.

Quarterly composite data are summarized in Table IV-A.4. Measurable quantities of cesium were not identified. The highest cesium LLD was 1.9 pCi/1000 m^3 for cesium 134.

The gross beta LLD of 0.01 pCi/m^3 was not attained for air sample station C46 for the sample period ending June 14th due to a disconnected hose. Also, at station C46, there was a loss of about 6 hours of sample collection for the sample period ending November 11th due to pump failure.

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, 2005**

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/m³)	I-131	0.012	<LLD	-	-	<LLD	0
AIRBORNE PARTICULATES	Gross ß 311	6.4	17 (259/260) (5–47)	C18 5.2 @ 0°	19 (52/52) (7–44)	17 (52/52) (8–43)	0
(pCi/1000m³ for Gross ß, pCi/1000m³ for γ Spec)	γ Spec 24						
	Cs-134	0.8	<LLD	-	-	<LLD	0
	Cs-137	0.8	<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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
01-04	<.01	<.01	<.01	<.01	<.01	<.01
01-11	<.01	<.01	<.01	<.01	<.01	<.01
01-18	<.02	<.02	<.02	<.02	<.02	<.02
01-25	<.02	<.02	<.02	<.02	<.02	<.02
02-01	<.02	<.02	<.02	<.02	<.02	<.02
02-07	<.02	<.02	<.02	<.02	<.02	<.02
02-14	<.02	<.02	<.02	<.02	<.02	<.02
02-21	<.02	<.02	<.02	<.02	<.02	<.02
03-01	<.02	<.02	<.02	<.02	<.02	<.02
03-07	<.02	<.02	<.02	<.02	<.02	<.02
03-14	<.02	<.02	<.02	<.02	<.02	<.02
03-21	<.02	<.02	<.02	<.02	<.02	<.02
03-28	<.02	<.02	<.02	<.02	<.02	<.02
04-05	<.03	<.03	<.03	<.03	<.03	<.03
04-12	<.02	<.01	<.01	<.01	<.02	<.01
04-19	<.01	<.01	<.01	<.01	<.01	<.01
04-26	<.01	<.01	<.01	<.01	<.01	<.01

TABLE IV-A.2 (Cont'd)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
05-03	<.01	<.01	<.01	<.01	<.01	<.01
05-10	<.02	<.02	<.02	<.02	<.02	<.02
05-17	<.02	<.02	<.02	<.02	<.02	<.02
05-23	<.01	<.01	<.01	<.01	<.01	<.01
05-31	<.01	<.01	<.01	<.01	<.01	<.01
06-06	<.03	<.03	<.03	<.03	<.03	<.03
06-14	<.02	<.02	<.02	<.02	<.02	<.02
06-27	<.02	<.02	<.02	<.02	<.02	<.02
07-05	<.01	<.01	<.01	<.01	<.01	<.01
07-12	<.01	<.01	<.01	<.01	<.01	<.01
07-19	<.01	<.01	<.01	<.01	<.01	<.01
07-26	<.01	<.01	<.01	<.01	<.01	<.01
08-02	<.02	<.02	<.02	<.02	<.02	<.02
08-08	<.02	<.02	<.02	<.02	<.02	<.02
08-15	<.02	<.02	<.02	<.02	<.02	<.02
08-23	<.01	<.01	<.01	<.01	<.01	<.01
08-31	<.01	<.01	<.01	<.01	<.01	<.01

TABLE IV-A.2 (Cont'd)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
09-06	<.02	<.02	<.02	<.02	<.02	<.02
09-12	<.02	<.02	<.02	<.02	<.02	<.02
09-20	<.01	<.01	<.01	<.01	<.01	<.01
09-27	<.01	<.01	<.01	<.01	<.01	<.01
10-04	<.01	<.01	<.01	<.01	<.01	<.01
10-11	<.01	<.01	<.01	<.01	<.01	<.01
10-18	<.01	<.01	<.01	<.01	<.01	<.01
10-26	<.01	<.01	<.01	<.01	<.01	<.01
11-01	<.01	<.01	<.01	<.01	<.01	<.01
11-08	<.01	<.01	<.01	<.01	<.01	<.01
11-15	<.01	<.01	<.01	<.01	<.01	<.01
11-21	<.02	<.02	<.02	<.01	<.02	<.01
11-29	<.02	<.02	<.02	<.01	<.02	<.01
12-06	<.01	<.01	<.01	<.01	<.01	<.01
12-12	<.01	<.01	<.01	<.01	<.01	<.01
12-19	<.01	<.01	<.01	<.01	<.01	<.01
12-27	<.01	<.01	<.01	<.01	<.01	<.01

TABLE IV-A.3

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/1000m^3 GROSS ß IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
01-04	19	21	21	16	19	16
01-11	12	13	10	4	10	15
01-18	15	16	13	13	17	10
01-25	17	28	16	18	26	26
02-01	9	13	15	11	15	12
02-07	15	16	10	10	15	12
02-14	15	24	26	23	26	23
02-21	23	23	16	24	19	25
03-01	10	14	9	9	9	14
03-07	25	18	23	18	21	20
03-14	17	18	9	13	16	19
03-21	15	15	14	17	19	16
03-28	12	17	18	15	19	17
04-04	14	15	18	15	10	17
04-12	12	21	13	15	20	15
04-19	18	19	17	20	22	21
04-26	21	23	20	20	24	23

TABLE IV-A.3 (Cont'd)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/1000m^3 GROSS ß IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
05-03	17	19	15	14	18	17
05-10	14	14	13	16	12	17
05-17	17	22	15	18	16	21
05-23	15	15	5	16	18	10
05-31	15	22	15	16	16	17
06-06	11	9	13	10	10	12
06-14	10	9	9	10	--	10
06-20	11	14	17	17	18	15
06-27	11	8	10	10	10	9
07-05	11	10	6	7	7	4
07-12	9	18	18	16	15	22
07-19	13	8	13	8	9	9
07-26	11	19	16	14	13	9
08-02	16	19	17	20	18	16
08-08	11	7	5	12	8	8
08-15	24	24	24	20	26	13
08-23	14	22	16	22	19	10
08-31	9	7	7	7	12	9

TABLE IV-A.3 (Cont'd)

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/1000m^3 GROSS ß IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
09-06	27	26	20	25	21	16
09-12	19	18	14	14	13	12
09-20	39	44	47	42	45	43
09-27	12	13	15	15	13	11
10-04	11	15	13	14	11	11
10-11	5	12	8	7	10	8
10-18	26	24	27	22	24	26
10-26	19	23	22	19	20	20
11-01	26	22	16	21	18	21
11-08	21	28	20	18	21	15
11-15	20	22	24	22	24	21
11-21	19	17	12	17	18	18
11-29	24	30	22	25	25	21
12-06	24	21	20	28	25	24
12-12	19	26	15	22	24	14
12-19	15	15	21	14	19	12
12-27	30	30	29	28	23	34

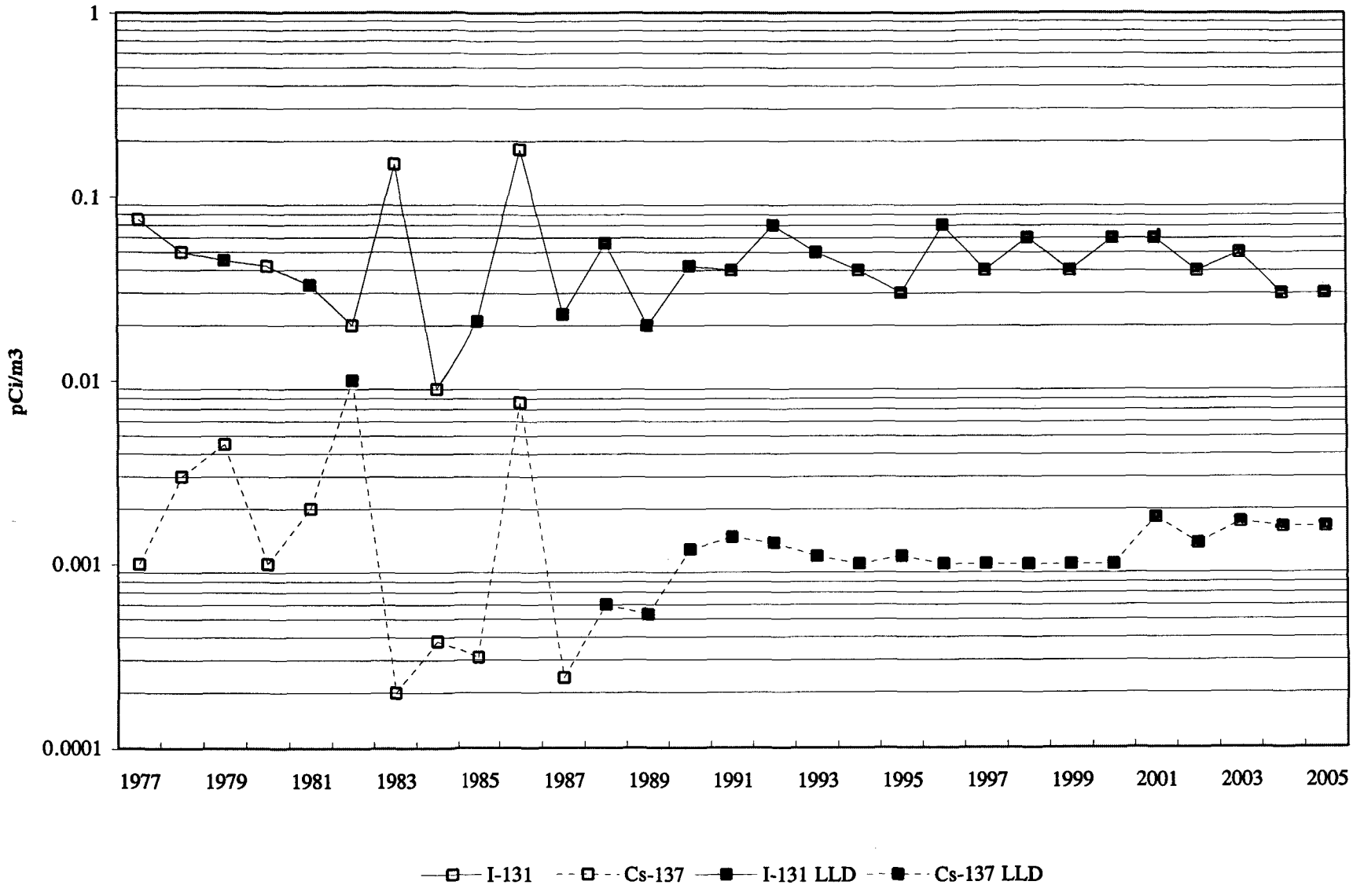
TABLE IV-A.4

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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

STATION	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
C07	Be-7	155	129	165	173
	K-40	<15	<22	<26	<27
	Cs-134	<0.7	<1.3	<1.7	<1.3
	Cs-137	<0.7	<1.2	<1.5	<1.0
C18	Be-7	170	151	173	184
	K-40	<22	<26	<20	<33
	Cs-134	<0.9	<1.2	<1.1	<1.9
	Cs-137	<1.0	<1.2	<0.8	<1.3
C40	Be-7	174	141	144	137
	K-40	<23	<23	<18	<20
	Cs-134	<1.2	<1.2	<1.0	<1.0
	Cs-137	<0.9	<1.2	<1.0	<0.9
C41	Be-7	151	154	146	149
	K-40	<23	<24	<31	<28
	Cs-134	<1.3	<1.6	<1.1	<1.5
	CS-137	<0.9	<1.1	<1.4	<1.3
C46	Be-7	168	137	151	188
	K-40	<21	<19	<20	<24
	Cs-134	<1.7	<0.7	<0.9	<1.0
	Cs-137	<1.6	<1.2	<0.9	<0.9
C47	Be-7	184	163	132	182
	K-40	<20	<25	<5	<29
	Cs-134	<1.4	<1.2	<0.7	<0.9
	Cs-137	<0.9	<1.0	<0.6	<1.2

Airborne


1
0.1
0.01
0.001
0.0001
pCi/m3
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
I-131
Cs-137
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 2005.

The highest on-site dose was 107 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 67 mrem/yr at station C65 (ESE at 1740 feet).

The highest off-site dose was 64 mrem/yr at station C40 (east at 3.5 miles). The control station (C47) dose was 49 mrem/yr. The average for all stations (except control) was 54 mrem/yr for 2005, 58 mrem/yr for 2004, and 58 mrem/yr for 2003. Direct radiation results are similar to previous years and show no change of significance.

TABLE IV-B

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2005**

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	LOCATION WITH HIGHEST MEAN MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT	γ DOSE 132	15	54 (128/128)	C71	107 (4/4)	49 (4/4)	0
RADIATION			(33 - 120)	0.6 @ 296°	(91 - 120)	(45 - 52)	
(mrem/yr)							

TABLE IV-B.1

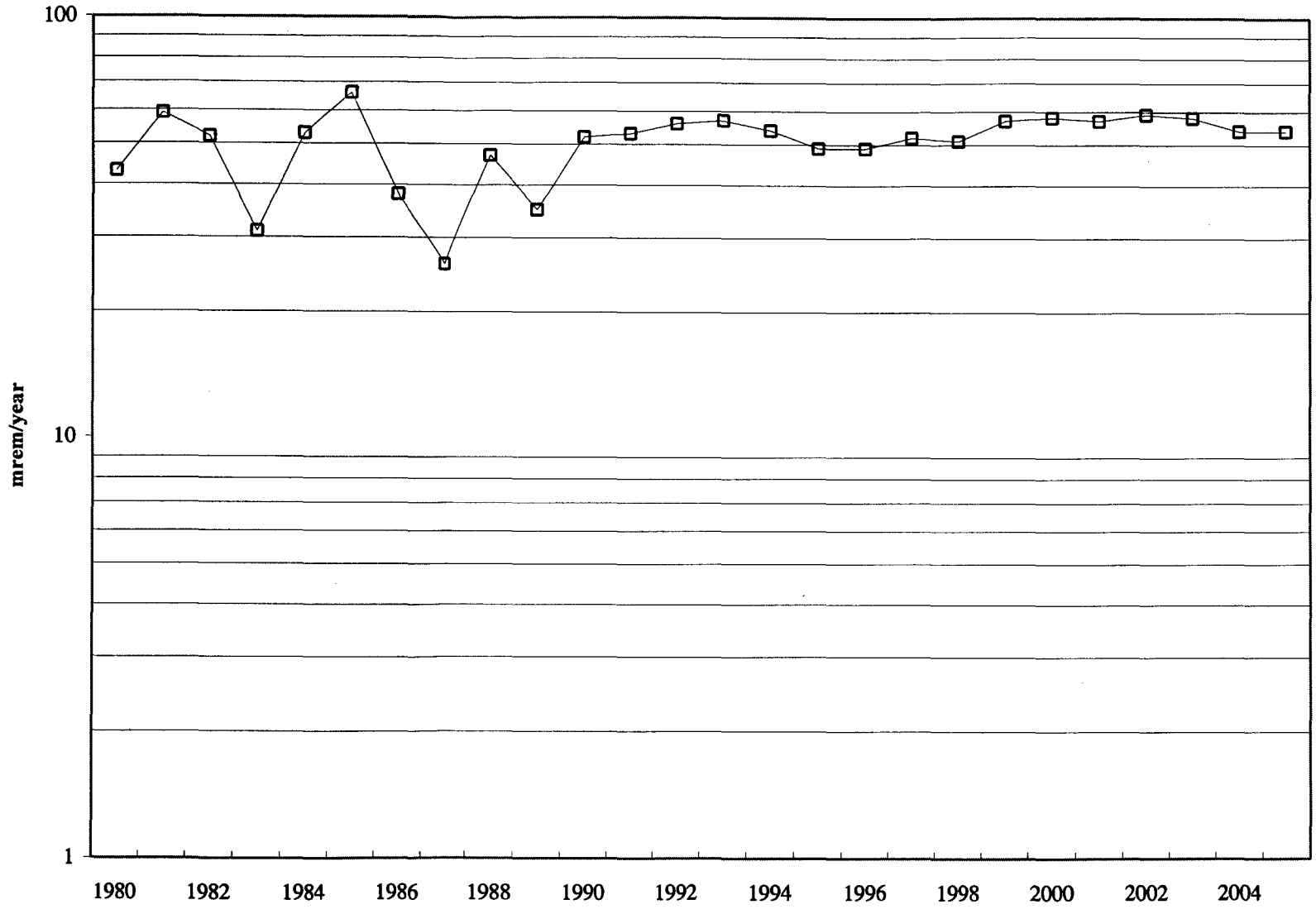
PROGRESS ENERGY FLORIDA, INC. - CR-3 - 2005

mrem/yr γ Dose

TLD STATION	Quarter	1	2	3	4
CO1		46	45	39	42
CO3		46	43	39	45
CO4		46	43	41	42
CO7*		43	42	36	41
CO8		46	44	38	42
C09		45	45	38	43
C14G		53	54	48	49
C18		49	49	45	50
C27		70	64	54	66
C40*		60	59	52	61
C41		57	56	49	54
C46*		55	56	47	53
C47 (CONTROL)		51	51	45	52
C60		59	55	49	56
C61		60	57	49	57
C62		63	60	57	62
C63		57	56	51	61
C64		59	58	53	54
C65		70	70	62	67
C66		63	64	50	55
C67		56	56	50	57
C68		60	57	53	58
C69		59	65	55	66
C70		63	59	53	60
C71		120	109	91	109
C72		62	62	60	64
C73		52	53	50	54
C74		41	43	41	41
C75		52	53	49	52
C76		49	51	45	49
C77		39	39	33	39
C78		44	46	41	40
C79		49	49	45	48

*TLDs not required by the ODCM.
Quarterly values are multiplied by 4 to obtain an equivalent yearly dose.

Direct Radiation



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. Of twenty-four indicator samples, eleven had measurable tritium at an average concentration of 1067pCi/L as compared to eight measurable samples with an average of 5294 pCi/L in 2004. The sample with the highest concentration of tritium, 7041 pCi/L, was obtained in October at station C14G near the mouth 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. Two control station samples contained tritium at an average concentration of 135 pCi/L. The 2004 control station results averaged 104 pCi/L.

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

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. 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 130 pCi/L for tritium and less than 10 pCi/L for select gamma emitters.

3. 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. 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.

4. 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. Of the six indicator samples, two had measurable amounts of cesium-137. Cobalt-60 was not detected in 2005 samples (The average cobalt-60 concentration at the indicator locations ranged from 30 to 389 pCi/L from 1998 through 2004). The average cesium-137 concentration at the indicator locations was 38 pCi/L. These results are similar to previous years' results. None of the samples taken at Fort Island Gulf Beach, the control location, indicated measurable amounts of cobalt or cesium.

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, 2005**

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
SEAWATER (pCi/L)	Tritium 36	131	1067 (11/24) (79-7041)	C14G 2.5 @ 270°	1617 (7/12) (181-7041)	135 (2/12)	0
	γ Spec 36						
	Mn-54	3	<LLD	-	-	<LLD	0
	Fe-59	6	<LLD	-	-	<LLD	0
	Co-58	3	<LLD	-	-	<LLD	0
	Co-60	4	<LLD	-	-	<LLD	0
	Zn-65	7	<LLD	-	-	<LLD	0
	Zr-Nb-95	6	<LLD	-	-	<LLD	0
	I-131	4	<LLD	-	-	<LLD	0
	Cs-134	4	<LLD	-	-	<LLD	0
	Cs-137	4	<LLD	-	-	<LLD	0
	Ba-La-140	9	<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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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	<126	207 ± 28	<3	<3	<7	<4	<7	<6	<4	<4	<3	<7
	FEB	<127	281 ± 30	<4	<4	<9	<5	<10	<8	<4	<4	<5	<6
	MAR	159 ± 26	239 ± 33	<5	<4	<8	<6	<9	<7	<4	<4	<4	<8
	APR	<136	194 ± 32	<4	<4	<8	<5	<8	<7	<5	<5	<5	<10
	MAY	<136	250 ± 34	<4	<4	<7	<4	<9	<6	<4	<5	<5	<15
	JUN	<145	252 ± 32	<3	<3	<6	<4	<8	<6	<4	<3	<4	<9
	JUL	<132	255 ± 32	<3	<3	<8	<4	<7	<5	<4	<3	<4	<6
	AUG	<148	304 ± 29	<3	<3	<7	<4	<7	<5	<3	<4	<4	<11
	SEP	111 ± 7	161 ± 37	<3	<3	<9	<5	<10	<7	<5	<5	<4	<10
	OCT	<146	282 ± 25	<3	<2	<5	<3	<6	<4	<3	<3	<3	<5
	NOV	<157	271 ± 36	<4	<3	<8	<4	<10	<7	<4	<5	<4	<10
	DEC	<149	230 ± 27	<3	<3	<7	<4	<8	<6	<4	<4	<4	<8
C14G	JAN	<126	220 ± 29	<3	<3	<6	<4	<7	<6	<3	<4	<3	<6
	FEB	<127	265 ± 31	<3	<3	<7	<5	<8	<6	<4	<4	<4	<8
	MAR	197 ± 27	219 ± 21	<3	<2	<5	<3	<6	<4	<3	<3	<3	<5
	APR	<136	202 ± 30	<5	<3	<8	<5	<8	<7	<5	<4	<5	<7
	MAY	2116 ± 46	215 ± 27	<4	<3	<6	<3	<7	<6	<4	<4	<4	<10
	JUN	854 ± 34	215 ± 30	<4	<3	<6	<4	<8	<5	<3	<4	<3	<13
	JUL	<132	269 ± 27	<3	<4	<7	<4	<7	<6	<4	<3	<3	<5
	AUG	520 ± 32	266 ± 30	<4	<3	<6	<4	<7	<5	<4	<3	<3	<10
	SEP	413 ± 32	189 ± 31	<3	<3	<6	<4	<8	<6	<4	<4	<3	<8
	OCT	7041 ± 132	292 ± 29	<3	<3	<8	<4	<8	<6	<6	<4	<4	<4
	NOV	181 ± 52	380 ± 33	<3	<3	<7	<3	<8	<6	<4	<4	<3	<7
	DEC	<149	243 ± 30	<4	<4	<7	<4	<7	<6	<4	<4	<3	<9

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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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	79 ± 23	243 ± 20	<2	<2	<5	<3	<6	<4	<3	<3	<3	<6
	FEB	<127	247 ± 35	<3	<3	<6	<4	<9	<6	<4	<4	<3	<10
	MAR	<135	256 ± 21	<2	<3	<5	<3	<5	<5	<3	<3	<3	<5
	APR	91± 26	187 ± 28	<2	<3	<8	<4	<7	<6	<5	<4	<4	<5
	MAY	<136	228 ± 28	<3	<3	<7	<4	<8	<5	<4	<4	<3	<12
	JUN	<145	276 ± 30	<3	<3	<7	<3	<7	<6	<4	<3	<3	<11
	JUL	<137	278 ± 32	<3	<4	<7	<4	<7	<7	<4	<3	<4	<9
	AUG	<148	262 ± 29	<3	<3	<8	<4	<6	<6	<3	<3	<4	<11
	SEP	153 ± 27	224 ± 27	<4	<4	<6	<4	<7	<5	<4	<4	<3	<7
	OCT	88 ± 46	256 ±32	<3	<3	<8	<4	<6	<6	<6	<5	<3	<6
	NOV	<157	288 ± 34	<3	<3	<7	<4	<7	<6	<4	<4	<3	<7
	DEC	<149	262 ± 32	<3	<4	<8	<4	<9	<6	<4	<3	<3	<7

Seawater

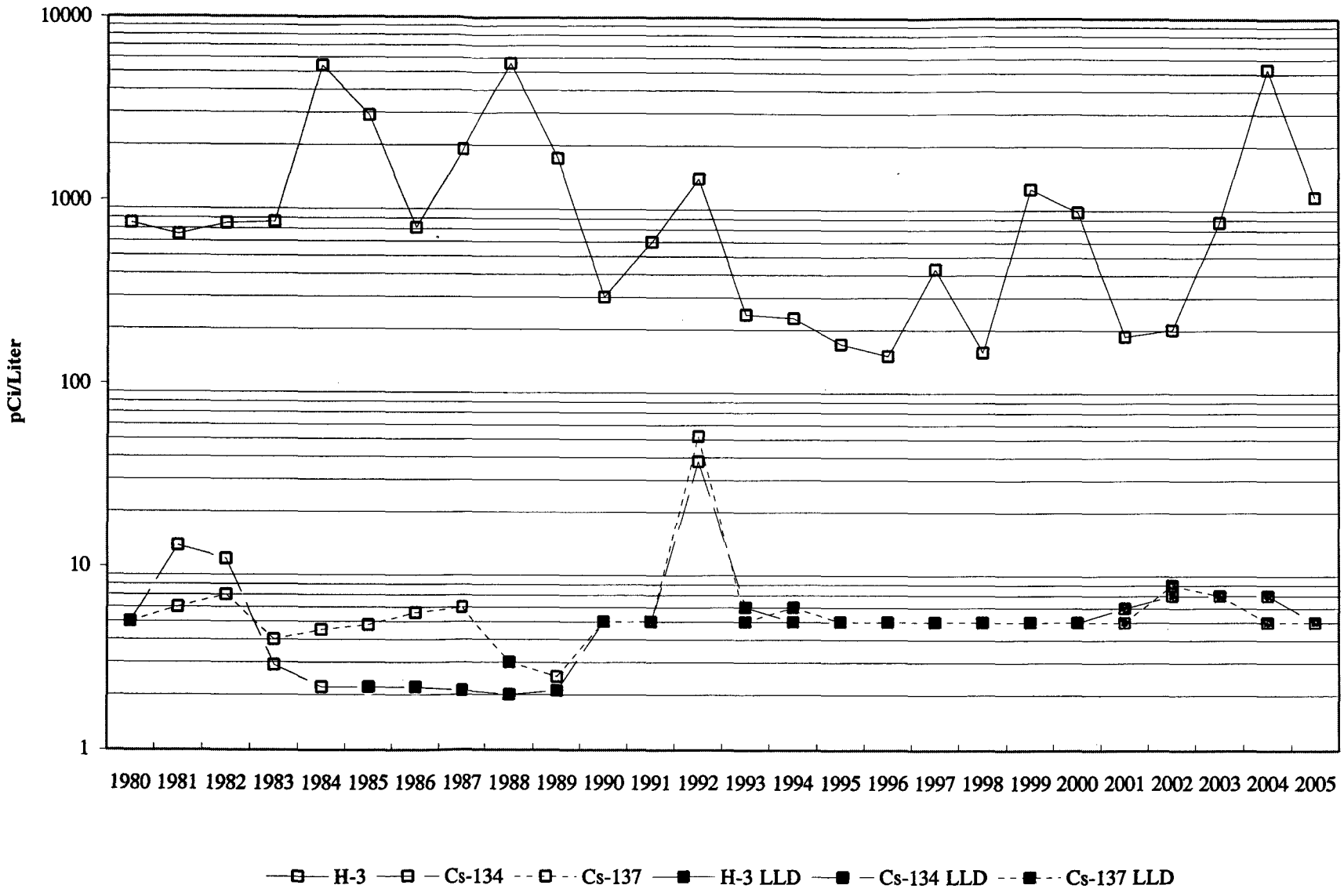

10000
1000
100
10
1
pCi/Liter
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
H-3
Cs-134
Cs-137
H-3 LLD
Cs-134 LLD
Cs-137 LLD

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, 2005**

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
GROUND WATER (pCi/L)	Tritium 2	131	None	-	-	<LLD	0
	γ Spec 2						
	Mn-54	3	None	-	-	<LLD	0
	Fe-59	6	None	-	-	<LLD	0
	Co-58	3	None	-	-	<LLD	0
	Co-60	4	None	-	-	<LLD	0
	Zn-65	7	None	-	-	<LLD	0
	Zr-Nb-95	6	None	-	-	<LLD	0
	I-131	4	None	-	-	<LLD	0
	Cs-134	4	None	-	-	<LLD	0
	Cs-137	4	None	-	-	<LLD	0
	Ba-La-140	9	None	-	-	<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.2.a

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/L γ EMITTERS AND TRITIUM IN GROUND WATER

STATION	NUCLIDE	FIRST HALF	SECOND HALF
C40	H-3	<126	<147
	Mn-54	<3	<5
	Fe-59	<5	<8
	Co-58	<3	<5
	Co-60	<2	<5
	Zn-65	<7	<9
	Zr-Nb-95	<4	<7
	I-131	<3	<5
	Cs-134	<3	<5
	Cs-137	<3	<4
	Ba-La-140	<10	<15
	K-40	47 ± 18	<60

Ground Water

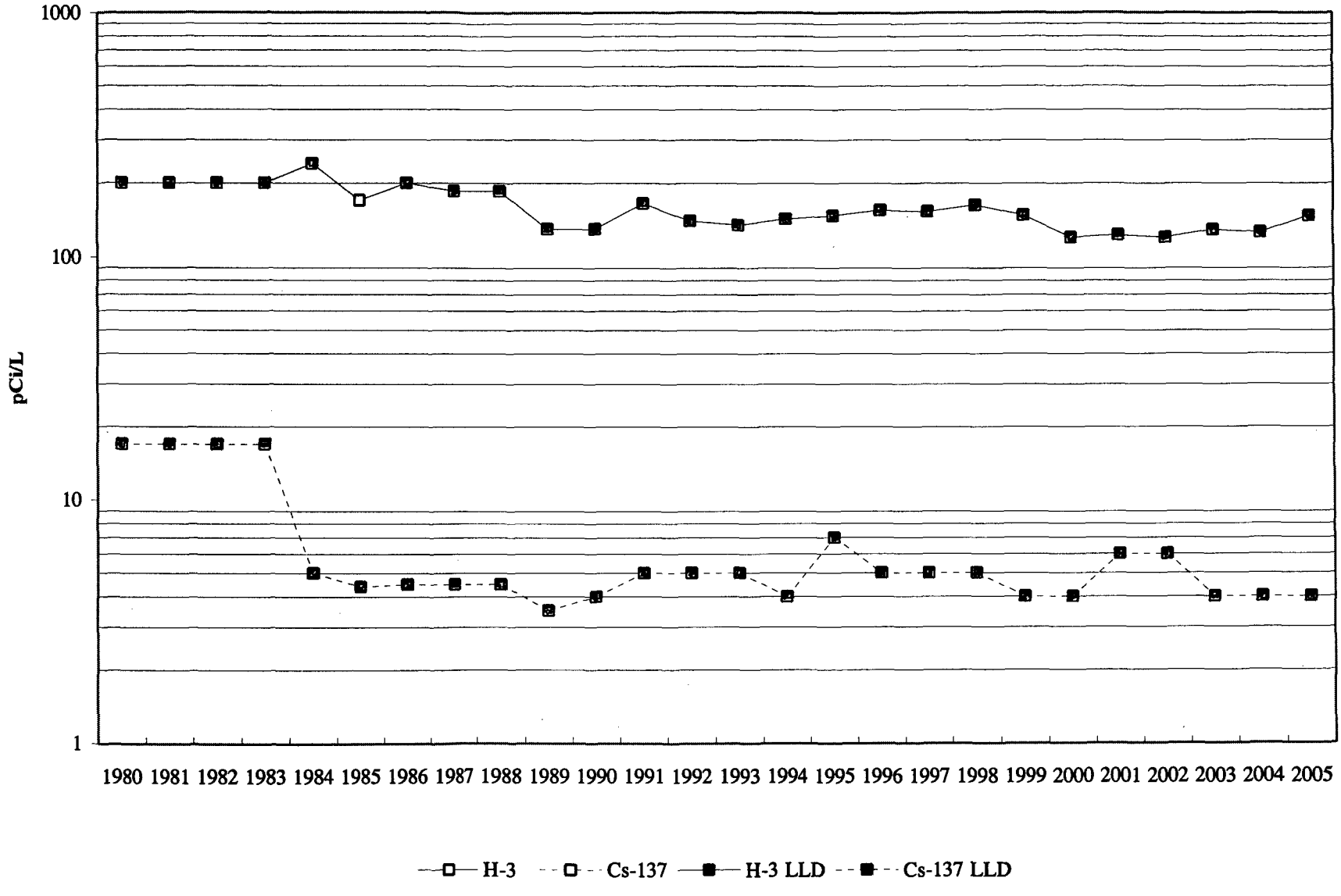


TABLE IV-C.3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 2005

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
DRINKING	Tritium 12	131	None	-	-	<LLD	0
WATER							
(pCi/L)	γ Spec 12						
	Mn-54	3	None	-	-	<LLD	0
	Fe-59	6	None	-	-	<LLD	0
	Co-58	3	None	-	-	<LLD	0
	Co-60	4	None	-	-	<LLD	0
	Zn-65	7	None	-	-	<LLD	0
	Zr-Nb-95	6	None	-	-	<LLD	0
	I-131	4	None	-	-	<LLD	0
	Cs-134	4	None	-	-	<LLD	0
	Cs-137	4	None	-	-	<LLD	0
	Ba-La-140	9	None	-	-	<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.3.a

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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	01-05	<124	<57	<4	<4	<7	<4	<8	<7	<4	<4	<4	<11
	04-12	<136	<37	<3	<2	<5	<2	<5	<4	<2	<3	<3	<6
	07-05	<132	<62	<4	<4	<7	<4	<6	<6	<4	<4	<4	<8
	10-11	<144	<56	<4	<3	<7	<4	<8	<5	<3	<4	<4	<13
C10	01-05	<124	<40	<2	<2	<5	<3	<5	<5	<3	<3	<3	<7
	04-12	<136	<60	<3	<3	<8	<4	<7	<5	<3	<4	<4	<13
	07-05	<132	<76	<5	<3	<9	<4	<9	<7	<4	<5	<4	<9
	10-11	<144	<46	<3	<2	<7	<4	<7	<5	<3	<3	<3	<10
C18	01-05	<124	<36	<2	<2	<5	<2	<5	<4	<3	<3	<2	<6
	04-12	<136	<56	<4	<4	<7	<5	<8	<7	<4	<4	<4	<12
	07-05	<132	<24	<1	<1	<3	<2	<3	<2	<2	<2	<2	<3
	10-11	<144	<38	<2	<2	<4	<3	<5	<4	<2	<2	<3	<7

Drinking Water

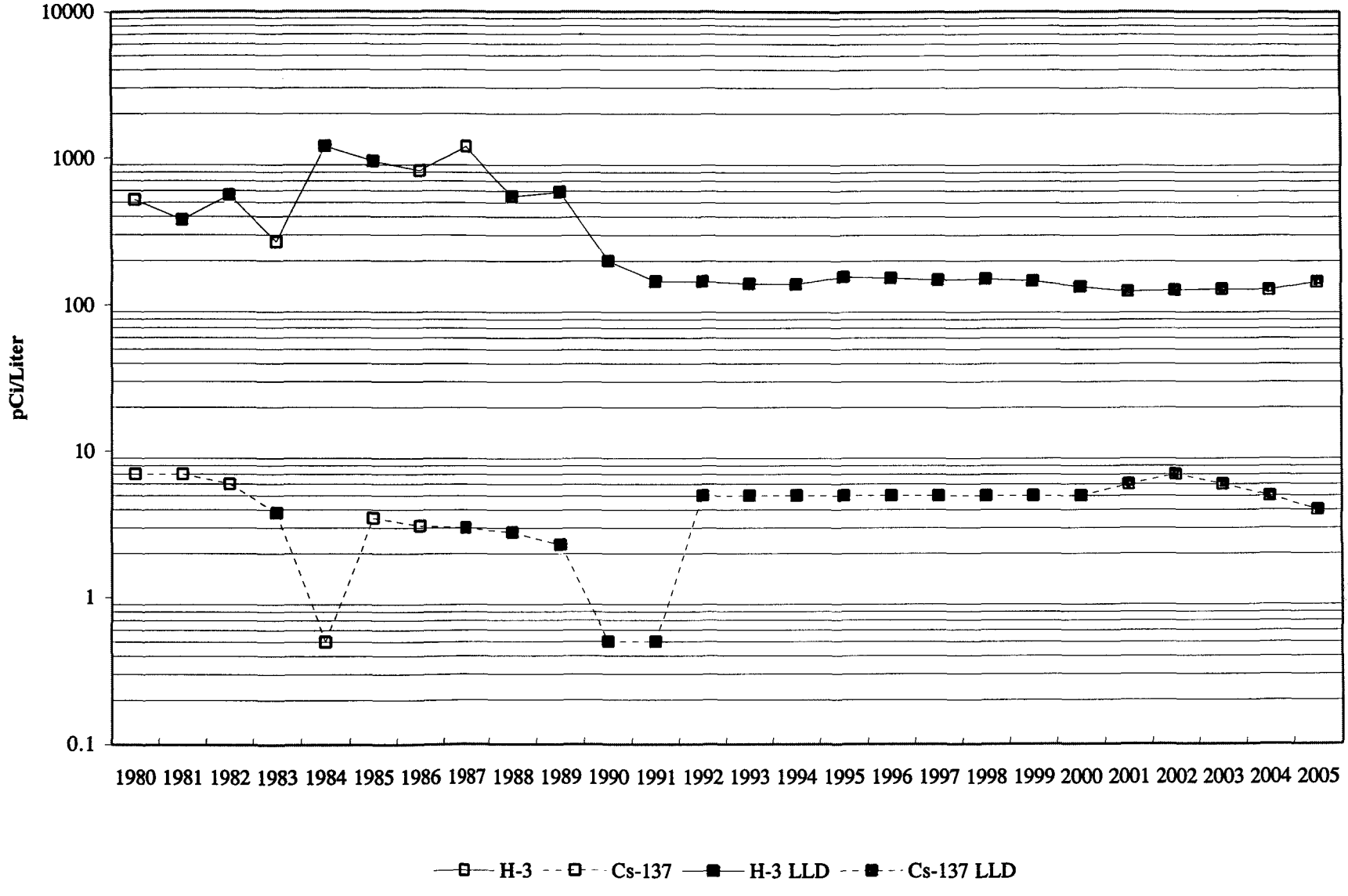


TABLE IV-C.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2005**

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	7	<LLD	—	—	<LLD	0
	Cs-137	7	38 (2/6)	C14M	38 (2/2)	<LLD	0
			(33-43)	1.2 @ 276°			

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

TABLE IV-C.4.a

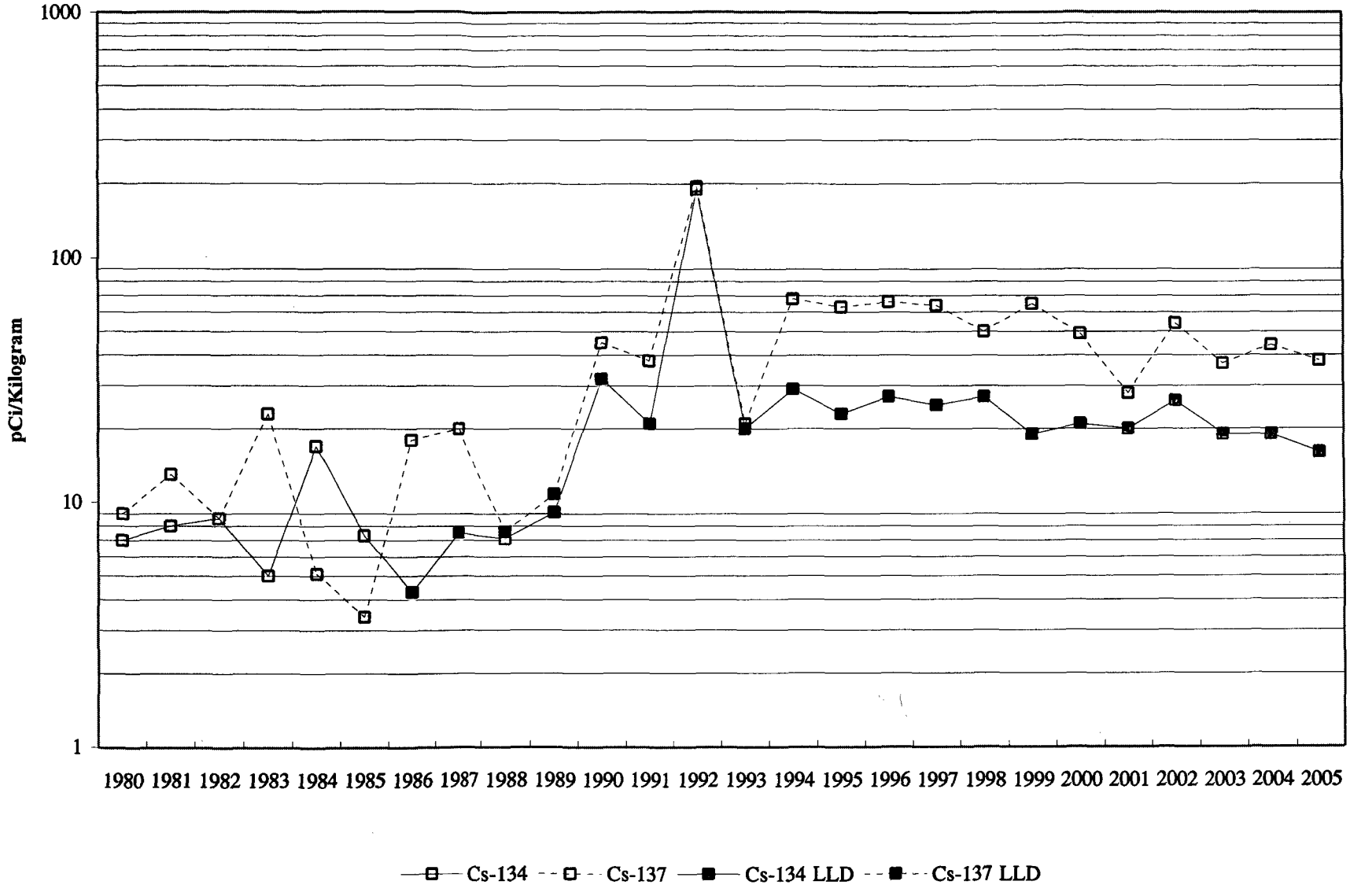
PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/kg γ EMITTERS IN SHORELINE SEDIMENT

STATION	PERIOD	Co-58	Co-60	Cs-134	Cs-137	K-40	Ra-226
C09	First Half	<13	<11	<18	<16	1074 ± 81	667 ± 20
	Second Half	<11	<13	<15	<11	590 ± 98	416 ± 13
C14H	First Half	<8	<9	<11	<11	1472 ± 63	1489 ± 29
	Second Half	<10	<15	<12	<16	1550 ± 91	909 ± 30
C14M	First Half	<13	<19	<15	43 ± 6	1303± 94	901 ± 23
	Second Half	<12	<20	<16	33 ± 8	935 ± 101	1060 ± 20
C14G	First Half	<7	<7	<8	<7	156 ± 54	985 ± 10
	Second Half	<11	<11	<12	<13	391 ± 59	1036 ± 30

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

Shoreline Sediment



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. None of the required radionuclides were found in measurable quantities. The highest cesium-137 LLD for station C29 was 31 pCi/kg. Naturally occurring potassium-40 was quantified in all eight samples at concentrations near 3000 pCi/kg.

2. Quarterly oyster samples were taken at the same locations as fish samples, C29 and C30. Of the isotopes required to be evaluated, none indicated measurable amounts of radioactivity. However, silver-110m was quantified in one sample at C29, with a concentration of 758 pCi/kg.

3. Monthly broad leaf vegetation samples were taken at two indicator locations, C48A and C48B, and one control location, C47. Three of twenty-four indicator samples had measurable amounts of cesium-137 with an average concentration of 22 pCi/kg and a range of 13 to 30 pCi/kg. This is similar to recent years results. Eight of twelve control station samples had measurable amounts of cesium-137 with an average of 72 pCi/kg and a range of 21 to 177 pCi/kg.

4. Citrus samples are taken at station C19 and watermelon samples were obtained at station C04. None of the required radionuclides were found in measurable quantities in watermelon, but Cs-137 was quantified at 51 pCi/kg in the citrus sample.

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, 2005**

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	16	<LLD	-	-	<LLD	0
	Fe-59	28	<LLD	-	-	<LLD	0
	Co-58	15	<LLD	-	-	<LLD	0
	Co-60	16	<LLD	-	-	<LLD	0
	Zn-65	32	<LLD	-	-	<LLD	0
	Cs-134	16	<LLD	-	-	<LLD	0
	Cs-137	18	<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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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	<20	<19	<53	<25	<30	<24	<20	2552 ± 201
	2	<13	<14	<23	<16	<33	<15	<13	2634 ± 144
	3	<12	<10	<23	<14	<26	<12	<12	2534 ± 132
	4	<14	<15	<41	<26	<38	<22	<24	2591 ± 193
C30	1	<40	<33	<74	<42	<61	<34	<38	2336 ± 294
	2	<20	<19	<38	<23	<52	<22	<21	2784 ± 199
	3	<26	<22	<41	<29	<50	<26	<28	2725 ± 209
	4	<19	<19	<37	<25	<41	<22	<18	2510 ± 215

Carnivorous Fish

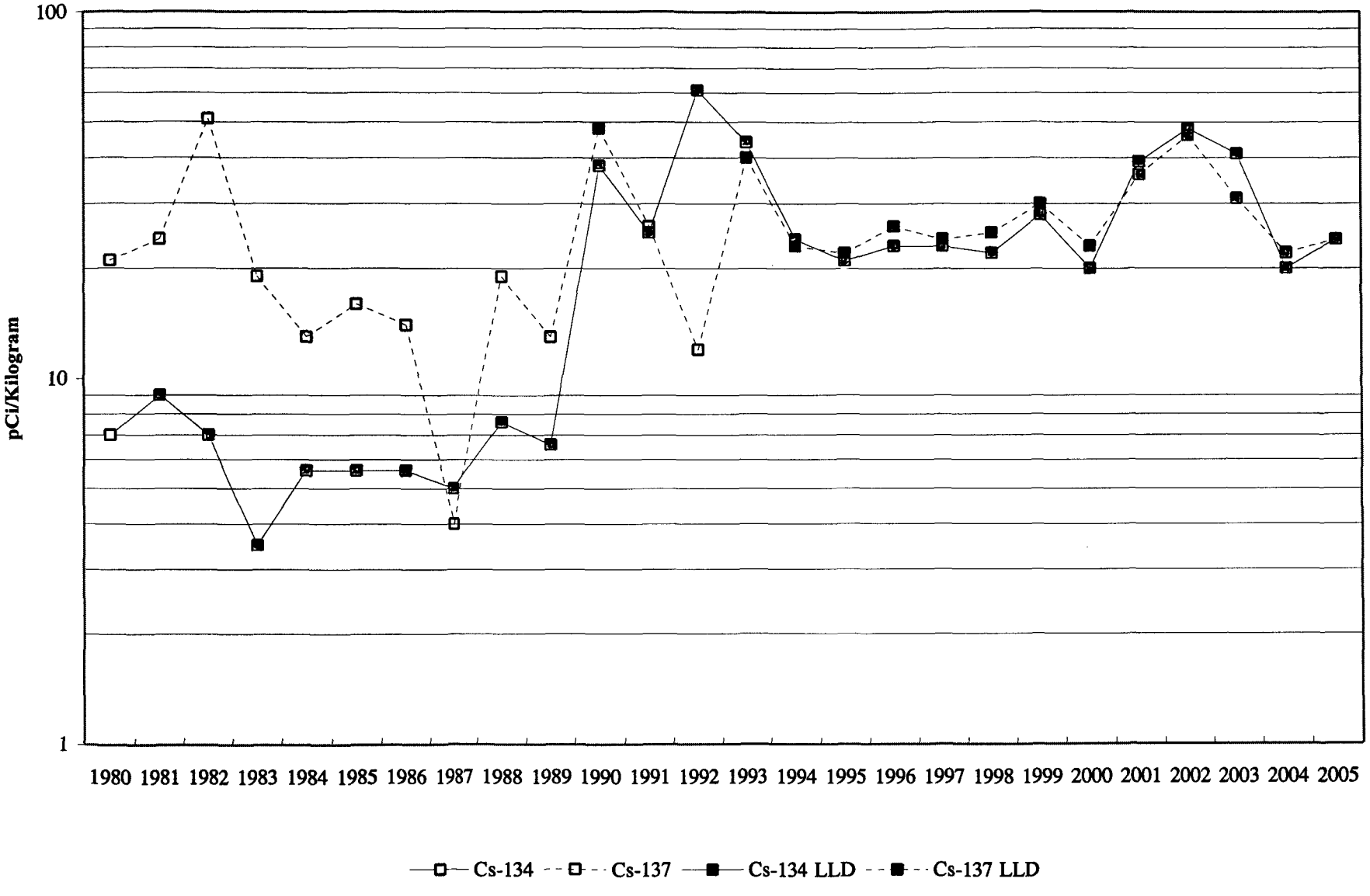


TABLE IV-D.2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2005**

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	γ Spec 8						
(pCi/kg)							
	Mn-54	16	<LLD	-	-	<LLD	0
	Fe-59	28	<LLD	-	-	<LLD	0
	Co-58	15	<LLD	-	-	<LLD	0
	Co-60	16	<LLD	-	-	<LLD	0
	Zn-65	32	<LLD	-	-	<LLD	0
	Cs-134	16	<LLD	-	-	<LLD	0
	Cs-137	18	<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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

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	<6	<6	<13	<7	<14	<6	<6	1052 ± 57
	2	<11	<11	<25	<13	<24	<13	<14	816 ± 97
	3	<12	<12	<24	<14	<30	<14	<13	662 ± 97
	4	<23	<20	<39	<25	<46	<26	<30	1421 ± 121
C30	1	<6	<6	<14	<7	<14	<7	<6	1612 ± 70
	2	<9	<9	<22	<10	<23	<10	<10	1024 ± 90
	3	<16	<19	<40	<17	<43	<19	<16	982 ± 131
	4	<21	<21	<44	<22	<47	<19	<21	1356 ± 134

Ag-110m was quantified in one sample taken at station C29, near the end of the discharge canal. The concentration was 758 pCi/Kg (November 2nd)

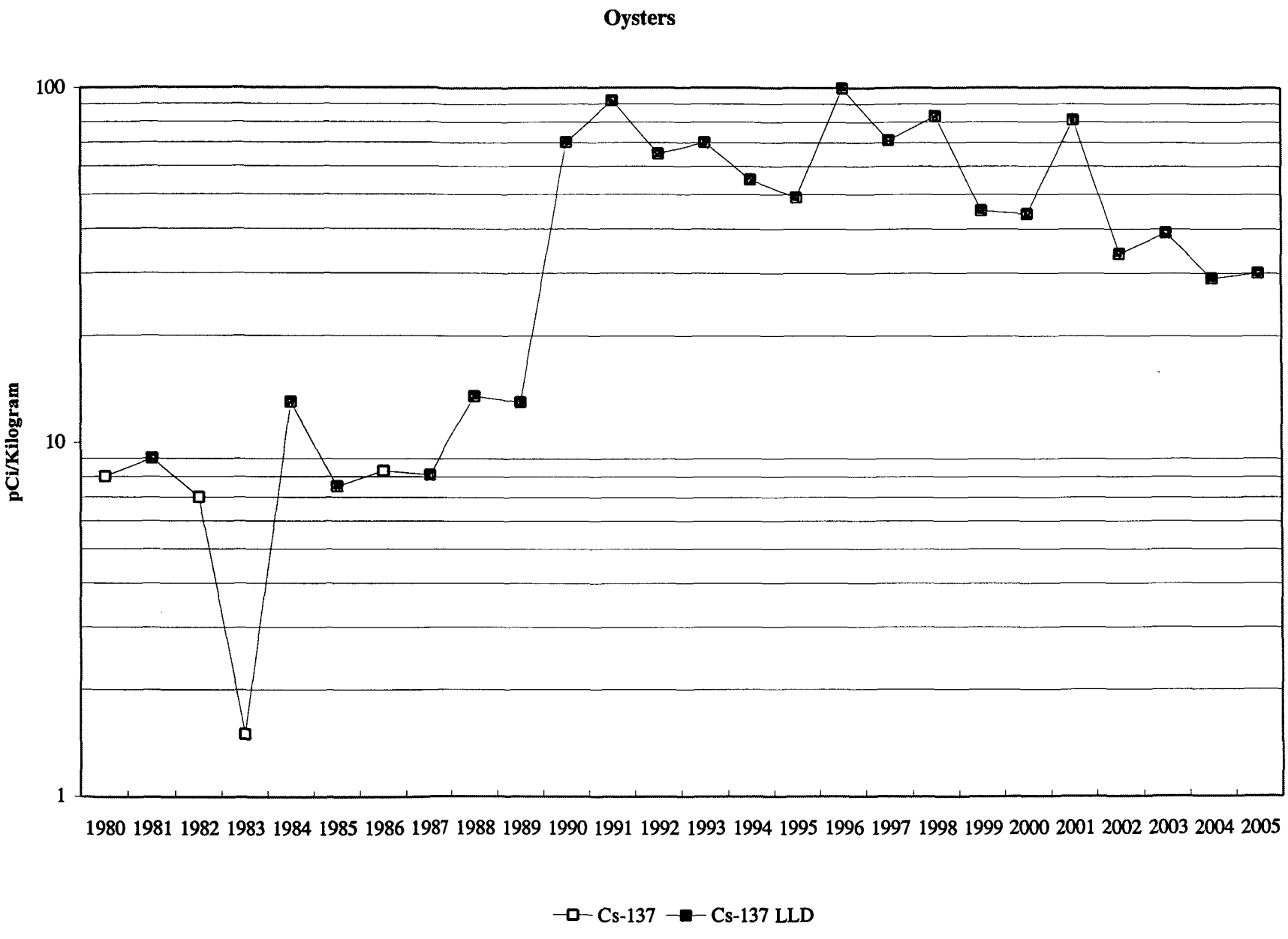

Oysters
100
10
1
pCi/Kilogram
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
Cs-137
Cs-137 LLD

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, 2005**

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
BROAD LEAF VEGETATION (pCi/kg)	γ Spec 36						
	I-131	8	<LLD	-	-	<LLD	0
	Cs-134	8	<LLD	-	-	<LLD	0
	Cs-137	8	22 (3/24) (13- 30)	C48A 0.4 @ 0°	24 (2/12)	77 (8/12) (21-177)	0

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

TABLE IV-D.3.a

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C47	JAN	<12	<12	<17	2766 ± 149
	FEB	<14	<19	96 ± 8	2560 ± 171
	MAR	<14	<14	131 ± 13	3172 ± 150
	APR	<10	<6	21 ± 3	3746 ± 78
	MAY	<10	<10	177 ± 10	3132 ± 142
	JUN	<14	<20	<21	2953 ± 200
	JUL	<11	<14	<14	5323 ± 171
	AUG	<14	<16	<20	3290 ± 206
	SEP	<15	<16	46 ± 8	4240 ± 220
	OCT	<24	<17	29 ± 8	4242 ± 219
	NOV	<8	<9	71 ± 5	3444 ± 104
	DEC	<20	<19	45 ± 8	3226 ± 195
C48A	JAN	<14	<19	<20	6580 ± 237
	FEB	<19	<21	<26	6287 ± 288
	MAR	<11	<16	<15	7245 ± 204
	APR	<20	<26	<21	6579 ± 270
	MAY	<12	<17	30 ± 6	5956 ± 212
	JUN	<16	<24	<19	8232 ± 292
	JUL	<15	<17	<18	7461 ± 226
	AUG	<13	<14	<17	7281 ± 221
	SEP	<16	<22	18 ± 8	6469 ± 273
	OCT	<30	<22	<25	7019 ± 293
	NOV	<19	<19	<19	5796 ± 247
	DEC	<19	<22	<22	6923 ± 275

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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C48B	JAN	<14	<13	<19	3720 ± 192
	FEB	<14	<14	<18	2403 ± 189
	MAR	<14	<15	<13	2770 ± 163
	APR	<8	<9	13 ± 4	4009 ± 108
	MAY	<7	<9	<8	3123 ± 108
	JUN	<15	<15	<13	2957 ± 179
	JUL	<14	<17	<14	3054 ± 178
	AUG	<14	<19	<14	2373 ± 167
	SEP	<12	<11	<12	2478 ± 138
	OCT	<20	<19	<19	2646 ± 196
	NOV	<5	<5	<5	2905 ± 71
	DEC	<13	<11	<13	2654 ± 140

Broad Leaf Vegetation

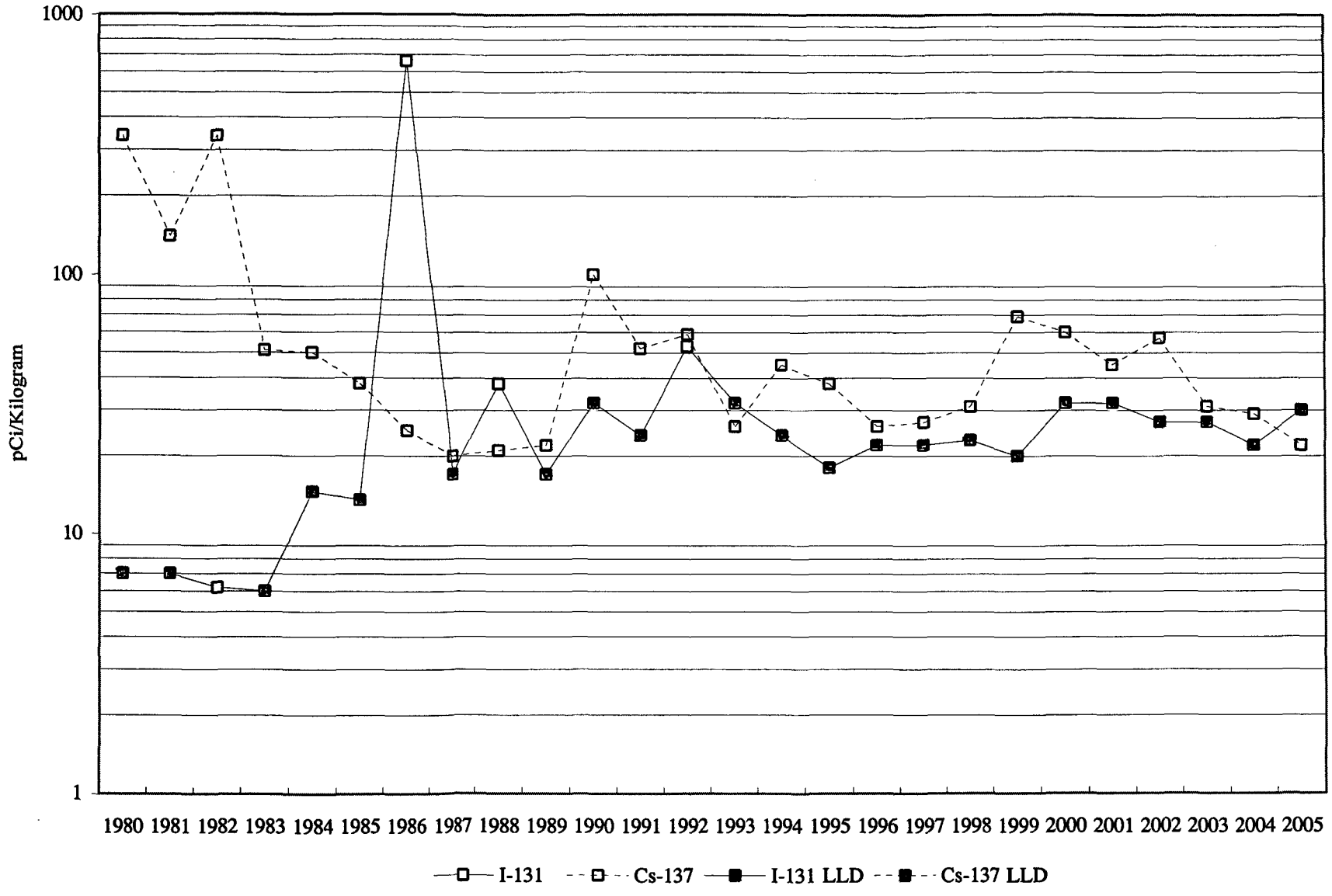


TABLE IV-D.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

CITRUS COUNTY, FLORIDA **JANUARY 1 TO DECEMBER 31, 2005**

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	8	<LLD	-	-	None	0
	Cs-134	8	<LLD	-	-	None	0
	Cs-137	8	<LLD	-	-	None	0
CITRUS (pCi/kg)	γ Spec 1						
	I-131	8	<LLD	-	-	None	0
	Cs-134	8	<LLD	-	-	None	0
	Cs-137	8	51 (1/1)	C19 9.6 @ 57°	51 (1/1)	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

PROGRESS ENERGY FLORIDA, INC. - CR3 - 2005

pCi/kg OF γ EMITTERS IN WATERMELON AND CITRUS

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C04 – Watermelon	June	<4	<4	<6	1320 ± 57
C19 – Citrus	January	<6	<5	51 ± 4	1537 ± 63