ANNUAL ENVIRONMENTAL OPERATING REPORT

VOLUME 2 - RADIOLOGICAL

1/1/80 - 12/31/80

SUPPLEMENT 1

CRYSTAL RIVER - UNIT 3

FLORIDA POWER CORPORATION

FACILITY OPERATING LICENSE NO. DPR-72

DOCKET NO. 50-302

December, 1981

APPROVED BY: Manager
Nuclear Support Services

Peter J. Baynard

DATE: 12/8/81

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

I. INTRODUCTION

The Radiological Environmental Monitoring Program provides information which can be used to assist in assessing the type and quantity of radiation exposure in unrestricted areas resulting from plant operation. The Program is conducted via a contract with the University of Florida, Department of Environmental Engineering Sciences, Gainesville, Florida and a grant to the State of Florida, Department of Health and Rehabilitative Services, Orlando, Florida. The parts of the Program for which each are responsible are listed in Table I-1. In essence, the Program provides a continuation of the preoperation program so that any increases of radioactivity in the environment can be detected. No pathway has shown any confirmed increases of radioactivity in the environment due to plant operation during this report period.

In the summary analysis tables, two terms are used which need explanation. The term "ND" means that the activity of the nuclide for the samples was non-detectable or less than half of the LLDs for those samples. The term "<LLD" means that the activity of the nuclide for the samples was less than the LLDs for those samples. In this way, an apparent change in activity below the lower limits of detection can be trended without getting bogged down in "actual" activity values.

The statistical evaluation of operational analyses were performed using one-fourth the LLD value if the activity was non-detectable and using three-fourths the LLD value if the activity was less than the LLD value. When a non-detectable or less than LLD concentration is used in an evaluation, the results are prefaced with a "<" sign to show that the results do not indicate only detected activity.

Finally, the statistical evaluation of the operational concentrations where there are preoperational results includes the median values. This is done solely for comparison to preoperational results.

Table I-1

Radiological Environmental Monitoring Program

RESPONSIBILITY	PATHWAY	SAMPLE STATIONS(1)
University	Air Submersion	C04, C14H*, C14M*, C14G*, C40, C41, C43, C46
State	Air Submersion	C07, C09, C18, C26
University	Air Inhalation	C41*
State	Air Inhalation	C04, C07, C18, C26, C40, C46
State	Precipitation	C04, C26, C40
University	Sea Water	C01, C09, C13, C14H, C14M, C14G*
State	River Water	C15
State	Ground Water	C40
University	Potable Water	C07, C10, C18
University	Shoreline External Sediment	C01, C09, C14H*, C14M*, C14G*
University	Seafood Chain	C29, C30
University	Ingestion Crab	C29*, C30
University	Ingestion Fish (Carnivorous)	C29*, C30
University	Ingestion Fish (Herbivorous)	C29*, C30
University	Ingestion Oysters	C29, C30
University	Ingestion Shrimp	C27
University	Ingestion Milk	C47, C49*
University	Ingestion Animals	C45
University	Food Chain (Grasses)	C05, C40, C41

Table I-1 (Continued)

Radiological Environmental Monitoring Program

RESPONSIBILITY	PATHWAY	SAMPLE STATIONS([1])
State	Ingestion Food Crops (Citrus)	C19
State	Ingestion Food Crops (Watermelon)	C04
University	Food Chain (Soil)	C04, C07, C18, C26, C40, C41, C46
State	Meat	C50
State	Poultry	C51
State	Eggs	C51
University	Food Chain (Vegetables)	C47, C48*

*Critical Pathway Sample Stations

([1]) See ETS Table 3.2-4 and Figures 3.2-2 and 3.2-3 for the description and location of all Sample Stations.

II. MILK AND GREEN LEAFY VEGETABLE CENSUS

Environmental Technical Specification 3.2.1 requires a census of animals producing milk for human consumption to be conducted semiannually. If this census fails to locate any such animals, a census of gardens producing fresh leafy vegetables for human consumption is required annually.

The garden census, required as the result of a lack of findings on the milk animal census, was completed on April 7 and 8, 1980. The critical garden (Sample Station C48) found to be in the east sector at 4.0 miles from the plant.

A semiannual milk cow survey was completed on July 31, 1980 again with no milk animals found. The critical station for green leafy vegetables was continued at the garden 4.0 miles from the plant in the east sector.

A seminannual milk cow census was completed by December 22, 1980. No milk animals were located within five miles of the plant site in this survey.

III. MEDIA OTHER THAN EXTERNAL RADIATION

AIR INHALATION PATHWAY

The Air Inhalation Pathway is one of two pathways split between the University and the State. In addition to the assigned stations, the University operates a station at C47.

Weekly Gross Beta Analysis

The summary for the gross beta analysis is in Table III-1. Three weekly samples were not collected and analyzed:

> C07 for the week of April 21, 1980 due to missing particulate filter.
>
> C41 for the week of May 2, 1980 due to failure to make required collection.
>
> C47 for the week of March 7, 1980 due to personnel error that resulted in discarding the particulate filter.

All other samples were collected and analyzed.

There are no critical stations for this type of analysis. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-4.

The operational concentrations are similar to the preoperational concentrations and consistent with the 1979 operational concentrations.

Weekly I-131 Analysis

The summary for the iodine analysis is in Table III-2. One weekly sample was not collected and analyzed:

> C41 for the week of January 4, 1980 due to personnel error that resulted in discarding the charcoal cartridge.

All other samples were collected and analyzed. Station C41 is the critical station for this type of analysis and no samples had activity greater than 10 times the control station's 95 percentile values. A statistical evaluation of the operational data is presented in Table III-4. There are no preoperational data.

The statistical analysis of the critical and control stations for the period of this report is presented in Table III-4.

Quarterly Gamma Analysis

The summary for gamma analysis of quarterly composites is in Table III-3. All samples were collected and analyzed. There are no critical stations for this type of analysis. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-4.

The concentrations of nuclides by gamma analysis during 1980 were generally less than the preoperational concentrations and consistent with the 1979 concentrations.

Quarterly Sr-89 and 90 Analysis

The summary for the strontium analysis of quarterly samples is in Table III-5. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-4.

There are no preoperational data and all operational concentrations are consistent.

Table III-1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
AIR INHALATION (PCI/M3)	GROSS B 416	0.008	0.030 (378/ 409) (0.004-0.261)	C26 0.036 (46/ 52) (0.011-0.126)	SEE COLUMN 4	

Table III-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
AIR INHALATION (PCI/M3)	Iodine- 131 416	0.039	0.062(27/ 411) (0.043-0.081)	C47 0.081(1/ 1) (0.081-0.081)	SEE COLUMN 4	

Table III-3

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
AIR INHALATION (PCI/M3)	GAMMA ANALYSIS QUARTERLY COMPOSITE 32					
	CE-144	0.050	0.029 (2/ 32) (0.009-0.050)	C47 0.050 (1/ 4) (0.050- 0.050)		
	RA-226	0.031	0.006 (8/ 32) (0.002-0.020)	C41 0.0075 (4/ 4) (0.003- 0.02)		
	TH-232	0.015	0.002 (7/ 32) (0.001-0.003)	C41 0.0023 (3/ 4) (0.002-0.003)		
	I-131	0.008	ND			
	BA-140	0.008	<LLD (12/ 32)			
	RU-106	0.038	<LLD (12/ 32)			
	CS-137	0.008	0.001 (8/ 32) (0.001-0.002)	C41 0.0012 (4/ 4) (0.001-0.002)		
	ZR-95	0.008	0.155 (2/ 32) (0.010-0.300)	C41 0.075 (1/ 4) (0.075-0.075)		
	MN-54	0.008	ND			
	ZN-65	0.016	ND			
	K-40	0.086	0.037 (8/ 32) (0.010- 0.20)	C41 0.06 (4/ 4) (0.01 - 0.20)		

Table III-4

AIR INHALATION PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/m^3)

Nuclide	Preoperational Values		Operational Values						
						Control Station		Critical Stations	
Iodine Analysis	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
I-131	--	--	<.010	<.010	.021	<.010	<.020	.010	.027
Gross Beta Analysis	.029	.12	.023	<.029	<.086	<.029	<.083	.024	.103
Gamma Analysis									
Ce-144	.003	.172	<.015	<.014	<.029	<.015	<.030	<.004	<.012
Ra-226	<.2	.241	<.010	<.009	<.016	<.009	<.013	<.008	<.024
Th-232	<.01	.008	<.005	<.004	<.007	<.005	<.007	<.002	<.004
I-131	<.07	.004	<.003	<.002	<.004	<.002	<.004	<.0001	<.0003
Ba-140	<.01	.016	<.005	<.004	<.010	<.004	<.010	<.0004	<.001
Ru-106	.025	.216	<.0125	<.019	<.049	<.022	<.050	<.001	<.002
Cs-137	<.01	.013	<.003	<.002	<.003	<.002	<.003	<.001	<.002
Zr-95	.003	.043	<.003	<.013	<.116	<.005	<.011	<.019	<.092
Mn-54	<.01	<.01	<.003	<.002	<.004	<.002	<.004	<.001	<.003
Zn-65	<.01	<.01	<.005	<.004	<.008	<.004	<.008	<.002	<.006
K-40	<16.8	<16.8	<.028	<.030	<.092	<.026	<.036	<.06	<.243
Strontium Analysis									
Sr-89	--	--	.0005	.0006	.002	<.0005	<.0008	<.001	<.006
Sr-90	--	--	.0003	.0002	.0004	<.0002	<.0004	0	0

Table III-5

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
AIR INHALATION (PCI/M3)	SR 89-90 ANALYSIS 32					
	SR-89	0.002	0.002 (3/ 32) (0.000-0.005)	C41 0.005 (1/ 4)	SEE COLUMN 4	
	SR-90	0.001	0.000 (1/ 32)	C41 0.000 (1/ 4)	SEE COLUMN 4	

PRECIPITATION PATHWAY

The State has the responsibility to collect and analyze precipitation samples. There are no additional stations for the pathway. No samples were available in May due to lack of sufficient precip.tation.

Monthly Gamma Analysis

The summary for the gamma analysis of the monthly samples is in Table III-6. All monthly samples were collected (except for May) and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-7.

The 1980 operational activities of the nuclides determined by gamma analysis were non detectable as were the preoperational, 1977, 1978 and 1979 operational activities.

Monthly Tritium Analysis

The summary for the tritium analysis of the monthly precipitation sample is in Table III-8.

All samples were collected (except for May) and analyzed. There are no critical stations in this pathway. A statistical evalutaion of the operational data and a comparison with the preoperational data is presented in Table III-7.

All of the 1980 operational activity data for tritium were less than the LLDs as were the preoperational and 1979 operational activities.

Table III-6

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
PRECIPITATION (PCI/L)	GAMMA ANALYSIS 36					0
	I-131	17	ND			
	BA-140	17	ND			
	CS-137	17	ND			
	CS-134	17	ND			
	CO-58	17	ND			
	MN-54	15	ND			
	ZN-65	30	ND			
	CO-60	17	ND			

Table III-7

PRECIPITATION PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysis					
I-131	<.4	<.4	<4.3	<4.3	<4.3
Ba-140	<10	<10	<4.3	<4.3	<4.3
Cs-137	<10	<10	<4.3	<4.3	<4.3
Cs-134	<10	<10	<4.3	<4.3	<4.3
Co-58	<10	<10	<4.3	<4.3	<4.3
Mn-54	<10	<10	<3.8	<3.8	<3.8
Zn-65	<20	<20	<7.5	<7.5	<7.5
Co-60	<10	<10	<4.3	<4.3	<4.3
Tritium Analysis					
H-3	<320	<320	<150	<150	<150

Table III-8

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
PRCIP (PCI/L) AIR	TRITIUM ANALYSIS 36					0
	H-3	241	<LLD(34/ 34)			

SEA WATER PATHWAY

The University has the responsibility to collect and analyze sea water samples. There are no additional stations for this pathway.

Monthly Gamma Analysis

The summary for the gamma analysis of monthly samples is in Table III-9. All samples were collected and analyzed. Sample Station C14G is the critical station in this pathway and no sample had activity greater than 10 times the control station value. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-10.

The concentrations of nuclides by gamma analysis during 1980 were generally less than the preoperational concentrations and consistent with 1979 concentrations. The critical stations and the control stations concentration were almost identical.

Quarterly Tritium Analysis

The summary for the tritium analysis of quarterly samples is in Table III-11. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-10.

The concentrations observed in 1980 were consistent with preoperational and 1979 operational concentrations.

Quarterly Sr-89 and 90 Analysis

The results of the analyses for the quarterly samples of Sr-89 and 90 are presented in Table III-12. All samples were collected and analyzed. Sr-89/90 are not critical nuclides in this pathway. A statistical evaluation of operational data is presented in Table III-10. There are no preoperational data. The 1980 Sr-89/90 concentrations are consistent with those of previous operational years.

Table III-9

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS			HIGHEST MEAN LOCATION			CONTROL LOCATION			NRR
SEA WATER (PCI/KG)	GAMMA ANALYSIS 72											0
	RA-226	11	31(66/ 72)			40(12/ 12)			33(55/ 60)			
			(5- 71)			(20- 71)			(13- 71)			
	TH-232	10	17(54/ 72)			17(8/ 12)			17(46/ 60)			
			(9- 29)			(13- 22)			(9- 29)			
	I -131	5	6(5/ 72)			7(2/ 12)			6(3/ 60)			
			(6- 7)			(7- 7)			(6- 6)			
	BA-140	18	26(2/ 72)			34(1/ 12)			18(1/ 60)			
			(18- 34)									
	RU-106	40	47(2/ 72)			55(1/ 12)			47(2/ 60)			
			(39- 55)						(39- 55)			
	CS-137	6	5(16/ 72)			7(3/ 12)			5(14/ 60)			
			(3- 11)			(5- 11)			(3- 11)			
	ZR -95	9	10(1/ 72)			10(1/ 12)			10(1/ 60)			
	CS-134	6	5(8/ 72)			7(2/ 12)			5(7/ 60)			
			(3- 7)			(7- 7)			(4- 7)			
	MN -54	5	6(1/ 72)			6(1/ 12)			0(0/ 60)			
	ZN -65	12	17(1/ 72)			17(1/ 12)			17(1/ 60)			
	K - 40	53	246(69/ 72)			301(12/ 12)			235(57/ 60)			
			(61- 502)			(194- 502)			(61- 362)			

Table III-10

SEA WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Gamma Analysis									
Ra-226	--	600	<29.3	<29.0	<59.0	<30.3	<61.5	<22.5	<41.9
Th-232	--	7	<15.3	<12.9	<26.4	<13.3	<26.7	<11.0	<24.9
I-131*	<.4	<.4	<1.5	<1.5	<3.6	<1.5	<3.8	<1.4	<2.3
Ba-140	<10	11	<5.8	<5.1	<13.4	<4.7	<9.7	<4.7	<8.6
Ru-106	--	--	<10.8	<11.1	<25.9	<11.2	<26.8	<11.0	<20.1
Cs-137*	<10	10	<2.0	<2.4	<6.1	<2.4	<6.3	<2.2	<5.7
Zr-95	<10	<10	<2.3	<2.1	<3.8	<2.1	<3.8	<2.3	<3.9
Cs-134*	<10	<10	<2.0	<1.9	<4.4	<1.9	<4.6	<1.8	<3.1
Mn-54	<10	<10	<1.0	<1.3	<2.8	<1.2	<2.2	<1.7	<4.5
Zn-65	<20	7	<2.8	<3.1	<7.0	<3.1	<7.3	<2.9	<4.9
K-40	150.8	368.7	<240.0	<241.7	<419.9	<223.9	<400.4	<300.7	<480.9
Strontium Analysis									
Sr-89	--	--	<0.5	<0.5	<1.2	<0.5	<1.3	<0.5	<0.9
Sr-90	--	--	0	<0.3	<1.4	<0.4	<1.5	0.0	0.0
Tritium Analysis									
H-3	71	87	<290.5	<326.3	<881.72	<324.28	<899.25	<336.63	<856.62

*Critical nuclides for critical station.

Table III-11

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
SEA WATER (PCI/KG)	TRITIUM ANALYSIS 24					0
	H-3	530	752(4/ 24) (363- 1445)	C14M 977(2/ 4) (508- 1445)	SEE COLUMN 4	

Table III-12

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
SEA WATER (PCI/KG)	SR-89/90 ANALYSIS 24					0
	SR-90	0	1(9/ 24)*C09 (0- 2)*	1(2/ 4)* (1- 2)*	SEE COLUMN 4	
	SR-89	1	1(2/ 24)*C09 (1- 2)*	2(1/ 4)*	SEE COLUMN 4	

RIVER WATER PATHWAY

The State has the responsibility to collect and analyze river water samples. There are no additional stations for this pathway.

Quarterly Gamma Analysis

The summary for the gamma analysis of quarterly samples is in Table III-13. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-14. Neither preoperational nor operational samples have had detectable activities present within the required LLDs.

Quarterly Tritium Analysis

The summary for the tritium analysis of quarterly samples is in Table III-15. All samples were collected and analyzed. The LLD for tritium in Table III-15 is higher than the required LLD of 200 pCi/kg. This is due to fourth quarter equipment problems which caused the LLD to be 400 pCi/kg. This equipment problem has been corrected. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-14. Neither preoperational nor operational samples have had detectable activities present within the required LLDs.

Table III-13

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
RIVER WATER (PCI/KG)	GAMMA ANALYSIS 4					0
	I-131	17	ND			
	BA-140	17	ND			
	CO-58	17	ND			
	CS-137	17	ND			
	CS-134	17	ND			
	MN-54	15	ND			
	ZN-65	30	ND			
	CO-60	17	ND			

Table III-14

RIVER WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysi.					
I-131	<.4	<.4	<4.3	<4.3	<4.3
Ba-140	<10	<10	<4.3	<4.3	<4.3
Co-58	<10	<10	<4.3	<4.3	<4.3
Cs-137	<10	<10	<4.3	<4.3	<4.3
Cs-134	<10	<10	<4.3	<4.3	<4.3
Mn-54	<10	<10	<3.8	<3.8	<3.8
Zn-65	<20	<20	<7.5	<7.5	<7.5
Co-60	<10	<10	<4.3	<4.3	<4.3
Tritium Analysis					
H-3	<320	<320	<150	<187.5	<334.5

Table III-15

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
RIVER WATER (PCI/KG)	TRITIUM ANALYSIS 4					0
	H-3	250	<LLD(4/ 4)			

GROUND WATER PATHWAY

The State has the responsibility to collect and analyze ground water samples. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of semiannual samples is in Table III-16. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-17. All operational samples had no detectable activity and there are no preoperational data.

Semiannual Tritium Analysis

The summary for the tritium analysis of semiannual samples is in Table III-18. The tritium analysis sample for the second half of 1980 was lost in a laboratory accident. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-17. All operational samples had no detectable activity and there are no preoperational data.

Table III-16

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	INF
GROUND WATER (PCI/KG)	GAMMA ANALYSIS 2					
	I-131	17	ND			
	BA-140	17	ND			
	CO-58	17	ND			
	CS-137	17	ND			
	CS-134	17	ND			
	MN-54	15	ND			
	ZN-65	30	ND			
	CO-60	17	ND			

Table III-17

GROUND WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values	
	Mean	95 Percentile
Gamma Analysis		
I-131	<4.3	<4.3
Ba-140	<4.3	<4.3
Co-58	<4.3	<4.3
Cs-137	<4.3	<4.3
Cs-134	<4.3	<4.3
Mn-54	<3.8	<3.8
Zn-65	<7.5	<7.5
Co-60	<4.3	<4.3
Tritium Analysis		
H-3	<150	<150

Table III-18

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
GROUND WATER (PCI/KG)	TRITIUM ANALYSIS 2					0
	H-3	200	<LLD(1/ 1)			

POTABLE WATER PATHWAY

The University has the responsibility to collect and analyze potable water samples. There are no additional stations for this pathway.

Quarterly Gamma Analysis

The summary for the gamma analysis of quarterly samples is in Table III-19. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-20. The 1980 operational activity was generally less than the preoperational activity levels and were consistent with 1979 concentrations.

Quarterly Tritium Analysis

The summary for the tritium analysis of the quarterly samples is in Table III-21. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-20. All sample activities were less than the sample LLD.

Table III-19

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
POT. WATER (PCI/KG) INGESTION	GAMMA ANALYSIS 12					0
	I -131	7	ND			
	BA-140	21	ND			
	CS-137	7	ND			
	CS-134	7	3(1/ 12)	C07 3(1/ 4)	SEE COLUMN 4	
	CO-58	6	ND			
	MN-54	6	ND			
	ZN-65	15	ND			
	CO-60	6	ND			

Table III 20

POTABLE WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysis					
I-131	<.4	<.4	<1.8	<1.6	<2.5
Ba-140	<10	<10	<5.9	<5.3	<9.3
Cs-137	<10	<10	<1.8	<1.7	<2.6
Cs-134	<10	<10	<1.8	<1.7	<2.6
Co-58	<10	<10	<1.5	<1.5	<2.1
Mn-54	<10	<10	<1.5	<1.6	<2.3
Zn-65	<20	<20	<3.8	<3.6	<5.7
Co-60	<10	<10	<1.6	<1.6	<2.4
Tritium Analysis					
H-3	<320	<320	<195.5	<176.7	<286.2

Table III-21

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
POT. WATER (PCI/KG)	TRITIUM ANALYSIS 12					0
	H-3	600	534(1/ 12)*C18	534(1/ 4)*	SEE COLUMN 4	

SHORELINE EXTERNAL SEDIMENT PATHWAY

The University has the responsibility to collect and analyze shoreline external sediment samples. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-22. All samples were collected and analyzed. The critical stations for this analysis are Sample Stations C14H, C14M, and C14G and no sample had activity greater than 10 times the control station value. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-23.

The 1980 operational data show nuclide concentrations less than the preoperational data and consistent with the 1979 operational data.

Semiannual Sr-90 Analysis

The summary for the strontium analysis of the semiannual samples are in Table III-24. All samples were collected and analyzed. The critical stations are Sample Stations C14H, C14M, and C14G and no sample had activity greater than 10 times the control station value. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-23.

There are no preoperational data and 1980 operational results are consistent with previous operational data.

Table III-22

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS			HIGHEST MEAN LOCATION			CONTROL LOCATION			NRR
BOT. SED. (PCI/KG) SHORELINE EXT	GAMMA ANALYSIS 10											0
	RA-226	8	317(10/ 10) (69- 925)			C14H	765(2/ 2) (605- 925)		141(4/ 4) (120- 162)			
	TH-232	8	65(8/ 10) (27- 183)			C14H	130(2/ 2) (77- 183)		44(4/ 4) (27- 76)			
	I-131	3	5(1/ 10)			C01	5(1/ 2)		5(1/ 4)			
	BA-140	9	ND									
	RU-106	17	ND									
	CS-137	3	9(5/ 10) (4- 15)			C14H	15(1/ 2)		11(2/ 4) (8- 14)			
	ZR- 95	4	ND									
	CS-134	3	7(2/ 10) (7- 7)			C14H	7(1/ 2)		ND			
	MN- 54	2	ND									
	ZN- 65	6	ND									
	K-40	31	199(9/ 10) (71- 612)			C14H	439(2/ 2) (265- 612)		121(3/ 4) (96- 164)			

Table III-23

SHORELINE EXTERNAL SEDIMENT PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Gamma Analysis									
Ra-226	2900	10,000	192.0	316.9	847.8	140.8	175.9	434.3	1024.0
Th-232	90	300	<38.0	<51.9	<155.2	44.3	87.5	<57.0	<190.3
I-131	<.4	34	<.8	<1.2	<3.9	<1.8	<6.0	<0.7	<1.7
Ba-140	<10	<10	<2.5	<2.2	<5.2	<2.6	<3.6	<2.0	<5.9
Ru-106	190	690	<4.8	<4.3	<10.5	<4.8	<7.1	<3.9	<12.1
Cs-137*	<10	250	<2.5	<4.8	<16.0	<5.9	18.4	<4.1	<15.4
Zr-95	12	40	<1.0	<1.0	<2.1	<1.0	<1.6	<0.9	<2.4
Cs-134*	<10	<10	<.9	<2.0	<7.2	<0.7	<1.2	<2.0	<6.9
Mn-54	<10	19	<.6	<0.6	<1.2	<0.6	<0.9	<0.6	<1.4
Zn-65	--	--	<1.4	<1.4	<3.0	<1.4	<1.7	<1.4	<3.6
K-40	259.8	1,006	141.0	179.8	507.9	92.7	219.8	237.8	618.9
Strontium Analysis									
Sr-90	--	--	<15.0	<13.5	<29.6	20.0	33.9	<9.2	<21.4

*Critical nuclides for critical station

Table III-24

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
BOT. SED (PCI/KG) SHORELINE EXT	SR-90 ANALYSIS 10					0
	SR-90	15	53(6/ 10) (6- 220)	C14H 220(1/ 2)	25(3/ 4) (23- 27)	

SEA FOOD CHAIN PATHWAY (MARINE PLANTS)

The University has the responsibility to collect and analyze marine plants in the sea food chain. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-25. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-26.

The 1980 operational concentrations are less than the preoperational concentrations and are consistent with 1979 operational data.

Semiannual Sr-89 and 90 Analysis

The summary of analysis of the quarterly samples for Sr-89 is presented in Table III-27. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-26. There are no preoperational data.

The 1980 Sr-89/90 concentrations have shown a slight increase over previous operational years' concentrations.

No apparent reason for this increase could be determined. Florida Power Corporation will continue to monitor this pathway.

Table III-25

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
MARINE PLANT PCI/KG SEAFOOD CHAIN	GAMMA ANALYSIS 4					0
	RA-226	13	51(4/ 4) (15- 74)	C30 57(2/ 2) (40- 74)	SEE COLUMN 4	
	TH-232	12	54(4/ 4) (27- 82)	C30 67(2/ 2) (52- 82)	SEE COLUMN 4	
	I-131	3	ND			
	BA-140	9	ND			
	RU-106	22	ND			
	CS-137	3	6(2/ 4) (5- 6)	C30 6(1/ 2)	SEE COLUMN 4	
	ZR- 95	4	ND			
	MN- 54	5	9(1/ 4)	C29 9(1/ 2)	SEE COLUMN 4	
	ZN-65	6	ND			
	K-40	69	2327(4/ 4) (68- 5930)	C30 2999(2/ 2) (68- 5930)	SEE COLUMN 4	

Table III-26

MARINE PLANT PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysis					
Ra-226	624	3300	56.5	50.5	106.3
Th-232	--	280	54.0	54.3	98.4
I-131	<10	37	<0.6	<.9	<2.0
Ba-140	<10	75	<1.9	<2.1	<6.4
Ru-106	--	360	<4.9	<5.4	<16.3
Cs-137	<10	181	<2.6	<2.9	<8.9
Zr-95	18	157	<0.8	<1.0	<2.9
Mn-54	--	43	<1.1	<2.9	<10.9
Zn-65	--	156	<1.3	<1.5	<4.4
K-40	1508.4	12570	1654.5	2326.8	7461.9
Strontium Analysis					
Sr-89	--	--	8.5	21.1	78.9
Sr-90	--	--	2.0	2.5	8.4

Table III-27

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/81-12/31/81

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
MAR. PLANT (PCI/KG) SEAFOOD CH	SR89/90 ANALYSIS 4					0
	SR-89	5	27(3/ 4) (6- 65)	C30 35(2/ 2) (6- 65)	SEE COLUMN 4	
	SR-90	0	5(2/ 4) (4- 6)	C29 6(1/ 2)	SEE COLUMN 4	

INGESTION CRAB PATHWAY

The University has the responsibility to collect and analyze crabs. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the edible portion of semiannual samples is in Table III-28. All samples were collected and analyzed. Sample Station C29 is the critical station in this pathway and no sample had activity greater than 10 times the control station value. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-29.

Except for naturally occurring K-40, the 1980 operational concentrations are less than the preoperational concentrations and consistent with previous years' operational concentrations.

Table III-28

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRI
CRABS (PCI/KG) INGESTION	GAMMA ANALYSIS 4					0
	RA-226	13	102(4/ 4)*C30 (69- 190)	130(2/ 2)* (69- 190)	130(2/ 2) (69- 190)	
	TH-232	12	28(4/ 4)*C30 (24- 30)	30(2/ 2)* (29- 30)	30(2/ 2) (29- 30)	
	I-131	7	ND			
	BA-140	23	ND			
	RU-106	56	ND			
	CS-137	7	11(3/ 4)*C30 (10- 12)	11(2/ 2)* (10- 12)	11(2/ 2) (10- 12)	
	ZR-95	11	ND			
	CS-134	7	8(1/ 4)*C29	8(1/ 2)*	0(0/ 2)	
	MN-54	6	ND			
	ZN-65	16	ND			
	K-40	78	1969(4/ 4)*C30 (226- 2830)	2630(2/ 2)* (2430- 2830)	2630(2/ 2) (2430- 2830)	

Table III-29

INGESTION CRAB PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Ra-226	1325	3600	75.0	102.3	217.3	129.5	297.2	75.0	88.9
Th-232	92	170	29.0	28.0	33.3	29.5	30.9	26.5	33.4
I-131*	<10	<10	1.8	1.8	2.3	1.8	2.4	1.8	2.4
Ba-140	<10	55	5.9	5.8	7.1	5.9	6.9	5.8	7.8
Ru-106	--	--	14	13.9	16.7	14.1	17.2	55	68.9
Cs-137*	<10	75	10	8.4	17.6	11.0	13.8	5.8	17.5
Zr-95	<10	13	3.0	2.7	3.5	2.6	3.0	2.8	4.1
Cs-134*	<10	<10	1.6	3.3	9.5	1.9	2.2	4.8	13.8
Mn-54	<80	24	1.5	1.5	1.9	1.5	1.5	1.5	2.2
Zn-65	<160	127	4.1	4.0	5.2	4.1	5.2	3.9	5.6
K-40	1424.6	2011.2	2410.0	1969.0	4279.6	2630.0	3184.4	1308.0	4307.2

*Critical nuclides for critical station

INGESTION CARNIVOROUS FISH PATHWAY

The University has the responsibility to collect and analyze carnivorous fish. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the edible portion of semiannual samples is in Table III-30. All samples were collected and analyzed. Sample Station C29 is the critical station in this pathway and no sample had activity greater than 10 times the control station value. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-31.

The operational concentrations for 1980 are less than the preoperational concentrations and consistent with previous years' operational concentrations.

Table III-30

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
C. FISH (PCI/KG) INGESTION	GAMMA ANALYSIS 4					0
	RA-226	11	63(4/ 4)C30 (22- 85)	76(2/ 2) (67- 85)	76(2/ 2) (67- 85)	
	TH-232	10	29(4/ 4)C30 (20- 41)	34(2/ 2) (26- 41)	34(2/ 2) (26- 41)	
	I-131	7	ND			
	BA-140	22	ND			
	RU-106	47	ND			
	CS-137	6	21(4/ 4)C29 (6- 39)	23(2/ 2) (6- 39)	20(2/ 2) (12- 27)	
	ZR-95	10	ND			
	CS-134	7	ND			
	MN-54	6	ND			
	ZN-65	14	ND			
	K-40	79	2868(4/ 4)C30 (1630- 3870)	2985(2/ 2) (2840- 3130)	2985(2/ 2) (2840- 3130)	

Table III-31

INGESTION CARNIVOROUS FISH PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Ra-226	335	2400	71.5	76.0	100.9	62.5	117.3	49.0	123.8
Th-232	--	92	26.5	28.5	45.9	33.5	54.3	23.5	33.2
I-131*	<10	<10	<1.6	<1.6	<1.6	<1.8	<1.8	<1.5	<1.5
Ba-140	<10	72	<5.4	<5.4	<6.5	<5.9	<6.2	<4.9	<5.2
Ru-106	--	--	<10.3	<11.8	<15.5	<13.4	<15.1	<10.3	<10.3
Cs-137*	<10	43	18.5	21.0	50.2	19.5	40.3	22.5	68.2
Zr-95	<10	12	<2.4	<2.4	<3.0	<2.6	<3.0	<2.1	<2.5
Cs-134*	<10	<10	<1.6	<1.7	<2.2	<1.9	<2.2	<1.5	<1.5
Mn-54	<80	<80	<1.4	<1.4	<1.7	<1.5	<1.5	<1.3	<1.3
Zn-65	<160	99	<3.6	<3.6	<4.4	<3.9	<4.2	<3.3	<3.9
K-40	2346.4	3854.8	2985.0	2867.5	4694.3	2985.0	3386.9	2750.0	5854.5

*Critical nuclides for critical station

INGESTION HERBIVOROUS FISH PATHWAY

The University has the responsibility to collect and analyze herbivorous fish. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the edible portion of semiannual samples is in Table III-32. No samples were caught during either semiannual period at the control location C30. All other samples were collected and analyzed. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-33.

The 1980 operational concentrations are generally lower than preoperational concentrations and are consistent with 1979 operational concentrations.

Table III-32

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
H. FISH (PCI/KG) INGESTION	GAMMA ANALYSIS 4					0
	RA-226	13	36(2/ 2)*C29 (10- 61)	36(2/ 2)* (10- 61)*	ND	
	TH-232	13	20(2/ 2)*C29 (14- 26)	20(2/ 2)* (14- 26)*	ND	
	I-131	6	ND			
	BA-140	23	ND			
	RU-106	56	ND			
	CS-137	7	23(2/ 2)*C29 (18- 28)	23(2/ 2)* (18- 28)*	ND	
	ZR-95	11	ND			
	CS-134	7	9(1/ 2)*C29	9(1/ 2)*	0(0/ 0)	
	MN-54	7	ND			
	ZN-65	17	ND			
	K-40	90	3125(2/ 2)*C29 (2910- 3340)	3125(2/ 2)* (2910- 3340)*	ND	

Table III-33

INGESTION HERBIVOROUS FISH PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Ra-226	960	3100	-	-	-	-	-	35.5	106.2
Th-232	--	84	-	-	-	-	-	20.0	36.6
I-131*	<10	<10	-	-	-	-	-	<1.5	<2.2
Ba-140	<10	50	-	-	-	-	-	<5.8	<8.5
Ru-106	--	90	-	-	-	-	-	<13.9	<17.7
Cs-137*	<10	110	-	-	-	-	-	<2.3	<36.9
Zr-95	<10	9	-	-	-	-	-	<2.8	<3.4
Cs-134*	<10	<10	-	-	-	-	-	<5.4	<15.4
Mn-54	<80	<80	-	-	-	-	-	<1.6	<2.0
Zn-65	<160	63	-	-	-	-	-	<4.1	<5.2
K-40	2178.8	3100.6	-	-	-	-	-	3125.0	3720.9

*Critical nuclides for critical station

INGESTION OYSTERS PATHWAY

The University has the responsibility to collect and analyze oysters. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the edible portion of semiannual samples is in Table III-34. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-35.

The 1980 operational concentrations are consistent with the 1979 operational and lower than the preoperational concentrations.

Table III-34

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NR
OYSTERS (PCI/KG) INGESTION	GAMMA ANALYSIS 4					0
	RA-226	14	66(4/ 4)*C29 (34- 99)*	75(2/ 2)* (50- 99)*	SEE COLUMN 4	
	TH-232	11	31(4/ 4)*C29 (19- 38)*	33(2/ 2)* (31- 34)*	SEE COLUMN 4	
	I-131	7	ND			
	BA-140	24	ND			
	RU-106	57	ND			
	CS-137	7	8(2/ 4)*C30 (8- 8)*	8(2/ 2)* (8- 8)*	SEE COLUMN 4	
	ZR-95	11	ND			
	MN-54	7	ND			
	ZN-65	15	ND			
	K-40	58	1220(4/ 4)*C30 (1000- 1360)*	1330(2/ 2)* (1300- 1360)*	SEE COLUMN 4	

Table III-35

INGESTION OYSTERS PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226	--	534	66.0	66.3	124.2
Th-232	--	--	32.5	30.5	46.5
I-131	<10	<10	<1.8	<1.8	<2.4
Ba-140	<10	<10	<5.4	<5.9	<8.3
Ru-106	--	82	<13.0	<14.1	<21.3
Cs-137	<10	<10	<5.1	<5.1	<11.7
Zr-95	<10	<10	<2.6	<2.7	<3.5
Mn-54	<80	<80	<1.5	<1.6	<2.5
Zn-65	<160	33	<3.8	<3.6	<4.6
K-40	--	1843.6	1260	1220.0	1528.7

INGESTION SHRIMP PATHWAY

The University has the responsibility to collect and analyze shrimp. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-36. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-37.

The 1980 operational concentrations are consistent with the 1979 operational and the preoperational concentrations.

Table III-36

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
SHRIMP (PCI/KG) INGESTION	GAMMA ANALYSIS 2					0
	RA-226	31	102(1/ 2)	C27 102(1/ 2)	SEE COLUMN 4	
	TH-232	15	56(2/ 2) (47- 65)	C27 56(2/ 2) (47- 65)	SEE COLUMN 4	
	I-131	8	ND			
	BA-140	30	ND			
	RU-106	72	ND			
	CS-137	9	13(2/ 2) (11- 15)	C27 13(2/ 2) (11- 15)	SEE COLUMN 4	
	ZR-95	15	ND			
	MN-54	8	ND			
	ZN-65	20	ND			
	K-40	93	2412(2/ 2) (2340- 2483)	C27 2412(2/ 2) (2340- 2483)	SEE COLUMN 4	

Table III-37

INGESTION SHRIMP PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226	--	--	<56.0	<56.0	<183.5
Th-232	--	36	56.0	56.0	80.9
I-131	<10	<10	<1.9	<1.9	<2.9
Ba-140	<10	<10	<7.5	<7.5	<11.7
Ru-106	--	--	<18.4	<18.4	<29.1
Cs-137	<10	37	13.0	13.0	<18.5
Zr-95	<10	<10	<3.4	<3.4	<6.5
Mn-54	<80	<80	<2.0	<2.0	<3.4
Zn-65	<160	<160	<4.9	<4.9	<8.0
K-40	921.8	2514	2411.5	2411.5	2609.6

INGESTION MILK PATHWAY

The University has the responsibility to collect and analyze milk. There are no additional stations for this pathway.

Monthly Gamma Analysis

The summary for the gamma analysis of the monthly samples is in Table III-35. The samples at Sample Station C49, the critical station for this pathway, were not collected due to the unavailability of milk. All other samples were collected and analyzed. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-39.

The 1980 operational concentrations are consistent with the 1979 operational, and lower than the preoperational concentrations.

Monthly Sr-89 and 90 Analysis

The summary for the strontium analysis of monthly samples is in Table III-40. All samples were collected and analyzed. Sample Station C49 is the critical station for this pathway and no samples were collected due to the unavailability of milk. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-39.

The 1980 operational concentrations are less than the operational values and are consistent with other operational concentrations.

Table III-38

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
MILK (PCI/L) INGESTION	GAMMA ANALYSIS 24					0
	I -131	6	ND			
	BA-140	21	28(2/ 12) (21- 35)	C47 28(2/ 12) (21- 35)	28(2/ 12) (21- 35)	
	CS-137	7	11(8/ 12) (7- 15)	C47 11(8/ 12) (7- 15)	11(8/ 12) (7- 15)	
	ZR- 95	11	ND			
	CS-134	8	ND			
	CO- 58	6	ND			
	MN- 54	7	ND			
	CO- 60	7	ND			

Table III-39

INGESTION MILK PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values						
						Control Stations		Critical Stations	
	Median	95 Percentile	Median	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Gamma Analysis									
I-131*	<10	<10	<1.3	<1.4	<2.6	<1.6	<2.7	NC/M	NC/M
Ba-140	<30	<30	<3.5	<4.8	<9.6	<5.1	<9.1	NC/M	NC/M
Cs-137	16	22	<11.0	<12.6	<29.7	<7.7	<16.7	NC/M	NC/M
Zr-95	<20	<20	<3.1	<3.3	<10.2	<2.8	<5.0	NC/M	NC/M
Cs-134	<10	<10	<2.3	<1.9	<3.9	<1.9	<3.4	NC/M	NC/M
Mn-54	<10	<10	<1.5	<1.4	<2.7	<1.7	<2.9	NC/M	NC/M
Co-58	<10	<10	<1.5	<1.7	<4.6	<1.5	<2.7	NC/M	NC/M
Co-60	<10	<10	<2.1	<1.9	<3.9	<1.8	<3.1	NC/M	NC/M
Strontium Analysis									
Sr-89	--	--				<6.3	<19.9		
Sr-90	4.0	6.0				<0.8	<3.0		

*Critical nuclides for critical station

Table III-40

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
MILK (PCI/L) INGESTION	SR 89/90 ANALYSIS 24					0
	SR-89	3	10(6/ 10)*C47 (4- 23)*	10(6/ 10)* (4- 23)*	10(6/ 10)* (4- 23)*	
	SR-90	0	2(4/ 10)*C47 (1- 3)*	2(4/ 10)* (1- 3)*	2(4/ 10)* (1- 3)*	

INGESTION ANIMAL PATHWAY

The University has the responsibility to collect and analyze small terrestrial animals. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-41. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-42.

The operational concentrations for 1980 are consistent with the 1979 operational and lower than the preoperational concentrations except for Cs-137 and Ra-226. Cs-137 is still elevated due to residual Chinese weapons test fallout; Ra-226 concentrations are similar to preoperational concentration.

Table III-41

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
ANIMALS (PCI/L) INGESTION	GAMMA ANALYSIS 2					0
	RA-226	16	64(2/ 2)(22- 106)	C45 64(2/ 2)(22- 106)	SEE COLUMN 4	
	TH-232	12	21(2/ 2)(8- 34)	C45 21(2/ 2)(8- 34)	SEE COLUMN 4	
	I-131	9	3(1/ 2)	C45 3(1/ 2)	SEE COLUMN 4	
	BA-140	26	ND			
	RU-106	52	ND			
	CS-137	16	2890(2/ 2)(20- 5760)	C45 2890(2/ 2)(20- 5760)	SEE COLUMN 4	
	ZR-95	6	ND			
	MN-54	4	ND			
	ZN-65	8	ND			
	K-40	42	1252(2/ 2)(303- 2200)	C45 1252(2/ 2)(303- 2200)	SEE COLUMN 4	

Table III-42

INGESTION ANIMALS PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226	--	720	64.0	64.0	180.4
Th-232	--	--	<21.0	21.0	57.0
I-131	<10	100	<3.3	<3.3	<3.9
Ba-140	<10	<10	<6.5	<6.5	<18.3
Ru-106	--	--	<13.0	<13.0	<37.9
Cs-137	<10	80	2890.0	2890.0	10845.2
Zr-95	<10	70	<1.5	<1.5	<3.6
Mn-54	<80	<80	<0.9	<0.9	<1.9
Zn-65	<160	160	<2.0	<2.0	<4.8
K-40	1656.5	3586.6	1251.5	1251.5	2880.6

FOOD CHAIN (GRASSES) PATHWAY

The University has the responsibility to collect and analyze grass samples. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-43. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-44.

The 1980 operational concentrations are similar to the 1979 operational and preoperational concentrations except for Ra-226, Th-232 and Cs-137. Cs-137 is still elevated due to residual Chinese weapons test fallout; Ra-226 and Th-232 are both naturally occurring and their concentrations are consistent with preoperational data.

Table III-43

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
GRASS (PCI/L) FOOD CHAIN	GAMMA ANALYSIS 6					0
	RA-226	16	107(6/ 6)*C41 (63- 157)*	131(2/ 2)* (128- 133)*	SEE COLUMN 4	
	TH-232	14	111(6/ 6)*C41 (56- 201)*	145(2/ 2)* (88- 201)*	SEE COLUMN 4	
	I-131	8	ND			
	BA-140	25	ND			
	RU-106	54	82(1/ 6)*C05	82(1/ 2)*	SEE COLUMN 4	
	CS-137	7	256(6/ 6)*C05 (12- 513)*	308(2/ 2)* (118- 498)*	SEE COLUMN 4	
	ZR-95	11	ND			
	MN-54	7	ND			
	ZN-65	15	ND			
	K-40	72	1715(6/ 6)*C40 (1420- 2290)*	1915(2/ 2)* (1540- 2290)*	SEE COLUMN 4	

Table III-44

FOOD CHAIN (GRASSES) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226	--	2363	108.5	106.7	181.3
Th-232	--	120	78.0	111.3	246.3
I-131	<10	<10	1.9	<2.0	<3.1
Ba-140	26	253	<6.3	<6.2	<8.4
Ru-106	--	--	<14.1	<25.0	<79.8
Cs-137	1363	5416	223.5	255.8	689.7
Zr-95	<10	31	<2.8	<2.8	<3.2
Mn-54	--	--	<1.6	<1.6	<2.1
Zn-65	--	589	<3.6	<3.8	<5.1
K-40	578.2	2430.2	1600.0	1715.0	2350.0

INGESTION FOOD CROPS (CITRUS) PATHWAY

The State has the responsibility to collect and analyze citrus samples. There are no additional stations in this pathway.

Annual Gamma Analysis

The summary for the gamma analysis of the annual samples is in Table III-45. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-46.

The 1980 operational concentrations were nondetectable as were the 1979 operational and preoperational concentrations.

Table III-45

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
CITRUS (PCI/KG) INGESTION	GAMMA ANALYSIS 1					
	I-131	24	ND			
	BA-140	24	ND			
	CO-58	24	ND			
	CS-137	24	ND			
	CS-134	24	ND			
	MN-54	21	ND			
	ZN-65	42	ND			
	CO-60	24	ND			

Table III-46

INGESTION FOOD CROPS (CITRUS) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoperational Values		Operational Values		
	Median	95 Percentile	Median	Mean	95 Percentile
I-131	<10	<10	<6.0	<6.0	--
Ba-140	<10	<10	<6.0	<6.0	--
Co-58	<10	<10	<6.0	<6.0	--
Cs-137	<10	<10	<6.0	<6.0	--
Cs-134	<10	<10	<6.0	<6.0	--
Mn-54	<10	<10	<5.3	<5.3	--
Zn-65	--	--	<10.5	<10.5	--
Co-60	<10	<10	<6.0	<6.0	--

INGESTION FOOD CROPS (WATERMELON) PATHWAY

The State has the responsibility to collect and analyze watermelon samples. There are no additional stations in this pathway.

Annual Gamma Analysis

The summary for the gamma analysis of the annual samples is in Table III-47. All samples were collected and analyzed. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-48. There are no preoperational data for this pathway. All 1980 operational analyses resulted in non-detectable activity as did the 1979 operational analyses.

Table III-47

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
WATERMELON (PCI/KG) INGESTION	GAMMA ANALYSIS 1					
	I-131	24	ND			
	BA-140	24	ND			
	CO-58	24	ND			
	CS-137	24	ND			
	CS-134	24	ND			
	MN-54	21	ND			
	ZN-65	42	ND			
	CO-60	24	ND			

Table III-48

INGESTION FOOD CROPS (WATERMELON) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values	
	Mean	95 Percentile
I-131	<6.0	--
Ba-140	<6.0	--
Co-58	<6.0	--
Cs-137	<6.0	--
Cs-134	<6.0	--
Mn-54	<5.3	--
Zn-65	<10.5	--
Co-60	<6.0	--

FOOD CHAIN (SOIL) PATHWAY

The University of Florida has the responsibility to collect and analyze soil samples. Soil samples are required every third year. The last sample was taken in 1978, therefore, no sampling was required in 1980.

Table III-49

FOOD CHAIN (SOIL) PATHWAY

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

NOT REQUIRED IN 1980

Table III-50

FOOD CHAIN (SOIL) PATHWAY

STATISTICAL EVALUATION OF ANALYSES

NOT REQUIRED IN 1980

FOOD CHAIN (MEAT) PATHWAY

The State has the responsibility to collect and analyze meat samples. There are no additional stations in this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-51. All samples were collected and analyzed. There is no critical station in this pathway. A statistical evaluation of the operational data is presented in Table III-52. There are no preoperational data for this pathway. All 1980 operational analyses resulted in nondetectable activity which is consistent with previous operational analyses.

Table III-51

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
MEAT (PCI/KG) FOOD CHAIN	GAMMA ANALYSIS 2					0
	I-131	38	ND			
	BA-140	39	ND			
	CO-58	60	ND			
	CS-137	37	ND			
	CS-134	60	ND			
	MN-54	32	ND			
	ZN-65	66	ND			
	CO-60	60	ND			

Table III-52

FOOD CHAIN (MEAT) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values	
	Mean	95 Percentile
I-131	<9.5	<9.5
Ba-140	<9.8	<9.8
Co-58	<15.0	<15.0
Cs-137	<9.25	<9.25
Cs-134	<15.0	<15.0
Mn-54	<8.0	<8.0
Zn-65	<16.5	<16.5
Co-60	<15.0	<15.0

FOOD CHAIN (POULTRY) PATHWAY

The State has the responsibility to collect and analyze poultry samples. There are no additional stations in this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-53. All samples were collected and analyzed. There is no critical station in this pathway. A statistical evaluation of the operational data is in Table III-54. There are no preoperational data for this pathway.

The 1980 operational concentrations were nondetectable as were the 1979 operational concentrations.

Table III-53

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
POULTRY (PCI/KG) FOOD CHAIN	GAMMA ANALYSIS 2					0
	I-131	38	ND			
	BA-140	39	ND			
	CO-58	60	ND			
	CS-137	37	ND			
	CS-134	60	ND			
	MN-54	32	ND			
	ZN-65	66	ND			
	CO-60	60	ND			

Table III-54

FOOD CHAIN (POULTRY) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values	
	Mean	95 Percentile
I-131	<9.5	<9.5
Ba-140	<9.8	<9.8
Co-58	<15.0	<15.0
Cs-137	<9.3	<9.3
Cs-134	<15.0	<15.0
Mn-54	<8.0	<8.0
Zn-65	<16.5	<16.5
Co-60	<15.0	<15.0

FOOD CHAIN (EGGS) PATHWAY

The State has the responsibility to collect and analyse egg samples. There are no additional stations in this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-55. All samples were collected and analyzed. There is no critical sample station in this pathway. A statistical evalution of the operational data is presented in Table III-56. There are no preoperational data for this pathway and all 1980 operational analyses resulted in nondetectable activity as did all 1979 operational analyses.

Table III-55

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
EGGS (PCI/KG) FOOD CHAIN	GAMMA ANALYSIS 2					0
	I-131	38	ND			
	BA-140	39	ND			
	CO-58	60	ND			
	CS-137	37	ND			
	CS-134	60	ND			
	MN-54	32	ND			
	ZN-65	66	ND			
	CO-60	60	ND			

Table III-56

FOOD CHAIN (EGGS) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values	
	Mean	95 Percentile
I-131	<9.5	<9.5
Ba-140	<9.8	<9.8
Co-58	<15.0	<15.0
Cs-137	<9.3	<9.3
Cs-134	<15.0	<15.0
Mn-54	<8.0	<8.0
Zn-65	<16.5	<16.5
Co-60	<15.0	<15.0

FOOD CHAIN (GREEN LEAFY VEGETABLES) PATHWAY

The University has the responsibility to collect and analyze green leafy vegetable samples. There are no additional stations for this pathway.

Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-57. All samples were collected and analyzed. The critical station for this type of analysis (Sample Station C48) is in the east sector at 4.0 miles from the plant. A statistical evaluation of the operational data is presented in Table III-58. There are no preoperational data for this pathway.

The 1980 operational concentrations are less than the 1979 operational concentrations except for Ra-226, Th-232 and K-40, all of which are naturally occurring.

Semiannual Sr-90 Analysis

The analysis of the semiannual samples for Sr-90 is presented in Table III-59. All samples were collected and analyzed. The critical station for this type of analysis is Station C-48. The critical station showed a Sr-90 concentration of 87 pCi/kg, which exceeded the control station concentration (no detectable activity) by more than ten times. LER No. 80-028/04T-0 was generated to report this occurrence.

Resample analysis confirmed the high level of Sr-90 was a valid finding. Sr-89 was not detected in either original or follow-up sample. Operation of Crystal River Unit 3 is not believed to be responsible for this finding. Supplemental LER 80-028/04T-1 supports this determination.

Table III-57

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
G.L. VEG. PCI/KG	GAMMA ANALYSIS 6					0
	RA-226	15	76(4/ 4)*C41 (48- 103)*	100(2/ 2)* (96- 103)*	53(2/ 2)* (48- 58)*	
	TH-232	14	102(4/ 4)*C47 (45- 171)*	150(2/ 2)* (129- 171)*	150(2/ 2)* (129- 171)*	
	I-131	7	ND			
	BA-140	23	ND			
	RU-106	55	ND			
	CS-137	7	335(4/ 4)*C41 (11- 1170)*	657(2/ 2)* (143- 1170)*	13(2/ 2)* (11- 14)*	
	ZR-95	11	ND			
	MN-54	6	ND			
	ZN-65	17	ND			
	K-40	79	2632(4/ 4)*C47 (828- 4430)*	3505(2/ 2)* (2580- 4430)*	3505(2/ 2)* (2580- 4430)*	

Table III-58

FOOD CHAIN (GREEN LEAFY VEGETABLES) PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Operational Values					
			Control Stations		Critical Stations	
	Mean	95 Percentile	Mean	95 Percentile	Mean	95 Percentile
Gamma Analysis						
Ra-226	76.3	129.8	53.0	60.1	99.5	109.2
Th-232	101.5	217.0	150.0	208.2	53.0	75.2
I-131*	<1.75	<2.44	<1.50	<1.50	<2.00	<2.69
Ba-140	<5.69	<7.82	<5.00	<5.69	<6.38	<8.80
Ru-106	<13.7	<17.4	<12.6	<13.7	<14.8	<19.3
Cs-137	334.5	1432.9	12.5	<16.7	656.6	2079.8
Zr-95	2.75	3.15	<2.63	<2.80	<2.88	<3.22
Mn-54	1.50	1.50	<1.50	<1.50	<1.50	<1.50
Zn-65	4.12	4.76	<4.25	<4.94	<4.00	<4.69
K-40	2632.0	5515.6	3505.0	6069.0	1759.0	4340.0
Strontium Analysis						
Sr-90	23.5	106.6	3.0	11.3	44.0	163.2

*Critical nuclides for critical station

Table III-59

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
G.L. VEG						
PCI/KG	SR-90					
FOOD CHAIN	ANALYSIS 4					0
	SR-90	1	31(3/ 4)*C48 (1-87)*	44(2/ 2)* (1-87)*	SEE COLUMN 4	

IV. EXTERNAL RADIATION

The External Radiation portion of the Radiological Environmental Monitoring Program (Specification 3.2.3) is split between the University and the State (See Table I-1). The University also has a TLD at Sample Station C47 and the State has additional TLDs at Sample Stations C04, C40, and C46. The summaries for the University's data is in Table IV-1 and for the State's data in Table IV-2. Sample Stations C14H, C14M, and C14G are the critical stations in this pathway.

Table IV-3 presents a statistical summary of all data. The 1980 data from all TLD stations is consistent with the 1979 data and the preoperational data. Additionally, the critical stations and the control stations of the University also compare very well. However, because the University and the State use different types of TLDs, it is necessary to report their results separately.

Table IV-1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
AIR SUBMERSION (MREM/YR)						
U OF F	EXTERNAL RADIATION	36	15	43(34/ 34) (27- 58)	C41 49(4/ 4) (40- 54)	44(23/ 23) (29- 58)	0

Table IV-2

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/80-12/31/80

PATHWAY	TYPE & NO.	LLD	ALL LOCATIONS	HIGHEST MEAN LOCATION	CONTROL LOCATION	NRR
AIR SUBMERSION (MREM/YR)						
STATE	EXTERNAL RADIATION 28	20	50 (28/ 28)	C26 130 (4/ 4)	SEE COLUMN 4	
			(29- 160)	(48- 160)		

Table IV-3

EXTERNAL RADIATION PATHWAY

QUARTERLY TLD ANALYSIS (mrem/yr)

	Median Value	Mean Value	95 Percentile Value
Preoperational	62	--	77
All Stations	42.0	46.4	97.9
State	37.5	50.1	124.6
University (All Stations)	44.2	43.3	60.1
University (Critical Stations)	44.8	41.1	55.2
University (Control Stations)	45.5	44.4	62.2