ANNUAL ENVIRONMENTAL OPERATING REPORT

VOLUME 2 - RADIOLOGICAL

1/1/78 - 12/31/78

CRYSTAL RIVER - UNIT 3
FLORIDA POWER CORPORATION

FACILITY OPERATING LICENSE NO. DPR-72

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#### 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 provdes 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.

The most significant achievement in 1978 was that all but one nuclide in one pathway had an annual average LLD that was equal to or less than that required. This was the result of corrective action started in 1977; but an Enhanced Sampling Program (ESP) was also required for the gamma analyses of several pathways. The Potable Water Pathway required two additional samples subsequent to the fourth quarterly sample in order for the average annual sample LLDs to meet the LLD requirements. The Shoreline External Sediment Pathway needed one additional sample after the second semiannual sample so that the average annual sample LLDs would meet the LLD requirements. The Food Chain (Green Leafy Vegetable) Pathway required five additional samples following the second semiannual sample to bring all annual average sample LLDs (except for I-131) to within the LLD requirements. The I-131 annual average sample LLD could not be brought to within the limits because the second semiannual sample was allowed to sit for approximately thirty days before it was counted. The LLD calculations, which allow for decay, gave an extremely high sample LLD as the half life of I-131 is only eight days. The average I-131 sample LLD for the five additional samples was 5.4 pCi/kg as compared to the 10 pCi/kg requirement. The annual average sample LLDs of all nuclides in 1979 should be within the requirements without an Enhanced Sampling Program.

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-half the LLD value if the activity was non-detectable and using the LLD value if the activity was less than the LLD value. When a non-detectable or less than LLD concentration 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	PATHW	SAMPLE STATIONS (1)
University	Air Submersion	CO4, C14H*, C14M*, C14G*, C40, C41, C43, C46
State	Air Submersion	CO7, CO9, C18, C26
University	Air Inhalation	C41*
State	Air Inhalation	CO4, CO7, C18, C26, C40, C46
State	Precipitation	CO4, C26, C40
University	Sea Water	CO1, CO9, C13, C14H, C14M, C14G*
State	River Water	C15
State	Ground Water	C40
University	Potable Water	CO7, C10, C18
University	Shoreline External Sediment	CO1, CO9, 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)	CO5, 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)	CO4, CO7, C18, C26, C40, C41, C46
State	Meat	C50
State	Poultry	C51
State	Eggs	C51
University	Food Chain (Vegetables)	C47, C48*

<sup>\*</sup>Critical Pathway Sample Stations

 $<sup>(^1)</sup>$  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 December 12, 1977, milk animal census, was completed on March 3, 1978. The critical garden (Sample Station C48) was found to be in the east sector at 4.5 miles from the plant.

A semiannual milk cow survey was completed on June 5, 1978 again with no milk animals found. The critical station for green leafy vegetables was continued at the garden 4.5 miles from the plant in the east sector.

A seminannual milk cow census was started in December, 1978 but was not completed within the period of this report.

## III. MEDIA OTHER THAN EXTERNAL RADIATION

Environmental Technical Specification 3.2.2 requires that samples be taken and analyzed per ETS Table 3.2-2 and that analysis LLDs will be equal to or less than those in ETS Table 3.2-5A and B. Each analysis routine of each pathway in ETS Table 3.2-2 will be summarized, interpreted, and evaluated in the order presented.

## 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. Two weekly samples were not collected and analyzed:

CO7 for the week of O6-18-78 because of a loose hose

C41 for the week of 03-03-78 because of loss in the U.S. Mail

All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required.

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 are lower than the 1977 operational concentrations. The 1977 concentrations were artificially elevated due to the Chinese weapons tests and the concentrations returned to preoperational levels.

## Weekly I-131 Analysis

The summary for the iodine analysis is in Table III-2. Because of the loss in the U.S. Mail, the sample from Station C41 for the week of 03-03-78 was not collected and analyzed. All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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 is no preoperational data.

The statistical analysis of the critical and control stations for the period of this report is as follows:

Critical Station Mean Value = <.020 pCi/m³
Critical Station 95 Percentile Value = <.073 pCi/m³
Control Stations Mean Value = <.020 pCi/m³
Control Stations 95 Percentile Value = <.027 pCi/m³

As with the gross beta concentrations, the Iodine-131 concentrations in 1978 were lower than the 1977 concentrations and probably approached the preoperational concentrations. The critical station and control station concentrations are less than their respective 1977 concentrations. Even though all samples at the critical station resulted in non detectable activity, the 95 percentile concentration appears high because of LLD differences in the two contractors collecting the data.

## Quarterly Gamma Analysis

The summary for gamma analysis of quarterly composites is in Table III-3. All samples were collected and analyzed and all had LLDs equal to or less than those required. There are no critical stations for this type of analysis.

The statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-4.

The concentrations of the nuclides, as determined by gamma analysis are similar to the preoperational and the 1977 operational concentrations. The only exceptions are Zr-95 and K-40 whose concentrations returned to preoperational levels after being elevated during 1977.

## Quarterly Sr-89 and 90 Analysis

The summary for the Strontium analysis of quarterly composites is in Table III-5. All samples were collected and analyzed and all had LLDs equal to or less than those required. There are no critical stations for this type of analysis.

A statistical evaluation of the operational data is presented in Table III-4. There is no preoperational data.

The strontium-89 concentrations in 1978 were lower than the 1977 concentrations while the strontium-90 concentrations were similar during both years.

Table III-1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY 50-302 LOCKET NO. CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

REPORTING PERIOD 01/01/78-12/31/78

PATHURY : TYPE & NO. : LLD : ALL LOCATIONS : HIGHEST NEAM LOCATION : CONTROL LOCATION : INRR SEE COLUMN 4 416 \*0.008 \*0.059( 412/ 415)\*C26 \*0.071( 52/ 52)\*
\* (0.002-0.310)\* \* (0.010-0.310)\* AIR INHALATION \* GROSS B \* GROSS B \*

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BONITORING PROGRAM SUNMARY Tab

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POOR ORIGINAL

Table III-3 ENVIFORMENTAL RADIOLOGICAL MONITURING PROGRAM SUMMARY

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Table III-4

AIR INHALATION PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/m<sup>3</sup>)

Nuclide	Preoper	rational Values	0pe	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Gross Beta Analy	sis				
Gross B	.029	.12	.044	.059	.153
Iodine Analysis					
I-131*				<.020	<.033
Gamma Analysis					
Ce-144	.003	.172	<.030	<.051	<.165
Ra-226	<.2	.241	<.020	<.016	<.030
Th-232	<.01	.008	<.010	<.008	<.015
I-131	<.07	.004	<.005	<.004	<.008
Ba-140	<.01	.016	<.005	<.004	<.007
Ru-106	.025	.216	<.025	<.021	<.036
Cs-137	<.01	.013	<.005	<.004	<.007
Zr-95	.003	.043	<.005	<.005	<.011
Mn-54	<.01	<.01	<.005	<.004	<.008
Zn-65	<.01	<.01	<.010	<.008	<.016
K-40	<16.8	<16.8	<.055	<.055	<.122
Strontium Analys	10				
Strontium Analys	15				
Sr-89				<.001	<.002
Sr-90			**	<.004	<.008
*Critical nuclid	e for crit	ical station			

ENVIRONMENTAL MADIDLUCICAL MONTHORING PROGRAM SUPHARY Table III-5

DUCHET NO 50-362 CRYSTAL RIVER ORDE 3

CITEUS COURTY, FLURIDA

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#### PRECIPITATION PATHWAY

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

## Monthly Gamma Analysis

The summary for the gamma analysis of the monthly samples is in Table III-6. All monthly samples except Station C40 for November were collected and analyzed and all had LLDs equal to or less than those required. 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-6a. No operational sample had any detectable activity and the preoperational analyses also had no detectable activity.

The 1978 operational activity of the nuclides determined by gamma analysis are non detectable as were the preoperational and 1977 operational concentrations.

## Monthly Tritium Analysis

The summary for the tritium analysis of the monthly precipitation sample is in Table III-7. Due to insufficient rainfall, the sample for Station C40 in November could not be collected. All other samples were collected and analyzed and all had LLDs equal to or less than those required. 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-6a.

The 1978 operational activity of tritium was non detectable as was the preoperational and 1977 operational activities.

ENVIRONMENTAL RADIOLOGICAL HORTTURING FROOREN SURMARY Table III-6

REFORMING PERIOD 01/01/78-12/31/78 DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3

CITRUS COUNTY, FLORIDA

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Table III-6a

PRECIPITATION PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/2)

Nuclide	Preope	rational Values	Ор	Operational Values					
	Median	95 Percentile	Median	Mean	95 Percentile				
Gamma Analysis									
I-131	<.4	<.4	<8.5	<8.5	<8.5				
Ba-140	<10	<10	<8.5	<8.5	<8.5				
Cs-137	<10	<10	<8.5	<8.5	<8.5				
Cs-134	<10	<10	<8.5	<8.5	<8.5				
Co-58	<10	<10	<8.5	<8.5	<8.5				
Mn-54	<10	<10	<7.5	<7.5	<7.5				
Zn-65	<20	<20	<15.0	<15.0	<15.0				
Co-60	<10	<10	<8.5	<8.5	<8.5				
Tritium Analys	sis								
H-3	<320	<320	<100	<100	<100				

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#### 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-8. All samples were collected and analyzed and all nuclides had annual average LLDs equal to or less than those required. 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-9.

The concentrations of nuclides by gamma analysis during 1978 was less than the concentrations during 1977 and similar to the preoperational concentrations. The critical stations and the control stations concentration were almost identical and both were less than the respective concentrations during 1977.

## Quarterly Sr-89 and 90 Analysis

The summary for the Sr-89 and 90 analysis of quarterly composites is in Table III-10. All quarterly composites were collected and analyzed and all LLDs were equal to or less than those required. There are no critical stations for this type of analysis.

There were no reported preoperational results and a statistical evaluation of the operational data is presented in Table III-9.

The 1978 operational concentrations are similar to the 1977 operational concentrations and probably are close to preoperational levels.

## Quarterly Tritium Analysis

The summary for the tritium analysis of quarterly composites is in Table III-11. All quarterly composites were collected and analyzed and all had LLDs that were equal to or less than those required. There are no critical stations for this type of analysis.

A comparison of the preoperational and operational analyses in Table III-9. The operational concentrations in 1978 were less than those in 1977 but did not approach preoperational levels. Some preoperational activities that were reported were less than the minimal detectable activities and this skewed the statistics downward.

ENVIRORMENTAL RADIOLOGICAL MINITURIAGE PROGRAM SUMMARY Table III-8

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Table III-9

SEA WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preope	rational Values	Operational Values								
	Median	95 Percentile	Median	Mean	95 Percentile		rol Stations	Criti	cal Stations		
						Mean	95 Percentile	Mean	95 Percentile		
Gamma Ana	lysis										
Ra-226		600	<30.5	<34.9	<77.6	<34.4	<79.5	<37.1	<66.4		
Th-232		7	<18.5	<18.2	<32.9	<17.6	<31.6	<20.8	<38.8		
I-131*	<.4	<.4	<4.5	<4.9	<9.6	<4.9	(9.9	<4.5	<8.2		
Ba-140	<10	11	<14.5	<14.4	<24.3	<14.4	<24.5	<14.3	<23.7		
Ru-106			<33.5	<30.9	<49.9	<30.9	<50.4	<31.2	<48.2		
Cs 137*	<10	10	<4.5	<4.0	<6.4	<4.0	<6.5	<4.0	<5.9		
Zr-95	<10	<10	<6.5	<5.9	<10.1	<5.9	<10.2	<6.2	<10.0		
Cs-134*	<10	<10	<4.0	<4.1	<7.6	<4.1	<7.9	<4.0	<6.0		
Mn-54	<10	<10	<3.5	<3.4	<5.8	<3.4	<5.9	<3.5	<5.4		
Zn-65	<20	7	<7.5	<7.2	<11.7	<7.2	<11.8	<7.3	<10.8		
K-40	150.8	368.7	<249.5	<232.4	<410.1	<221.0	<405.4	<289.8	<358.7		
Strontium	Analysis										
Sr-89				<2.4	<10.7						
Sr-90				<0.5	<1.7		-				
Tritium Ar	nalvsis										
H-3	71	87	<349.5	<359.4	<623.3			lew.			

<sup>\*</sup>Critical nuclides for critical station.

PRACTICIONARIO PROGRAM SUMMARY ENVIRONMENTAL RADIOLOGICAL HALLER

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Table III-11 ENVIRONMENTAL RADIOLOGICAL BONGTORING PROGRAD SUBMARY

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#### 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-12. All samples were collected and analyzed and all had LLDs equal to or less than those required. 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-12a. All operational samples had no detectable activity and all preoperational samples also had no detectable activity.

## Quarterly Tritium Analysis

The summary for the tritium analysis of quarterly samples is in Table III-13. All samples were collected and analyzed and all had LLDs equal to or less than those required. 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-12a. All operational samples had no detectable activity and all preoperational samples also had no detectable activity.

Table 11'-12

ENVIRONMENTAL RADIOLOSICAL DOLUGING PROGRAM SUMMARY

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Table III-12a

RIVER WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoper	rational Values	Ор	erational	onal Values		
	Median	95 Percentile	Median	Mean	95 Percentile		
Gamma Analysis							
I-131	<.4	<.4	<8.5	<8.5	<8.5		
Ba-140	<10	<10	<8.5	<8.5	<8.5		
Co-58	<10	<10	<8.5	<8.5	<8.5		
Cs-137	<10	<10	<8.5	<8.5	<8.5		
Cs-134	<10	<10	<8.5	<8.5	<8.5		
Mn-54	<10	<10	<7.5	<7.5	<7.5		
Zn-55	<20	<20	<15.0	<15.0	<15.0		
Co-60	<10	<10	<8.5	<8.5	<8.5		
Tritium Analysi	s						
H-3	<320	<320	<100	<100	<100		

Table 111-13

ENVIRONMENTAL RADIDEDSICAL HUNITORING PROGNAU SUMMARY

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## 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-14. All samples were collected and analyzed and all had LLDs equal to or less than those required. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-14a. All operational samples had no detectable activity and there is no preoperational data.

## Semiannual Tritium Analysis

The summary for the tritium analysis of semiannual samples is in Table III-15. All samples were collected and analyzed and all had LLDs equal to or less than those required. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-14a. All operational samples had no detectable activity and there is no preoperational data.

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GROUND WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Opera	tional Values
	Mean	95 Percentile
Gamma Analysis		
I-131	<8.5	<8.5
Ba-140	<8.5	<8.5
Co-58	<8.5	<8.5
Cs-137	<8.5	<8.5
Cs-134	<8.5	<8.5
Mn-54	<7.5	<7.5
Zn-65	<15.0	<15.0
Co-60	<8.5	<8.5
Tritium Analysis		
H-3	<100	<100

Table 111-15

ERVIRONMENTAL RADIOLOGICAL MARKEDERING PROGRAM SURBARY

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### POTABLE WATER PATHWAY

The University has the responsibility to collect and analyze potable water samples. There are no additional stations for this pathway. Two additional samples were collected at each station as part of the Enhanced Sampling Program for the gamma analysis.

## Quarterly Gamma Analysis

The summary for the gamma analysis of quarterly samples is in Table III-16. All samples were collected and analyzed and all nuclides had annual average LLDs equal to or less than those required. 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-16a. The 1978 operational activity was similar to the 1977 operational concentrations and was less than the preoperational activity levels except for Ba-140. Activity for Ba-140 was only found in two samples, one of which was at the LLD level. This activity is thought to be spurious.

## Quarterly Tritium Analysis

The summary for the tritium analysis of the quarterly samples is in Table III-17. All samples were collected and analyzed and all had LLDs equal to or less than those required. There are no critical stations in this pathway and all samples had activity that was less than the sample LLD. All preoperational samples had an average activity of less than 320 pCi/l. There was, therefore, probably no increase in activity over the preoperational levels and the 1977 operational levels.

ERVIRINGENTAL RABIOLDGICAL NOBILLORING PROGRAM SUMMARY Table III-16

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Table III-16a

POTABLE WATER PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoper	rational Values	Ор	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysis					
I-131	<.4	<.4	<6.5	<4.6	<11.3
Ba-140	<10	<10	<22.5	<15.6	<37.1
Cs-137	<10	<10	<3.0	<3.8	<7.9
Cs-134	<10	<10	<3.0	<3.7	<8.1
Co-58	<10	<10	<2.8	<3.1	<6.0
Mn-54	<10	<10	<2.8	<3.0	<5.7
Zn-65	<20	<20	<5.0	<6.2	<12.0
Co-60	<10	<10	<2.5	<5.0	<19.3
Tritium Analysis	5				
H-3	<320	<320	<349.5	<305.5	<533.7

Table III-17

EPVIRORINENTAL BADIOLDGICAL TORLIDEINS PROGRAM SUNMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

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# 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. One additional sample was collected at each station as part of the Enhanced Sampline Program for the gamma analysis.

# Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-18. Samples were not reported for the first half at Sample Station C14H because of excessive LLDs due to naturally occurring nuclides. All other samples were collected and analyzed and the annual average LLDs for all nuclides were equal to or less than those required. 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-19.

The 1978 operational data is equal to or less than the preoperational data and similar to the 1977 operational data for almost every nuclide. The lack of more operational data prevents a more thorough comparison. Also, the control station data is very similar to the critical station data.

## Semiannual Sr-90 Analysis

The summary for the strontium analysis of the semiannual samples is in Table III-20. Due to a laboratory accident, the sample for the first half from Station CO9 was lost. All other samples were collected and analyzed and all LLDs for all nuclides were equal to or less than those required. There are no critical stations for this analysis. A statistical evaluation of the operational data is presented in Table III-20. There is no preoperational data.

The operational concentrations in 1978 are similar to the 1977 operational concentrations.

ENVIRONMENTAL REDICEDGICAL NONTIORING PROGRAM SURMARY DOCKET NO. 50-302 Table III-18 CHYSTAL RIVER URIT 3.

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SHORELINE EXTERNAL SEDIMENT PATHWAY
STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

	Median	ledian 95 Percentile	Median	Mean	95 Percentile	le Control S	Control Stations	Critic	Critical Stations
Gamma Analysis	lysis								
Ra-226	2900	10,000	324.5	372,3	750.8	244.8	391.5	476.2	854.3
Th-232	06	300	<59.5	<56.8	<111.2	72.7	110.5	<44.9	8.66>
1-131	4.4	34	<4.3	<4.4	<9.2	<4.8	<10.0	<4.0	<8.8
Ba-140	<10	<10	<10.8	<12.6	<26.0	<12.8	<25.5	<12.4	<27.1
Ru-136	190	069	<15.3	<29.8	<84.8	(23.9	<62.1	<34.2	<100.3
Cs-137*	<10	250	<10.5	<14.3	<42.8	<11.9	<35.8	<16.0	<48.,
Zr-95	12	40	<3.0	<4.9	<12.4	<4.7	<11.1	<5.1	<13.7
Cs-134*	<10	<10	<4.5	<5.0	<11.3	<4.8	48.4	<5.1	<13.2
Mn-54	<10	19	<1.5	<2.7	9.9>	<2.6	(6.3	<2.8	<7.1
Zn-65	1	1	<3.5	0.9>	<15.9	<5.3	<12.7	9.9>	<18.
K-40	259.8	1,006	270.5	252.9	519.3	154.7	379.8	326.5	526.8
trontium	Strontium Analysis								
Sr-90	;	1	1	<12.2	<24.9	1		1	:

Table 111-20

ENVIRONMENTAL BADIOLOGICAL PRINTIORING PROGRAM SUMMERY

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Y TYPE & NO. 1 LLD 1 ALL LI	人名西西南南 縣方在 然以在我不敢不敢在你不住 在我不不不下下了不以及我在在在我也就以			SE-90	F & ANALYSIS 10			3 91 8	
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Y TYPE & NO. 1 LLD 1 ALL LI	高級人名印度者奏 銀中京縣人名 形形形 不及 不不不 以及 以及 中下 丁丁二 不 以 在 在 在 在 在 在 在 在	2 *		SE-90	F & ANALYSIS 10			3 91 8	
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POOR ORIGINAL

### SEA FOOD CHAIN PATHWAY

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-21. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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-22.

The 1978 operational concentrations are less than both the 1977 operational and the preoperational concentrations.

## Semiannual Sr-89 and 90 Analysis

The summary for the strontium analysis of the semiannual samples is in Table III-23. All samples were collected and analyzed and all nuclides had annual average LLDs equal to or less than those required. There are no critical stations in this pathway. A statistical evaluation of the operational data is presented in Table III-22. There is no preoperational data.

The 1977 and 1978 operational concentrations are very similar.

Table III-21

CHVIRDBRENTAL RADIOLOGICAL NONITORING PROCRAM SUMMARY

REPORTING PERIOD 01/01//8-12/31/78 DUCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CIFRUS COUNTY, FLORIDA NER S K E

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POOR ORIGINAL

Table III-22

SEA FOOD CHAIN PATHWAY

STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Nuclide	Preoper	rational Values	Оре	rationel V	alues
	Median	95 Percentile	Median	Mean	95 Percentile
Gamma Analysis					
Ra-226	624	3300	33.5	33.5	53.9
Th-232		280	30.5	28.5	41.4
I-131	<10	37	<2.5	<2.5	<4.1
Ba-140	<10	75	<9.5	<9.0	<14.8
Ru-106		360	<27.8	<31.6	<59.8
Cs-137	<10	181	<8.0	<7.3	<11.1
Zr-95	18	157	<5.3	<6.4	<12.5
Mn-54		43	<2.8	<3.8	<8.0
Zn-65		156	<6.0	<6.38	<10.1
K-40	1508.4	12570	3623.5	3330.5	6855.6
Strontium Anal	<u>ysis</u>				
Sr-89		"		<4.1	<13.2
Sr-90				<1.3	<3.1

Table III-23 FEDGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DUCKET NO. 50-302

CLIRUS COUNTY FLORIDA REPORTING PERIOD 01/01/78-12/31/78

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PODR ORIGINAL

## 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-24. The sample for the first half at C30 was not collected due to the unsuccessful attempts at entrapment. All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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-25.

The 1978 operational concentrations are less than both the 1977 operational and preoperational concentrations except for naturally occurring K-40 which has similar concentrations for the three periods. The concentrations of the critical and control stations during 1978 were in close agreement.

Table III-24
EPVIROUNEHFAL RADIOLOGICAL ROBITORING PROGRAN SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO 50-302

REPORTING PERIOD 01/01/78-12/31/78 CITIEUS CHUNEY, FLORIDA

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Table III-25

INGESTION CRAB PATHWAY

SEMT NNUAL GAMMA ANALYSIS (pCi/kg)

	Nuclide	Preoper	rational Values			Oper-	ational Valu	ies		
		Median	95 Percentile	Median	Mean	95 Percentile	Control	Stations Percentile		Stations 5 Percentile
	Ra-226	1325	3600	63.0	65.7	95.4	82.0		57.5	72.8
	Th-232	92	170	<12.0	<18.3	<24.2	12.0		<21.5	<64.5
	I-131*	<10	<10	<4.0	<3.5	<5.2	<4.0		<3.3	<5.3
	Ba-140	<10	55	<9.5	<12.3	<17.4	<13.0		<12.0	<18.9
43	Ru-106			<21.5	<21.8	<23.0	<22.5		<21.5	<21.5
	Cs-137*	<10	75	<3.5	<3.5	<4.5	<3.0		<3.8	<4.4
	Zr-95	<10	13	<1.5	<5.2	<7.4	<4.5		<5.5	<8.3
	Cs-134*	<10	<10	<3.5	<3.5	<4.5	<3.0		<3.8	<4.4
	Mn-54	<80	24	<3.0	<3.0	<4.0	<2.5		<3.3	<3.9
	Zn-65	<160	127	<7.0	<7.2	<9.6	<7.0		⟨~.3	<10.7
	K-40	1424.6	2011.2	1790.0	1630.0	2478.3	1790.0	Yake in	1550,ι	2686.5

<sup>\*</sup>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-26. The samples for the first half at C30 were not collected due to the unsuccessful attempts at capture. All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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-27.

The operational concentrations for 1978 are less than both the 1977 operational and the preoperational concentrations except for naturally occurring K-40 where the concentrations were similar.

Table III-26 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY. FLORIDA REPORTING PERIOD 01/01/78-12/31/78

PATHKAY	TYPE & NO.	1 LLD	L ALL	OCATIO	NS   HIGH	HEST MEAN	LOCAT	1.001	CONTROL	LOCAT	ION INRR
C. FISH (PCI/KG) INGESTION	* * GAMMA * ANALYSIS 4	:	:		*	*		*	••••••	*****	* 0
	* RA-226	* 12 *	43(	3/	3)*C30 61)*	61(	1/	1)	61(	1/	1)*
	* TH-232	11	21(	2/	3) *C30 22) *	22(	1/	1)	22(	1/	1)
	* I- 131	* 5	61	1/	3) *C30	6(	1/	1)*	61	17	1)*
45	* BA-140	19		ND		* *		:			*
	* RU-106	* 47	146	1/	3)*C29	14(	1/	2)*	0(	0/	1)*
	* CS-137	6	13(	3/ 5-	3) *C30	15(	1/	1)*	15(	1/	1)
	* ZR- 95	* * 9		ND				:			
	* CS-134	* 6		ND ,	:			*			
	* MN- 54	* 6		ND	*			*			:
	* ZN- 65	* 13	71	1/	3)*C29	7(	1/	2)*	0(	0/	1) *
	* K - 40	* 97	1517(	3/	3)*C30	2020(	1/	1)*	2020(	17	1)*

46

Table III-27
INGESTION CARNIVOROUS FISH PATHWAY
SEMIANNUAL JAMMA ANALYSIS (pCi/kg)

Nuclide	Preoper	rational Values			0per	ational Val	ues		
	Median	95 Percentile	Median	Mean	95 Percentile	Contro	1 Stations 5 Percentile		1 Stations 5 Percentile
Ra-226	335	2400	47.0	43.0	82.8	61.0		34.0	70.0
Th-232		92	<19.0	<16.2	<31.2	22.0		<13.3	<17.2
1-131*	<10	<10	<3.5	<3.8	<7.8	<6.0		<2.8	<4.8
Ba-140	<10	72	<8.5	<9.7	<14.5	<8.5		<10.3	<16.5
Ru-106			<19.0	<17.3	<23.0	<19.0		<16.5	<23.4
Cs-137*	<10	43	15.0	13.3	28.3	15.0		12.5	33.3
Zr-95	<10	12	<4.0	<4.7	<6.9	<4.0		<5.0	<7.8
Cs-134*	<10	<10	<2.5	<13.3	<28.3	<2.5		<12.5	<33.3
Mn-54	<80	<80	<2.5	<2.8	<4.9	<2.0		<3.3	<5.3
Zn-65	<160	99	<5.5	⟨5.ሪ⟩	<7.9	<5.0		<6.3	<8.3
K-40	2346.4	3854.8	2020.0	1517.3	3698.2	2020.0		1266.0	4104.4

<sup>\*</sup>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-28. The samples for the first half at C29 and C30 and for the second half at C29 were not collected due to the unsuccessful attempts at capture. All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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.

The 1978 operational concentrations are lower than both the 1977 operational and the preoperational concentrations.

Table III-28 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY. FLORIDA REPORTING PERIOD 01/01/78-12/31/78

H.FISH (PCI/KG) INJESTION	* GAMMA * ANALYSIS 4							i			٥
	* RA-226	16	34(	1/	1)*C30 *	34(	1/	1)*	34(	1/	11:
	* TH-232	13	361	1/	1)*C30 *	36(	1/	1)*	36(	1/	1)*
	1- 131	8		ND	: :			:			:
4	* BA-140	28		ND	: :			:			:
48	* RU-106	62		ND	: :			:			:
	cs-137	7	12(	1/	1)*C30 *	12(	1/	1)*	12(	1/	1)*
	* ZR- 95	11		ND	: :			:			:
	* CS-134	8		ND	: :			:			:
	* MN- 54	7		ND	: :			:			:
	* ZN- 65	15 *		ND	: :			:			:
	* K - 40	75 *	12206	1/	1)*C30 *	12201	1/	1)*	12206	1/	1)*

Table III-29
INGESTION HERBIVONOUS FISH PATHWAY
SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Preoper	Preoperational Values			Opera	Operational Values	es		
	Median	95 Percentile	Median	Mean	95 Percentile	Control Mean 95	Control Stations an 95 Percentile	Criti	Critical Stations lean 95 Percentile
Ra-226	096	3100	34.0	34.0		34.0		NC/M	NC/M
Th-232	1	84	36.0	36.0		36.0		NC/M	NC/M
I-131*	<10	<10	<4.0	<4.0		<4.0		NC/M	NC/M
Ba-140	<10	90	<14.0	<14.0	1	<14.0	,	NC/M	NC/M
Ru-106	;	06	<31.0	<31.0		<31.0	,	NC/M	NC/M
Cs-137*	<10	110	12.0	12.0		12.0	1	NC/M	NC/M
Zr-95	<10	6	<5.5	<5.5		<5.5		NC/M	NC/M
Cs-134*	<10	<10	<4.0	<4.0		<4.0	,	NC/M	NC/M
Mn-54	<80	<80	<3.5	(3.5		<3.5		NC/M	NC/M
Zn-65	<160	63	<7.5	<7.5		<7.5		NC/M	NC/M
K-40	2178.8	3100.6	1220.0	1220.0		1220.0		NC/M	NC/M

\*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-30. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. 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-31.

The 1978 operational concentrations are lower than both the 1977 operational and preopoerational concentrations except for Ru-106 which is probably the result of including concentrations that were less than the minimum detectable activities in the statistics.

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY able III-30

REPORTING PERIOD 01/01/78-12/31/78 DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

******	**************************************	***	***	****	****	****	***	**	***	* * * * * * * * * * * * * * * * * * * *	* * *
O STERS (PCI/KG) INGESTION	* GAMMA * ANALYSIS 4	****			••••			****			****
	* RA-226	12	99	39-	4)*C30 62)*	215	39-	62)*	SEE	SEE COLUMN 4	****
	* TH-232	=	316	19-61	4) *C30	38(	28-	47)*	SEE	SEE COLUMN 4	
	1 -131	•		Q	•••			***			***
51	** BA-140	50		QN	***			***			***
	** RU-106	8	368	27	4)*C29 *	196	2	2)**	SEE	SEE COLUMN 4	
	* CS-137	***	=	>	4)*C29	:	2	23*	SEE	SEE COLUMN 4	•••
	* ZR -95	• • •		Q	***			***			•••
	MN -54	· · ·		Q	***			***			***
	59- NZ **			Q	•••			***			•••
	0 + ×	86	1229(	994-	994- 1440)*	13556	1270- 1440)	21 *	SEE	SEE COLUMN 4	•••

Table III-31

INGESTION OYSTERS PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Preope	rational Values	Оре	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226		534	40.5	45.5	67.1
Th-232			29.0	31.0	53.9
I-131	<10	<10	<2.5	<2.8	<3.7
Ba-140	<10	<10	<10.3	<10.0	<12.9
Ru-106		82	<53.3	<55.3	<132.6
Cs-137	<10	<10	<5.8	<6.3	<14.0
Zr-95	<10	<10	<5.0	<4.6	<6.8
Mn-54	<80	<80	<2.8	<2.6	<3.6
Zn-65	<160	33	<6.8	<7.0	<8.4
K-40		1843.6	1240.0	1228.5	1589.5

## 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-32. The sample for the second half at C27 was not available from the Ralston Purina Research Facility. The other sample was collected and analyzed and all nuclides had LLDs equal to `r less than those required. 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-32a.

One sample lacks the statistics for an evaluation of the operational data or a rigorous comparison with the preoperational data. The activity found in the shrimp does, however, correspond to that found in the preoperational and the 1977 operational shrimp. It should be noted that discharge canal water was not used for shrimp raising in 1978.

ENVIRONMENTAL RADIOLOGICAL MONITORIES PROGRAM SUMMARY Table III-32

REPORTING PERIOD 01/01/78-12/31/78 DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

PATHWAY	**************************************	LL D	ALL LO	CATION	91H - **	1EST MEAN	LOCAT	NO	CONTR	JL LOCATI	NR.
SHRIMP (PCI/KG) INGESTION	* GAMMA * ANALYSIS 2				••••			****			
	* RA-226	161	1716	1	1) *C27	1711	2	*:*	SEE	SEE COLUMN 4	•••
	* TH-232		905	7	1)*C27	200	>	*:*	SEE	SEE COLUMN 4	•••
	1 -131	10		QN	•••			***			***
	* BA-140	31.	39(	2	1) #C27	39(	7	*:*	SEE	SEE COLUMN 4	***
54	* RU-106			QN	***			***			•••
	* CS-137	6		ON	•••			***			•••
	* ZR-95	***		QN	•••			***			***
	# # #	0		QN	•••			***			
	* ZN-65	18		QN	***			•••			***
	** X - 40	* 72 *	1240(	1	1114627	12406	1	*:	SEE	SEE COLUMN 4	••

Table III-32a

INGESTION SHRIMP PATHWAY

SEMIANNUAL GAMMA ANALYSES (pCi/kg)

Nuclide	Preoper	rational Values	Ope	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226		-	85.5	85.5	
Th-232		36	25.0	25.0	
I-131	<10	<10	<5.0	<5.0	
Ba-140	<10	<10	19.5	19.5	
Ru-106			<35.5	<35.5	
Cs-137	<10	37	<4.5	<4.5	
Zr-95	<10	<10	<7.0	<7.0	
Mn-54	<80	<80	<4.0	<4.0	
Zn-65	<160	<160	<9.0	<9.0	
K-40	921.8	2514	<36.0	<36.0	-

### 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-33. The samples at Sample Station C49 were not collected due to the unavailability of milk. All other samples were collected and analyzed and all nuclides had annual average LLDs equal to or less than those required. Sample Station C49 is the critical station for this type of analysis. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-34.

The 1978 operational concentrations are similar to both the 1977 operational and the preoperational concentrations including Cs-137 which was elevated in 1977 due to the Chinese weapons tests fallout.

## Monthly Sr-89 and 90 Analysis

The summary for the strontium analysis of the monthly samples is in Table III-35. The samples at Sample Station C49 were not collected due to the unavailablity of milk. All other samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. Sample There is no critical station for this type of analysis. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-34.

The 1978 operational concentrations are similar to both the 1977 operational and the preoperational concentrations.

REPORTING PERIOD 01/01/78-12/31/78 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 Table III-33 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

PATHWAY	TYPE & NO.   LLD   ALL LOCATIONS   HIGHEST MEAN LOCATION   CONTROL LOCATION   NRR	1.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4	ALL L.	CATION	HIGHE	ST MEAN	LOCA1	NO1	CONTROL	*****	NO.	2*
MILK (PCI/L) INGESTION	* GAMMA * ANALYSIS 24 *	• • • • •			*****			• • • • •			• * * * *	•
	1 -131	20		QN	***			***			•••	
	* BA-140 *	25 **		Q	•••			***			•••	
	CS-137	****	13(	13( 11/	12)*C47 * 19)*	136	7-8	12)*	13( 11/ 12)* 13( 11/ 12) ( 8- 19)* ( 8- 19)	111/8	193*	
56	** ZR- 95	***		QN	•••			***			•••	
	** CS- 34 **	***	19	2	121 *C47 *	19	2	121*	)9	1	12)*	
	*** C0-58	• • •	101	2	12)*(47 *	100	2	12)*	101	>	121*	
	*** WN- 54	***		Q	• • •			* * *			• • •	
	** 09-00	• •	2(	-	5( 1/ 12)*C47 *	2(	1	5( 1/ 12)*	95	1/ 121	121*	

Table III-34
INGESTION MILK PATHWAY
STATISTICAL EVALUATION OF ANALYSES (pCi/kg)

Median         95 Percentile         Median         Median         Median         Oritical Stations original Stations         Critical Mean         Oritical Stations         Critical Mean         Oritical M	Nuclide	Preoper	Preoperational Values			Opera	Operational Values	lues		
Analysis         4.10         4.3.5         4.3.9         4.7.4         4.3.9         4.7.4         NC/M           0         4.30         4.12.5         4.1.1         4.12.5         4.1.1         1.2.5         4.1.1         NC/M           1         4.20         4.2.5         4.2.5         4.3.5         4.5         4.5         4.5         4.5         8.5         NC/M           1         4.10         4.0         4.5         4.5         4.5         4.5         8.5         NC/M           1         4.10         4.0         4.5         4.5         4.5         4.5         8.5         NC/M           4.10         4.10         4.2         4.2         4.2         4.5         8.5         NC/M           4.10         4.10         4.1 <t< th=""><th></th><th>Median</th><th>95 Percentile</th><th>Median</th><th>Mean</th><th>95 Percentile</th><th>Contr</th><th>ol Stations 95 Percentile</th><th>Criti</th><th>cal Stations 95 Percentile</th></t<>		Median	95 Percentile	Median	Mean	95 Percentile	Contr	ol Stations 95 Percentile	Criti	cal Stations 95 Percentile
4         (10)         (3.5)         (3.4)         (3.4)         (3.9)         (7.4)         NC/M           9         (30)         (12.3)         (12.5)         (21.1)         (12.5)         (21.1)         NC/M           1         (20)         (12.5)         (12.2)         (19.4)         (12.2)         (19.4)         NC/M           1         (20)         (20)         (4.5)         (4.5)         (4.5)         NC/M           1         (10)         (4.0)         (3.5)         (5.4)         NC/M           (10)         (2.9)         (5.4)         NC/M           (10)         (3.0)         (3.4)         (7.8)         NC/M           (10)         (3.0)         (4.1)         (8.5)         NC/M           (10)         (3.0)         (4.1)         <	Gamma Anal	ysis								
3         430         412.3         412.5         421.1         412.5	I-131*	<10	<10	(3.5	<3.9	<7.4	(3.9	47.4	NC/M	NC/M
7         16         22         <12.5         <12.5         <19.4         <12.2         <19.4         NC/M           <20	Ba-140	<30	<30	<12.3	<12.5	<21.1	<12.5	(21.1	NC/M	NC/M
<20       <5.5       <4.5       <8.5       <4.5       <8.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.5       <4.6       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7       <4.7	Cs-137	16	22	<12.5	<12.2	<19.4	<12.2	<19.4	NC/M	NC/M
1	Zr-95	<20	<20	<5.5	<4.5	<8.5	<4.5	<8.5	NC/M	NC/M
<10       <10       <2.8       <2.9       <5.4       <2.9       <5.4       NC/M         <10	Cs-134	<10	<10	< <b>4.</b> 0	(3.5	0.9>	<3.5	(6.0	NC/M	NC/M
<10	Mn-54	<10	<10	<2.8	<2.9	<5.4	<2.9	<5.4	NC/M	NC/M
<pre>&lt;10</pre>	30-58	<10	<10	<3.0	<3.4	47.8	<3.4	47.8	NC/M	NC/M
tium Analysis <4.0 <4.1 <8.4 4.0 <2.0 <2.5 <6.2	09-0	<10	<10	<3.0	<4.1	(8.5	<4.1	<8.5	NC/M	NC/M
4.0 6.0 <2.5 <6.2	trontium	Analysis								
4.0 6.0 <2.0 <2.5 <6.2	r-89	1	1	<4.0	<4.1	<8.4	1	1	1	
	r-90	4.0	0.9	<2.0	<2.5	<6.2	1	1	1	1

\*Critical nuclides for critical station

Table III-35 ENVIRONMENTAL RADIOLOGICAL WONITORING PROGRAM SUMMARY

REPORTING PERIOD 01/01/78-12/31/78 DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

2 * 2 *			
NO *	*****	3( 117 12)*	6( 3/ 12)*
LOCA		===	3/
ONTROL		35	19
O NOI	****	12) *	121*
LBCAT		3( 11/ 12)*	6( 3/ 12)*
T MEAN		¥~	30
GHE S		***	***
ALL LOCATIONS   HIGHEST MEAN LOCATION   CONTROL LOCATION   NRR	*****	3( 11/ 12)*C47	3/ 121*647 *
CAT TONS		<u>}</u> -	3/
ALL LD		36	39
L.D	• • • • •	• * * *	***
-			
** 0* X*	24		
TYPE &	SR 89790 ANALYSIS	SR-90	SR-89
-	· * * * * *	***	
PATHWAY TYPE & NO.   LLD	MILK (PCI/L) INGESTION		

### 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-36. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. There are no critical sample 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 operational concentrations for 1978 are lower than both the 1977 operational and the preoperational concentrations. Cesium-137 is the exception with the 1978 concentration approaching preoperational levels after being elevated in 1977 due to the Chinese weapons test fallout.

REPORTING PERIOD 01/01/78-12/31/78 Table III-36 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

****	****	****	***	***	***	****	***	***	***	*
	COLUMN 4	COLUMN				SEE COLUMN				
	SEE	SEE (				SEE (				
****	2) * 73) *	510*	***	* * *	***	2)*	***	***	•••	*
	45-	15-				93-				
****	365	336				144[				
	*C45 *	2)*C45 * 51)* * *	•••	***	•••	** 6 4 5 **	***	***	•••	*
	73)	511				*1361				•
	45-	15-	Q	QN	Q	93-	QN	QN	9	
	965	33(				144(				
	15		8	24 *	** 95	2	=	9	***	•
α	• • • •	****	***	***	***	****	***	***	***	•
ANIMALS * * * * * * * * * * * * * * * * * * *	* RA-226	* TH-232	1 -131	* BA-140	* RU-106	* CS-137	* ZR -95	** MN -54	* ZN -65	
ANIMALS (PCI/KG) INGESTION				60						

Table III-37

\_ INGESTION ANIMALS PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Preoper	rational Values	Operational Values				
	Median	95 Percentile	Median	Mean	95 Percentile		
Ra-226		720	59.0	59.0	97.8		
Th-232			33.0	33.0	82.9		
I-131	<10	100	<3.8	<3.8	<4.4		
Ba-140	<10	<10	<23.5	<23.5	<33.2		
Ru-106			<55.5	<55.5	<101.2		
Cs-137	<10	80	143.5	143.5	283.5		
Zr-95	<10	70	<5.3	<5.3	<10.1		
Mn-54	<80	<80	<3.0	<3.0	<5.8		
Zn-65	<160	160	<6.8	<6.8	<10.2		
K-40	1656.5	3586.6	2090.0	2090.0	3004.7		

# 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 camples is in Table III-38. Results for Stations CO5 and C40 for the first half are not reported due to contamination by fallout from a Chinese weapons test. All other samples were collected and analyzed and all nuclides had annual average LLDs equal to or less than those required. 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-39.

The 1978 operational concentrations are similar to the 1977 operational and preoperational concentrations.

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 Table III-38 CRYSTAL RIVER UNIT 3

REPORTING PERIOD 01/01/78-12/31/78 CITRUS COUNTY, FLORIDA

	. * * * *	••••	••••	•••	***	•••	••••	•••	***	***	••
		SEE COLUMN 4	SEE COLUMN 4	SEE COLUMN 4			SEE COLUMN 4		SEE COLUMN 4		SEE COLUMN 4
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*	• • • • •	*:**		*12	***	***	::"	***	• • •	***	2)*
		1	2	2			2		>		2/ 2)*
		169	3571	926			251 (		56		* 3516(
	••••	41*C40	4)*C40 *	4)*C41 *	•••	***	4)*C05 * 251)* * *	•••	** 040**	•••	4/ 4)*C41 *
		29-	20-	1	QN	1	36-	Q	2	QN	1
		52(	1216	926		KLLDE	136(		96		20705
			· · · · ·	8	* 26 *	** 67 **	101	13 **	***	* 15 *	* 157 *
	* GAMMA * ANALYSIS 6	* RA-226	** TH-232	. 1 -131	* BA-140	** RU-106	CS-137	* ZR- 95	MN- 54	\$9 -NZ **	**
	GRASS (PCI/KG) FOOD CHAIN				63						

Table III-39

FOOD CHAIN (GRASSES) PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Preope	rational Values	Оре	erational \	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226		2363	44.5	51.8	107.5
Th-232		120	52.5	120.5	432.7
I-131	<10	<10	<2.5	<24.8	<112.6
Ba-140	26	253	<7.5	<13.1	<35.9
Ru-106			<18.3	<53.0	<191.5
Cs-137	1363	5416	128.5	136.0	314.4
Zr-95	<10	31	<3.0	<6.3	<19.0
Mn-54			<3.3	<4.5	<11.7
Zn-65		589	<4.0	<7.5	<21.9
K-40	578.2	2430.2	759.5	2069.8	7631.8

### 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-40. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. There is no critical sample stations in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-40a.

The 1978 operational concentrations were non detectable as were the 1977 operational and the preoperational concentrations except for Cs-137. Because this is an annual sample and Cs-137 was not found in 1977 or the preoperational data, this positive indication is considered to be spurious.

Table III-40 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

REPORTING PERIOD 01/01/78-12/31/78 DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY. FLORIDA

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MEAN.					101				
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DCATION ******		9	QN .	QN	2	QN	QN	QN	QN
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1 617	****	24*	24*	24*	24*	24*	21*	***	24*
0:		•••	•••	•••	***	•••	•••	•••	••
TYPE & NO.   LLD	GAMMA ANALYSIS	1- 131	BA-140	CO- 58	CS-137	CS-134	MN- 54	ZN- 65	09 -00
PATHWAY	CITRUS ** (PCI/KG) ** INGESTION **	•••	•••	•••	•••	•••	•••	•••	••

Table III-40a

INGESTION FOOD CROPS (CITRUS) PATHWAY

ANNUAL GAMMA ANALYSIS (pCi/kg)

muclide	Preope	rational Values	Оре	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
I-131	<10	<10	<12.0	<12.0	
Ba-140	<10	<10	<12.0	<12.0	
Co-58	<10	<10	<12.0	<12.0	**
Cs-137	<10	<10	70.0	70.0	
Cs-134	<10	<10	<12.0	<12.0	
Mn-54	<10	<10	<10.5	<10.5	
Zn-65			<21.0	<21.0	
Co-60	<10	<10	<12.0	<12.0	44

# INGESTION FOUR CROPS (WATERMELON) PATHWAY

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

### Armual Gamma Analysis

The summary for the gamma analysis of the annual samples is in Table III-41. All samples were collected and analyzed and all had LLDs equal to or less than those required. There is no critical sample station in this pathway. A statistical evaluation of the operational data is presented in Table III-41a. There was no preoperational data for this pathway and all 1978 operational analyses resulted in nondetectable activity as did the 1977 operational analyses.

Table III-41 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 31/01/78-12/31/78

PATHWAY	TYPE & NO.	LLD A	LL LOCATIONS	HIGHEST ME	AN LOCATION	ONTROL LOCATION IN
WATERMELON	:	:		: :	:	
(PCI/KG)	* GAMMA *	*				
INGESTION	* ANALYSIS 1 *	:		: :	:	:
				* *		
	* I- 131 *	24*	ND			
	•					
	* BA-140 *	24*	NO	* *	*	
	* 54-140	244	ND	1 1		:
	* CO- 58 *	24*	ND			
	•	*		* *		
	*					
	* CS-137 *	24*	ND	•	•	
	1					
	* CS-134 *	24*	ND	: :		
	* MN- 54 *	21*	ND			
	:				*	
	* ZN- 65 *	42*	ND	: :	*	*
	. 214-03	42.	NU	: :		
	* CO- 60 *	24*	ND	* *		

Table III-41a

INGESTION FOOD CROPS (WATERMELON) PATHWAY

ANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Opera	tional Values
	Mean	95 Percentile
I-131	<12.0	
Ba-140	<12.0	
Co-58	<12.0	
Cs-137	<12.0	
Cs-134	<12.0	**
Mn-54	<12.0	
Zn-65	<12.0	
Co-60	<12.0	

### FOOD CHAIN (SOIL) PATHWAY

The University has the responsibility to collect and analyze soil samples. There are no additional stations in this pathway. This pathway was sampled in 1978, even though it was not required, to show that sample LLDs could be met by improved techniques.

### Gamma Analysis

The summary for the gamma analysis of the annual samples is in Table III-42. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. There is no critical sample station in this pathway. A statistical evaluation of the operational data and a comparison with the preoperational data is presented in Table III-43.

The 1978 operational results are almost identical to the 1977 operational and the preoperational results.

Table III-42
ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY
CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/78-12/31/78

SGIL PCI/KG) FOOD CHAIN	# GAMMA # ANALYSIS	7										
	* RA-226	:	9*	372(	7/ 88-	7)*C41 * 784)* *	784 (	1/	1)	SEE	COLUMN	4
	* TH-232	:	9	102(	41-	7) *C40 373) *	373(	1/	1):	SEE	COLUMN	4
	* I -131	:	4*		ND	: :			:			
70	# # BA-140	:	140		ND	: :			:			
	* RU-106	:	29*	35 <b>(</b>	29-	7)*C04 *	41(	1/	1):	SEE	COLUMN	4
	-137	:	4	128(	26-	7)*C04 *	325(	1/	1)	SEE	COLUMN	4
	* ZR-95	:	5*	4 (	1/	7)*C26	41	1/	1)*	SEE	COLUMN	4
	* MN-54	•	3.	21	1/	7) * C 04 *	2(	1/	1)*	SEE	COLUMN	4
	* ZN-65	:	7*		ND	: :			:			
	* K -40	:	34*	1540	71-	7) *C46 * 261)* *	261(	1/	1)+	SEE	COLUMN	4

Table III-43
FOOD CHAIN (SOIL) PATHWAY
ANNUAL GAMMA ANALYSIS (pCi/kg)

<u>Nuclide</u>	reope	rational Values	0р	erational	Values
	Median	95 Percentile	Median	Mean	95 Percentile
Ra-226		2200	131.0	371,6	1012.3
Th-232		300	49.0	102.3	338.7
I-131	<10	<10	<2.0	<2.1	<3.5
Ba-140	<10	<10	<5.5	<6.8	<11.8
Ru-106	0	330	<29.0	<27.3	<47.9
Cs-137	270	1100	64.0	110.1	343.9
Zr-95	40	150	<3.5	<3.1	<5.5
Mn-54	<10	<10	<2.0	<1.6	<2.9
Zn-65	1 22		<2.5	<3.5	<6.3
K-40	713	1482	<71.0	<96.2	<286.9

# 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-44. All samples were collected and analyzed and all nuclides had LLDs equal to or less than those required. There is no critical sample station in this pathway. A statistical evaluation of the operational data is presented in Table III-44a. There was no preoperational data for this pathway and all 1978 operational analyses resulted in nondetectable activity as did the 1977 operational analyses.

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3

REPORTING PERIOD 01/01/78-12/31/78 CITRUS COUNTY, FLORIDA

PATHWAY	TYPE & NO.	110	ALL LOCATIONS	**************************************	NRR
MEAT (PCI/KG) FOOD CHAIN	* GAMMA * ANALYSIS 2				
	. 1- 131	38 *	ð	•••	
	* BA-140	39 *	Q	•••	
	*** CO- 58	***	Q	•••	•••
	* CS-137	37 **	Q	•••	
73	* CS-134	***	Q	•••	***
	MN- 54	32 *	QV	•••	
	** 59 -NZ **	***	Q	•••	***
	** 09 -00	** 09	QN	••	

Table III-44a

FOOD CHAIN (MEAT) PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Opera	tional Values
	Mean	95 Percentile
I-131	<19.0	<19.0
Ba-140	<19.5	<19.5
Co-58	<30.0	<30.0
Cs-137	<16.5	<16.5
Cs-134	<30.0	<30.0
Mn-54	<16.0	<16.0
Zn-65	<33.0	<33.0
Co-60	<30.0	<30.0

# 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-45. All samples were collected and analyzed and all had LLDs equal to or less than those required. There is no critical sample station in this pathway. A statistical evaluation of the operational data is in Table III-45a. There is no preoperational data for this pathway.

The 1978 operational concentrations were non detectable as were the 1977 operational and the preoperational concentrations except for Cs-137 in the second half of 1978. This is considered spurious as Cs-137 has never been found in poultry before and there were no other detectable nuclides in the same sample.

REPORT ING PERIOD 01/01/78-12/31/78 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 Table III-45 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

PATHWAY TYPE & NG.   LLD   ALL LOCATIONS   HIGHEST MEAN LOCATION   CONTROL LOCATION   NRR	TYPE & NO	ררם	ALL LOCAT	IONS	EST MEAN	LOCATION	CON	TROL LUCATION	NRR
POULTRY (PCI/KG) FOOD CHAIN	GAMMA ANALYSIS 2								0
	1- 131	38 *	9				•••		
	BA-140	39 *	Q	•••			***		
	CO- 58	09	Q	***			***		
	CS-137	37 **	170( 1/	21*649 *	1021	17 29		SEE COLUMN 4	•••
	CS-134	09	Q	•••					•••
75	MN- 54	32 **	QN	•••					•••
	59 -NZ	***	Q	•••					
	09 -00	** 09	Q	••					

Table III-45a

FOOD CHAIN (POULTRY) PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Opera	tional Values
	Mean	95 Percentile
I-131	<19.0	<19.0
Ba-140	<19.5	<19.5
Co-58	<30.0	<30.0
Cs-137	<94.3	<304.2
Cs-134	<30.0	<30.0
Mn-54	<16.0	<16.0
Zn-65	<33.0	<33.0
Co-60	<30.0	<30.0

# FOOD CHAIN (EGGS) PATHWAY

The State has the responsibility to collect and analyze 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-46. All samples were collected and analyzed and all had LLDs equal to or less than those required. There is no critical sample station in this pathway. A statistical evaluation of the operational data is presented in Table III-46a. There was no preoperational data for this pathway and all 1978 operational analyses resulted in nondetectable activity as did all 1977 operational analyses.

REPORTING PERIOD 01/01/78-12/31/78 Table III-46 ENVIRONMENTAL RADIOLOGICAL MONITGRING PRUGRAM SUMMARY DOCKET NO. 50-302 CRYSTAL RIVER UNIT CITRUS COUNTY, FLORIDA

PATHWAY	TYPE & NO.	LLD	TYPE & NO.   LLD   ALL LOCATIONS	++++++++++++++++++++++++++++++++++++++
EGGS (PCI/KG) FOOD CHAIN	* GAMMA * ANALYSIS 2			•••••
	. 1- 131	38	Q	••••
	* BA-140	39	QN	••••
	*** CO- 58	09	QN	•••
	* CS-137	37 *	QN	••••
	* CS-134	09	QN	***
77	#N- 54	32	QV	•••
	59 -NZ	999	QN	••••
	* CO- SO	** 09	QN	

Table III-46a

FOOD CHAIN (EGGS) PATHWAY

SEMIANNUAL GAMMA ANALYSIS (pCi/kg)

Nuclide	Opera	Operational Values						
	Mean	95 Percentile						
I-131	<19.0	<19.0						
Ba-140	<19.5	<19.5						
Co-58	<30.0	<30.0						
Cs-137	<18.5	<18.5						
Cs-134	<30.0	<30.0						
Mn-54	<16.0	<16.0						
Zn-65	<33.0	<33.0						
Co-60	<30.0	<30.0						

# FOOD CHAIN (GREEN LEAFY VEGETABLES) PATHWAY

The University has the responsibility to collect and analyze green leafy vegetable samples. There are no additional stations in this pathway. Five additional samples were collected at each station as part of the Enhanced Sampling Program for the gamma analysis.

# Semiannual Gamma Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-47. All samples were collected and analyzed and all nuclides had LLDs that were equal to or less than those required. The critical station for this type of analysis (Sample Station C48) is in the east sector at 4.5 miles from the plant. A statistical evaluation of the operational data is presented in Table III-48. There is no preoperational data for this pathway.

The 1978 operational concentrations are similar to the 1977 operational concentrations.

### Semiannual Sr-90 Analysis

The summary for the gamma analysis of the semiannual samples is in Table III-49. All samples were collected and analyzed and all nuclides had LLDs that were equal to or less than those required. There is no critical station for this type of analysis. A statistical evaluation of the operational data is presented in Table III-48. There is no preoperational data for this pathway and the 1977 operational data showed no detectable activity. The 1978 samples showed no detectable activity but the first half samples collected subsequent to the fallout from a Chinese weapons test. This is probably the cause for the higher than normal activity.

REPORT ING PERIOD 01/01/78-12/31/78 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY DOCKET NO. 50-302 CRYSTAL RIVER UNIT 3 CITRUS COUNTY, FLORIDA

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	436	) 36	99	201	62(	166	00			
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	34-	20-	>	2	1	77	2			3
••••	310	366	99	211	621	1959	98			* 25981
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*****	131:	13)*	13)*	131*C48 21)*	131*	13) 4	131*	***	***	* 33
	13/	12/	2	20-	1	13/	1	QN	QN	13/
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*****		****	50	••••	***	****	12 *	***	***	142 *
24 ****	****	****	***	****	***	****	* * *	* * *	***	* *
GAMMA	RA-226	TH-232	1-131	BA-140	RU-106	CS-137	2R-95	MN-54	2N-65	X - 40
EAF VE *	****	****	***	***	***	****	***	* * *	***	* *
GREEN LEAF VE				7	9					

FOOD CHAIN (GREEN LEAFY VEGETABLES) PATHWAY STATISTICAL EVALUATION OF AMALYSES (pci/kg)

201120	Mean	95 Percentile	obo	Control Stations	Ö	Critical Stations
			Mean		Mean	95 Percentile
Gamma Analysis	215					
Ra-225	52.5	112.5	42.7	63.9	6.09	139.2
Th-232	<63.4	<154.1	94.5	193.5	<36.7	<74.1
I-131*	<10.3	<40.2	<10.0	<42.8	<10.6	<40.3
Ba-140	<22.1	(62.1	<19.0	<58.9	<24.7	<67.3
Ru-106	<32.2	(96.7	<27.0	<61.3	<36.7	<121.1
Cs-137	360.3	1669.9	15.5	41.3	6.55.9	2262.5
Zr-95	<6.1	<17.6	4.4	8.9>	9.7>	<23.0
Mn-54	<3.3	<10.5	<2.5	<3.4	<4.0	<14.0
Zn-65	<8.3	<26.2	< <b>6.</b> 1	(1.7)	<10.3	<34.7
K-40	2433.2	4024.8 25	2598.3	4012.8	2301.0	4085.4
Strontium Analysis	nalysis					
Sr-90	16.3	54.6	ŀ	1	1	1
Critical	*Critical nuclides for	critical station	ion			

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY
CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

REPORT ING PERIOD 01/01/78-12/31/78

CITRUS COUNTY, FLORIDA

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**************************************		G.L.VEG	PCI/KG	FOOD CHAIN				
*								

## 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. Because of vandalism, the University's TLDs at Sample Station C04 were lost and because of construction, those at C43 were lost for the third quarter. No other TLDs were lost during the report period. Sample Stations C14H, C14M, and C14G are the critical stations in this pathway.

Table IV-3 presents a statistical summary of all data. The 1978 data from all TLD stations compares very well with the 1977 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.

# ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302

CITRUS COUNTY, FLORIDA REFORTING PERIOD 01/01/78-12/31/78

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Table IV-2
ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY
CRYSTAL RIVER UNIT 3 DOCKET NO. 50-302
CITRUS COUNTY, FLORIDA REPORTING PERIOD 01/01/78-12/31/78

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STATE	*	EXTERNAL	*		16			*	*			k-			ě.	
		RADIATION	28*	20	45	38(	287	28) *(	26 *	49(	4/	4)*	SEE C	OLUMN 4	4 4	
	-		- 15	-	40-	(	26-	三月) 任	#	(	35-	54) +			#	
	36		W.		46		20.00	10	it:			+6			*	

Table IV-3

EXTERNAL RADIATION PATHWAY

QUARTERLY TLD ANALYSIS (mrem/yr)

	Median Value	Mean Value	93 Percentile Value
Preoperational	62		77
All Stations	44	42.5	65.9
State	35	35.8	59.9
University (All Stations)	48	47.9	65.5
University (Critical Stations)	48	48.0	60.3
University (Control Stations)	48	47.8	47.8