Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

May 12, 1995
3F0595-15

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Subject: 1994 Annual Radiological Environmental Operating Report

Dear Sir:

Florida Power Corporation hereby submits the 1994 Annual Radiological Environmental Operating Report in compliance with Crystal River Unit 3's Technical Specification, Section 5.7.1.1.b. The report contains the data obtained from the radiological environmental surveillance program conducted for the Crystal River site for 1994.

Sincerely,

G. L. Boldt
Vice President
Nuclear Production

Attachment

JBC/ff

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

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FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

1994

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Date 5-8-95

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INTRODUCTION

This report is submitted as required by Technical Specification 5.7.1.1b to Crystal River Facility Operating License No. DPR-72, and Section 6.6 of the Offsite Dose Calculation Manual. The following information is 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 REMP.
- A map of all sampling locations keyed to a table giving distances and directions from the reactor.
- The results of land-use censuses.
- Results of Interlaboratory Comparison Program.

I. SUMMARY DESCRIPTION OF RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The analytical results of the Crystal River Unit 3 (CR-3) operational Radiological Environmental Monitoring Program (REMP) for 1994 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 and Rehabilitative Services (FDHRS), Office of Radiation Control. The State also performs the required analyses, participates in the Environmental Protection Agency's (EPA's) Interlaboratory Comparison Program, and performs the annual land-use census.

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 1994 REMP have been compared to previous years' results. This comparison, in part illustrated by the trend graphs[1] of Section IV, shows no evidence of long-term radionuclide buildup in any of the sample media. Additionally, these results verify the effectiveness of in-plant measures for controlling radioactive releases. When combined with dose calculation results[2] (based upon actual release data and a hypothetical individual residing at the Site Boundary), REMP data indicates that the environmental impact of CR-3's operation is not significant.

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[1]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.

[2]For 1994 releases, the whole body dose commitment to the maximum individual was calculated to be < 1 mrem.

TABLE I-1

FLORIDA POWER CORP. - CR3 - 1994

SAMPLE STATION LOCATIONS

SAMPLE MEDIA	STATION ID	DIRECTION	DISTANCE
TLD	C60	N	4400 FT.
	C61	NNE	4400
	C62	NE	5300
	C63	ENE	4400
	C64	E	4400
	C65	ESE	1740
	C66	SE	1600
	C67	SSE	1480
	C68	S	1500
	C69	SSW	1780
	C41	SW	2100
	C70	WSW	4400
	C71	WNW	3600
	C72	NW	2400
	C73	NNW	2000
	C27	W	3400
	C18	N	5.2 MI.
	C03	NNE	5.3
	C04	NE	6.3
	C74	ENE	5.5
	C75	E	4.2
	C76	ESE	5.4
	C08	SE	3.5
	C77	SSE	3.2
	C09	S	3.2
	C78	WSW	4.1
	C14G	W	2.8
	C01	NW	4.9
	C79	NNW	5.0
	C47-Control	ESE	80

TABLE I-1 (CONT'D)

FLORIDA POWER CORP. - CR3 - 1994

SAMPLE STATION LOCATIONS

SAMPLE MEDIA	STATION ID	DIRECTION	DISTANCE
AIR	C07	ESE	7.5 MI.
	C18	N	5.2
	C40	E	3.5
	C41	SW	0.4
	C46	N	0.4
	C47-Control	ESE	80
WATER			
SEAWATER	C14H	NW	0.1
	C14G	W	2.8
	C13-Control	WSW	3.4
GROUND WATER	C40-Control	E	3.5
DRINKING WATER	C07-Control	ESE	7.5
	C10-Control	ESE	5.9
	C18-Control	N	5.2
SHORELINE SEDIMENT	C09-Control	S	3.2
	C14H	NW	0.1
	C14M	W	1.2
	C14G	W	2.8
FISH & OYSTERS	C29	E	2.0
	C30-Control	WSW	3.6
VEGETATION	C48A	N	0.8
	C48B	NNE	0.8
	C47-Control	ESE	80
WATERMELON	C04	ENE	6.3
CITRUS	C19	ENE	8.5

TABLE I-2

FLORIDA POWER CORP. - CR3 - 1994

SAMPLING AND ANALYSIS PROGRAM

SAMPLE MEDIA	# OF STATIONS	FREQUENCY	ANALYSIS		LLD[1]
TLD	30	Quarterly	γ Dose		---
Air Iodine	6	Weekly	I-131		0.07 pCi/m^3
Air Particulate	6	Weekly	Gross β		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		
		Quarterly	γ Spec :		
				(2)	(2)
Shoreline Sediment	4	Semiannual	γ Spec :		
				Cs-134	150 pCi/kg
				Cs-137	180

(1) The maximum "a priori" LLD
(2) Same as Seawater γ Spec

TABLE I-2 (Cont'd)

FLORIDA POWER CORP. - CR3 - 1994

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
Citrus	1	Annual [4]	γ Spec :		
				(5)	(5)
Watermelon	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

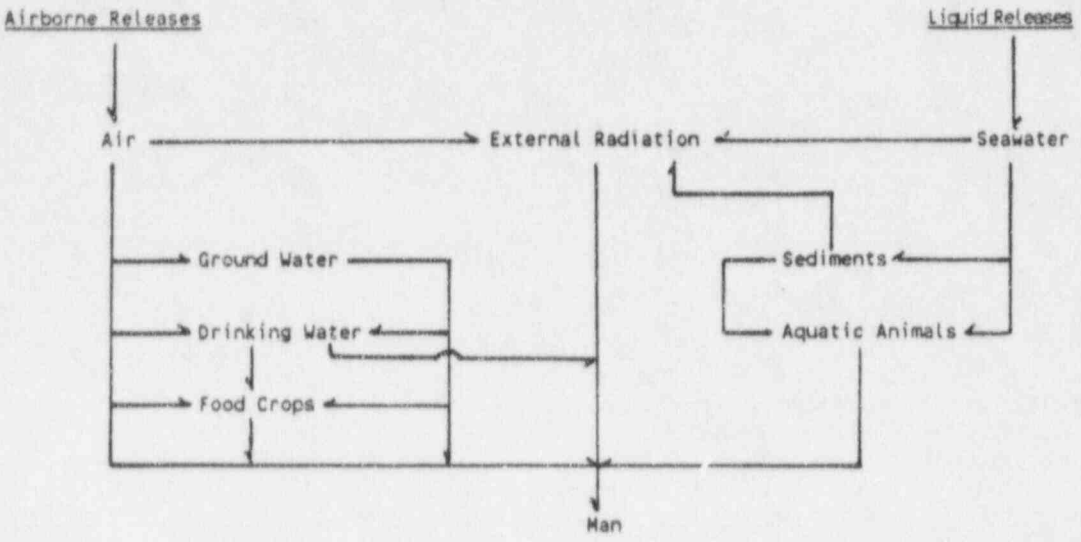


FIGURE I-1: Environmental Media and Exposure Pathways

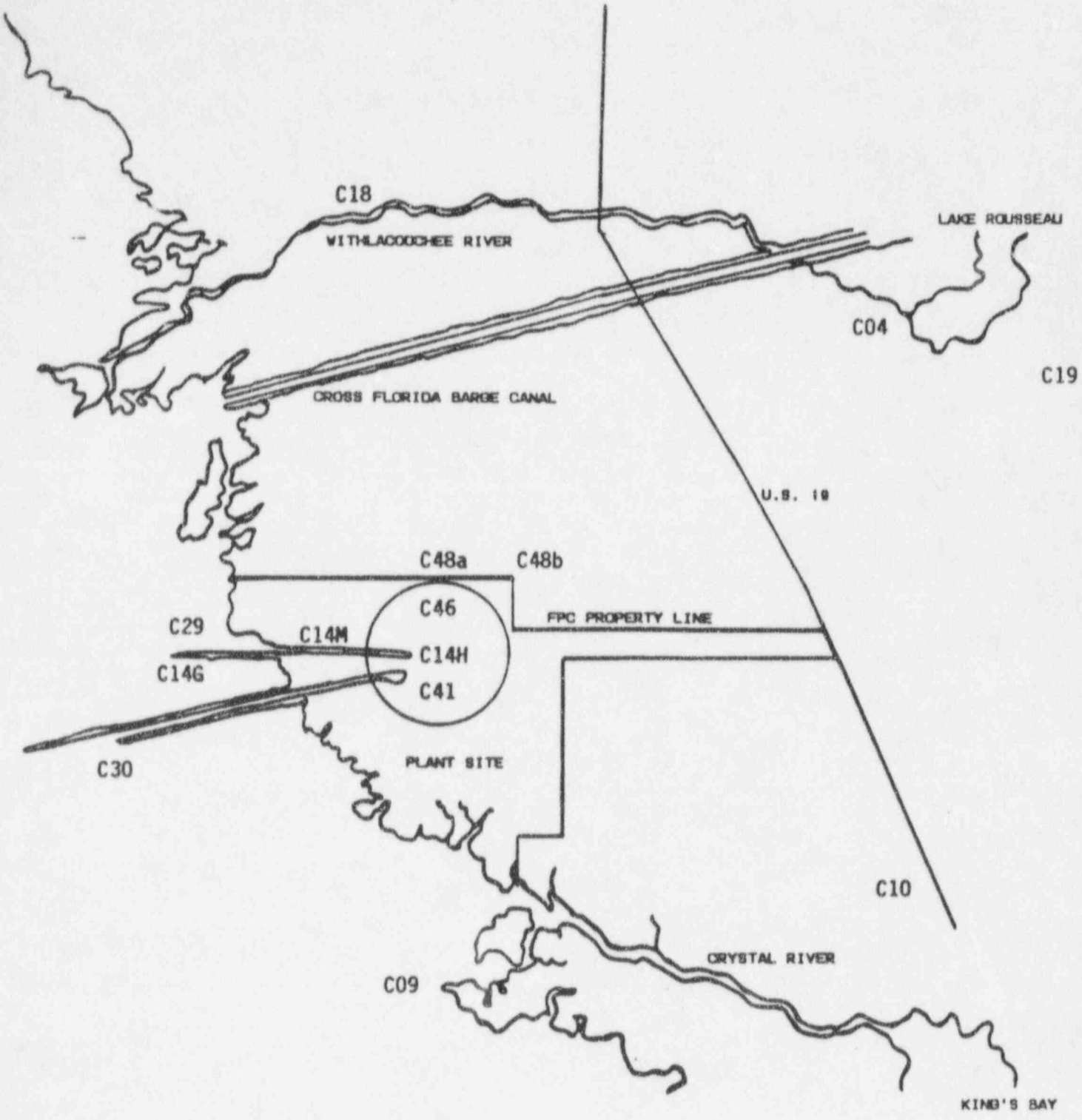


FIGURE I-2: Environmental Monitoring Sample Station Locations

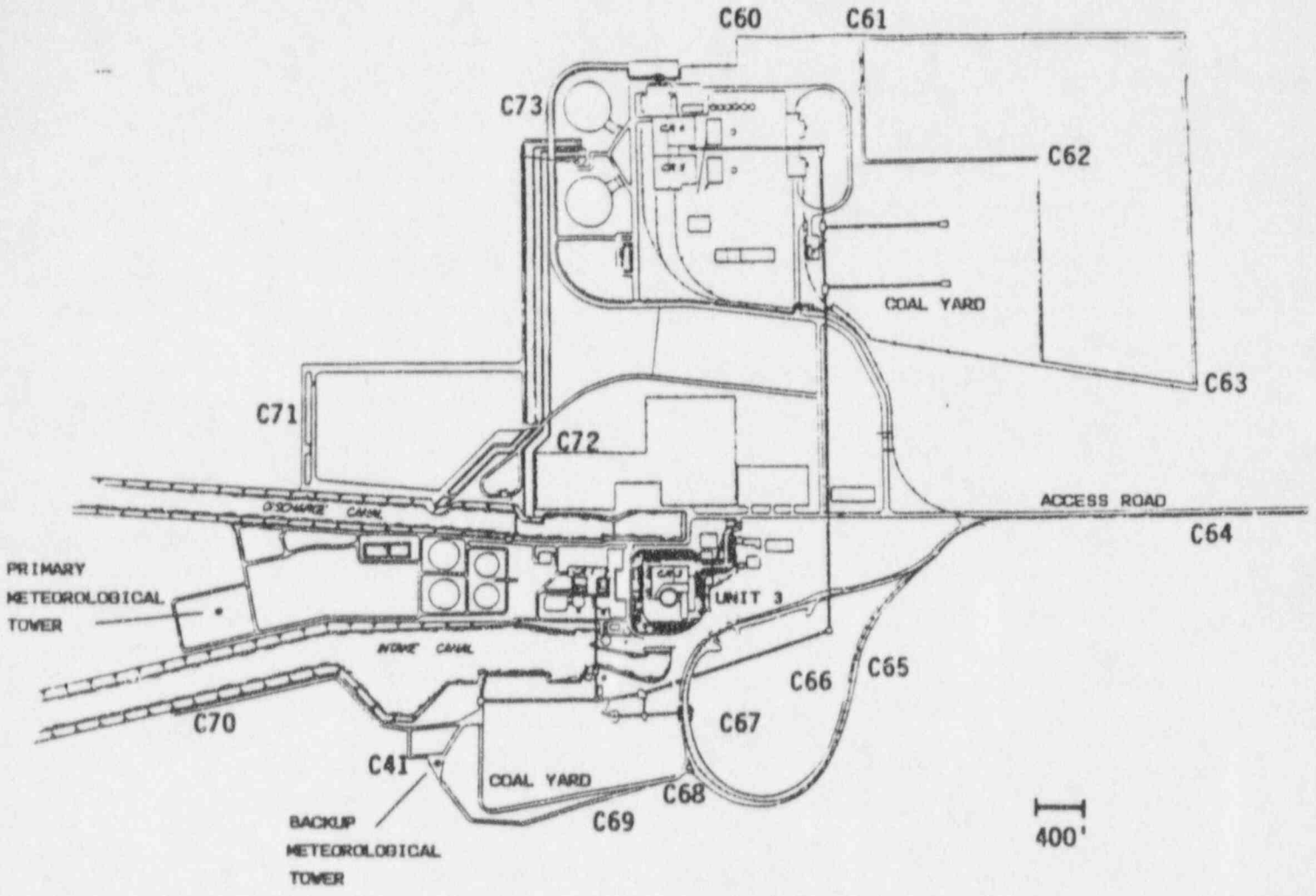


FIGURE 1-3: Environmental Monitoring TLD Locations (Site Boundary)

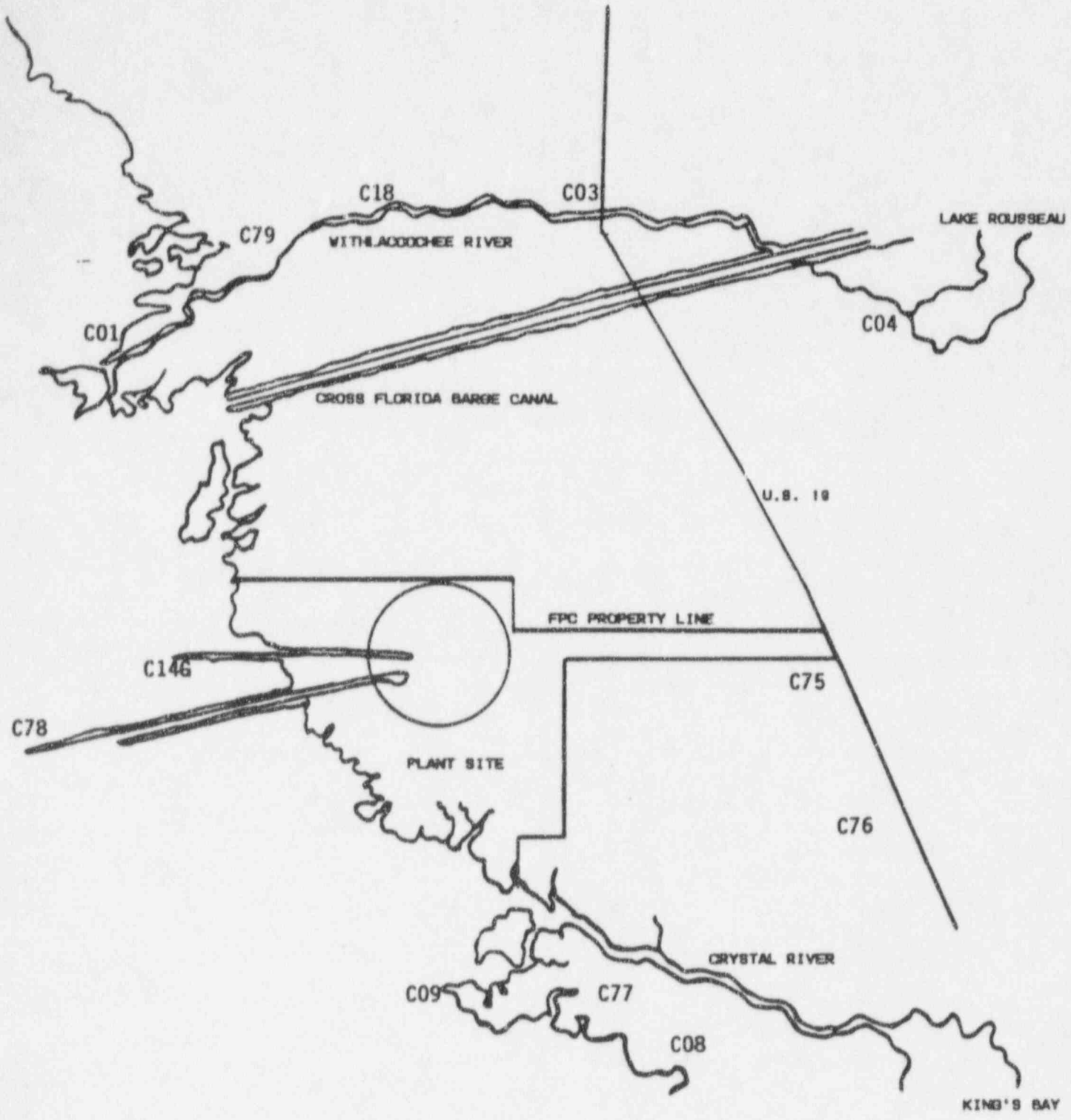


FIGURE I-4: Environmental Monitoring TLD Locations (5 Miles)

II. LAND-USE CENSUS

A land-use census to identify the nearest residences, vegetable gardens, and potential milk-producing animals within a five mile radius of the nuclear plant was conducted in May. 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	4.4 @ 2°	4.6 @ 0°	**
NNE	3.8 @ 15°	4.5 @ 13°	**
NE	3.8 @ 55°	4.1 @ 47°	**
ENE	3.4 @ 60°	4.4 @ 57°	4.4 @ 73°
E	4.0 @ 92°	4.1 @ 93°	**
ESE	4.2 @ 101°	4.2 @ 101°	**
SE	4.7 @ 133°	*	**
SSE	3.4 @ 150°	*	*
S	*	*	*
SSW	*	*	*
SW	*	*	*
WSW	*	*	*
W	*	*	*
WNW	*	*	*
NW	4.6 @ 319°	*	*
NNW	4.5 @ 338°	4.5 @ 339°	**

* None

** All sectors around the plant which are not exclusively water or marshland might occasionally have milk-producing animals at the plant boundary. Most of the land adjacent to the plant site is woodland; however, much of the land in the immediate area is pastureland for cattle and a few horses. Stray cattle are often seen in the wooded areas adjacent to the plant site. These cattle are raised for beef or veal. At times there may be fresh females in these herds, but these animals roam freely and are not milked. A few goats have also been located at residences within the survey area. None of these cows or goats are known to be providing milk for human use, and the owners are not willing to make samples of milk available.

FLORIDA DEPARTMENT OF HRS - EPA INTERLABORATORY CROSS-CHECK PROGRAM DATA

Media	Nuclide	Collection Mon	Day	Yr	EPA Known	Units	Normal Range	Mean of Analysis	M.D.K.	Action Level
WATER	Alpha	01	28	94	15	pCi/L	0.591	16.33	0.46	
WATER	Beta	01	28	94	62	pCi/L	0.354	65.00	0.52	
WATER	Co-60	06	10	94	50	pCi/L	0.354	50.33	0.12	
WATER	Zn-65	06	10	94	134	pCi/L	0.091	145.00	1.47	
WATER	Ru-106	06	10	94	252	pCi/L	0.213	196.00	-3.88	1
WATER	Ba-133	06	10	94	98	pCi/L	0.059	83.33	-2.54	
WATER	Cs-134	06	10	94	40	pCi/L	0.236	37.67	-0.81	
WATER	Cs-137	06	10	94	49	pCi/L	0.118	54.33	1.85	
WATER	H-3	03	04	94	4936	pCi/L	0.005	4957.67	0.08	
WATER	I-131	02	04	94	119	pCi/L	0.148	115.00	-0.58	
WATER	Sr-89	01	14	94	25	pCi/L	0.591	20.00	-1.73	
WATER	Sr-90	01	14	94	15	pCi/L	0.354	11.67	-1.15	
FILTER	Alpha	08	26	94	35	pCi/F	0.000	37.00	0.38	
FILTER	Beta	08	26	94	56	pCi/F	0.000	61.00	0.87	
FILTER	Cs-137	08	26	94	15	pCi/F	0.000	16.00	0.35	
FILTER	Sr-90	08	26	94	20	pCi/F	0.118	17.33	-0.92	
MILK	I-131	09	30	94	75	pCi/L	0.148	73.33	-0.36	
MILK	Cs-137	09	30	94	59	pCi/L	0.118	62.67	1.27	
MILK	K	09	30	94	1715	mg/L	0.220	1726.00	0.22	
MILK	Sr-89	09	30	94	25	pCi/L	0.000	22.00	-1.04	
MILK	Sr-90	09	30	94	15	pCi/L	0.000	15.00	0.00	
WATER	Alpha	07	22	94	32	pCi/L	0.517	45.00	2.81	
WATER	Alpha	10	28	94	57	pCi/L	0.253	61.67	0.58	
WATER	Beta	07	22	94	10	pCi/L	0.000	15.00	1.73	
WATER	Beta	10	28	94	23	pCi/L	0.000	30.00	2.42	
WATER	Co-60	11	04	94	59	pCi/L	0.118	60.67	0.58	
WATER	Zn-65	11	04	94	100	pCi/L	0.236	108.33	1.44	
WATER	Ba-133	11	04	94	73	pCi/L	0.338	66.00	-1.73	
WATER	Cs-134	11	04	94	24	pCi/L	0.236	23.00	-0.35	
WATER	Cs-137	11	04	94	49	pCi/L	0.118	53.67	1.62	
WATER	H-3	08	05	94	9951	pCi/L	0.149	9985.33	0.06	
WATER	I-131	10	07	94	79	pCi/L	0.222	77.33	-0.36	
WATER	Sr-89	07	15	94	30	pCi/L	0.591	30.67	0.23	
WATER	Sr-90	07	15	94	20	pCi/L	0.236	20.00	0.00	

(Cont'd)

NOTES:

NORMAL: Normalized Range. As defined in "Environmental Range Radioactivity Laboratory Intercomparison Studies Program Fiscal Year 1981 - 1982", Environmental Monitoring Systems Laboratory, U. S. Environmental Protection Agency, P. O. Box 93478, Las Vegas, Nevada, 89193-3478. EPA-600/4-81-004, February, 1981.

N.D.K. Normalized deviation of the mean from the known value, as defined in EPA-600/4-81-004.

NDP: No data provided. No data was provided to EPA for inclusion in their report.

NA: Not available. Report containing this data has not yet been received from EPA, Las Vegas.

ACTION LEVEL:

(1) Cause: The EPA cross-check lab has experienced problems with their Ru-106 standard.

Corrective Action: None on he part of the HRS lab. EPA is continuing to follow-up.

IV-A. AIRBORNE PATHWAY

Air samples are taken at five locations in the vicinity of the plant. The control location is 80 miles ESE of the plant, at the State Office of Radiation Control in Orlando.

Table IV-A.1 provides a statistical summary of the analytical results for 310 gross beta samples and 310 Iodine samples.

Of 310 particulate samples analyzed for gross beta activity, 307 had measurable activity. The average indicator concentration was 18 pCi/1,000 m^3 with a range of 5 to 114 pCi/1,000 m^3. The average indicator concentration for each year from 1989 through 1993 was 19 pCi/1,000 m^3. An increase in 1993 to 31 pCi/1,000 m^3 is attributed to a shortening of the time between collection and counting, resulting in a greater fraction of the activity being due to short-lived naturally occurring daughter products.

Three hundred and ten samples were analyzed for Iodine activity, with none having measurable activity.

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

Quarterly composite data are summarized in Table IV-A.4. Measurable quantities of cesium were not identified. The highest Cesium LLD was 1.2 pCi/1,000 m^3.

The gross beta LLD of 0.01 pCi/m^3 was not attained for the following air samples as sample duration was shortened due to power outages:

Station C40 on 1-10-94

Station C40 on 1-24-94

Station C07 on 1-31-94

Station C41 on 10-17-94

Power outages during the entire weekly sample period prevented the following samples from being obtained:

Station C40 on 1-18-94

Station C41 on 10-24-94

TABLE IV-A.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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
AIRBORNE IODINE (pCi/m^3)	γ Spec 310						
	I-131	0.024	<LLD	-	-	<LLD	0
AIRBORNE PARTICULATES ($pCi/1000m^3$ for Gross β, $pCi/1000m^3$ For γ Spec)	Gross β 310	2.5	18 (255/260) (5 - 114)	C[illegible] 3.5 @ 90°	27 (50/52) (7 - 114)	17 (52/52) (6 - 45)	0
	γ Spec 24						
	Cs-134	6.9	<LLD	-	-	<LLD	0
	Cs-137	6.6	<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

FLORIDA POWER CORP. - CR3 - 1994

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
01-03	<.02	<.02	<.02	<.02	<.02	<.02
01-10	<.02	<.02	<.03	<.02	<.02	<.02
01-18	<.02	<.02	---	<.02	<.02	<.02
01-24	<.02	<.02	<.02	<.02	<.02	<.02
01-31	<.02	<.02	<.02	<.02	<.02	<.02
02-07	<.03	<.02	<.02	<.02	<.02	<.02
02-14	<.01	<.01	<.01	<.01	<.01	<.01
02-21	<.02	<.02	<.02	<.02	<.02	<.02
02-28	<.01	<.01	<.01	<.01	<.01	<.01
03-07	<.01	<.01	<.01	<.01	<.01	<.01
03-14	<.01	<.01	<.01	<.01	<.01	<.01
03-21	<.02	<.02	<.02	<.02	<.02	<.02
03-28	<.01	<.01	<.01	<.01	<.01	<.01
04-04	<.01	<.01	<.01	<.01	<.01	<.01
04-11	<.01	<.01	<.01	<.01	<.01	<.01
04-18	<.01	<.01	<.01	<.01	<.01	<.01
04-25	<.02	<.02	<.02	<.02	<.02	<.02

TABLE IV-A.2 (Cont'd)

FLORIDA POWER CORP. - CR3 - 1994

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
05-02	<.01	<.01	<.01	<.01	<.01	<.01
05-09	<.02	<.02	<.02	<.02	<.02	<.02
05-16	<.01	<.01	<.01	<.01	<.01	<.01
05-23	<.02	<.01	<.01	<.01	<.01	<.01
05-31	<.01	<.01	<.01	<.01	<.01	<.01
06-06	<.02	<.02	<.02	<.02	<.02	<.02
06-14	<.02	<.02	<.02	<.02	<.02	<.02
06-21	<.02	<.02	<.02	<.02	<.02	<.02
06-28	<.01	<.01	<.01	<.01	<.01	<.01
07-05	<.01	<.01	<.01	<.01	<.01	<.01
07-11	<.02	<.02	<.02	<.02	<.02	<.02
07-18	<.01	<.01	<.01	<.01	<.01	<.01
07-25	<.01	<.01	<.01	<.01	<.01	<.01
08-01	<.03	<.03	<.03	<.03	<.03	<.03
08-08	<.01	<.01	<.01	<.01	<.01	<.01
08-15	<.01	<.01	<.01	<.01	<.01	<.01
08-22	<.01	<.01	<.01	<.01	<.01	<.01
08-30	<.01	<.01	<.01	<.01	<.01	<.01

TABLE IV-A.2 (Cont'd)

FLORIDA POWER CORP. - CR3 - 1994

pCi/m^3 IODINE - 131 IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
09-06	<.01	<.01	<.01	<.01	<.01	<.01
09-12	<.01	<.01	<.01	<.01	<.01	<.01
09-19	<.02	<.02	<.02	<.02	<.02	<.02
09-27	<.01	<.01	<.01	<.01	<.01	<.01
10-04	<.01	<.01	<.01	<.01	<.01	<.01
10-10	<.02	<.03	<.02	<.03	<.03	<.02
10-17	<.01	<.01	<.01	<.05	<.01	<.01
10-24	<.01	<.01	<.01	---	<.01	<.01
11-01	<.01	<.01	<.01	<.02	<.01	<.01
11-07	<.01	<.01	<.01	<.01	<.01	<.01
11-14	<.03	<.03	<.03	13	<.03	<.03
11-21	<.04	<.04	<.04	.4	<.04	<.04
11-28	<.04	<.04	<.04	<.04	<.03	<.04
12-05	<.01	<.01	<.01	<.01	<.01	<.01
12-12	<.02	<.02	<.02	<.02	<.02	<.02
12-19	<.03	<.03	<.03	<.03	<.03	<.03
12-27	<.02	<.02	<.02	<.02	<.02	<.02

TABLE IV-A.3

FLORIDA POWER CORP. - CR3 - 1994

pCi/1000m^3 GROSS B IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
01-03	24	23	28	19	17	19
01-10	17	20	11	17	19	22
01-18	15	17	--	12	18	19
01-24	36	34	61	22	24	23
01-31	11	5	8	<4	6	8
02-07	13	13	17	12	12	22
02-14	8	11	8	7	5	9
02-21	9	12	<5	15	14	11
02-28	13	21	20	18	16	25
03-07	37	35	105	20	28	33
03-14	14	22	39	19	20	29
03-21	30	36	114	19	24	45
03-28	21	20	55	16	21	22
04-04	26	29	40	17	25	30
04-11	28	35	41	25	20	27
04-18	11	16	17	16	12	18
04-25	27	32	59	18	27	24

TABLE IV-A.3 (Cont'd)

FLORIDA POWER CORP. - CR3 - 1994

pCi/1000m^3 GROSS B IN AIR

COLLECTION DATE	C07	C18	C40	C41	C46	C47
05-02	41	29	95	30	30	40
05-09	9	16	17	15	15	18
05-16	29	27	21	24	24	25
05-23	12	19	16	14	15	11
05-31	21	18	17	9	18	21
06-06	35	37	114	22	30	31
06-14	14	17	19	13	16	15
06-21	6	10	12	7	8	9
06-28	20	21	23	18	18	16
07-05	17	13	11	15	13	9
07-11	10	11	12	12	13	14
07-18	22	21	19	19	26	16
07-25	17	15	21	16	16	12
08-01	9	11	12	11	8	8
08-08	11	8	7	8	6	9
08-15	8	10	10	7	8	9
08-22	13	12	17	11	12	12
08-30	9	15	10	11	16	11

TABLE IV-A.3 (Cont'd)

FLORIDA POWER CORP. - CR3 - 1994

pCi/1090m^3 GROSS B IN AIR

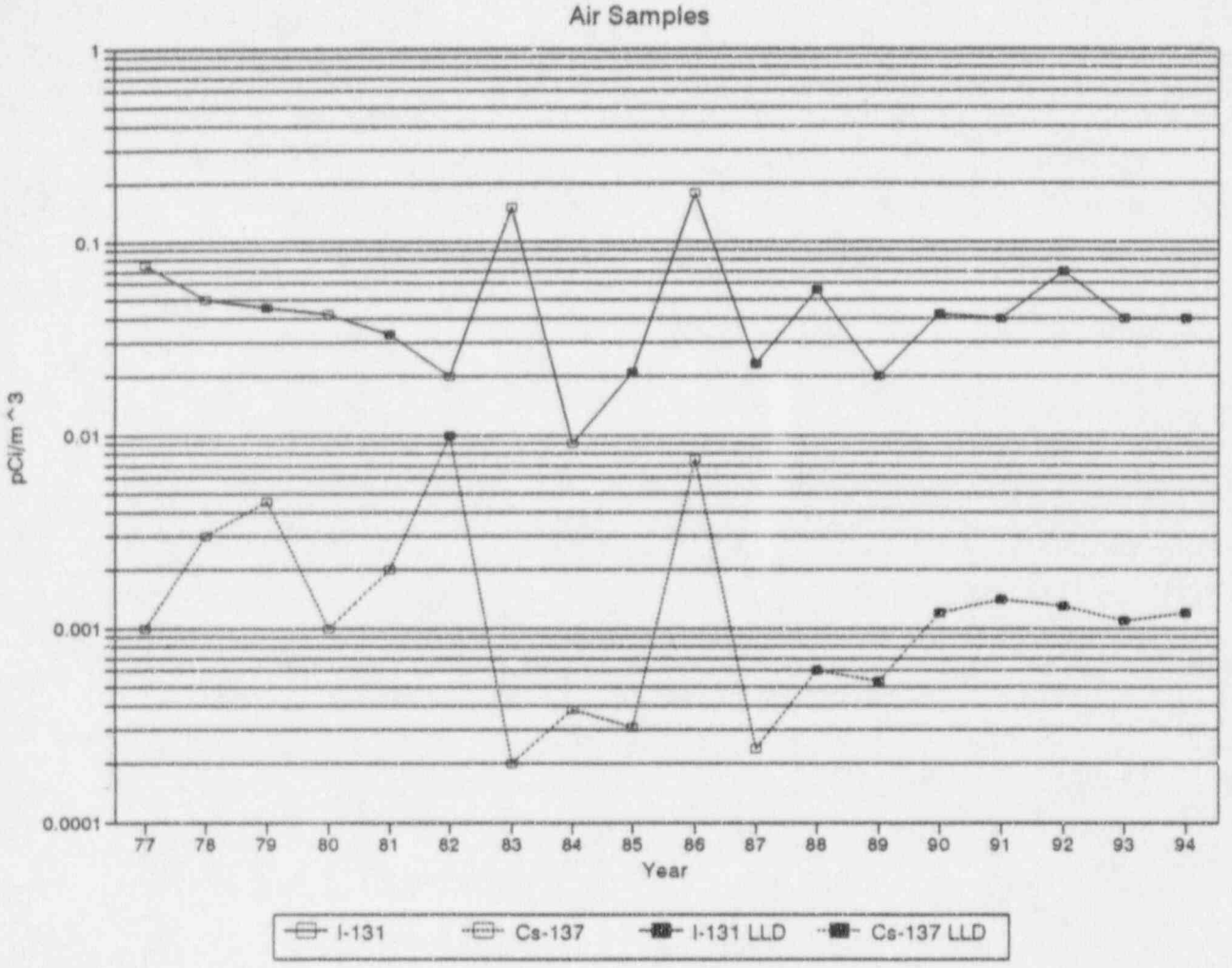
COLLECTION DATE	C07	C18	C40	C41	C46	C47
09-06	17	12	14	16	15	12
09-12	12	16	14	13	13	9
09-19	10	12	12	9	15	13
09-27	14	15	18	13	10	10
10-04	14	17	17	16	16	15
10-10	8	16	18	16	18	15
10-17	9	7	11	<18	9	9
10-24	20	17	27	--	19	19
11-01	15	23	12	10	11	21
11-07	16	24	16	16	14	18
11-14	11	11	8	11	6	8
11-21	5	6	7	7	7	8
11-28	20	19	20	15	14	15
12-05	7	13	18	14	13	10
12-12	6	8	10	8	8	6
12-19	15	17	16	12	16	11
12-27	11	22	24	24	19	18

TABLE IV-A.4

FLORIDA POWER CORP. - CR3 - 1994

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

STATION	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
C07	Be-7	130	123	105	93
	K-40	<17	<17	<14	<19
	Cs-134	<0.8	<0.8	<0.8	<0.7
	Cs-137	<0.8	<0.8	<1.0	<0.7
C18	Be-7	114	121	112	111
	K-40	<17	<11	<18	<16
	Cs-134	<0.9	<0.9	<1.1	<0.8
	Cs-137	<0.9	<0.7	<0.7	<0.7
C40	Be-7	118	114	97	91
	K-40	<16	<17	<17	<14
	Cs-134	<0.9	<0.7	<0.8	<1.0
	Cs-137	<0.9	<0.7	<0.7	<0.7
C41	Be-7	113	94	81	101
	K-40	<17	<16	<17	<23
	Cs-134	<1.1	<1.0	<1.0	<1.2
	CS-137	<0.6	<0.7	<0.8	<0.9
C46	Be-7	134	117	90	113
	K-40	<19	<13	<18	<17
	Cs-134	<0.6	<0.9	<0.8	<1.0
	Cs-137	<0.7	<0.7	<0.8	<1.0
C47	Be-7	130	106	90	111
	K-40	<19	14	<16	<20
	Cs-134	<0.6	<0.9	<0.9	<0.9
	Cs-137	<0.7	<0.9	<0.9	<0.7


Air Samples
1
0.1
0.01
0.001
0.0001
pCi/m ^3
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
I-131
Cs-137
I-131 LLD
Cs-137 LLD

IV-B. DIRECT RADIATION

Direct radiation measurements (using TLDs) were taken at sixteen locations within one mile of the plant, at thirteen locations ranging from 2.8 to 6.3 miles from the plant, and at one control location 80 miles from the site. The highest on-site dose was 114 mrem/yr at station C71 (NW at 2400 feet). The increase at C71 of approximately 30 mrem/yr since 1992 is attributed to the TLD being moved (due to construction). The new location is closer to a storage pond for Units 4 & 5 fly ash. The highest off-site dose was 57 mrem/yr at station C14G (west at 2.8 miles). The control station (C47) dose was 46 mrem/yr. The average for all stations was 54 mrem/yr. With the exception of C71, 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. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

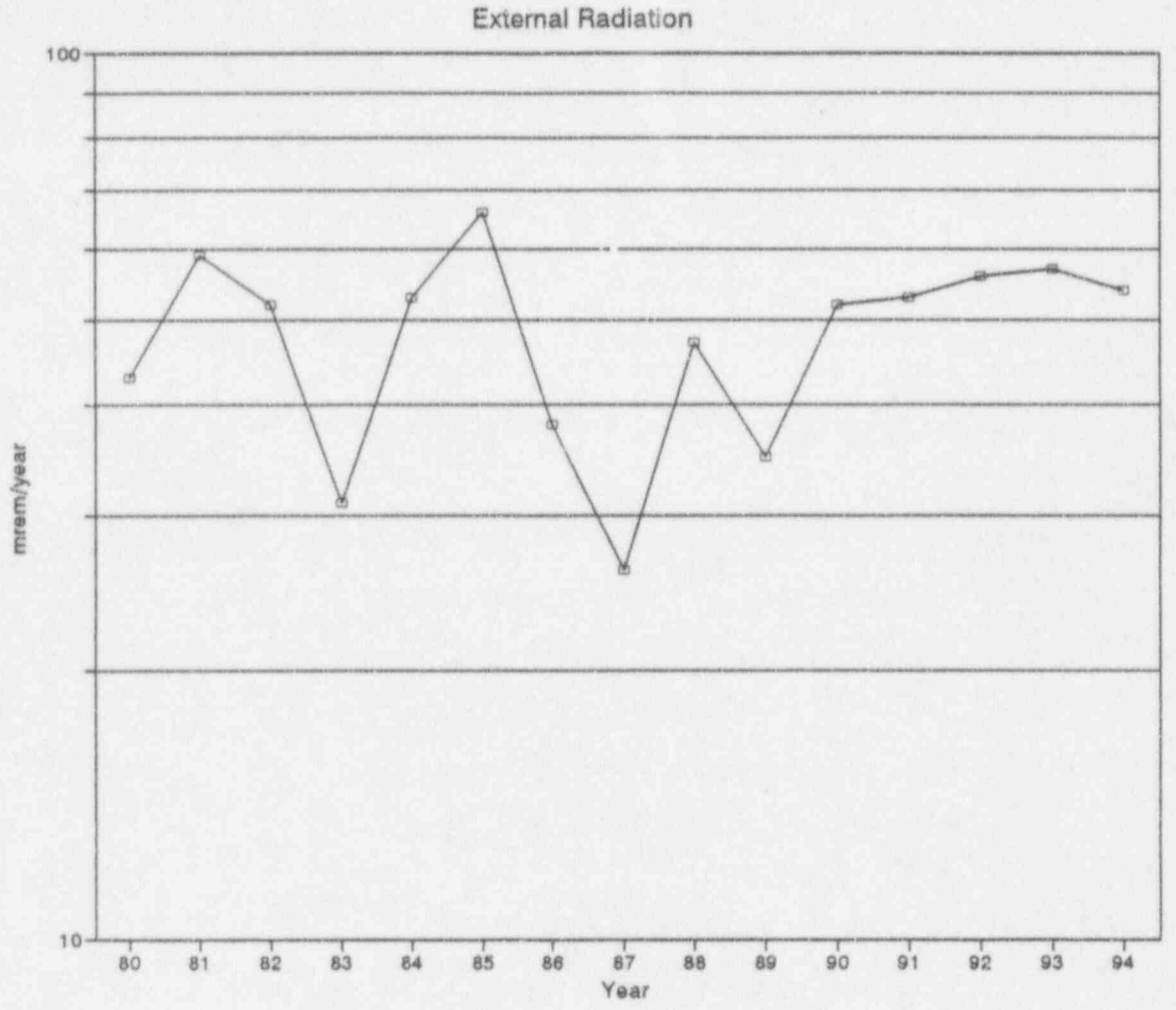
MEDIUM OR PATHWAY SAMPLED (UNITS)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE & BEARING	MEAN RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION (mrem/yr)	γ DOSE 116	15	54 (113/116) (39 - 114)	C71 0.5 @ 280°	109 (4/4) (105 - 114)	46 (4/4) (45 - 47)	0

TABLE IV-B.1

FLORIDA POWER CORP. - CR-3 - 1994

mrem/yr γ Dose

TLD STATION	Quarter:	1	2	3	4
C01		44	44	44	46
C03		45	46	48	47
C04		44	44	44	46
C08		41	39	41	43
C09		42	45	43	43
C14G		56	58	55	58
C18		47	47	46	47
C27		65	67	64	68
C41		56	58	58	60
C47 (CONTROL)		45	45	47	46
C60		52	53	51	52
C61		54	58	57	57
C62		61	62	61	63
C63		56	57	57	58
C64		55	53	53	53
C65		56	55	56	56
C66		55	58	58	57
C67		55	56	60	63
C68		58	58	57	60
C69		59	61	61	61
C70		60	61	63	62
C71		105	114	109	108
C72		--	59	58	60
C73		49	53	53	53
C74		39	44	42	44
C75		51	54	49	53
C76		45	46	48	50
C77		39	40	39	41
C78		46	--	45	--
C79		48	46	47	50


External Radiation
100
10
mrem/year
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year

IV-C. WATERBORNE PATHWAY

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

1. Monthly seawater grab samples are taken at two locations in the discharge canal and at one control location near the mouth of the intake canal. Of twenty-four indicator samples, nine had a measurable amount of Tritium at an average level of 231 pCi/L. Five samples taken at the control location, C13, indicated measurable amounts of Tritium at an average level of 152 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 groundwater samples are taken at one location, station C40. Gamma spectral and Tritium analyses are performed on both samples. All results were less than the LLD. 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 groundwater is 2000 pCi/L. Analysis of groundwater in the vacinity of CR-3 is done at a sensitivity of approximately 200 pCi/L for tritium and 10 pCi/L for select gamma emitters.

3. Quarterly drinking water samples are drawn from three locations: the Crystal River Public Water Plant (C07), the Indian Waters Public Water Supply (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 for Tritium or the required gamma emitters.

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 eight samples analyzed, six had measurable amounts of cobalt and three had measurable amounts of cesium. The Cesium-137 concentration at Fort Gulf Island Beach was <9 pCi/L as compared to an average of 68 pCi/L for the indicator locations in the discharge canal. None of the samples taken at Fort Island Gulf Beach had measurable amounts of cobalt. These results are similar to previous years.

TABLE IV-C.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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
SEA WATER (pCi/L)	Tritium 36	230	231 (9/24) (98 - 1028)	C14G 2.8 @ 270°	284 (6/12) (98 - 1028)	152 (4/12) (88 - 295)	0
	γ Spec 36						
	Mn-54	4	<LLD	-	-	<LLD	0
	Fe-59	8	<LLD	-	-	<LLD	0
	Co-58	4	<LLD	-	-	<LLD	0
	Co-60	4	<LLD	-	-	<LLD	0
	Zn-65	8	<LLD	-	-	<LLD	0
	Zr-Nb-95	7	<LLD	-	-	<LLD	0
	I-131	5	<LLD	-	-	<LLD	0
	Cs-134	5	<LLD	-	-	<LLD	0
	Cs-137	4	<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.1.a

FLORIDA POWER CORP. - CR3 - 1994

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	107 ± 43	242 ± 34	<4	<4	<9	<4	<7	<6	<7	<5	<5	<5
	FEB	119 ± 42	197 ± 36	<4	<5	<9	<6	<9	<9	<5	<4	<5	<8
	MAR	<135	183 ± 34	<5	<6	<8	<6	<10	<8	<7	<4	<5	<6
	APR	88 ± 42	194 ± 30	<4	<4	<8	<4	<9	<6	<6	<4	<4	<6
	MAY	<140	246 ± 37	<3	<4	<7	<4	<8	<7	<6	<4	<4	<6
	JUN	<138	224 ± 34	<4	<3	<8	<4	<9	<6	<4	<3	<5	<8
	JUL	<140	264 ± 34	<4	<4	<8	<4	<8	<8	<5	<3	<4	<6
	AUG	<132	228 ± 34	<4	<4	<6	<3	<7	<6	<5	<4	<4	<6
	SEP	<131	141 ± 30	<4	<4	<8	<4	<9	<6	<4	<4	<4	<8
	OCT	<148	263 ± 32	<3	<3	<7	<4	<7	<7	<6	<4	<4	<7
	NOV	295 ± 47	163 ± 31	<4	<4	<6	<5	<8	<7	<4	<4	<4	<7
	DEC	<141	269 ± 34	<3	<3	<8	<4	<9	<8	<5	<3	<5	<6
C14G	JAN	<154	332 ± 37	<3	<4	<9	<4	<7	<7	<6	<4	<4	<5
	FEB	131 ± 42	221 ± 43	<4	<4	<11	<5	<10	<8	<7	<4	<5	<7
	MAR	197 ± 45	144 ± 34	<4	<3	<8	<4	<10	<8	<7	<5	<6	<7
	APR	142 ± 43	258 ± 33	<3	<4	<8	<5	<8	<6	<6	<4	<3	<5
	MAY	<146	265 ± 29	<3	<4	<9	<4	<7	<6	<6	<5	<4	<5
	JUN	<145	233 ± 30	<4	<4	<9	<4	<6	<6	<4	<4	<4	<7
	JUL	<140	254 ± 37	<4	<3	<8	<5	<9	<6	<5	<4	<4	<4
	AUG	<138	220 ± 34	<3	<3	<7	<4	<9	<6	<5	<4	<4	<5
	SEP	106 ± 42	194 ± 34	<4	<4	<9	<5	<5	<7	<5	<4	<4	<5
	OCT	<134	258 ± 37	<4	<4	<7	<5	<9	<6	<6	<3	<3	<6
	NOV	1028 ± 59	264 ± 16	<2	<2	<3	<2	<3	<3	<2	<2	<2	<3
	DEC	98 ± 45	174 ± 30	<3	<3	<7	<3	<8	<6	<6	<4	<4	<5

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

FLORIDA POWER CORP. - CR3 - 1994

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	133 ± 43	247 ± 32	<3	<4	<7	<3	<10	<7	<6	<3	<5	<5
	FEB	122 ± 42	189 ± 42	<4	<4	<9	<7	<12	<7	<7	<5	<4	<8
	MAR	<135	211 ± 34	<5	<5	<10	<5	<9	<9	<9	<5	<5	<7
	APR	121 ± 42	188 ± 34	<4	<4	<8	<3	<9	<8	<6	<4	<4	<3
	MAY	<140	139 ± 29	<3	<4	<7	<4	<9	<6	<5	<4	<4	<4
	JUN	<138	246 ± 33	<4	<4	<8	<5	<7	<7	<5	<3	<5	<5
	JUL	<140	244 ± 35	<4	<4	<7	<5	<9	<6	<6	<4	<4	<4
	AUG	<132	221 ± 34	<4	<4	<8	<4	<9	<5	<5	<4	<4	<6
	SEP	<131	262 ± 33	<3	<4	<7	<4	<9	<7	<5	<4	<5	<5
	OCT	<134	298 ± 41	<4	<3	<7	<4	<8	<6	<6	<4	<4	<6
	NOV	<153	201 ± 29	<2	<4	<7	<3	<8	<7	<4	<4	<4	<5
	DEC	<141	206 ± 33	<4	<3	<8	<4	<8	<7	<6	<4	<4	<5

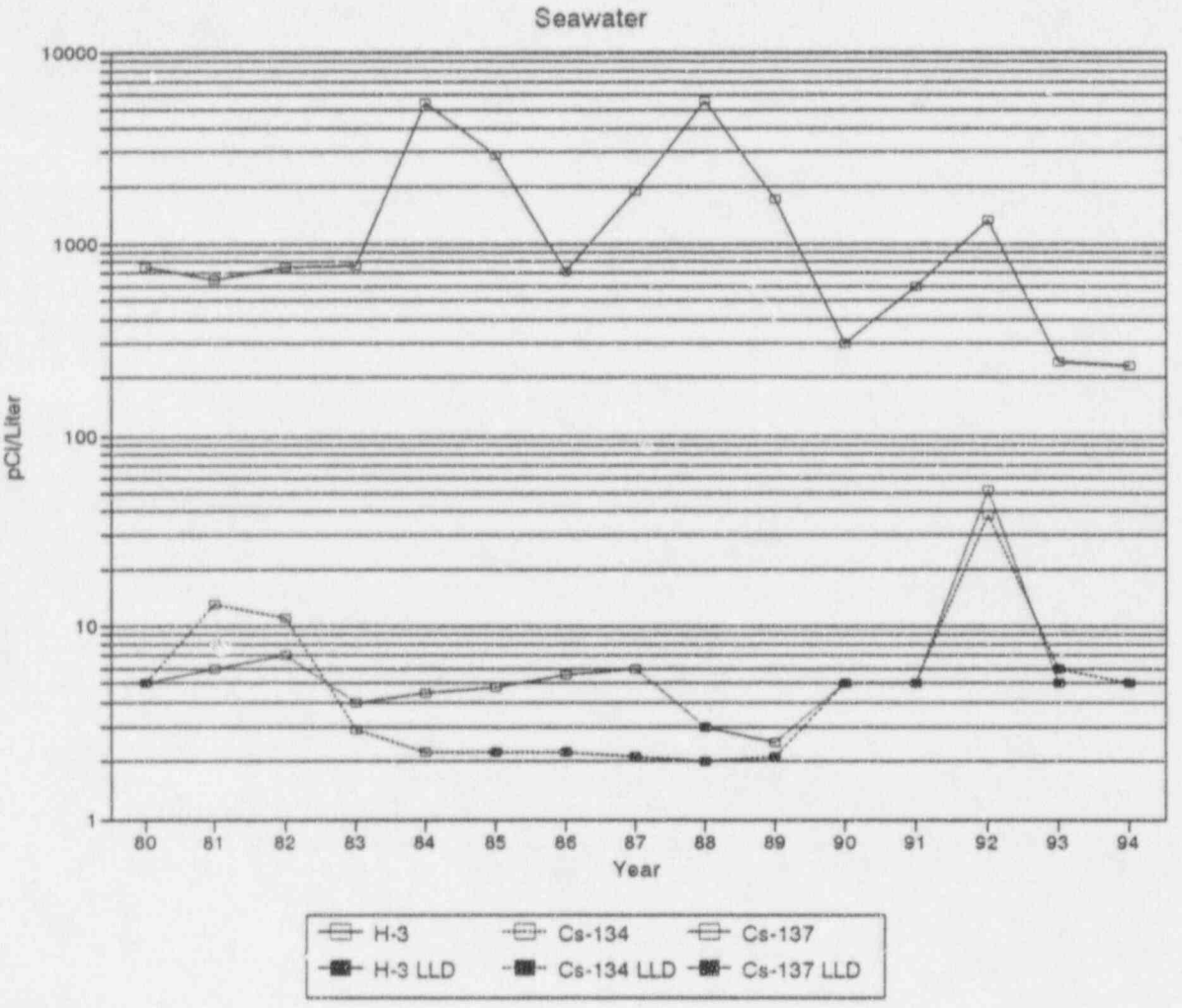

Seawater
10000
1000
100
10
1
pCi/Liter
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
H-3
Cs-134
Cs-137
H-3 LLD
Cs-134 LLD
Cs-137 LLD

TABLE IV-C.2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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 (pCi/L)	Tritium 2	230	None	-	-	<LLD	0
	γ Spec 2						
	Mn-54	4	None	-	-	<LLD	0
	Fe-59	8	None	-	-	<LLD	0
	Co-58	4	None	-	-	<LLD	0
	Co-60	4	None	-	-	<LLD	0
	Zn-65	8	None	-	-	<LLD	0
	Zr-Nb-95	7	None	-	-	<LLD	0
	I-131	5	None	-	-	<LLD	0
	Cs-134	5	None	-	-	<LLD	0
	Cs-137	4	None	-	-	<LLD	0
	Ba-La-140	11	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

FLORIDA POWER CORP. - CR3 - 1994

pCi/L γ EMITTERS AND TRITIUM IN GROUND WATER

STATION	NUCLIDE	FIRST HALF	SECOND HALF
C40	H-3	<143	<132
	Mn-54	<4	<4
	Fe-59	<9	<8
	Co-58	<4	<3
	Co-60	<6	<4
	Zn-65	<11	<6
	Zr-Nb-95	<8	<5
	I-131	<6	<4
	Cs-134	<4	<4
	Cs-137	<4	<4
	Ba-La-140	<7	<8
	K-40	<72	<54

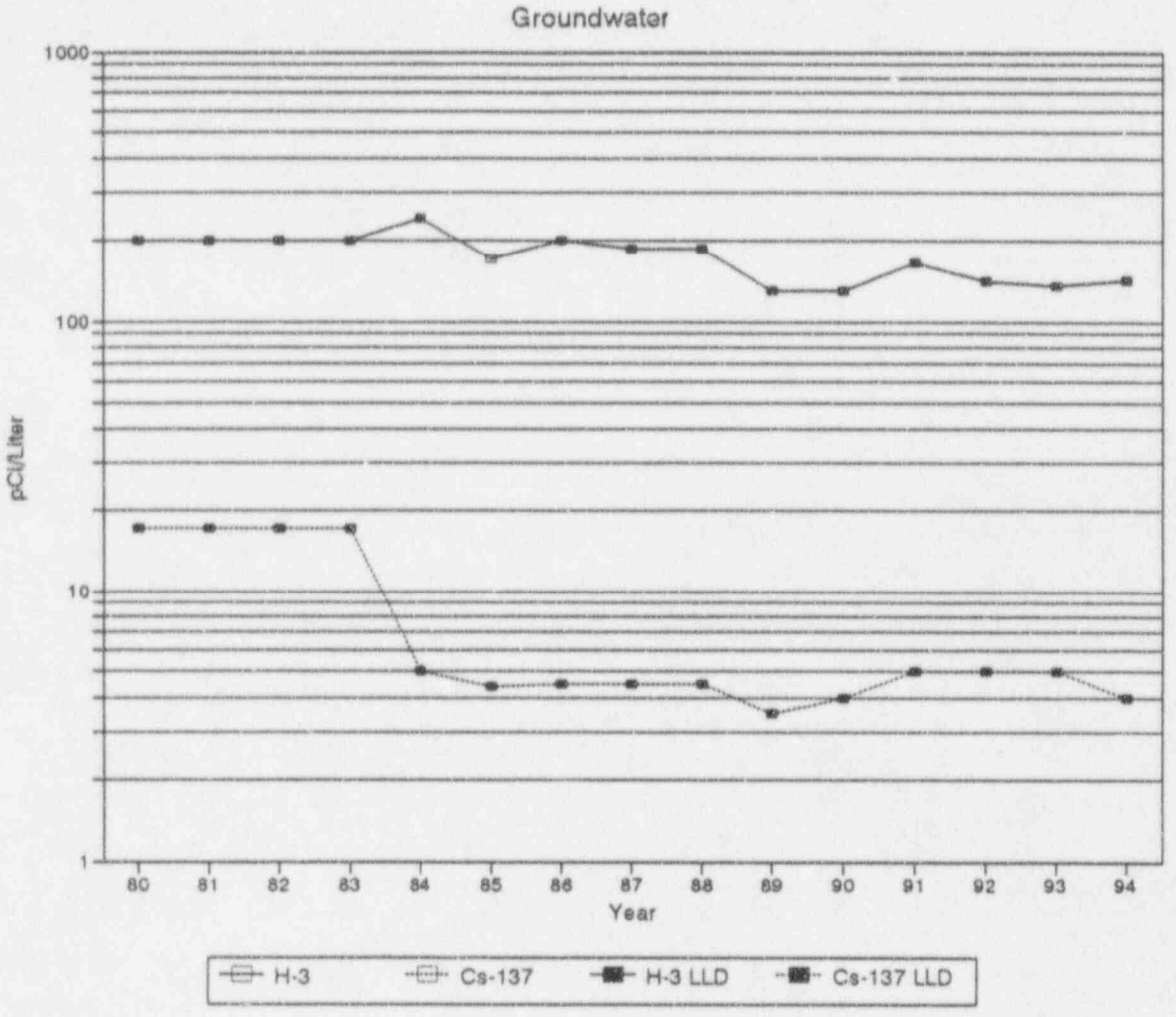

Groundwater
1000
100
10
1
pCi/Liter
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
H-3
Cs-137
H-3 LLD
Cs-137 LLD

TABLE IV-C.3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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	230	None	-	-	<LLD	0
	γ Spec 12						
	Mn-54	4	None	-	-	<LLD	0
	Fe-59	8	None	-	-	<LLD	0
	Co-58	4	None	-	-	<LLD	0
	Co-60	4	None	-	-	<LLD	0
	Zn-65	8	None	-	-	<LLD	0
	Zr-Nb-95	7	None	-	-	<LLD	0
	I-131	5	None	-	-	<LLD	0
	Cs-134	5	None	-	-	<LLD	0
	Cs-137	4	None	-	-	<LLD	0
	Ba-La-140	11	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

FLORIDA POWER CORP. - CR3 - 1994

pCi/L γ EMITTERS AND TRITIUM IN DRINKING WATER

STATION	QUARTER	H-3	K-40	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zn-Nb-95	I-131	Cs-134	Cs-137	Ba-La-140
C07	1	<134	<76	<3	<11	<3	<4	<7	<6	<7	<5	<5	<6
	2	<132	<46	<3	<7	<4	<4	<8	<7	<4	<4	<4	<5
	3	<139	<58	<4	<6	<4	<3	<7	<7	<6	<4	<4	<4
	4	<134	<53	<4	<7	<4	<4	<9	<5	<5	<3	<4	<7
C10	1	<134	<73	<5	<9	<5	<4	<10	<6	<7	<5	<4	<6
	2	<132	<54	<3	<6	<4	<4	<7	<7	<6	<5	<4	<6
	3	<139	<59	<3	<8	<4	<4	<9	<9	<7	<4	<5	<8
	4	<134	<64	<4	<9	<4	<5	<9	<6	<4	<4	<4	<8
C18	1	<134	<71	<3	<9	<4	<3	<9	<6	<6	<4	<4	<7
	2	<132	<57	<4	<8	<4	<4	<7	<7	<5	<4	<4	<6
	3	<139	<60	<3	<8	<3	<2	<8	<6	<5	<4	<4	<6
	4	<134	<50	<4	<7	<3	<4	<9	<6	<4	<4	<4	<7

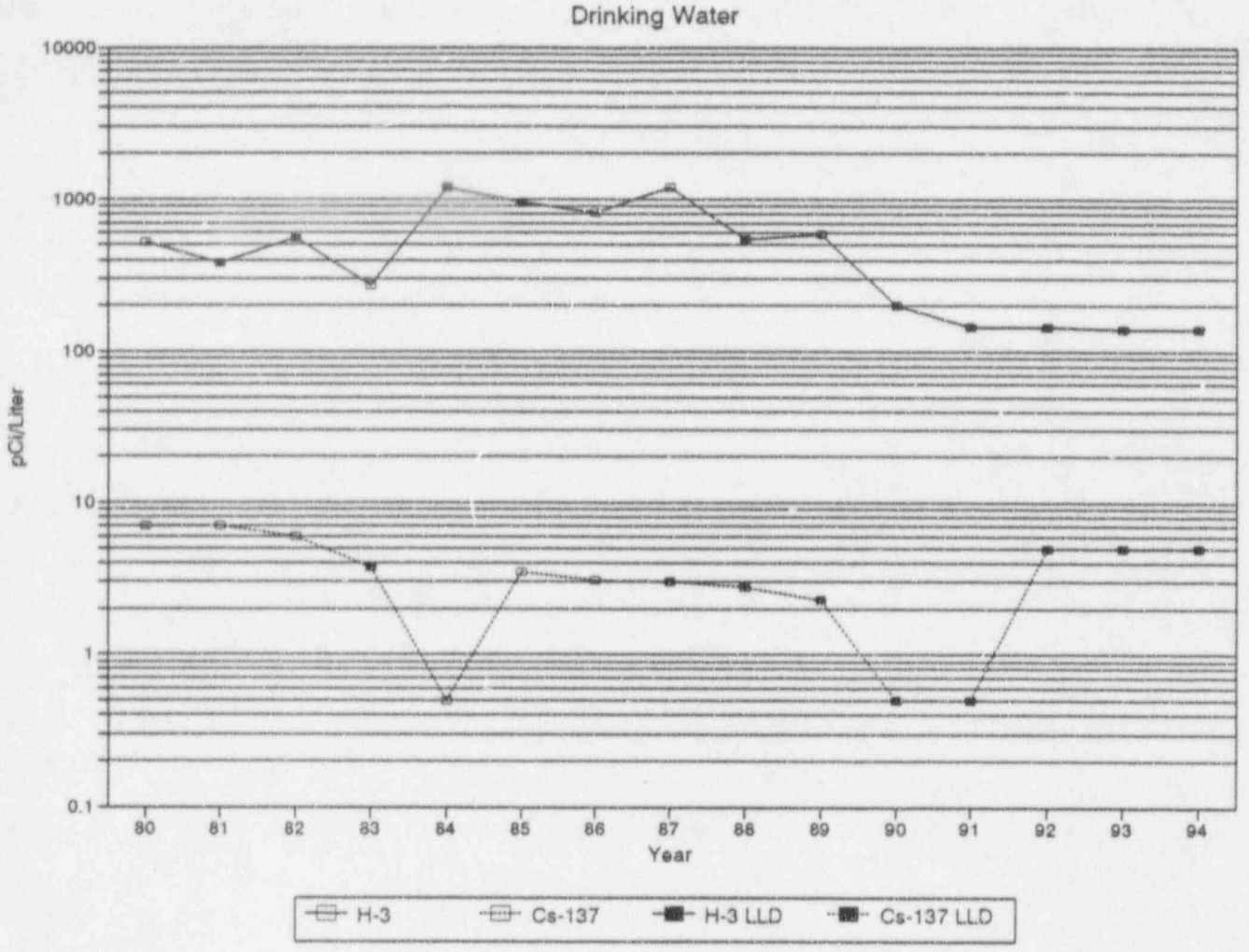

Drinking Water
10000
1000
100
10
1
0.1
pCi/Liter
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
H-3
Cs-137
H-3 LLD
Cs-137 LLD

TABLE IV-C.4.a

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg γ EMITTERS IN SHORELINE SEDIMENT

STATION	PERIOD	Cs-134	Cs-137	Co-58	Co-60	K-40	Ra-226
C09(1)	First Half	<11	<9	<8	<9	559 ± 56	269 ± 15
	Second Half	<10	<9	<8	<7	<145	392 ± 11
C14H	First Half	<29	108 ± 13	32 ± 15	742 ± 19	1798 ± 154	1126 ± 34
	Second Half	<25	82 ± 10	120 ± 12	541 ± 14	2417 ± 146	1233 ± 21
C14M	First Half (2)	<15	15 ± 6	49 ± 8	224 ± 9	396 ± 72	743 ± 22
	Second Half	<15	<18	258 ± 12	190 ± 7	732 ± 75	579 ± 15
C14G	First Half	<12	<12	20 ± 5	20 ± 5	278 ± 71	903 ± 24
	Second Half	<17	<16	34 ± 7	79 ± 7	348 ± 101	1224 ± 20

(1) C09 is the control station at Ft. Gulf Island Beach. C14H, M, & G are discharge canal stations.

First half samples taken 2-01-94.

Second half samples taken 8-02-94.

TABLE IV-C.4

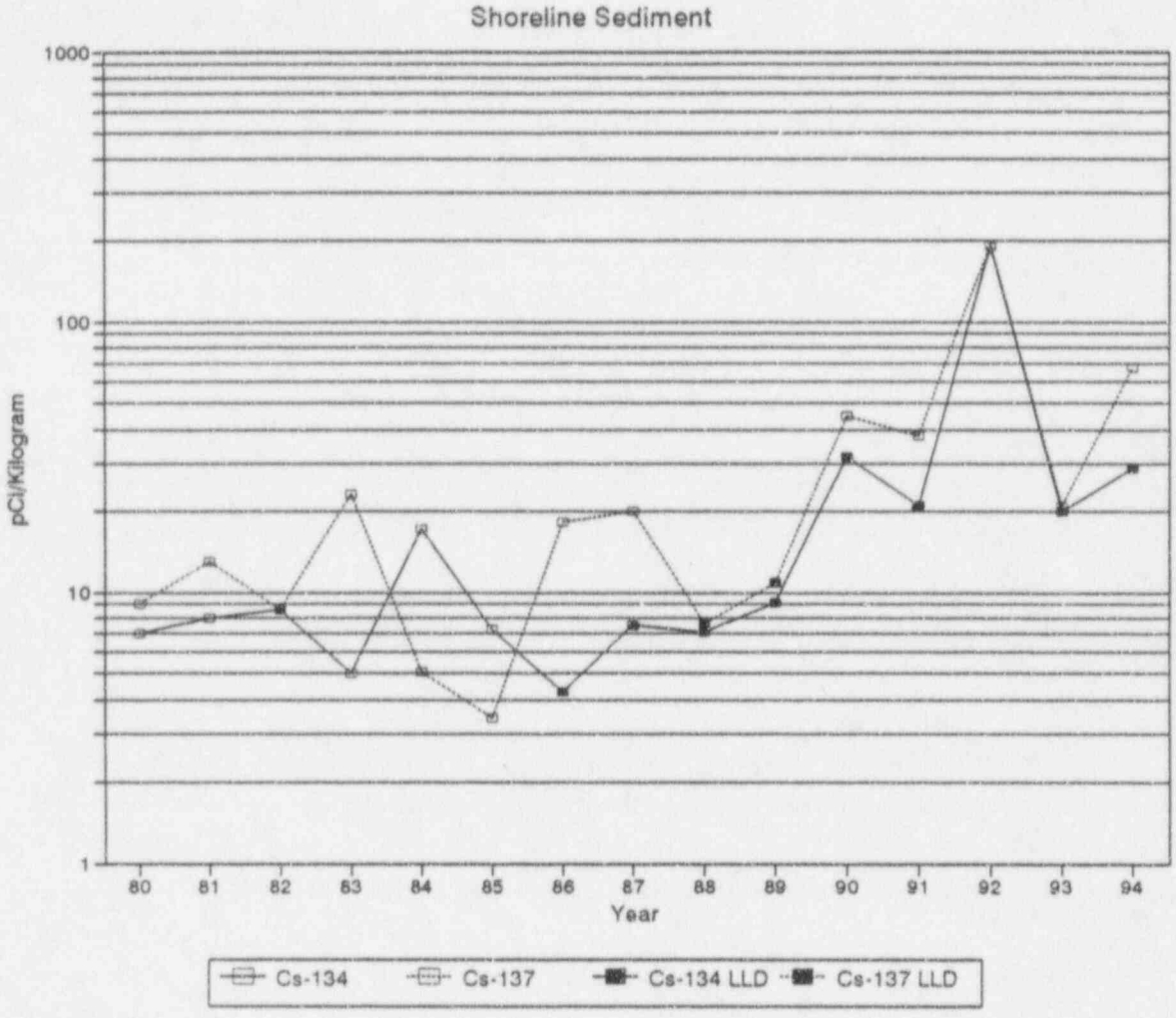
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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 (pCi/kg)	γ Spec 8						
	Cs-134	14	<LLD	-	-	<LLD	0
	Cs-137	12	68 (3/6) (15 - 108)	C14H 0.1 @ 315°	95 (2/2) (82 - 108)	<LLD	0

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


Shoreline Sediment
1000
100
10
1
pCi/Kilogram
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
Cs-134
Cs-137
Cs-134 LLD
Cs-137 LLD

IV-D. INGESTION PATHWAY

To evaluate the ingestion pathway, fish, oysters, citrus, and watermelon samples are taken.

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 Cs-137 LLD for station C29 was 23 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 for, cobalt-58, at a concentration of 70 pCi/kg, was identified in a sample taken at the end of the discharge canal. Silver-110m was also identified in three of the four C29 samples at levels ranging from 229 pCi/kg to 1863 pCi/kg. These results are similar to previous years values.

3. Monthly broadleaf vegetation samples were taken at two indicator locations, C48a and C48b, and one control location, C47. Six of twenty-four indicator samples had measurable amounts of Cs-137 with an average concentration of 45 pCi/kg and a range of 23 to 73 pCi/kg. All control station samples had measurable amounts of Cs-137 with an average of 64 pCi/kg and a range of 35 to 110 pCi/kg. The disparity between cesium levels in onsite vegetation and the control location is attributed to the difference in species. The control location plants apparently concentrate cesium (from bomb test fallout) to higher levels than do the onsite plants.

4. Annual watermelon and citrus (oranges) samples are taken at stations C04 and C19, respectively. Cesium-137 was measured in the citrus sample at a level of 14 pCi/kg. This is similar to previous years, and is not attributed to CR-3.

TABLE IV-D.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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 (pCi/kg)	γ Spec 8						
	Mn-54	9	<LLD	-	-	<LLD	0
	Fe-59	16	<LLD	-	-	<LLD	0
	Co-58	9	<LLD	-	-	<LLD	0
	Co-60	10	<LLD	-	-	<LLD	0
	Zn-65	17	<LLD	-	-	<LLD	0
	Cs-134	9	<LLD	-	-	<LLD	0
	Cs-137	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-D.1.a

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg γ EMITTERS IN CARNIVOROUS FISH

STATION	QUARTER	Mn-54	Co-58	Co-60	Fe-59	Zn-65	Cs-134	Cs-137	K-40
C29	1	<25	<25	<33	<51	<39	<24	<20	1428 ± 213
	2	<15	<20	<32	<35	<45	<22	<23	2765 ± 212
	3	<18	<19	<24	<38	<46	<22	<19	2259 ± 207
	4	<11	<18	<20	<32	<32	<15	<17	3241 ± 180
C30	1	<23	<26	<23	<48	<60	<20	<29	2393 ± 266
	2	<19	<19	<23	<47	<44	<21	<19	1737 ± 216
	3	<19	<17	<26	<35	<42	<25	<19	1823 ± 187
	4	<7	<7	<9	<16	<16	<8	<8	2602 ± 103

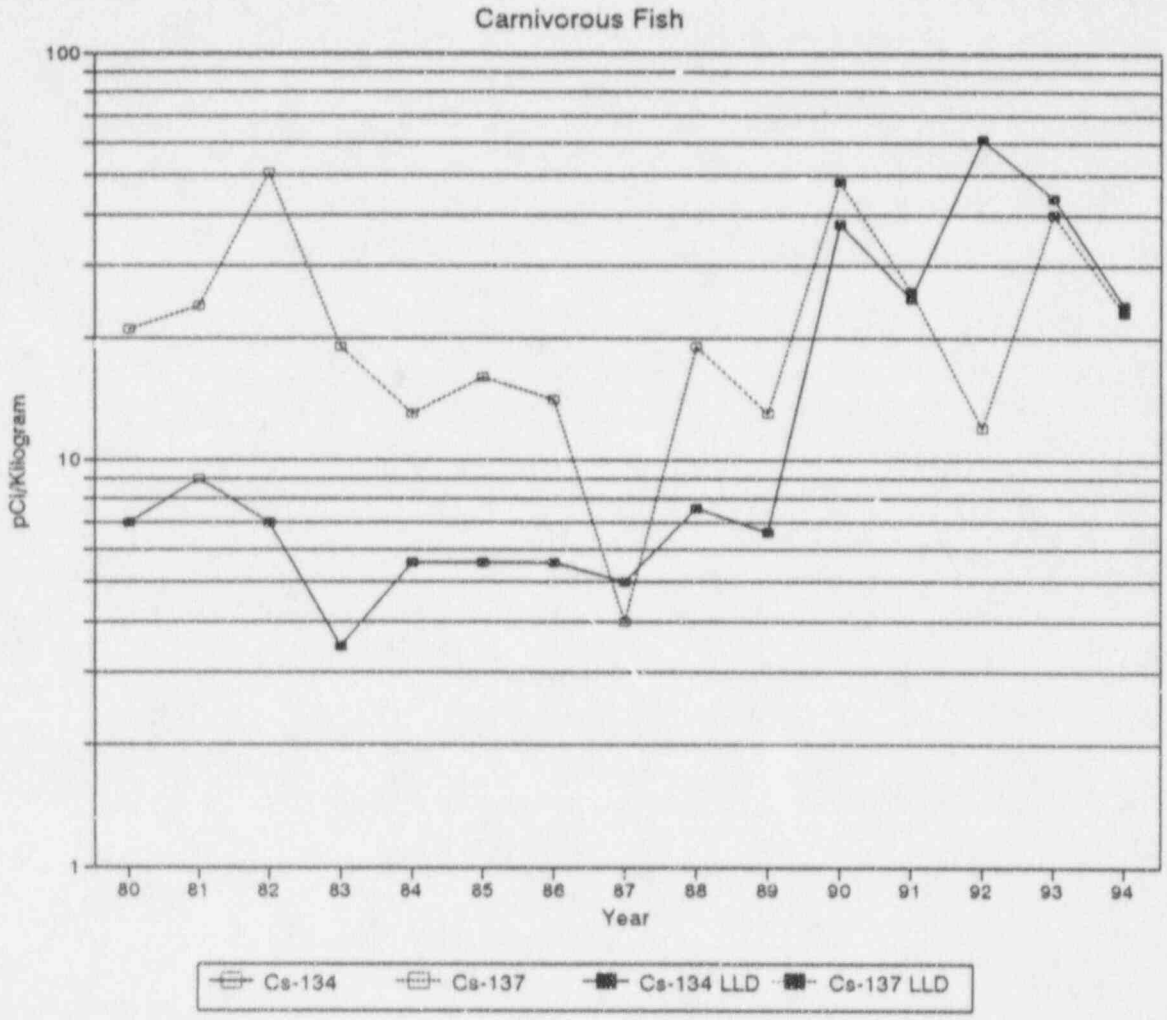

Carnivorous Fish
100
10
1
pCi/Kilogram
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
Cs-134
Cs-137
Cs-134 LLD
Cs-137 LLD

TABLE IV-D.2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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	9	<LLD	-	-	<LLD	0
	Fe-59	16	<LLD	-	-	<LLD	0
	Co-58	9	70 (1/4)	C29 2 @ 270°	70 (1/4)	<LLD	0
	Co-60	10	<LLD	-	-	<LLD	0
	Zn-65	17	<LLD	-	-	<LLD	0
	Cs-134	9	<LLD	-	-	<LLD	0
	Cs-137	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-D.2.a

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg γ EMITTERS IN OYSTERS

STATION	QUARTER	Mn-54	Co-58	Co-60	Fe-59	Zn-65	Cs-134	Cs-137	K-40
C29	1	<40	<44	<45	<80	<78	<30	<39	1151 ± 238
	2	<36	70 ± 17	<55	<74	<83	<45	<55	1245 ± 204
	3	<21	<20	<26	<41	<43	<27	<19	1298 ± 165
	4	<14	<17	<18	<28	<37	<15	<19	1261 ± 103
C30	1	<26	<23	<30	<59	<67	<29	<29	1327 ± 268
	2	<16	<17	<22	<52	<44	<19	<22	1318 ± 180
	3	<10	<9	<11	<21	<22	<11	<10	1090 ± 82
	4	<15	<15	<22	<32	<41	<14	<17	1550 ± 168

Ag-110m was quantified in three samples taken at station C29. Concentration of 2-01-94 sample was 229 pCi/kg, 5-24-94 sample was 1863 pCi/kg, and the 11-28-94 sample was 964 pCi/kg.

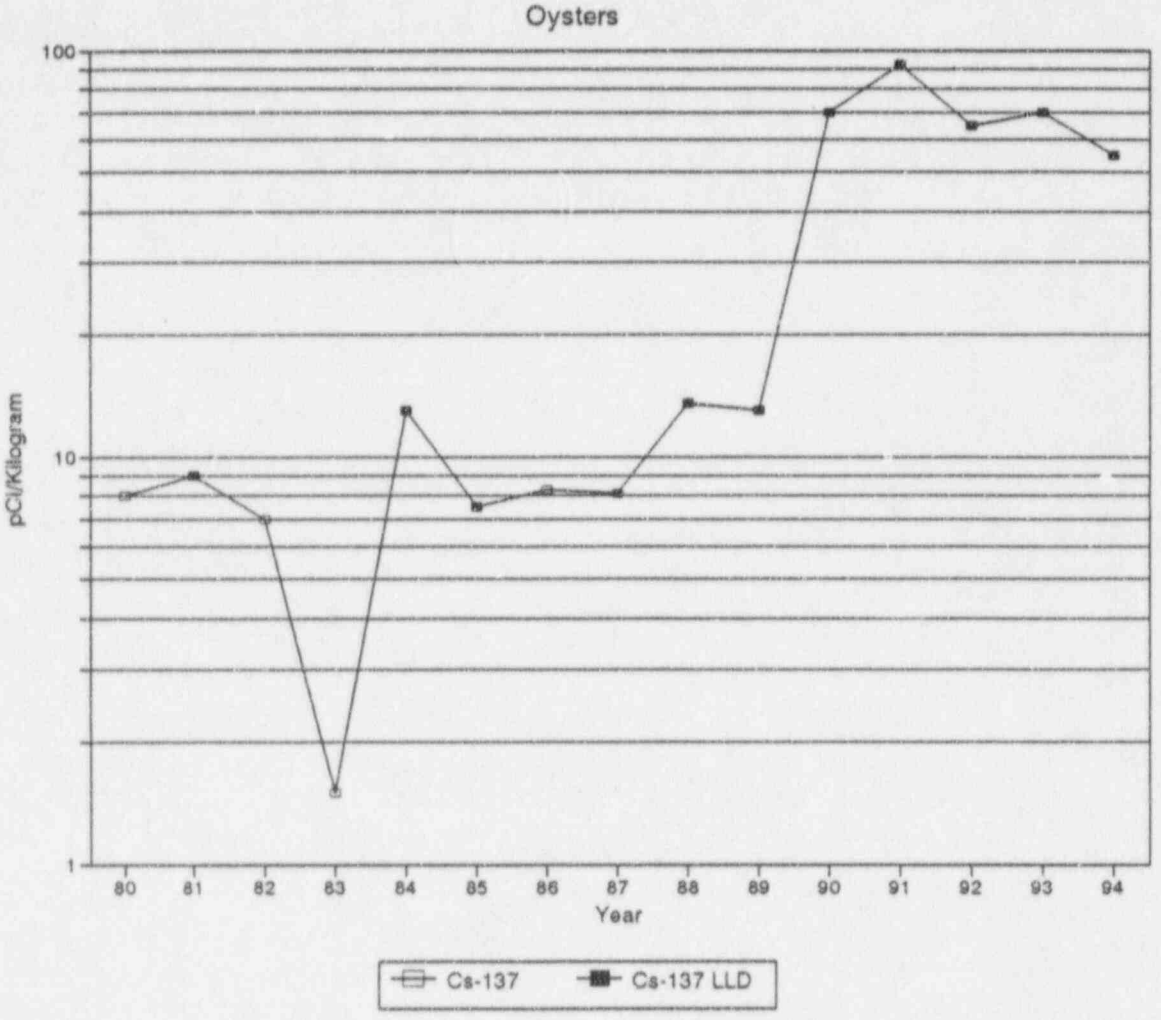

Oysters
100
10
1
pCi/Kilogram
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
Cs-137
Cs-137 LLD

TABLE IV-D.3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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
VEGETATION (pCi/kg)	γ Spec 36						
	I-131	9	<LLD	-	-	<LLD	0
	Cs-134	8	<LLD	-	-	<LLD	0
	Cs-137	8	45 (6/24) (23 - 73)	C48B 0.8 @ 30°	50 (4/12) (23 - 73)	64 (12/12) (35 - 110)	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

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C47	JAN	<10	<10	49 ± 6	2923 ± 115
	FEB	<13	<17	47 ± 11	3176 ± 225
	MAR	<20	<16	47 ± 10	4061 ± 199
	APR	<11	<15	76 ± 10	3904 ± 173
	MAY	<12	<12	100 ± 10	3242 ± 145
	JUN	<12	<15	46 ± 8	4718 ± 194
	JUL	<13	<11	55 ± 7	5525 ± 186
	AUG	<12	<12	59 ± 7	3824 ± 155
	SEP	<11	<12	58 ± 8	4024 ± 164
	OCT	<12	<14	35 ± 7	5079 ± 202
	NOV	<13	<13	81 ± 9	4539 ± 165
	DEC	<21	<19	110 ± 13	3507 ± 205
C48A	JAN	<18	<13	<21	3229 ± 170
	FEB	<11	<13	24 ± 5	2122 ± 153
	MAR	<19	<16	<13	2487 ± 155
	APR	<11	<14	<17	5153 ± 199
	MAY	<10	<10	26 ± 6	2350 ± 120
	JUN	<10	<12	31 ± 5	3588 ± 150
	JUL	<10	<8	68 ± 7	2136 ± 112
	AUG	<12	<9	<9	4236 ± 144
	SEP	<9	<12	<9	4107 ± 143
	OCT	<12	<11	54 ± 10	3165 ± 140
	NOV	<10	<12	<12	3076 ± 144
	DEC	<17	<13	<16	1115 ± 110

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

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg OF γ EMITTERS IN BROAD LEAF VEGETATION

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C48B	JAN	<11	<12	72 ± 7	4493 ± 151
	FEB	<13	<11	73 ± 9	3677 ± 192
	MAR	<16	<11	32 ± 7	5486 ± 208
	APR	<9	<13	<12	6976 ± 184
	MAY	<14	<15	<15	4569 ± 189
	JUN	<11	<11	23 ± 8	5264 ± 176
	JUL	<13	<18	<18	6806 ± 224
	AUG	<11	<10	<11	3391 ± 136
	SEP	<11	<12	<11	3762 ± 143
	OCT	<10	<9	<11	3108 ± 131
	NOV	<12	<11	<14	2596 ± 125
	DEC	<24	<24	<21	5500 ± 259

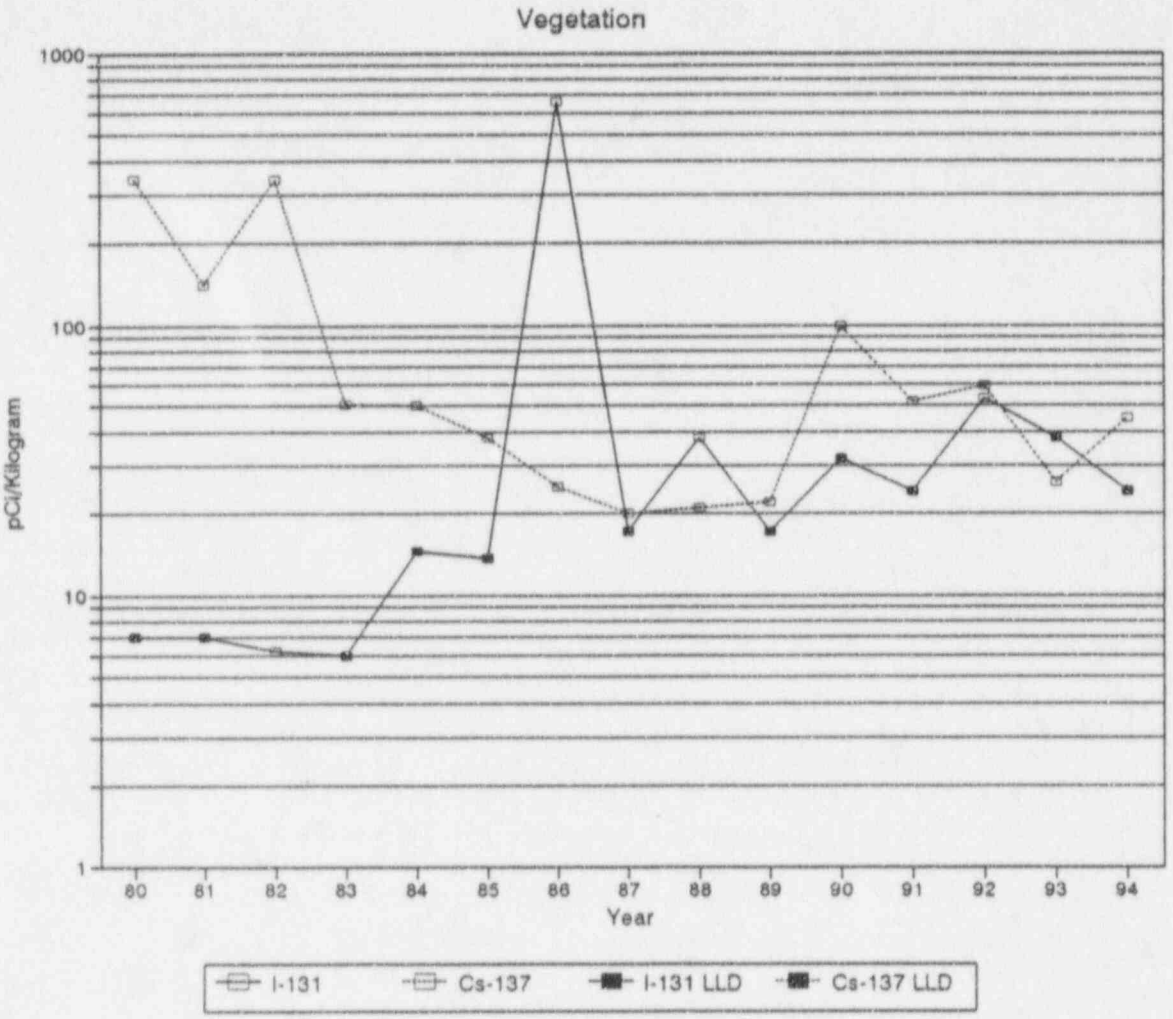

Vegetation
1000
100
10
1
pCi/Kilogram
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
Year
I-131
Cs-137
I-131 LLD
Cs-137 LLD

TABLE IV-D.4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 5-302

CITRUS COUNTY, FLORIDA JANUARY 1 TO DECEMBER 31, 1994

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
WATERMELON (pCi/kg)	γ Spec 1						
	I-131	9	<LLD	-	-	None	0
	Cs-134	8	<LLD	-	-	None	0
	Cs-137	8	<LLD	-	-	None	0
CITRUS (pCi/kg)	γ Spec 1						
	I-131	9	<LLD	-	-	None	0
	Cs-134	8	<LLD	-	-	None	0
	Cs-137	8	14 (1/1)	C19 8.5 @ 60°	14 (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

FLORIDA POWER CORP. - CR3 - 1994

pCi/kg OF γ EMITTERS IN WATERMELON AND CITRUS

STATION	MONTH	I-131	Cs-134	Cs-137	K-40
C04 - Watermelon	May	<7	<6	<7	1706 ± 71
C19 - Citrus	January	<7	<7	14 ± 3	2033 ± 99