Entergy Operations

Entergy Operations, Inc.
P.O. Box B
Killona, LA 70066
Tel 504-739-6650

W3F1-96-0064
A4.05
PR

April 24, 1996

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

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Annual Radiological Environmental Operating Report

Gentlemen:

Attached is the subject 1995 annual report on radiological environmental monitoring which covers the period of January 1 through December 31, 1995. This report is submitted per Section 6.9.1.7 in the Waterford 3 Technical Specification (NUREG-1117).

If there are any questions, please contact C. Jeff Thomas at (504) 739-6531.

Very truly yours,

James J. Fisicaro

J.J. Fisicaro
Director
Nuclear Safety

260033

JJF/CJT/ssf
Attachment

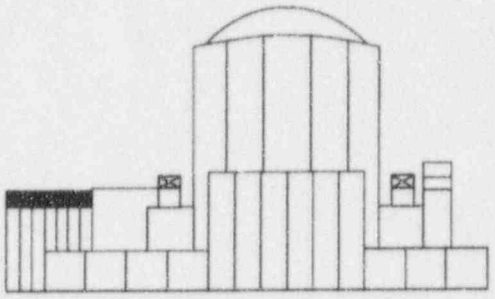
cc: (w/Attachment)
L.J. Callan (NRC Region IV), NRC Resident Inspectors Office

(w/o Attachment)
C.P. Patel (NRC-NRR), R.B. McGehee, N.S. Reynolds

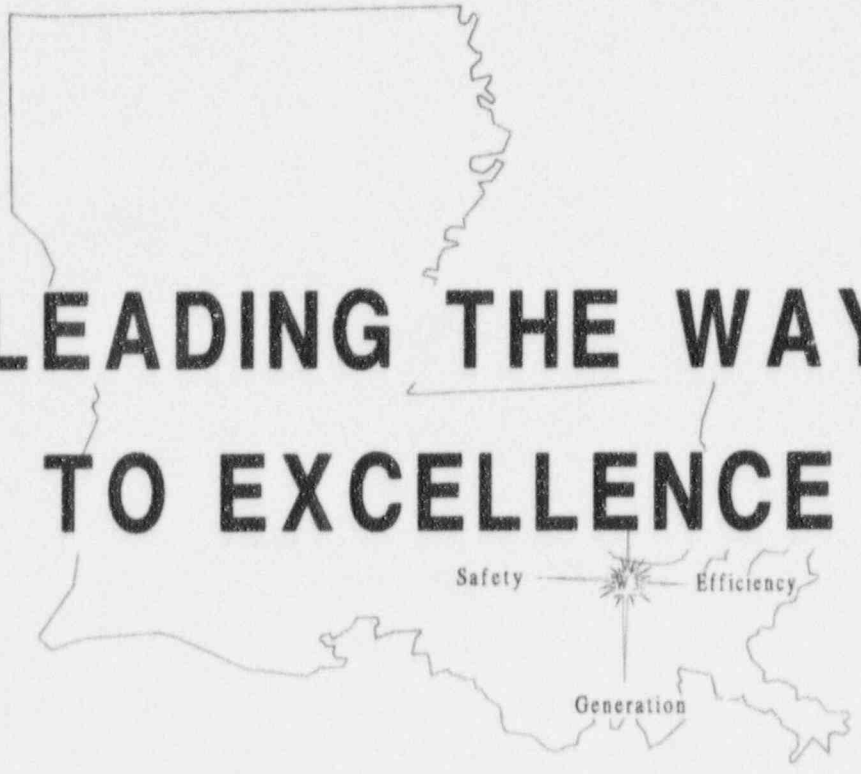
IE25
1/1

9604260198 951231
PDR ADOCK 05000382
R PDR

ENTERGY



WATERFORD SES - UNIT3



LEADING THE WAY
TO EXCELLENCE

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT 1995

Entergy Operations, Inc.

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

FOR WATERFORD 3 STEAM ELECTRIC STATION

JANUARY 1 THROUGH DECEMBER 31, 1995

Docket Number: 50-382

License Number: NPF-38

ABSTRACT

This report is issued pursuant to Waterford 3 Technical Specification 6.9.1.7. Its purpose is to discuss the Waterford 3 Radiological Environmental Monitoring Program (REMP), present the results of the program for the year of 1995, and evaluate the radiological impact on the environment resulting from plant operation.

The Waterford 3 REMP collected data on environmental radioactivity levels around the Waterford 3 nuclear power plant. These levels were determined by analyzing samples of air, water, shoreline soil, fish, vegetation, and milk from various locations around the facility. Based on the evaluation of the environmental data collected, the operation of Waterford 3 exhibited no discernable impact on the levels of radioactivity in the environment during 1995.

TABLE OF CONTENTS

PAGE

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF TABLES iv

LIST OF FIGURES vi

1.0 INTRODUCTION .....
- 1.1 Program and Report Objectives 1
- 1.2 Plant and Site Description 1

2.0 PROGRAM DESCRIPTION 2
- 2.1 History and Development 2
- 2.2 Responsibilities 2
- 2.3 Sample Collection and Handling Procedures 3
  - 2.3.1 Direct Radiation Exposure Pathway Samples 3
  - 2.3.2 Airborne Exposure Pathway Samples 3
  - 2.3.3 Waterborne Exposure Pathway Samples 4
  - 2.3.4 Ingestion Exposure Pathway Samples 4
- 2.4 Analytical Procedures 5
  - 2.4.1 Gross Beta Analysis in Air Particulates 5
  - 2.4.2 Gross Beta Analysis in Water 5
  - 2.4.3 Tritium Analysis in Water 6
  - 2.4.4 Iodine-131 Analysis in Milk and Water 6
  - 2.4.5 Gamma Spectroscopy Analysis 6
  - 2.4.6 Environmental Dosimetry 6
  - 2.4.7 Lower Limits of Detection 7
- 2.5 Laboratory Quality Assurance 7

3.0 DISCUSSION OF RESULTS 21
- 3.1 Direct Radiation Exposure Pathway 21
- 3.2 Airborne Exposure Pathway 21
  - 3.2.1 Airborne Particulates 21
  - 3.2.2 Airborne Iodine 22
  - 3.2.3 Gamma Isotopic Analysis 22

TABLE OF CONTENTS (CONTINUED)

PAGE

3.3 Waterborne Exposure Pathway 22
3.3.1 Drinking/Surface Water 22
3.3.2 Groundwater 23
3.3.3 Shoreline Sediment 23
3.4 Ingestion Exposure Pathway 24
3.4.1 Milk 24
3.4.2 Fish 24
3.4.3 Broad Leaf Vegetation 24
3.4.4 Food Products 24
3.5 Statistical Analyses 25
3.5.1 Calculation of the Mean and Standard Deviation 25
3.5.2 Comparing Two Sample Population Means 25
3.5.3 TLD Measurements 27
3.5.4 Gross Beta on Air Particulate Filters 27
3.5.5 Gross Beta in Monthly Drinking Water Composites 27
3.6 Deviations from the REMP 28
3.6.1 Unavailable Samples 28
3.6.2 Lack of Sample Continuity 28
3.6.3 Missed Lower Limits of Detection 28
3.7 Annual Land Use Census Results 28

4.0 CONCLUSIONS 35

APPENDIX A - REMP DATA SUMMARY 39

APPENDIX B - REMP DATA 45

LIST OF TABLES

		PAGE
TABLE 2.1	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP) SUMMARY	8
TABLE 2.2	DESCRIPTION OF REMP SAMPLING STATION LOCATIONS	9
TABLE 2.3	DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS, LOWER LIMIT OF DETECTION (LLD)	16
TABLE 2.4	ANALYTICAL LABORATORY EPA CROSS CHECK RESULTS	17
TABLE 3.1	1995 DIRECT RADIATION DATA ORGANIZED BY COMPASS DIRECTION AND DISTANCE FROM WATERFORD 3 SES	29
TABLE 3.2	STATISTICAL COMPARISON OF 1995 TLD MEASUREMENTS FROM STATIONS GROUPED BY DISTANCE FROM WATERFORD 3 SES	30
TABLE 3.3	STATISTICAL COMPARISON OF GROSS BETA ACTIVITY ON AIR PARTICULATE FILTERS FOR 1995	31
TABLE 3.4	STATISTICAL COMPARISON OF GROSS BETA ACTIVITY IN MONTHLY DRINKING WATER COMPOSITES FOR 1995	32
TABLE 3.5	SUMMARY OF 1995 REMP DEVIATIONS	33
TABLE 3.6	1995 ANNUAL LAND USE CENSUS RESULTS	34
TABLE A-1	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY	39
TABLE B-1	QUARTERLY TLD DOSE RATES	46
TABLE B-2	AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES GROSS BETA AND IODINE-131 ANALYSES	47

LIST OF TABLES (CONTINUED)

PAGE

TABLE B-3 AIR PARTICULATE FILTERS: GAMMA ISOTOPIC ANALYSIS ON QUARTERLY COMPOSITES 52

TABLE B-4 DRINKING WATER: IODINE-131 ANALYSIS 53

TABLE B-5 DRINKING WATER: GROSS BETA ANALYSES ON MONTHLY COMPOSITES AND GAMMA ISOTOPIC ANALYSIS ON MONTHLY COMPOSITES 56

TABLE B-6 DRINKING WATER: TRITIUM ANALYSIS ON QUARTERLY COMPOSITES 62

TABLE B-7 GROUNDWATER: TRITIUM AND GAMMA ISOTOPIC ANALYSES 63

TABLE B-8 SHORELINE SOIL: GAMMA ISOTOPIC ANALYSES 64

TABLE B-9 MILK: IODINE-131 AND GAMMA ISOTOPIC ANALYSES 65

TABLE B-10 FISH: GAMMA ISOTOPIC ANALYSES 67

TABLE B-11 BROAD LEAF VEGETATION: IODINE-131 AND GAMMA ISOTOPIC ANALYSES 69

TABLE B-12 VEGETATION - FOOD PRODUCTS: IODINE-131 AND GAMMA ISOTOPIC ANALYSES 72

LIST OF FIGURES

PAGE

FIGURE 2.1 REMP SAMPLE LOCATIONS WITHIN 2 MILES OF WATERFORD 3 18

FIGURE 2.2 REMP SAMPLE LOCATIONS WITHIN 10 MILES OF WATERFORD 3 19

FIGURE 2.3 REMP SAMPLE LOCATIONS WITHIN 50 MILES OF WATERFORD 3 20

FIGURE 3.1 DIRECT RADIATION DOSE COMPARISON 36

FIGURE 3.2 GROSS BETA - AIR PARTICULATE COMPARISON 37

FIGURE 3.3 GROSS BETA - DRINKING/SURFACE WATER COMPARISON 38

1.0 INTRODUCTION

This report describes the Radiological Environmental Monitoring Program (REMP) for the Waterford 3 Steam Electric Station and discusses the results obtained during the calendar year 1995. The results discussed in this report were used to evaluate the radiological environmental impact from the operation of Waterford 3. The submission of this report to the Nuclear Regulatory Commission (NRC) fulfills the requirements pursuant to Waterford 3 Technical Specification 6.9.1.7.

1.1 Program and Report Objectives

The objective of the monitoring program is to evaluate the radiological environmental impact of the plant. In order to conduct this evaluation, the data analyses and interpretations contained in this report fulfill the following specific objectives:

a. to identify any radioactive materials or radiation in the environment associated with plant operation,

b. to compare the results obtained during the reporting period with past operational and pre-operational data and identify any trends associated with accumulation of radioactivity in the environment; and

c. to verify compliance with federal regulatory requirements.

1.2 Plant and Site Description

Waterford 3 employs a pressurized water reactor for the production of approximately 1153 gross (1104 net) megawatts of electricity. The station uses a flow of water obtained from and discharged to the Mississippi River for condenser cooling. On March 4, 1985, the unit achieved initial criticality.

The plant is located on the west bank of the Mississippi River at River Mile 129.6 between Baton Rouge and New Orleans, Louisiana. The site is in the northwestern section of St. Charles Parish approximately 3 miles southeast of the St. John the Baptist Parish boundary between Killona and Taft. The Mississippi River is the closest prominent natural feature; other features include Lac des Allemands, about 5.5 miles southwest of the site, and Lake Ponchartrain, about 7 miles northeast of the site.

Most of the man-made features are located on the narrow strip of land between the Mississippi River and the wetlands. Specifically, several industrial facilities including Waterford 1 and 2 Steam Electric Stations (0.4 miles northwest), Little Gypsy Steam Electric Station (0.8 miles northeast), IMC Agrico, a fertilizer manufacturer (0.6 miles east

southeast), Oxychem Chemical Company (0.8 miles east southeast), and Union Carbide, a chemical manufacturer (1.2 miles east southeast) are operating in the area.

Major urban centers in the region include New Orleans (approximately 25 miles east) and Baton Rouge (approximately 50 miles west northwest). Communities near the site in St. Charles Parish include Killona (0.9 miles west northwest), Montz (1.0 miles north), Norco (2.5 miles east), Hahnville (3.7 miles east southeast), and Destrehan (6.3 miles east southeast). Laplace (4.7 miles north) is located in St. John the Baptist Parish.

2.0 PROGRAM DESCRIPTION

A general summary of the REMP is given in Table 2.1; brief descriptions and locations of the sampling stations are presented in Table 2.2. In addition, station locations are illustrated in Figures 2.1 through 2.3. A more detailed description of the REMP is provided below.

2.1 History and Development

The Waterford 3 REMP evolved from the Pre-operational Environmental Radiological Surveillance (PERS) program (1978-1982) and was initiated in April of 1983. Equipment, procedures, techniques, and sampling locations used during the pre-operational survey were incorporated into the operational program. Further, the environmental data collected during the first two years of the REMP (1983 and 1984), prior to initial criticality, were used to supplement the baseline established during the PERS Program.

2.2 Responsibilities

Waterford 3 personnel are responsible for implementing and ensuring that the REMP complies with federal regulatory, Technical Specification, and Offsite Dose Calculation Manual (ODCM) requirements. Responsibilities of Waterford 3 personnel include collecting (with the exception of fish samples), preparing, and shipping of environmental samples; conducting environmental dosimetry measurements; reviewing analytical results reports; and preparing and submitting the annual Radiological Environmental Operating Report and other relevant reports to the Nuclear Regulatory Commission.

The primary contractor, Entergy Services, Inc. (ESI) System Chemistry located in Little Rock, Arkansas, is responsible for performing radiological analyses; conducting initial data review; preparing results reports; and overseeing laboratory quality assurance and control. Additionally, a separate contractor, the Fisheries Co-operative Extension Service of Louisiana State University, is responsible for the collection of fish samples.

2.3 Sample Collection and Handling Procedures

Sample types, location, collection frequency, and the analyses performed are summarized in Tables 2.1 and 2.2. The information contained in these tables is based on requirements specified in Table 5.8-1 of the Waterford 3 ODCM. Location maps of the sampling are illustrated in Figures 2.1 through 2.3. Any stations deviations (i.e., unavailable samples and missed lower limits of detection) or changes made to the REMP during 1995 are discussed in Section 3.6.

The environmental samples collected are classified into four general categories according to exposure pathways: direct radiation, airborne, waterborne, and ingestion. Sample collection and handling procedures are described in the following sections. The descriptions are intended to provide a concise procedural overview rather than a step-by-step description.

2.3.1 Direct Radiation Exposure Pathway Samples

Integrated external gamma exposure, determined using Panasonic multi-element thermoluminescent dosimeters (TLDs), was measured at thirty-one locations as follows:

a. an inner ring of stations, one in each of the sixteen meteorological sectors, in the general area of the site boundary;

b. an outer ring of stations, one in ten of the sixteen meteorological sectors, in the six to eight kilometer range from the site; and

c. the balance placed in areas of special interest (e.g., population centers, schools, etc.) with one area serving as a control.

The TLDs were exchanged and analyzed quarterly by Waterford 3 personnel.

2.3.2 Airborne Exposure Pathway Samples

Samples of airborne particulates and radioiodines were collected at four indicator stations (APP-1, APQ-1, APG-1, APC-1) and one control station (APE-30). Low-volume air pumps and flow totalizers in weather proof shelters provided continuous air sampling.

Using the sampling device described above, airborne particulate samples were obtained on a filter and collected weekly by Waterford 3 personnel for shipment to the contract laboratory for gross beta analysis. The filters were composited quarterly by the contract laboratory for isotopic analysis by gamma spectroscopy.

Airborne iodine sampling was done in conjunction with air particulate sampling using a charcoal cartridge to collect iodine. The cartridges were collected weekly by Waterford 3 personnel and sent to the contract laboratory for iodine-131 analysis by gamma spectroscopy.

2.3.3 Waterborne Exposure Pathway Samples

Because the plant discharges into the Mississippi River, the major source of drinking water in the vicinity of Waterford 3, water samples taken from the Mississippi River were designated as both drinking and surface water samples.

Composite drinking/surface water samples were obtained biweekly from the Mississippi River using automatic composite samplers placed at one upstream (DWP-7/SWP-7) and two downstream (DWG-2/SWG-2, DWE-5/SWE-5) locations. Hydrochloric acid was added to each sample prior to shipment. The contract laboratory analyzed the biweekly samples for iodine-131, composited them monthly for gross beta and gamma spectroscopy, and composited them quarterly for tritium analysis.

Due to the high water table resulting from shallow aquifers in the vicinity of the site, drainage canal sampling represents groundwater discharge. Groundwater was obtained quarterly by grab sampling from one sampling location (GWK-1). Again, hydrochloric acid was added to the sample prior to shipment to the contract laboratory for tritium and gamma spectroscopy analyses.

Shoreline sediment samples were obtained semi-annually from a sampling station at each plant discharge point. Station SHWE-3 is located downstream on the shoreline of the Mississippi River; station SHWK-1 is on the shoreline of the 40-Arpent canal. The samples were shipped without further processing.

2.3.4 Ingestion Exposure Pathway Samples

Milk samples were collected semi-monthly from one indicator location (MKQ-5) and one control location (MKQ-45). Sampling of the control station was performed by Louisiana Radiation Protection Division personnel. Although one additional indicator location was identified (MKQ-1), no samples were available from

this location during 1993 (see Section 3.6). Finally, formaldehyde was added as a preservative to all samples prior to shipment. Upon arrival at the laboratory, iodine-131 and gamma spectroscopy analyses were performed.

Fish samples were collected bi-annually from the Mississippi River upstream (FH-1) and downstream (FH-2) from the plant. A contractor performed the sampling by netting. Subsequently, the fish were segregated by species and location prior to delivery to Waterford 3. The samples were shipped frozen for analysis by gamma spectroscopy.

The Waterford 3 ODCM, Section 5.8.1, requires broad leaf vegetation to be sampled from 3 locations within 5 miles of the plant in the event milk samples are unavailable. Since milk samples were collected from only one sampling location within five miles of Waterford 3, broad leaf vegetation was sampled monthly at two indicator locations (BLQ-1 and BLB-1) and one control location (BLK-15). The samples were shipped without further processing.

Food product sampling was not required because no areas surrounding the plant were irrigated with water in which plant wastes are discharged. However, food products grown within the site boundary were collected to demonstrate the absence of radionuclide accumulation.

These food product samples (sugarcane) were collected at the time of harvest from two locations (FPG-1 and FPP-1) by normal harvesting techniques and shipped without further processing. Iodine-131 and gamma spectroscopy analyses were performed.

2.4 Analytical Procedures

2.4.1 Gross Beta Analysis in Air Particulates

After allowing for the radon-222 and radon-220 daughter products to decay, the particulate filters were counted in a gas-flow proportional counter.

2.4.2 Gross Beta Analysis in Water

A known volume of water, usually 200 milliliters, was reduced by evaporation, transferred to a two inch diameter planchet, and evaporated to dryness. The planchet was counted for 100-200 minutes or until the required LLD is achieved in an automatic alpha-beta counter.

2.4.3 Tritium Analysis in Water

A known volume of water, 5 milliliters, was added to 15 milliliters of liquid scintillation solution in a 25 milliliter vial. The sample was counted for 500 minutes in a liquid scintillation counter.

2.4.4 Iodine-131 Analysis in Milk and Water

Approximately four liters of sample were mixed with a stable iodine carrier solution and eluded through an anion exchange resin column to remove iodine from the sample. Iodine analysis was performed using gamma spectroscopy. The time between sample receipt and analysis, sample amount, and count times were adjusted in order to attain the required LLD. The chemical yield was corrected by measuring the stable iodide content of the milk or water with a specific ion electrode.

2.4.5 Gamma Spectroscopy Analysis

Air particulate filters and iodine cartridges, water, milk, broadleaf vegetation, sediment, food products and fish samples are prepared in containers, using the appropriate geometry for its sample type. Secondly, the sample is counted in a shielded high purity germanium (HPGE) or germanium lithium (GeLi) detector coupled to a computer based data acquisition system that performs pulse height analysis.

The computer software program defines peaks by changes in the slope of the spectrum, compares each specific peak energy with a library of peaks for isotopic identification, and performs the radioactivity calculation using the appropriate fractional gamma ray abundance, half life, detector efficiency, and net counts in the peak region.

Iodine analysis was performed using gamma spectroscopy. The time between sample receipt and analysis, the sample size and count times were adjusted in order to attain the required lower limit of detection.

2.4.6 Environmental Dosimetry

Model UD-814 Panasonic thermoluminescent dosimeters (TLDs) that contain one lithium borate and three calcium sulfate phosphor elements were used for environmental dosimetry. However, only the calcium sulfate phosphor elements were used for analysis. For placement in field, two annealed dosimeters are placed inside a plastic bag and mounted in an aluminum frame. The dosimeters are checked monthly and exchanged for analysis each quarter

using an automatic TLD reader manufactured by Panasonic (Model UD-710).

2.4.7 Lower Limits of Detection (LLD)

The minimum sensitivities for the analytical procedures are reflected by the Lower Limits of Detection (LLD) values presented in Table 2.3 from Table 5.8-3 of Waterford 3 ODCM. The LLD's are a priori estimates based on assumed sample volumes, counting times, detector efficiencies, etc. Analyses that could not achieve these lower limits of detection are discussed in Section 3.6.

2.5 Laboratory Quality Assurance

During 1995, the ESI System Chemistry laboratory performed between 5% and 10% of all analyses for quality assurance purposes. Spiked and blank samples were prepared in-house. In addition, the laboratory participated in the EPA Radiological Interlaboratory Comparison (cross-check) Program.

This quality assurance program satisfies the requirements of the Waterford 3 ODCM, Section 5.8.2, for participation in an interlaboratory comparison program. The program involved analyses on various sample media typically found in the REMP. As a result of participation in the program, an objective measure of analytical precision and accuracy was obtained. In the event that results obtained by ESI System Chemistry were not within control limits (3 standard deviations), an investigation was conducted to determine the cause, and corrective action was taken to prevent a recurrence. Table 2.4 lists the 1995 results of the laboratory's participation in the cross-check program.

TABLE 2.1

RADIOLOGICAL ENVIRONEMNTAL MONITORING PROGRAM (REMP) SUMMARY[a]			
SAMPLE TYPE	**LOCATION**	**ANALYSIS**	**FREQUENCY**
DIRECT RADIATION	A-2, B-1, C-1, D-2, E-1, F-2, G-2, H-2, J,2, K-1, L-1, M-1, N-1, P-1, Q-1, R-1, A-5, B-4, D-5, E-5, F-4, G-4, H-6, P-6, Q-5, R-6, G-9, E-15, J-15, E-30	TLD Gamma	Quarterly
AIR RADIOIODINE AND PARTICULATES	APP-1, APQ-1, APG-1, APC-1, APE-30	Gross Beta I-131 Gamma Isotopic	Weekly Quarterly Composite
DRINKING WATER[B]	DWG-2, DWE-5, DWP-7	H-3 Gamma Isotopic Gross Beta I-131	Quarterly Composite Monthly Composite Bi-Weekly Composite
SURFACE WATER[B]	SWG-2, SWE-5, SWP-7	H-3 Gamma Isotopic Gross Beta I-131	Quarterly Composite Monthly Composite Bi-Weekly Composite
GROUND WATER	GWK-1	H-3 Gamma Isotopic	Quarterly
SHORELINE SEDIMENT	SHWE-3, SHWK-1	Gamma Isotopic	Semi-Annually
MILK	MKE-4, MKQ-5, MKQ-1, MKQ-45	Gamma Isotopic I-131	Semi-Monthly
BROAD LEAF	BLQ-1, BLB-1, BLK-15	Gamma Isotopic I-131	Monthly When milk samples are not collected
FISH	FH-1, FH-2	Gamma Isotopic	In season or Semi-Annually
FOOD PRODUCTS	FPG-1, FPP-1, FPQ-1	Gamma Isotopic I-131	At harvest time

a. Based on requirements in Table 5.8-1 of Waterford 3 SES Offsite Dose Calculational Manual, Section 5.8-1.

b. Drinking and surface water samples are identical.

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
	DIRECT RADIATION (TLD)		
A-2	(Eastbank) Located on a utility pole on River Road (LA 628) at the south corner of the Zephrin L. Perriloux Fire Station(Station 5) in Montz, La.	**1.1**	**N**
B-1	(Eastbank) On fence enclosing the transmission tower 0.3 miles west (up-river) from Little Gypsy. Access from River Road (LA 628). TLDs are located at SW corner of fence enclosure.	**0.8**	**NNE**
C-1	(Eastbank) On fence enclosing the Little Gypsy Cooling Water Intake. Access is from River Road (LA 628) across from Little Gypsy Steam Electric Station entrance. TLDs are on the south side (inside) of the Cooling Water Intake fence enclosure, directly opposite the entrance gate.	**0.8**	**NE**
D-2	(Eastbank) Located approximately 0.3 miles east of Little Gypsy Power Station. Access from River Road (LA 628). TLDs are attached to a stop sign post located at the peak of the levee on the west entrance road through the Bonne Carre Spillway.	**1.1**	**ENE**
E-1	(Westbank) Located on utility pole along River Road (LA 18) approximately 0.3 miles east of Waterford 3 plant entrance. Access from LA 18. TLDs are on the third utility pole east of the construction entrance road.	**0.2**	**E**
F-2	(Westbank) Located on fence enclosure surrounding the LP&L substation on LA 3142. Access from LA 3142 approximately 0.2 miles south of LA 18. TLDs are on the southeast corner of the fence enclosure	**1.1**	**ESE**

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
G-2	(Westbank) Located on utility pole on east side of LA 3142 (Next to Union Carbide Star Plant Gate 3). Access from LA 3142 approximately 0.2 miles north of railroad overpass	**1.2**	**SE**
H-2	(Westbank) Located on fence enclosure to shell road off of LA3142. Access from LA 3142 south of railroad overpass on east side of LA 3142. TLDs are on the south side of the gate for shell road (just south of Texaco pipeline station).	**1.2**	**SSE**
J-2	(Westbank) Located on northeast corner of fence enclosing Texaco valve station south of LA 3127. Access from LA 3127, approximately 0.6 miles west of LA 3127/3142 intersection.	**1.3**	**S**
K-1	(Westbank) Located on fence at Gate 92 entrance off of LA 3127. Access from LA 3127, approximately 1.3 miles west of LA 3127/3142 intersection. (Gate 92 is the access to the Waterford 3 switchyard station and training center.)	**1.0**	**SSW**
L-1	(Westbank) Located next to "Private Road" sign at LP&L Gate 97 entrance off of LA 3127, approximately 1.6 miles west of LA 3127/3142 intersection. (Gate 97 is an access road for Waterford 3.)	**1.0**	**SW**
M-1	(Westbank) Located on south gate into the Waterford 1 and 2 SES fuel oil storage tank enclosure. Access is either thru LP&L Gate 92, Gate 97 off of LA 3127, the shell access road from LA 18 between Waterford 3, or through the Waterford 1 and 2 SES access road.	**0.7**	**WSW**
N-1	(Westbank) Located behind the "No Trespassing" sign off of Short Street, in Killona, just south of the entrance to Killona Elementary School.	**0.9**	**W**
P-1	(Westbank) Located on Short Street, in Killona. TLD is inside fence at air sample station APP-1.	**0.8**	**WNW**

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS

LOCATION	LOCATION DESCRIPTION	DISTANCE FROM PLANT	METOROLOGICAL DIRECTION
Q-1	(Westbank) Located on fence enclosing air sample station approximately 0.5 miles west of Waterford 1 and 2 on River Road (LA 18).	0.8	NW
R-1	(Westbank) Located on fence enclosure for Waterford 1 and 2 Cooling Water Intake Structure. Access is from River Road (LA 18) opposite Waterford 1 and 2. TLDs are on the southwest corner of fence.	0.5	NNW
A-5	(Eastbank) Located on utility pole just east of the Shady Nook Trailer Park on Hwy 61 in LaPlace. TLDs are on second utility pole east of trailer park on north side of Hwy 61 (eastern end of LaPlace).	4.5	N
B-4	(Eastbank) Located on utility pole just east of shell access road to South Central Bell transmission tower on south side of Hwy 61. Transmission tower is just east of weigh station at St. John/St. Charles Parish line. TLDs are on the first utility pole east of access road.	3.8	NNE
D-5	(Eastbank) Located on fence gate on shell access road to Big 3 Chemical Plant. Shell access road is approximately 0.1 miles west of Hwy 61/48 intersection (at black and yellow gate). TLD's are on fence gate 0.1 miles north on shell access road from Hwy 61.	4.2	ENE
E-5	(Eastbank) Located on the Norco Substation fence enclosure. Access from River Road (LA 48) onto Wesco St. (adjacent to Norco Shell Chemical Plant), take Wesco St. to the dead end. TLDs are located on sixth fence post south of the north substation gate.	4.2	E
F-4	(Westbank) Located on utility pole behind blonde brick house on Aquarius St. in Hahnville. Access from River Road (LA 18) and turn onto Oak St. Follow Oak St. to Hickory St., turn right on Hickory St. and follow to Aquarius St. and turn left. Blonde brick house is second house on right (west) side of Aquarius St. heading south.	3.5	ESE

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
G-4	(Westbank) Located on railroad sign northwest side of LA 3160/railroad track intersection. Access from either LA 3127 or River Road (LA 18) onto LA 3160.	**3.2**	**SE**
H-6	(Westbank) Located on a road sign on the northwest side of the second canal bridge east of LA 3160 along LA 3127.	**5.7**	**SSE**
P-6	(Westbank) Located on a fence surrounding the Union Pacific communications tower at the LA 640/railroad intersection approximately 500 ft. from LA 640.	**5.5**	**WNW**
Q-5	(Westbank) Located on fence post surrounding (green) river marker on levee just east of Edgard. Fence post is located along River Road (LA 18) across from the Webre's house.	**5.0**	**NW**
R-6	(Eastbank) Located on fence enclosing LP&L laydown yard on LA 3223 in LaPlace. Access from Hwy 61 onto Elm St. (LA 3223), take Elm St. to the northeast corner of LA 3223/railroad intersection. TLDs are located on the southeast corner of fence enclosure.	**5.3**	**NNW**
F-9	(Eastbank) Located on entrance gate to Destrehan Substation. Access from River Road (LA 48), approximately 1.5 miles east of Luling-Destrehan Ferry, onto Jonathan Street (west of Bunge Corp. Grain Elevator), and proceed to substation gate.	**8.2**	**ESE**
G-9	(Westbank) Located on back fence of LP&L District Office in Luling. Access via Ellington St. from either River Road (LA 18); or Second or Third St. from Paul Mallaird Rd. (LA 52) to Ellington St.	**8.1**	**SE**
E-15	(Eastbank) Located on Kenner Substation fence enclosure. Access from either River Road (LA 48) or Hwy 61, turn onto Alliance Ave. TLDs are located on the north side of the fence enclosure, near a light pole.	**11.8**	**E**

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
J-15	(Westbank) Located on fence enclosure surrounding LP&L switchyard at LA 631/Hwy 90 intersection in Des Allemands. TLDs are on the northwest corner of fence. Access from LA 631 via shell road.	**12.0**	**S**
E-30**	(Westbank) at LP&L General Office on Delaronde St. in Algiers. TLDs are in the courtyard at the south entrance to the building.	**27.0**	**E**
	AIRBORNE		
APP-1	(Westbank) Located in soybean/sugarcane field at northwest corner of Short St. in Killona.	**0.8**	**WNW**
APQ-1	(Westbank) Located at northwest corner of soybean/sugarcane field on east side of Killona. Access from River Road (LA 18) approximately 0.6 miles east of LA 18/3141 intersection.	**0.8**	**NW0**
APG-1	(Westbank) Located at the north side of the Secondary Meteorological Tower.	**0.5**	**SE**
APC-1	(Eastbank) Located inside the Little Gypsy Cooling Water Intake Structure fence enclosure.	**0.8**	**NE**
APE-30**	(Westbank) Located on the roof of the LP&L General Office building on Delaronde St. in Algiers.	**27.0**	**E**
	WATERBORNE		
DWG-2 **SWG-2**	(Westbank) Located at the Union Carbide drinking water canal. Access from LA 3142 through Gate 28.	**2.0**	**SE**
DWE-5 **SWE-5**	(Eastbank) Located at the St. Charles Parish Waterworks off of River Road (LA 48) near New Sarpy.	**4.5**	**E**

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
DWP-7**	(Westbank) Located at the St. John Parish Waterworks off of LA 18 in Edgard.	**6.5**	**WNW**
SWP-7**			
SHWE-3	(Westbank) Located at the Foot Ferry Landing off of LA 18 in Taft.	**3.0**	**E**
SHWK-1	(Westbank) Located at the 40 Arpent Canal south of the Plant. Access from LA 3127 through Gate 92	**0.5**	**SSW**
GWK-1	(Westbank) Located at 40 Arpent Canal south of the plant. Access from LA 3127 through LP&L Gate 92 which is at the Waterford 3 Training Center. The canal is northwest of the shell access road/railroad track intersection.	**0.5**	**SSW**
INGESTION (MILK)			
MKQ-1	(Westbank) 1.0 miles west of Waterford 3 SES at the corner of River Road and Post Street in Killona.	**1.0**	**NW**
MKQ-5	(Westbank) Located at the Webre's house, just across LA 18 from river marker, at the eastern end of Edgard.	**4.9**	**NW**
MKQ-45**	(Eastbank) Located off of I-12 in Denham Springs, take LA 3002 south to LA 1034, then right to LA 1032, then left. Farm is 1 mile on the right.	**42**	**NW**
INGESTION (BROAD LEAF VEGETATION)			
BLQ-1	(Westbank) Located between LA 18 and soybean field on eastern edge of Killona, near air sample station APQ-1.	**0.8**	**NW**
BLB-1	(Eastbank) Located at wooded area at the southwestern corner of the LP&L Little Gypsy plant along River Road.	**0.8**	**NNE**
BLK-15**	(Westbank) Located 3.5 miles SSW of Des Allemands on Hwy. 90.	**15**	**SSW**

TABLE 2.2

DESCRIPTION OF REMP SAMPLING LOCATIONS			
LOCATION	**LOCATION DESCRIPTION**	**DISTANCE FROM PLANT**	**METOROLOGICAL DIRECTION**
INGESTION (FOOD PRODUCTS*)**			
FPP-1	(Westbank) Located in sugarcane/soybean field on eastern edge of Killona, between air sample stations APP-1 and APQ-1.	**0.8**	**WNW**
FPG-1	(Westbank) Located in a sugarcane/soybean field east of Waterford 3 near the back-up meteorological tower and air sample station APG-1.	**0.4**	**SE**
INGESTION (FISH)			
FH-1*	Upstream of the plant intake structure.	**NA***	**NA***
FH-2	Downstream of the plant discharge structure.	**NA***	**NA***

* NA - NOT APPLICABLE

** Control Location

*** Food products are not required since no areas surrounding the plant are irrigated with water into which plant wastes are discharged. Food products grown within the site boundary were collected however, in order to demonstrate the absence of man-made radionuclides.

TABLE 2.3

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS LOWER LIMIT OF DETECTION (LLD) [a]						
ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GAS (pCi/m^3)	FISH (pCi/kg-wet)	MILK (pCi/l)	FOOD PRODUCTS[b] (pCi/kg-wet)	SEDIMENT (pCi/kg-dry)
gross beta	4	0.01				
H-3	2000					
Mn-54	15		130			
Fe-59	30		260			
Co-58, 60	15		130			
Zn-65	30		260			
Zr-95	30					
Nb-95	15					
I-131	1	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-140	60			60		
La-140	15			15		

a. From Table 5.8-3 of Waterford 3 SES Offsite Dose Calculation Manual.

b. Applicable to broad leaf vegetation.

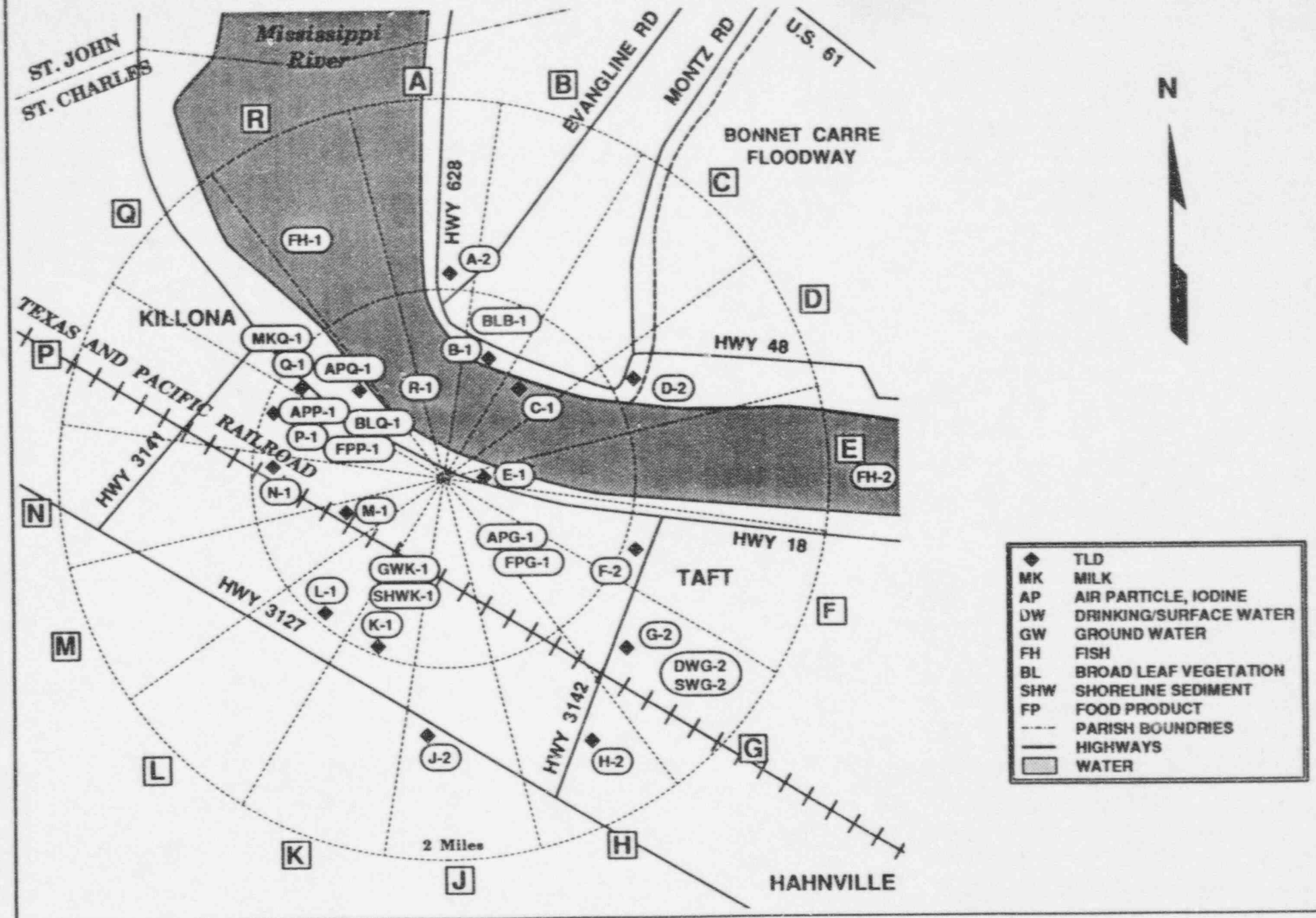
TABLE 2.4

ANALYTICAL LABORATORY EPA CROSS CHECK RESULTS

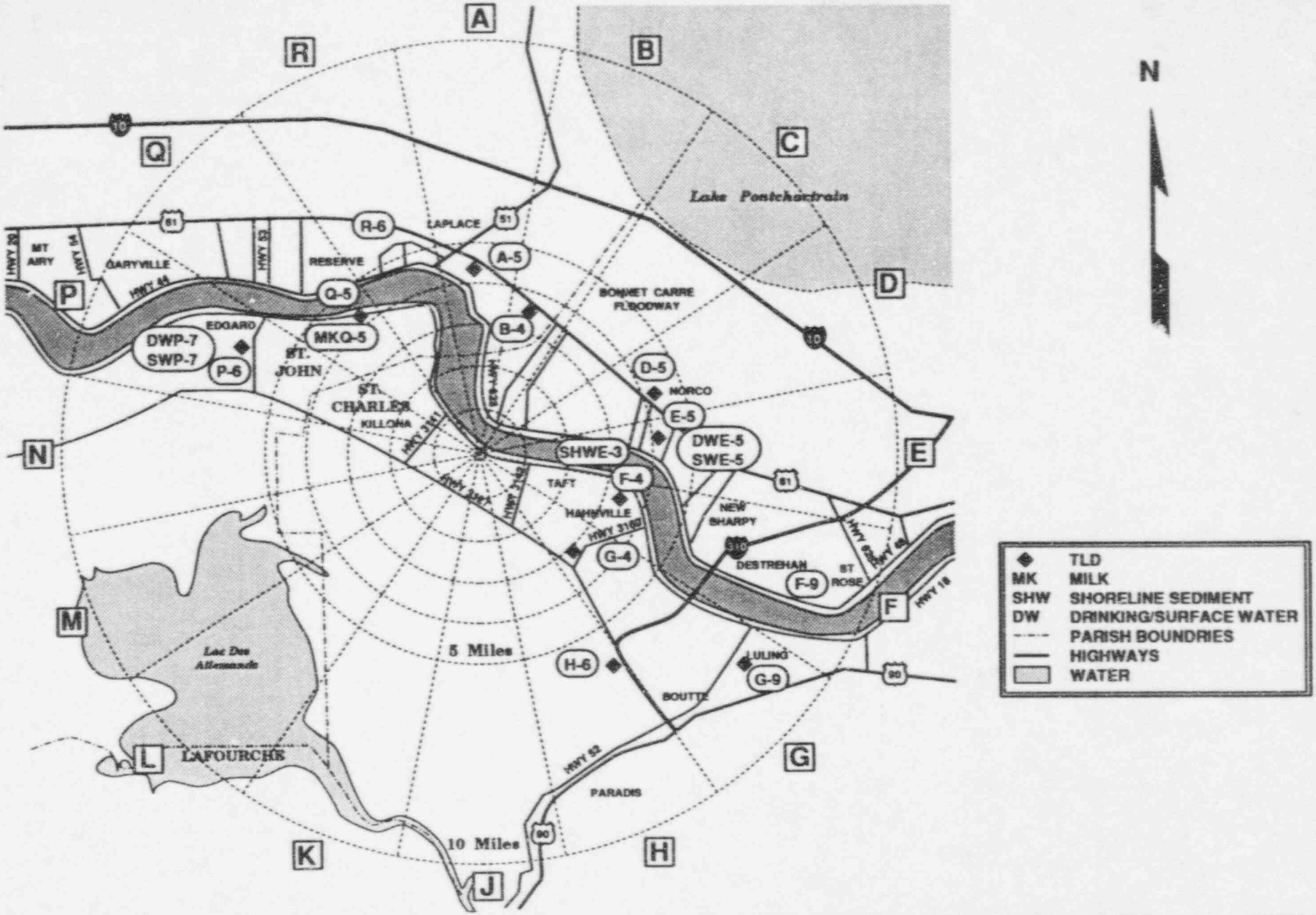
EPA PREP DATE	DATE RESULTS ISSUED	MEDIA	NUCLIDE	EPA RESULTS	ESI, SYSTEM CHEMISTRY RESULTS	NORM DEV. KNOWN
09/30/94	02/06/95	MILK GAMMA (pCi/L)	I-131	75.0	71.67	-0.72
			Cs-137	59.0	62.67	1.27
			K (Total)	1715.0	1653.33	-1.24
10/28/94	02/13/95	WATER (pCi/L)	Gross Beta	23.0	19.00	-1.39
11/04/94	02/14/95	WATER* (pCi/L)	Co-60	59.0	69.33	3.58*
			Zn-65	100.0	128.33	4.91*
			Cs-134	24.0	27.33	1.15
			Cs-137	49.0	60.33	3.93*
			Ba-133	73.0	97.00	5.94*
02/03/95	04/21/95	WATER (pCi/L)	I-131	100.0	100.00	0.00
03/10/95	05/18/95	WATER (pCi/L)	Tritium	7435.00	7030.00	-0.94
04/18/95	08/16/95	BLIND B (pCi/L)	Co-60	29.0	29.33	0.12
			Cs-134	20.0	18.67	-0.46
			Cs-137	11.0	11.00	0.00
			Beta	86.8	77.93	-1.50
06/09/95	Unofficial	WATER (pCi/L)	Co-60	40.0	39.66	-0.12
			Zn-65	76.0	80.00	0.87
			Cs-134	50.0	45.00	-1.73
			Cs-137	35.0	35.66	0.23
			Ba-133	79.0	76.66	-0.51
07/21/95	10/31/95	WATER (pCi/L)	Gross Beta	19.4	23.4	1.37
08/04/95	10/02/95	WATER (pCi/L)	Tritium	4872.0	4823.33	-0.17

* Each isotope measured by ESI was 14-33% higher than values reported by the U.S. EPA. When EPA published the results on 2/14/95, the ESI cross-check sample had been disposed of. Because the EPA sample was inadvertently disposed, no follow-up action could be taken on that particulate sample. Since all measurements made by ESI were higher than the EPA values, it appears that a dilution error when preparing the sample was the cause for the discrepancy between ESI values and the EPA values. A new liquid standard was purchased from Analytics, Inc. in March 1995 and new efficiency curves were calculated using a 3.5 liter Marinelli geometry. There were no appreciative differences between the efficiency curves calculated before and after the Nov 4, 1994 cross-check sample was analyzed. A 3.5L resin standard prepared by Analytics, Inc. was analyzed, resulting in efficiency curves which were approximately 90 percent as efficient as deionized water. These results are theoretically in agreement since the Analytics, Inc. resin standard has a density of 1.15 kg/L. No data from gamma spectroscopy would be affected by this apparent dilution error.

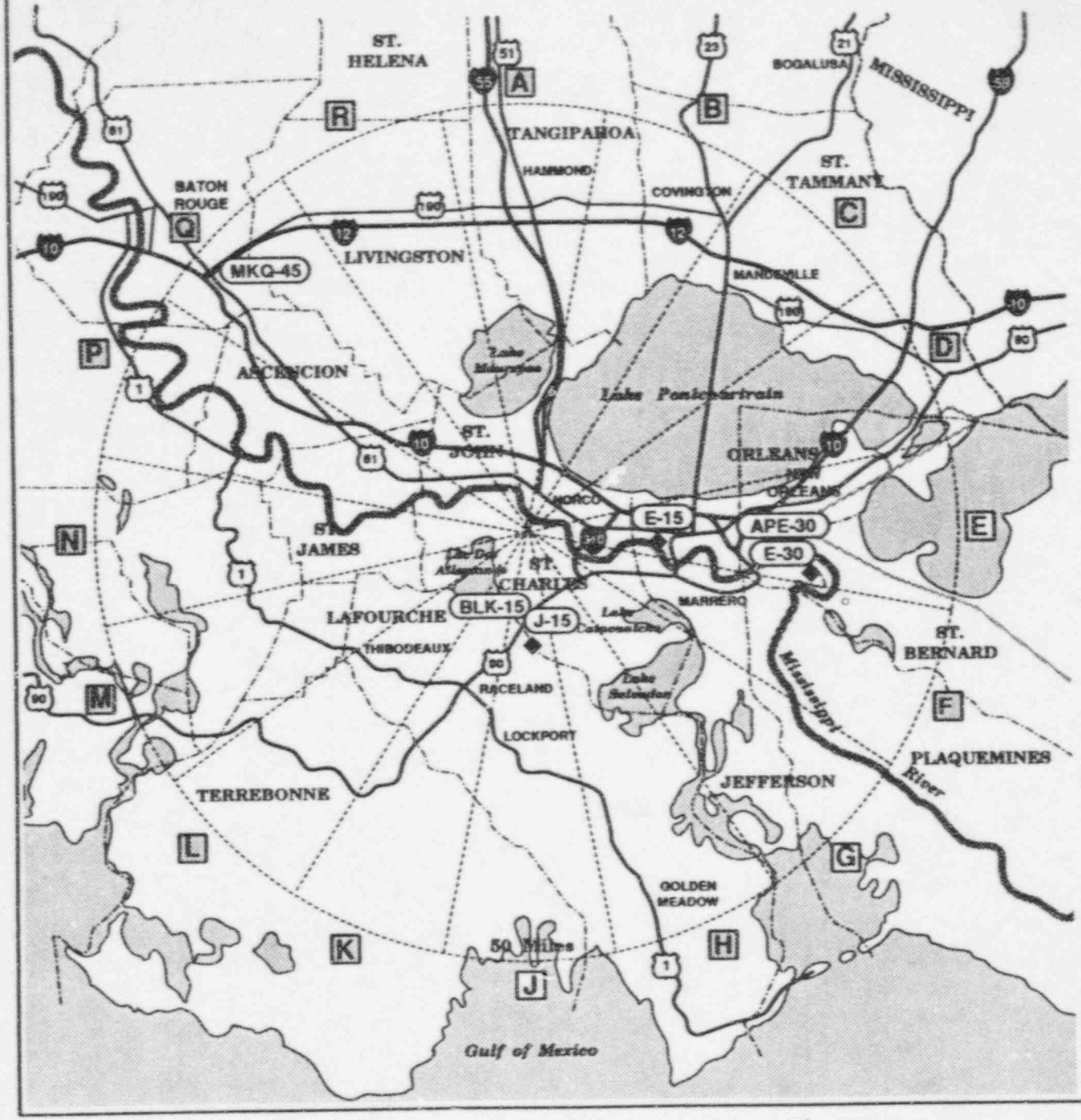
REMP SAMPLES WITHIN 2 MILES OF WATERFORD 3



REMP SAMPLES WITHIN 10 MILES OF WATERFORD 3



REMP SAMPLES WITHIN 50 MILES OF WATERFORD 3



N

◆	TLD
MK	MILK
AP	AIR PARTICLE, IODINE
BL	BROAD LEAF VEGETATION
----	PARISH BOUNDRIES
———	HIGHWAYS
	WATER

3.0 DISCUSSION OF RESULTS

Analytical results for the year 1995 are discussed in this section by exposure pathway, sample type, and analysis performed. Further, analytical results focusing only on man-made radioactivity are summarized in Appendix A; data for the individual analyses are presented in the tables of Appendix B.

3.1 Direct Radiation Exposure Pathway

The average exposure rates measured by thermoluminscent dosimeters (TLDs) at both control and indicator stations were 13, 12, 13, and 12 mrem/standard quarter for the first, second, third, and fourth quarters of 1995, respectively. The average exposure rate of the 120 indicator TLD locations was 13 mrem/standard quarter compared to 11 mrem/standard quarter average exposure rate at the control location. The lowest and highest individual exposure rates were 8 mrem/standard quarter (C-1, 2nd and 3rd quarters) and 19 mrem/standard quarter (P-6, 1st quarter) for all locations. Table 3.1 compares the indicator TLD results by directional sector and distance from the facility. A comparison of directional sectors indicates the highest average exposure rate in 1995 to be 14 mrem/standard quarter in Sectors D, Q, and R.

The average exposure rates during 1995 are consistent with those from the pre-operational program and the previous five years of operation (Figure 3.1). In particular, the pre-operational survey indicates that exposure rates ranged between 11 and 33 mrem/standard quarter with an average of 20 mrem/standard quarter. Similarly, the range indicated during the previous five years of operation was from 7 to 23 mrem/standard quarter with an average exposure rate of 13 mrem/standard quarter.

3.2 Airborne Exposure Pathway

3.2.1 Airborne Particulates

Gross beta activity ranged from 0.004 pCi/m^3 (APG-1, 7/11-7/18) to 0.035 pCi/m^3 (APQ-1, 4/25-5/2) with an average of 0.017 pCi/m^3 for 258 measurements from all five locations. The average gross beta activity for the indicator (APG-1, APQ-1, APP-1, APC-1) locations was 0.017 pCi/m^3 compared to 0.016 pCi/m^3 at the control (APE-30) location.

The gross beta activity results obtained during 1995 are consistent with those from the pre-operational program and the previous five years of operation (Figure 3.2). Specifically, the pre-operational

survey indicates that in periods not significantly influenced by nuclear weapons testing the gross beta activity ranged between 0.007 and 0.48 pCi/m^3 with an average of .08 pCi/m^3. Similarly, the range indicated during the previous five years of operation was from 0.004 to 0.039 pCi/m^3 with an average activity of 0.017 pCi/m^3.

3.2.2 Airborne Iodine

All of the 258 airborne iodine-131 results were below the calculated lower limit of detection (LLD). The sample LLD variability (0.012 to 0.032 pCi/m^3) was due primarily to the difference in air sample volumes.

3.2.3 Gamma Isotopic Analysis

Gamma spectroscopy results of the twenty air sample quarterly composites indicate that no man-made radionuclides were detected above their respective lower limits of detection.

3.3 Waterborne Exposure Pathway

3.3.1 Drinking/Surface Water

As mentioned previously, drinking water samples also serve as surface water samples for Waterford 3. Therefore, monthly and quarterly gamma spectroscopy analyses of drinking water and quarterly tritium analyses also satisfy the surface water sampling requirement.

Seventy-eight composite drinking/surface water samples were analyzed by gamma spectroscopy for iodine-131 (Table B-4). All of the 78 composite sample iodine-131 results were below the calculated lower limit of detection (LLD).

Gross beta activity was detected in thirty-six of the forty-two composites with a range of 1.3 (DWE-5, 2/21-3/21) to 12.1 (DWG-2, 1/24-2/21) pCi/l and an average activity of 3.9 pCi/l. The average activity for the control location, DWP-7, was 3.7 pCi/l compared to the averages of 4.9 and 3.2 pCi/l for indicator stations DWG-2 and DWE-5, respectively.

Analyses for gross beta in drinking/surface water were not performed during the pre-operational survey. However, in order to fulfill comparison requirements, 1995 data will be compared to data from the 1983 report and the previous five years of operation.

The gross beta activity results obtained during 1995 are consistent with those from the 1983 reporting period and the previous five years of operation (Figure 3.3). In particular, the 1983 survey indicates that in periods not significantly influenced by nuclear weapons testing the gross beta activity ranged between 2.9 and 14.0 pCi/l with an average of 7.0 pCi/l. Similarly, the range indicated during the previous five years of operation was from 1.1 to 12.4 pCi/l with an average activity of 4.4 pCi/l.

Tritium analysis of drinking/surface water samples indicate that all of the twelve measurements were below the calculated LLD.

3.3.2 Groundwater

Four groundwater samples were collected from one sampling location, GWK-1, and analyzed for tritium and gamma emitters. Results from all gamma and tritium analyses indicate that all measurements were below the calculated LLDs.

The tritium concentrations detected in 1995 are consistent with those from the pre-operational program and the previous five years of operation. In particular, the pre-operational survey indicates that tritium concentrations in groundwater samples ranged between 50 and 180 pCi/l with an average of 121 pCi/l. Similarly, the range indicated in the previous five years of operation was from 270 to 650 pCi/l.

3.3.3 Shoreline Sediment

Four shoreline soil samples were collected from the following sampling locations: two samples from the Mississippi River shoreline downriver of the plant (SHWE-3) and two samples from the shoreline of a drainage canal (SHWK-1).

Naturally occurring radionuclides including potassium-40, radium-226, and actinium-228 were detected in all of the samples.

Cesium-137, a man-made nuclide was detected in samples from station SHWK-1 at concentrations of 31 and 34 pCi/kg (dry) and from SHWE-3 at concentrations of 44 and 45 pCi/kg (dry). No other man-made radionuclides were detected in any of the samples.

The cesium-137 results obtained during 1995 are consistent with those from the pre-operational program and the previous five years of operation. In particular, the pre-operational survey indicates that cesium-137 was detected in 9 of 14 soil samples at concentrations

ranging between 30 and 890 pCi/kg(dry) with an average concentration of 164 pCi/kg (dry). Similarly, the range indicated during the previous five years of operation was from 18 to 66 pCi/kg (dry) with an average activity of 45 pCi/kg (dry). Further, studies in Louisiana indicate that cesium-137 is commonly found in soils and sediments as a result of atmospheric weapon testing. Because the cesium-137 levels are consistent with pre-operational values, the cesium-137 levels detected in 1995 are more than likely attributable to weapon testing fallout.

3.4 Ingestion Exposure Pathway

3.4.1 Milk

Forty-eight milk samples were collected from two sampling locations and analyzed by gamma spectroscopy and a radiochemical procedure for iodine-131. Naturally occurring potassium-40 was detected in all samples. Results from iodine-131 analyses indicate that all measurements were below the calculated LLD. Further, cesium-137 was detected in two control samples (MKQ-45, 7/18 and 10/17) at concentrations of 2.0 and 3.0 +/- 2.0 pCi/l. However, the levels of cesium-in these control samples are below both the reporting levels and the LLD required by the Waterford 3 ODCM and have a high level of statistical uncertainty associated with them.

3.4.2 Fish

Sixteen fish samples, eight upstream and eight downstream of the plant were collected and the edible portions analyzed by gamma spectroscopy. Only naturally occurring potassium-40 was detected above the lower limits of detection in any samples.

3.4.3 Broad Leaf Vegetation

Thirty-six broad leaf vegetation samples were collected and analyzed by gamma spectroscopy and a radiochemical procedure for iodine-131. Naturally occurring radionuclides were detected in all of the samples; however, no man-made radionuclides were detected above their calculated LLDs.

3.4.4 Food Products

Two food products samples were collected and analyzed by gamma spectroscopy and a radiochemical procedure for iodine-131. Naturally occurring potassium-40 was detected in all the samples; however, no man-made radionulides were detected above their calculated LLDs.

3.5 Statistical Analyses

3.5.1 Calculation of the Mean and Standard Deviation

The mean and standard deviation for different groups of analyses are calculated using the following equations:

(F-1)

$$\overline{X} = \sum_{i=1}^{n} \frac{X_i}{n}$$

(F-2)

$$S = \left(\frac{\sum_{i=1}^{n} (X_i - \overline{X})^2}{(n-1)} \right)^{0.5}$$

where:

x = mean of sample population,
s = standard deviation of sample population,
n = number of samples in sample population, and
x_i = value of the i'th sample.

3.5.2 Comparing Two Sample Population Means

The means of two sample populations are compared for statistical difference using the standard "t" test. The use of the test requires the assumption that the data within the populations are normally distributed and that the true standard deviations of the mean are equal for both populations. The standard "t" test tests the hypothesis that the true means of both populations are equal. The "t" value can be calculated from the equation below (obtained from the CRC Standard Mathematical Tables, 26th Edition (1981)):

(F-3)

$$t = \frac{\overline{X} - \overline{Y}}{\left(\frac{(n_x - 1)s_x^2 + (n_y - 1)s_y^2}{n_x + n_y - 2} \right)^{0.5} \left(\frac{1}{n_x} + \frac{1}{n_y} \right)^{0.5}}$$

where:

t = calculated "t" value,
x = mean of first data set,
y = mean of second data set,
n_x = number of variables in first data set,
s_x = standard deviation of first data set,
n_y = number of variables in second data set, and
s_y = standard deviation of second data set.

The calculated "t" value is used to test the hypothesis that the true mean of the first population (m_x) is equal to the true mean of the second population (m_y) assuming that the true standard deviations of both populations are equal ($m_x = m_y$). The calculated "t" value is compared to a tabular "t" value such that:

a. if $t > t_{\mu,n}$ then reject the hypothesis when $m_x > m_y$,

b. if $t < -t_{\mu,n}$ then reject the hypothesis when $m_x < m_y$,

c. if $t > t_{\mu/2,n}$ then reject the hypothesis when $m_x = m_y$,

where $t_{\mu/2,n}$ and $t_{\mu,n}$ are the tabular "t" values, with a preselected error (5%), confidence level (1 - μ) or (1 - μ/2), and degrees of freedom n ($n=n_x+n_y-2$ for Equation F-3 and n=N-1 for F-4, respectively). Tabular values of the "t" were obtained from the CRC Standard Mathematical Tables, 26th Edition (1981).

3.5.3 TLD Measurements

TLD stations were categorized by distance into three groups: 0-2 miles, 2-5 miles, and >5 miles from the plant. A statistical analysis using the standard "t" test (described above) was performed comparing average exposure rates from 0-2 miles and 2-5 miles to the average exposure rate at >5 miles. In short, results indicate that the average exposure rates at 0-2 miles and 2-5 miles are statistically the same as the rates at >5 miles. Table 3.2 summarizes the results of this analysis.

3.5.4 Gross Beta Activity on Air Particulate Filters

Additionally, the standard "t" test was used to compare average gross beta activity from each indicator station to the average gross beta activity at the control station. The results from this test show average activity detected at all indicator stations (APG-1, APQ-1, APC-1, and APP-1) to be statistically the same as the activity

detected at the control station. Table 3.3 summarizes the results of this analysis.

3.5.5 Gross Beta Activity in Monthly Drinking Water Composites

Finally, the standard "t" test was used to compare average gross beta activity from the two indicator stations to the average gross beta activity from the control station. The results from this test show average activity at indicator stations (DWG-2 and DWE-5) are statistically the same as the average activity detected at the control station. Table 3.4 summarizes the results of this analysis.

3.6 Deviations from the REMP

3.6.1 Unavailable Samples

Two air samples were missed during the 1995 reporting period. One of the air samples was unavailable because the air sample heads were inadvertantly switched, while the other sample was missed due to a disconnection in the sample line.

Milk samples were not available during 1995 from the animal owners at station MKQ-1 since the cows are not currently producing milk for human consumption. With the absence of milk samples at these stations, broad leaf vegetation sampling was performed. These results are summarized on Table 3.5.

3.6.2 Lack of Sample Continuity

Two air samples failed to meet the requirement for sample continuity as a result of air sample pump failures.

3.6.3 Missed Lower Limits of Detection

All lower limit of detection requirements were met for 1995.

3.7 Annual Land Use Census

In compliance with Waterford 3 ODCM, the annual land use census was conducted on August 23, 24, and 25, 1995. The nearest residence, garden, and milking animal in each sector within a five mile radius of the plant were located by visual inspection and verbal inquiry.

While residence locations remained unchanged for 1995, minor changes in garden locations were observed as recorded on Table 3.6. Additionally, large tracts of sugar cane are still being cultivated near the plant and remain classified as food products.

One new location for milk cows and one new location for goats was identified; however, in all cases it was determined that the animals are not currently producing milk for human consumption. This information was ascertained by verbal inquiry with the owners of the animals. As a result of the interviews, Waterford 3 personnel obtained a verbal agreement that the animal owners will sell milk samples to Waterford 3 in the event of a radiological emergency to provide additional data for analysis of environmental impact

TABLE 3.1

1995 DIRECT RADIATION DATA
ORGANIZED BY COMPASS DIRECTION
AND DISTANCE FROM WATERFORD 3 SES

BY COMPASS DIRECTION

SECTOR	COMPASS DIRECTION	AVERAGE DOSE RATE (mrem/std qtr)	STANDARD DEVIATION (mrem/std qtr)	NUMBER IN GROUP
A	N	13	1.00	8
B	NNE	13	0.99	8
C	NE	9	0.83	4
D	ENE	14	2.44	8
E*	E	12	0.86	12
F	ESE	13	1.37	12
G	SE	12	1.93	12
H	SSE	13	1.39	8
J	S	13	1.62	8
K	SSW	12	2.28	4
L	SW	12	1.92	4
M	WSW	12	0.83	4
N	W	13	2.12	4
P	WNW	12	2.82	8
Q	NW	14	1.56	8
R	NNW	14	3.08	8
CONTROL	E	11	1.12	4

BY DISTANCE FROM PLANT

DISTANCE FROM PLANT (MILES)	AVERAGE DOSE RATE (mrem/std qtr)	STANDARD DEVIATION (mrem/std qtr)	NUMBER IN GROUP
0 - 2	12	2.14	64
2 - 5	13	1.52	28
5*	13	2.28	28
CONTROL	11	1.12	4

* Does not include control station data.

TABLE 3.2

STATISTICAL COMPARISON OF 1995 TLD MEASUREMENTS FROM STATIONS GROUPED BY DISTANCE FROM WATERFORD 3 SES			
	Stations Located 0-2 Miles from the Plant	**Stations Located 2-5 Miles from the Plant**	**Stations Located more than 5 Miles from the Plant**
Mean (mRem/std.qtr.)	12.44(12)	12.89(13)	12.82(13)
Standard Deviation (mRem/std. qtr.)	2.14	1.5229	2.28
Number in Sampie	64	28	28
Calculated "t" Value to Comparisons with Stations Located more than 5 miles from the Plant	0.78	0.14	NA*
Tabular "t" Value at 95% Confidence($t_{0.025,n}$)	1.986(a)	2.006(a)	NA*

a. Results indicate that the means for stations located 0-2 miles and 2-5 miles from the plant means are statistically identical to the mean for stations located more than 5 miles from the plant.

*Not Applicable

TABLE 3.3

STATISTICAL COMPARISON OF 1995 GROSS BETA ACTIVITY MEASUREMENTS ON AIR PARTICULATE FILTERS FROM WATERFORD 3 SES					
SAMPLE STATION	**APC-1**	**APG-1**	**APP-1**	**APQ-1**	**APE-30**
Mean (10^{-3}pCi/m^3)	17.1	16.6	15.0	17.9	16.4
Standard Deviation (10^{-3}pCi/m^3)	5.33	5.87	4.82	5.87	5.42
Number in Sample	52	50	52	52	52
Calculated "t" Value Comparing Control Station (APE-30) to Indicator Station	0.67	0.20	1.38	1.41	NA*
Tabular "t" Value at 95% Confidence($t_{0.025,n}$)	1.986(a)	1.987(a)	1.986(a)	1.986(a)	NA*

a. Results indicate that the means for indicator stations APC-1, APG-1, , APP-1, and APQ-1 are statistically identical to mean for the control location APE-30.

*Not Applicable

TABLE 3.4

STATISTICAL COMPARISON OF 1995 GROSS BETA ACTIVITY MEASUREMENTS IN DRINKING/SURFACE WATER SAMPLES FROM WATERFORD 3 SES			
	DWG-2	**DWE-5**	**DWP-7**
Mean (pCi/liter)	4.9	3.2	3.7
Standard Deviation (pCi/liter)	3.7	1.3	1.3
Number in Sample	12	11	12
Calculated "t" Value to Comparing Control Station DWP-7 to Indicator Station	1.01	1.03	NA*
Tabular "t" Value at 95% Confidence($t_{0.025,n}$)	2.074(a)	2.080(a)	NA*

a. Results indicate that the means for indicator stations DWG-2 and DWE-5 are statistically identical to mean for the control location DWP-7.

*Not Applicable

TABLE 3.5

SUMMARY OF 1992 REMP DEVIATIONS				
SAMPLE TYPE	**ANALYSIS**	**LOCATION**	**DATE**	**EXPLANATION OF DEVIATION**
MISSED SAMPLES				
1. Air	Gross Beta & I-131	APG-1	04/18/95 - 04/25/95	Sample head switched.
2.	Gross Beta & I-131	APG-1	06/13/95 - 06/20/95	Sample line disconnected.
LACK OF SAMPLE CONTINUITY				
1. Air	Gross Beta & I-131	APQ-1	05/02/95 - 05/10/95	Sample pump failure - replaced.
2.	Gross Beta & I-131	APE-30	06/13/95 - 06/20/95	Sample pump failure - replaced.
MISSED LLDs				
NONE	N/A*	N/A*	N/A*	N/A*

* Not Applicable

TABLE 3.6

1995 ANNUAL LAND USE CENSUS RESULTS							
SECTOR	DIRECTION	DISTANCE FROM PLANT IN MILES					
		BEEF COW	MILK COW	MILK GOAT	GARDEN	RESIDENCE	FOOD PRODUCTS
A	N	-	-	-	1.7	1.3	4.1
B	NNE	-	-	-	1.3	1.1	-
C	NE	-	-	-	0.9	0.9	-
D	ENE	-	-	-	0.9	0.9	-
E	E	2.3	3.2[c]	2.3[c]	2.2	2.2	0.3
F	ESE	2.3	3.5[c]	-	2.2	3.1	0.3
G	SE	2.4	-	-	4.1	4.0	0.3
H	SSE	-	-	-	-	-	0.3
J	S	-	-	-	-	-	0.5
K	SSW	-	-	-	-	-	0.5
L	SW	-	-	-	-	-	0.5
M	WSW	1.0	-	-	1.4	-	0.5
N	W	-	-	-	1.1	1.0	0.6
P	WNW	0.9	-	0.9	0.9	0.9	0.5
Q	NW	0.9	4.9[a,b]	-	0.9	0.9	0.5
R	NNW	4.9	-	-	3.0	3.0	2.6

- None found in sector within five mile radius of the plant.

a Samples are being taken at 4.9 miles (MKQ-5) for the Waterford 3 REMP.

b Cows at Location MKQ-1 are currently not producing milk for human consumption. The owner will be contacted on a periodic basis to determine if milk will be used for human consumption and for the availability of samples.

c Milk animals at these locations are not currently producing milk for human consumption. The owners will be contacted on a periodic basis to determine if milk will be used for human consumption and for the availability of samples.

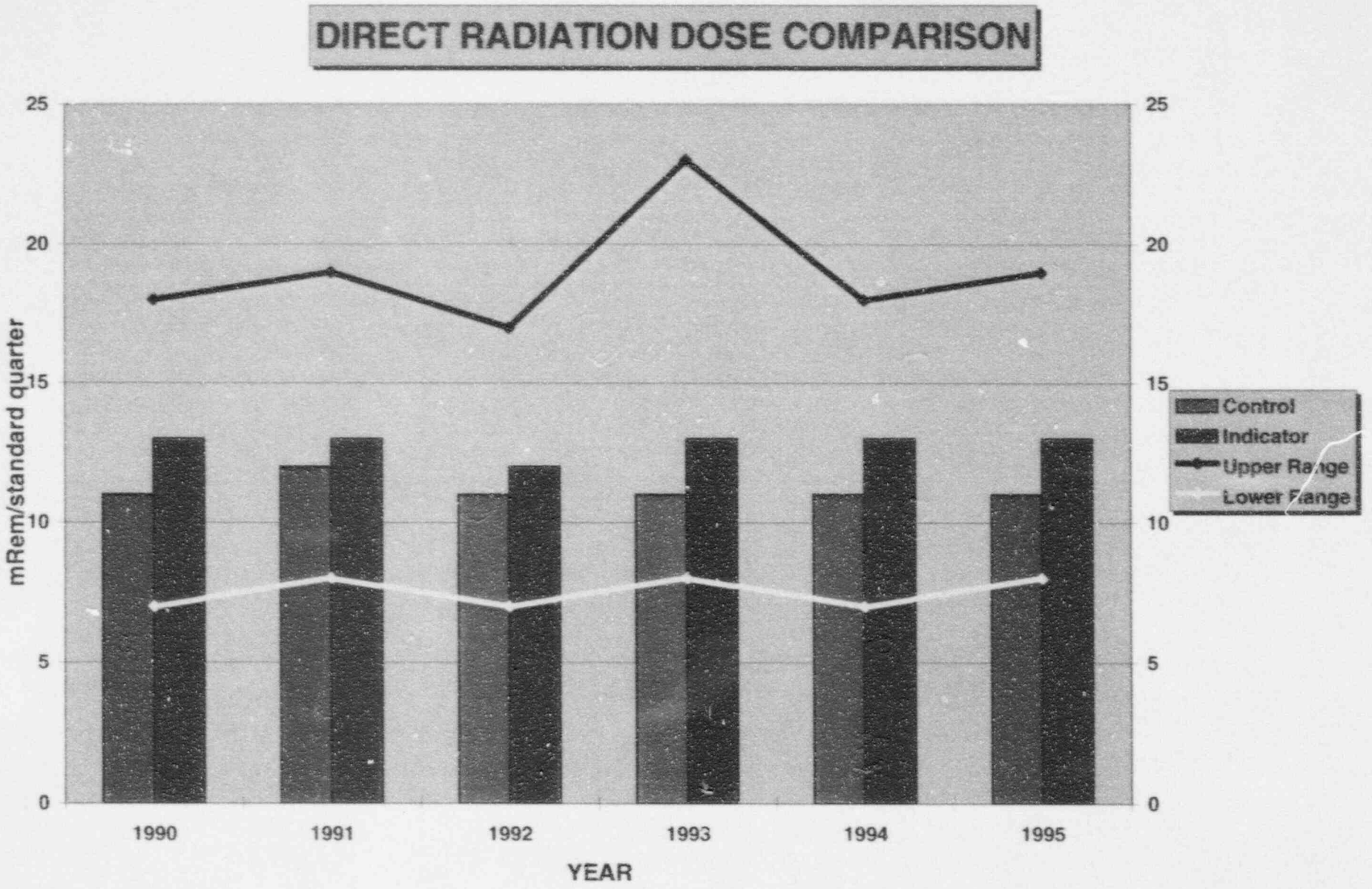
4.0 CONCLUSIONS

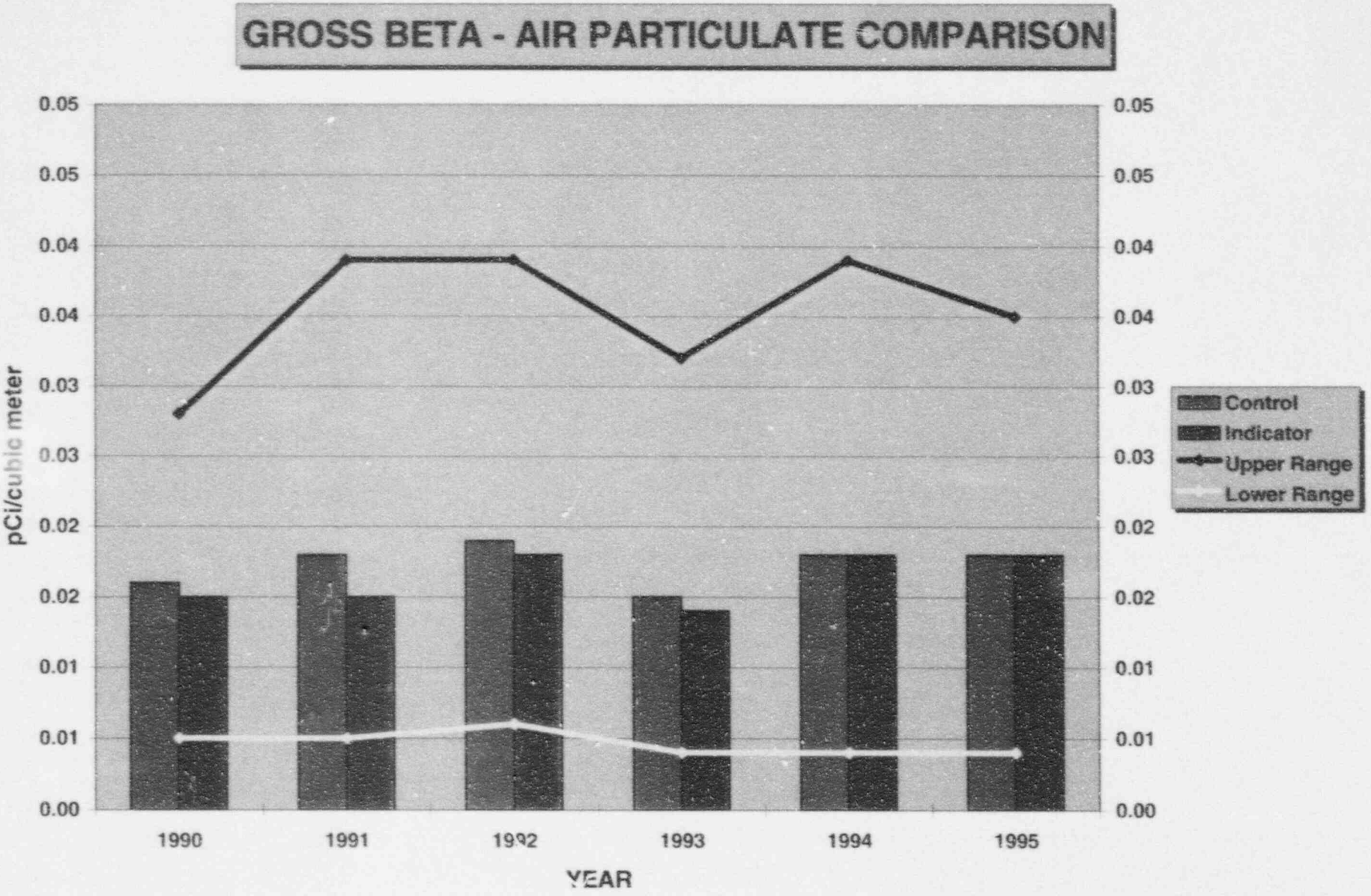
The radiological environmental data collected during 1995 are consistent with the data obtained during the previous five years of plant operation (1990-94), the first two years of the REMP prior to Waterford 3 initial criticality (1983-84), and the Pre-operational Environmental Radiological Surveillance (PERS) Program (1978-82). The only man-made radionuclide detected in the environmental samples analyzed during 1995 was cesium-137.

Cesium-137 was detected in four shoreline soil samples. Studies in Louisiana indicate that cesium-137 is commonly found in soils and sediments as a result of fallout from nuclear weapons testing. In addition, the detected concentrations were consistent with pre-operational levels and the levels detected in the previous five years of operation. Further, the concentrations detected in both instances were lower than the required LLD and well below levels requiring notification.

Analyses of milk samples indicated cesium-137 in two samples collected from the control location in July and October of 1995. The activity detected in both instances was at levels below the required LLD and well below reporting levels defined in the Waterford 3 ODCM. In addition, cesium-137 concentrations detected in 1995 milk samples are consistent with the levels indicated in the pre-operational program and the levels detected in the previous five years of operation. Further, statistical errors associated with the indicated concentrations are higher than would be expected with true activity and may be artifacts of counting statistics.

In conclusion, based on the evaluation of the REMP data collected during 1995 the operation of Waterford 3 had no discernable radiological impact on the environment.


DIRECT RADIATION DOSE COMPARISON
mRem/standard quarter
25
20
15
10
5
0
1990
1991
1992
1993
1994
1995
YEAR
Control
Indicator
Upper Range
Lower Range


GROSS BETA - AIR PARTICULATE COMPARISON
pCi/cubic meter
0.05
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1990
1991
1992
1993
1994
1995
YEAR
Control
Indicator
Upper Range
Lower Range

GROSS BETA - DRINKING/SURFACE WATER COMPARISON

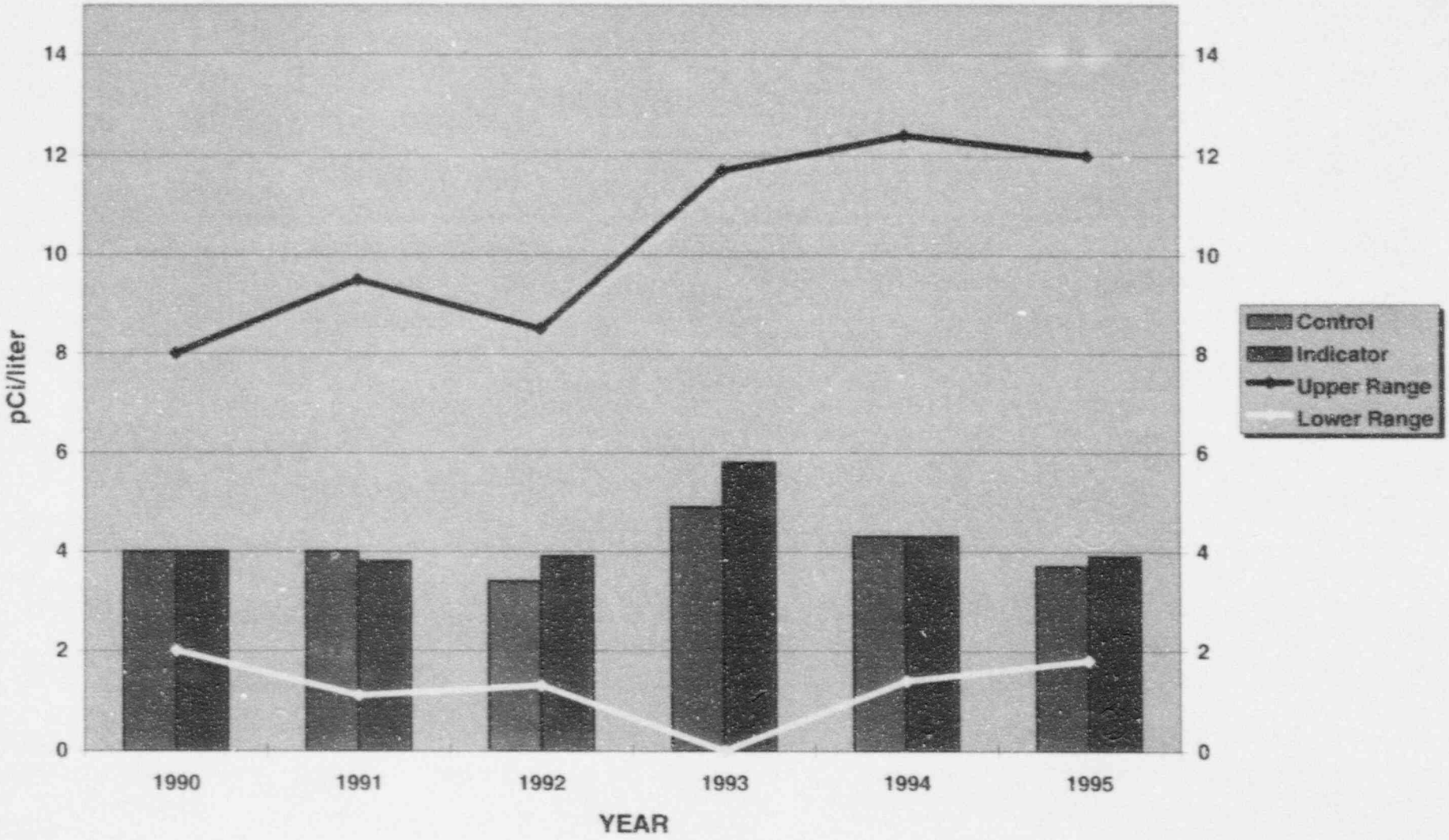


TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Name of Facility Waterford 3 SES Docket No. 50-382

Location of Facility St. Charles, Louisiana (Parish, State) Reporting Period January 1 to December 31, 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES	LOWER LIMIT OF DETECTION[a] PERFORMED	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b] (LLD)	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
1. Direct Radiation (mrem/Std. qtr.)	TLD 120	(c)	12(116/116) (8-19)	P-6 5.5 miles WNW 19(4/4) (11-19)	E-30 11(4/4) (9-12)	0
2. Airborne Particulates (10^{-3}pCi/m^3)	Gross Beta 258	10	17(206/206) (4-35)	APQ-1 0.5 miles SE 18(52/52) (8-35)	APE-30 16(52/52) (6-33)	0
	Gamma 20	(d)	<LLD (0/16) (-)	N/A N/A	APE-30 <LLD (0/4) (-)	0
3. Airborne Iodine (10^{-3}pCi/m^3)	I-131 258	70	<LLD (0/206) (-)	N/A N/A	APE-30 <LLD (0/52) (-)	0

NOTE: Footnotes at end of table.

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Name of Facility Waterford 3 SES Docket No. 50-382

Location of Facility St. Charles, Louisiana (Parish, State) Reporting Period January 1 to December 31, 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES	LOWER LIMIT OF DETECTION[a] PERFORMED	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b] (LLD)	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
4. Drinking/Surface Water (pCi/l)	Gross Beta 42	4	4.0(23/28) (1.3-12.1)	DWG-2 2.0 miles SE	4.9(12/14) (1.8-12.1)	DWP-7 3.7(12/14) (1.8-5.5)	0
	I-131 78	1	<LLD (0/52) (-)	N/A	N/A	DWP-7 <LLD(0/26) (-)	0
	Gamma 42	(d)	<LLD (0/28) (-)	N/A	N/A	DWP-7 <LLD (0/14) (-)	0
	Tritium 12	2000	<LLD (0/8) (-)	N/A	N/A	DWP-7 <LLD (0/4) (-)	0

NOTE: Footnotes at end of table.

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Name of Facility Waterford 3 SES Docket No. 50-382

Location of Facility St. Charles, Louisiana (Parish, State) Reporting Period January 1 to December 31, 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES	LOWER LIMIT OF DETECTION[a] PERFORMED	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b] (LLD)	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
5. Groundwater (pCi/l)	Gamma 4	(d)	<LLD (0/4) (-)	N/A	N/A	NONE	0
	Tritium 4	2000	<LLD (0/4) (-)	N/A	N/A	NONE	0
6. Shoreline Water Sediment (pCi/kg-dry)	Gamma 4 Cs-137	180	38(4/4) (31-45)	SHWE-3 3.0 miles E	45(2/2) (44-45)	NONE	0

NOTE: Footnotes at end of table.

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Name of Facility Waterford 3 SES Docket No. 50-382

Location of Facility St. Charles, Louisiana (Parish, State) Reporting Period January 1 to December 31, 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES	LOWER LIMIT OF DETECTION[a] PERFORMED	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b] (LLD)	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
7. Milk (pCi/l)	I-131 48	1	<LLD (0/24) (-)	N/A	N/A	MKQ-45 <LLD (0/24) (-)	0
	Gamma 48 Cs-137	18	<LLD (0/24) (-)	MKQ-45 42.0 miles NW	N/A	MKQ-45 3.0(2/24) (2.0-3.0)	0
8. Fish (pCi/kg-wet)	Gamma 16	(d)	<LLD (0/8) (-)	N/A	N/A	FH-1 <LLD (0/8) (-)	0

NOTE: Footnotes at end of table.

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Name of Facility Waterford 3 SES Docket No. 50-382

Location of Facility St. Charles, Louisiana (Parish, State) Reporting Period January 1 to December 31, 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES	LOWER LIMIT OF DETECTION[a] PERFORMED	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b] (LLD)	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
9. Broad Leaf Vegetation (pCi/kg- wet)	I-131 36	60	<LLD (0/24) (-)	N/A	N/A	BLK-15 <LLD (0/12) (-)	0
	Gamma 36	(d)	<LLD (0/24) (-)	N/A	N/A	BLK-15 <LLD (0/12) (-)	0
9. Food/Garden Crop (pCi/kg- wet)	Gamma 2	(d)	<LLD (0/2) (-)	N/A	N/A	NONE	0

NOTE: Footnotes at end of table.

TABLE A-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

FOOTNOTES

[a]Nominal Lower Limit of Detection (LLD) as defined in the Waterford 3 Offsite Dose Calculation Manual.

[b]Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis.

[c]Lower Limit of Detection (LLD) not defined in Waterford 3 Offsite Dose Calculation Manual.

[d]Lower Limit of Detection (LLD) for individual radionuclides using gamma spectroscopy are given in Waterford 3 Offsite Dose Calculation Manual.

APPENDIX B
REMP DATA

TABLE B-1

QUARTERLY TLD DOSE RATES					
LOCATION	1ST QUARTER DOSE RATE (mrem/std qtr)	2ND QUARTER DOSE RATE (mrem/std qtr)	3RD QUARTER DOSE RATE (mrem/std qtr)	4TH QUARTER DOSE RATE (mrem/std qtr)	AVERAGE DOSE RATE (mrem/std qtr)
A-2	13	12	15	13	**13**
A-5	13	12	14	12	**13**
B-1	14	13	14	12	**13**
B-4	15	12	14	13	**14**
C-1	10	8	8	9	**9**
D-2	12	19	15	13	**15**
D-5	14	14	13	10	**13**
E-1	13	10	12	11	**12**
E-5	12	12	12	12	**12**
E-15	12	10	11	12	**11**
E-30	12	11	10	9	**12**
F-2	14	11	15	10	**13**
F-4	13	13	14	13	**13**
F-9	13	12	13	11	**12**
G-2	16	14	16	13	**15**
G-4	12	11	11	10	**11**
G-9	11	11	11	12	**11**
H-2	14	14	13	14	**14**
H-6	13	11	13	10	**12**
J-2	13	11	16	12	**13**
J-15	14	14	14	11	**13**
K-1	16	10	12	11	**12**
L-1	11	10	13	15	**12**
M-1	12	11	13	11	**12**
N-1	15	10	15	12	**13**
P-1	11	10	12	10	**11**
P-6	19	11	14	11	**14**
Q-1	12	12	13	13	**13**
Q-5	15	13	16	16	**15**
R-1	14	9	11	10	**11**
R-6	15	17	18	15	**16**
Average	**13**	**12**	**13**	**12**	**13**

TABLE B-2

AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES
GROSS BETA AND IODINE-131 ANALYSES

SAMPLE LOCATION: APC-1 **UNITS: pCi/CUBIC METER**

LAB NO.	BEGIN DATE	END DATE	GROSS BETA	I-131
9500069	12/27/94	01/03/95	0.022 +/-0.002	< 0.024
9500670	01/03/95	01/10/95	0.027 +/-0.003	< 0.032
9500912	01/10/95	01/17/95	0.024 +/-0.002	< 0.021
9501383	01/17/95	01/24/95	0.022 +/-0.002	< 0.027
9501722	01/24/95	01/31/95	0.016 +/-0.002	< 0.018
9502204	01/31/95	02/07/95	0.017 +/-0.002	< 0.024
9502898	02/07/95	02/14/95	0.015 +/-0.002	< 0.021
9503381	02/14/95	02/21/95	0.012 +/-0.002	< 0.023
9503702	02/21/95	02/27/95	0.014 +/-0.002	< 0.030
9504190	02/27/95	03/07/95	0.021 +/-0.002	< 0.019
9504612	03/07/95	03/14/95	0.018 +/-0.002	< 0.024
9505239	03/14/95	03/21/95	0.014 +/-0.002	< 0.021
9505673	03/21/95	03/28/95	0.019 +/-0.003	< 0.023
9506221	03/28/95	04/04/95	0.023 +/-0.002	< 0.021
9506945	04/04/95	04/11/95	0.019 +/-0.002	< 0.025
9507520	04/11/95	04/18/95	0.020 +/-0.002	< 0.022
9508232	04/18/95	04/25/95	0.017 +/-0.002	< 0.023
9508692	04/25/95	05/02/95	0.014 +/-0.002	< 0.020
9509382	05/02/95	05/10/95	0.012 +/-0.002	< 0.024
9509674	05/10/95	05/16/95	0.011 +/-0.002	< 0.031
9510361	05/16/95	05/23/95	0.010 +/-0.002	< 0.021
9510734	05/23/95	05/30/95	0.014 +/-0.002	< 0.012
9511399	05/30/95	06/06/95	0.012 +/-0.002	< 0.019
9512035	06/06/95	06/13/95	0.012 +/-0.002	< 0.032
9512685	06/13/95	06/20/95	0.016 +/-0.002	< 0.018
9513235	06/20/95	06/27/95	0.020 +/-0.002	< 0.019
9513914	06/27/95	07/03/95	0.011 +/-0.002	< 0.028
9514347	07/03/95	07/11/95	0.017 +/-0.002	< 0.019
9514968	07/11/95	07/18/95	0.014 +/-0.002	< 0.014
9515403	07/18/95	07/25/95	0.012 +/-0.002	< 0.020
9516253	07/25/95	08/01/95	0.006 +/-0.002	< 0.016
9516679	08/01/95	08/08/95	0.012 +/-0.002	< 0.018
9517614	08/08/95	08/15/95	0.012 +/-0.002	< 0.023
9518264	08/15/95	08/22/95	0.017 +/-0.002	< 0.023
9518863	08/22/95	08/29/95	0.020 +/-0.002	< 0..017
9519476	08/29/95	09/05/95	0.022 +/-0.003	< 0.025
9520279	09/05/95	09/12/95	0.024 +/-0.003	< 0.023
9520491	09/12/95	09/19/95	0.013 +/-0.002	< 0.022
9520896	09/19/95	09/26/95	0.022 +/-0.002	< 0.014
9521414	09/26/95	10/03/95	0.030 +/-0.003	< 0.021
9522110	10/03/95	10/10/95	0.019 +/-0.002	< 0.024
9522653	10/10/95	10/17/95	0.020 +/-0.002	< 0.024
9522996	10/17/95	10/24/95	0.012 +/-0.002	< 0.023
9523473	10/24/95	10/31/95	0.012 +/-0.002	< 0.026
9523888	10/31/95	11/07/95	0.012 +/-0.002	< 0.027
9524375	11/07/95	11/13/95	0.015 +/-0.002	< 0.030
9525015	11/13/95	11/20/95	0.022 +/-0.002	< 0.029
9525281	11/20/95	11/27/95	0.024 +/-0.003	< 0.025
9525655	11/27/95	12/04/95	0.018 +/-0.002	< 0.024
9525818	12/04/95	12/11/95	0.029 +/-0.003	< 0.023
9526532	12/11/95	12/18/95	0.008 +/-0.002	< 0.019
9526792	12/18/95	12/27/95	0.024 +/-0.002	< 0.017

TABLE B-2

AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES
GROSS BETA AND IODINE-131 ANALYSES

SAMPLE LOCATION: APG-1 **UNITS: pCi/CUBIC METER**

LAB NO.	BEGIN DATE	END DATE	GROSS BETA	I-131
9500066	12/27/94	01/03/95	0.020 +/-0.002	< 0.024
9500667	01/03/95	01/10/95	0.025 +/-0.002	< 0.032
9500909	01/10/95	01/17/95	0.020 +/-0.002	< 0.021
9501380	01/17/95	01/24/95	0.019 +/-0.002	< 0.027
9501719	01/24/95	01/31/95	0.018 +/-0.002	< 0.018
9502201	01/31/95	02/07/95	0.026 +/-0.003	< 0.024
9502895	02/07/95	02/14/95	0.015 +/-0.002	< 0.021
9503378	02/14/95	02/21/95	0.012 +/-0.002	< 0.023
9503699	02/21/95	02/27/95	0.014 +/-0.002	< 0.030
9504187	02/27/95	03/07/95	0.019 +/-0.002	< 0.019
9504609	03/07/95	03/14/95	0.019 +/-0.002	< 0.024
9505236	03/14/95	03/21/95	0.016 +/-0.002	< 0.021
9505670	03/21/95	03/28/95	0.016 +/-0.003	< 0.023
9506218	03/28/95	04/04/95	0.020 +/-0.002	< 0.021
9506942	04/04/95	04/11/95	0.016 +/-0.002	< 0.025
9507517	04/11/95	04/18/95	0.020 +/-0.002	< 0.022
9508229	04/18/95	04/25/95	N/A	N/A
9508689	04/25/95	05/02/95	0.020 +/-0.003	< 0.020
9509379	05/02/95	05/10/95	0.010 +/-0.002	< 0.024
9509671	05/10/95	05/16/95	0.011 +/-0.002	< 0.031
9510358	05/16/95	05/23/95	0.010 +/-0.002	< 0.021
9510731	05/23/95	05/30/95	0.014 +/-0.002	< 0.012
9511396	05/30/95	06/06/95	0.011 +/-0.002	< 0.019
9512032	06/06/95	06/13/95	0.014 +/-0.002	< 0.032
9512682	06/13/95	06/20/95	N/A	N/A
9513232	06/20/95	06/27/95	0.020 +/-0.002	< 0.019
9513911	06/27/95	07/03/95	0.010 +/-0.002	< 0.028
9514344	07/03/95	07/11/95	0.015 +/-0.002	< 0.019
9514965	07/11/95	07/18/95	0.004 +/-0.002	< 0.014
9515400	07/18/95	07/25/95	0.011 +/-0.002	< 0.020
9516250	07/25/95	08/01/95	0.006 +/-0.002	< 0.016
9516676	08/01/95	08/08/95	0.013 +/-0.002	< 0.018
9517611	08/08/95	08/15/95	0.011 +/-0.002	< 0.023
9518261	08/15/95	08/22/95	0.016 +/-0.002	< 0.023
9518860	08/22/95	08/29/95	0.019 +/-0.002	< 0.017
9519473	08/29/95	09/05/95	0.024 +/-0.003	< 0.025
9520276	09/05/95	09/12/95	0.025 +/-0.003	< 0.023
9520488	09/12/95	09/19/95	0.013 +/-0.002	< 0.022
9520893	09/19/95	09/26/95	0.022 +/-0.002	< 0.014
9521411	09/26/95	10/03/95	0.028 +/-0.003	< 0.021
9522107	10/03/95	10/10/95	0.019 +/-0.002	< 0.024
9522650	10/10/95	10/17/95	0.016 +/-0.002	< 0.024
9522993	10/17/95	10/24/95	0.013 +/-0.002	< 0.023
9523470	10/24/95	10/31/95	0.013 +/-0.002	< 0.026
9523885	10/31/95	11/07/95	0.012 +/-0.002	< 0.027
9524372	11/07/95	11/13/95	0.020 +/-0.002	< 0.030
9525012	11/13/95	11/20/95	0.020 +/-0.002	< 0.029
9525278	11/20/95	11/27/95	0.021 +/-0.002	< 0.025
9525652	11/27/95	12/04/95	0.017 +/-0.002	< 0.024
9525815	12/04/95	12/11/95	0.024 +/-0.003	< 0.023
9526529	12/11/95	12/18/95	0.010 +/-0.002	< 0.019
9526789	12/18/95	12/27/95	0.020 +/-0.002	< 0.017

TABLE B-2 (continued)

AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES
GROSS BETA AND IODINE-131 ANALYSES

SAMPLE LOCATION: APP-1 **UNITS: pCi/CUBIC METER**

LAB NO.	BEGIN DATE	END DATE	GROSS BETA	I-131
9500068	12/27/94	01/03/95	0.017 +/-0.002	< 0.024
9500669	01/03/95	01/10/95	0.022 +/-0.002	< 0.032
9500911	01/10/95	01/17/95	0.018 +/-0.002	< 0.021
9501382	01/17/95	01/24/95	0.015 +/-0.002	< 0.027
9501721	01/24/95	01/31/95	0.016 +/-0.002	< 0.018
9502203	01/31/95	02/07/95	0.018 +/-0.002	< 0.024
9502897	02/07/95	02/14/95	0.015 +/-0.002	< 0.021
9503380	02/14/95	02/21/95	0.011 +/-0.002	< 0.023
9503701	02/21/95	02/27/95	0.014 +/-0.002	< 0.030
9504189	02/27/95	03/07/95	0.016 +/-0.002	< 0.019
9504611	03/07/95	03/14/95	0.018 +/-0.002	< 0.024
9505238	03/14/95	03/21/95	0.015 +/-0.002	< 0.021
9505672	03/21/95	03/28/95	0.016 +/-0.002	< 0.023
9506220	03/28/95	04/04/95	0.019 +/-0.002	< 0.021
9506944	04/04/95	04/11/95	0.018 +/-0.002	< 0.025
9507519	04/11/95	04/18/95	0.017 +/-0.002	< 0.022
9508231	04/18/95	04/25/95	0.014 +/-0.002	< 0.023
9508691	04/25/95	05/02/95	0.010 +/-0.002	< 0.020
9509381	05/02/95	05/10/95	0.010 +/-0.002	< 0.024
9509673	05/10/95	05/16/95	0.009 +/-0.002	< 0.031
9510360	05/16/95	05/23/95	0.010 +/-0.002	< 0.021
9510733	05/23/95	05/30/95	0.011 +/-0.002	< 0.012
9511398	05/30/95	06/06/95	0.011 +/-0.002	< 0.019
9512034	06/06/95	06/13/95	0.009 +/-0.002	< 0.032
9512684	06/13/95	06/20/95	0.012 +/-0.002	< 0.018
9513234	06/20/95	06/27/95	0.015 +/-0.002	< 0.019
9513913	06/27/95	07/03/95	0.010 +/-0.002	< 0.028
9514346	07/03/95	07/11/95	0.014 +/-0.002	< 0.019
9514967	07/11/95	07/18/95	0.013 +/-0.002	< 0.014
9515402	07/18/95	07/25/95	0.009 +/-0.002	< 0.020
9516252	07/25/95	08/01/95	0.005 +/-0.002	< 0.016
9516678	08/01/95	08/08/95	0.009 +/-0.002	< 0.018
9517613	08/08/95	08/15/95	0.011 +/-0.002	< 0.023
9518263	08/15/95	08/22/95	0.013 +/-0.002	< 0.023
9518862	08/22/95	08/29/95	0.019 +/-0.002	< 0..017
9519475	08/29/95	09/05/95	0.021 +/-0.003	< 0.025
9520278	09/05/95	09/12/95	0.023 +/-0.003	< 0.023
9520490	09/12/95	09/19/95	0.012 +/-0.002	< 0.022
9520895	09/19/95	09/26/95	0.021 +/-0.002	< 0.014
9521413	09/26/95	10/03/95	0.024 +/-0.002	< 0.021
9522109	10/03/95	10/10/95	0.020 +/-0.002	< 0.024
9522652	10/10/95	10/17/95	0.013 +/-0.002	< 0.024
9522995	10/17/95	10/24/95	0.011 +/-0.002	< 0.023
9523472	10/24/95	10/31/95	0.010 +/-0.002	< 0.026
9523887	10/31/95	11/07/95	0.012 +/-0.002	< 0.027
9524374	11/07/95	11/13/95	0.015 +/-0.002	< 0.030
9525014	11/13/95	11/20/95	0.021 +/-0.002	< 0.029
9525280	11/20/95	11/27/95	0.020 +/-0.003	< 0.025
9525654	11/27/95	12/04/95	0.016 +/-0.002	< 0.024
9525817	12/04/95	12/11/95	0.030 +/-0.003	< 0.023
9526531	12/11/95	12/18/95	0.010 +/-0.002	< 0.019
9526791	12/18/95	12/27/95	0.021 +/-0.002	< 0.017

TABLE B-2 (continued)

AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES
GROSS BETA AND IODINE-131 ANALYSES

SAMPLE LOCATION: APQ-1 **UNITS: pCi/CUBIC METER**

LAB NO.	BEGIN DATE	END DATE	GROSS BETA	I-131
9500067	12/27/94	01/03/95	0.020 +/-0.002	< 0.024
9500668	01/03/95	01/10/95	0.027 +/-0.003	< 0.032
9500910	01/10/95	01/17/95	0.022 +/-0.002	< 0.021
9501381	01/17/95	01/24/95	0.020 +/-0.002	< 0.027
9501720	01/24/95	01/31/95	0.018 +/-0.003	< 0.018
9502202	01/31/95	02/07/95	0.022 +/-0.003	< 0.024
9502896	02/07/95	02/14/95	0.016 +/-0.002	< 0.021
9503379	02/14/95	02/21/95	0.012 +/-0.002	< 0.023
9503790	02/21/95	02/27/95	0.015 +/-0.002	< 0.030
9504188	02/27/95	03/07/95	0.019 +/-0.002	< 0.019
9504610	03/07/95	03/14/95	0.019 +/-0.002	< 0.024
9505237	03/14/95	03/21/95	0.019 +/-0.002	< 0.021
9505671	03/21/95	03/28/95	0.020 +/-0.003	< 0.023
9506219	03/28/95	04/04/95	0.022 +/-0.002	< 0.021
9506943	04/04/95	04/11/95	0.018 +/-0.002	< 0.025
9507518	04/11/95	04/18/95	0.022 +/-0.003	< 0.022
9508230	04/18/95	04/25/95	0.016 +/-0.002	< 0.023
9508690	04/25/95	05/02/95	0.035 +/-0.003	< 0.020
9509380	05/02/95	05/10/95	0.013 +/-0.002	< 0.024
9509672	05/10/95	05/16/95	0.013 +/-0.002	< 0.031
9510359	05/16/95	05/23/95	0.010 +/-0.002	< 0.021
9510732	05/23/95	05/30/95	0.014 +/-0.002	< 0.012
9511397	05/30/95	06/06/95	0.010 +/-0.002	< 0.019
9512033	06/06/95	06/13/95	0.011 +/-0.002	< 0.032
9512683	06/13/95	06/20/95	0.014 +/-0.002	< 0.018
9513233	06/20/95	06/27/95	0.024 +/-0.002	< 0.019
9513912	06/27/95	07/03/95	0.011 +/-0.002	< 0.028
9514345	07/03/95	07/11/95	0.019 +/-0.002	< 0.019
9514966	07/11/95	07/18/95	0.013 +/-0.002	< 0.014
9515401	07/18/95	07/25/95	0.012 +/-0.002	< 0.020
9516251	07/25/95	08/01/95	0.008 +/-0.002	< 0.016
9516677	08/01/95	08/08/95	0.015 +/-0.002	< 0.018
9517612	08/08/95	08/15/95	0.012 +/-0.002	< 0.023
9518262	08/15/95	08/22/95	0.016 +/-0.002	< 0.023
9518861	08/22/95	08/29/95	0.018 +/-0.002	< 0.017
9519474	08/29/95	09/05/95	0.025 +/-0.003	< 0.025
9520277	09/05/95	09/12/95	0.023 +/-0.003	< 0.023
9520889	09/12/95	09/19/95	0.014 +/-0.002	< 0.022
9520894	09/19/95	09/26/95	0.024 +/-0.003	< 0.014
9521412	09/26/95	10/03/95	0.030 +/-0.003	< 0.021
9522108	10/03/95	10/10/95	0.022 +/-0.002	< 0.024
9522651	10/10/95	10/17/95	0.017 +/-0.002	< 0.024
9522994	10/17/95	10/24/95	0.014 +/-0.002	< 0.023
9523471	10/24/95	10/31/95	0.012 +/-0.002	< 0.026
9523883	10/31/95	11/07/95	0.013 +/-0.002	< 0.027
9524373	11/07/95	11/13/95	0.015 +/-0.002	< 0.030
9525013	11/13/95	11/20/95	0.021 +/-0.002	< 0.029
9525273	11/20/95	11/27/95	0.023 +/-0.003	< 0.025
9525653	11/27/95	12/04/95	0.017 +/-0.002	< 0.024
9525816	12/04/95	12/11/95	0.033 +/-0.003	< 0.023
9526530	12/11/95	12/18/95	0.010 +/-0.002	< 0.019
9526790	12/18/95	12/27/95	0.024 +/-0.002	< 0.017

TABLE B-2 (continued)

AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES
GROSS BETA AND IODINE-131 ANALYSES

SAMPLE LOCATION: APE-30 **UNITS: pCi/CUBIC METER**

LAB NO.	BEGIN	END DATE	GROSS BETA	I-131
9500070	12/27/94	01/03/95	0.019 +/-0.002	< 0.024
9500671	01/03/95	01/10/95	0.025 +/-0.002	< 0.032
9500913	01/10/95	01/17/95	0.020 +/-0.002	< 0.021
9501384	01/17/95	01/24/95	0.021 +/-0.002	< 0.027
9501723	01/24/95	01/31/95	0.019 +/-0.002	< 0.018
9502205	01/31/95	02/07/95	0.018 +/-0.002	< 0.024
9502699	02/07/95	02/14/95	0.017 +/-0.002	< 0.021
9503382	02/14/95	02/21/95	0.012 +/-0.002	< 0.023
9503703	02/21/95	02/27/95	0.015 +/-0.002	< 0.030
9504191	02/27/95	03/07/95	0.020 +/-0.002	< 0.019
9504613	03/07/95	03/14/95	0.018 +/-0.002	< 0.024
9505240	03/14/95	03/21/95	0.015 +/-0.002	< 0.021
9505674	03/21/95	03/28/95	0.017 +/-0.003	< 0.023
9506222	03/28/95	04/04/95	0.006 +/-0.002	< 0.021
9506946	04/04/95	04/11/95	0.019 +/-0.002	< 0.025
9507521	04/11/95	04/18/95	0.020 +/-0.002	< 0.022
9508233	04/18/95	04/25/95	0.018 +/-0.002	< 0.023
9508693	04/25/95	05/02/95	0.013 +/-0.002	< 0.020
9509383	05/02/95	05/10/95	0.011 +/-0.002	< 0.024
9509675	05/10/95	05/16/95	0.011 +/-0.002	< 0.031
9510362	05/16/95	05/23/95	0.010 +/-0.002	< 0.021
9510735	05/23/95	05/30/95	0.014 +/-0.002	< 0.012
9511400	05/30/95	06/06/95	0.008 +/-0.002	< 0.019
9512036	06/06/95	06/13/95	0.012 +/-0.003	< 0.032
9512686	06/13/95	06/20/95	0.011 +/-0.002	< 0.018
9513236	06/20/95	06/27/95	0.014 +/-0.002	< 0.019
9513915	06/27/95	07/03/95	0.009 +/-0.002	< 0.028
9514348	07/03/95	07/11/95	0.020 +/-0.002	< 0.019
9514969	07/11/95	07/18/95	0.015 +/-0.002	< 0.014
9515404	07/18/95	07/25/95	0.012 +/-0.002	< 0.020
9516254	07/25/95	08/01/95	0.009 +/-0.002	< 0.016
9516680	08/01/95	08/08/95	0.014 +/-0.002	< 0.018
9517615	08/08/95	08/15/95	0.014 +/-0.002	< 0.023
9518265	08/15/95	08/22/95	0.018 +/-0.002	< 0.023
9518864	08/22/95	08/29/95	0.020 +/-0.002	< 0.017
9519477	08/29/95	09/05/95	0.023 +/-0.003	< 0.025
9520280	09/05/95	09/12/95	0.021 +/-0.003	< 0.023
9520492	09/12/95	09/19/95	0.014 +/-0.002	< 0.022
9520897	09/19/95	09/26/95	0.021 +/-0.002	< 0.014
9521415	09/26/95	10/03/95	0.025 +/-0.002	< 0.021
9522111	10/03/95	10/10/95	0.023 +/-0.002	< 0.024
9522654	10/10/95	10/17/95	0.021 +/-0.002	< 0.024
9522997	10/17/95	10/24/95	0.013 +/-0.002	< 0.023
9523474	10/24/95	10/31/95	0.010 +/-0.002	< 0.026
9523889	10/31/95	11/07/95	0.012 +/-0.002	< 0.027
9524376	11/07/95	11/13/95	0.018 +/-0.002	< 0.030
9525016	11/13/95	11/20/95	0.009 +/-0.002	< 0.029
9525282	11/20/95	11/27/95	0.033 +/-0.003	< 0.025
9525656	11/27/95	12/04/95	0.016 +/-0.002	< 0.024
9525819	12/04/95	12/11/95	0.025 +/-0.003	< 0.023
9526533	12/11/95	12/18/95	0.009 +/-0.002	< 0.019
9526793	12/18/95	12/27/95	0.024 +/-0.002	< 0.017

TABLE B-3

AIR PARTICULATE FILTERS
GAMMA ISOTOPIC ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL SAMPLE SITES **UNITS: pCi/CUBIC METER**

LOCATION	LAB NO.	BEGIN DATE	END DATE	Cs-134	Cs-137
APG-1	9506197	12/27/94	04/04/95	< 0.0012	< 0.0008
APG-1	9513535	04/04/95	07/03/95	< 0.0014	< 0.0017
APG-1	9522002	07/03/95	10/03/95	< 0.0016	< 0.0011
APG-1	9600215	10/03/95	01/02/06	< 0.0010	< 0.0008
APQ-1	9506198	12/27/94	04/04/95	< 0.0014	< 0.0011
APQ-1	9513536	04/04/95	07/03/95	< 0.0018	< 0.0013
APQ-1	9522003	07/03/95	10/03/95	< 0.0012	< 0.0010
APQ-1	9600216	10/03/95	01/02/06	< 0.0009	< 0.0007
APP-1	9506199	12/27/94	04/04/95	< 0.0014	< 0.0010
APP-1	9513537	04/04/95	07/03/95	< 0.0015	< 0.0010
APP-1	9522004	07/03/95	10/03/95	< 0.0008	< 0.0007
APP-1	9600217	10/03/95	01/02/06	< 0.0009	< 0.0010
APC-1	9506200	12/27/94	04/04/95	< 0.0011	< 0.0008
APC-1	9513538	04/04/95	07/03/95	< 0.0015	< 0.0015
APC-1	9522005	07/03/95	10/03/95	< 0.0012	< 0.0011
APC-1	9600218	10/03/95	01/02/06	< 0.0011	< 0.0013
APE-30	9506201	12/27/94	04/04/95	< 0.0013	< 0.0011
APE-30	9513539	04/04/95	07/03/95	< 0.0015	< 0.0011
APE-30	9522006	07/03/95	10/03/95	< 0.0007	< 0.0005
APE-30	9600219	10/03/95	01/02/06	< 0.0013	< 0.0009

TABLE B-4

DRINKING/SURFACE WATER IODINE-131 ANALYSIS

SAMPLE LOCATION: DWG/SWG-2 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	I-131
9500672	12/27/94	01/10/95	< 0.7
9501385	01/10/95	01/24/95	< 0.7
9502209	01/24/95	02/07/95	< 0.7
9503383	02/07/95	02/21/95	< 0.9
9504192	02/21/95	03/07/95	< 0.8
9505241	03/07/95	03/21/95	< 0.8
9506223	03/21/95	04/04/95	< 0.9
9507525	04/04/95	04/18/95	< 0.5
9508694	04/18/95	05/02/95	< 0.9
9509697	05/02/95	05/16/95	< 0.5
9510737	05/16/95	05/30/95	< 0.5
9512037	05/30/95	06/13/95	< 0.6
9513237	06/13/95	06/27/95	< 0.5
9514349	06/27/95	07/11/95	< 0.5
9515406	07/11/95	07/25/95	< 0.6
9516681	07/25/95	08/08/95	< 0.5
9518266	08/08/95	08/22/95	< 0.7
9519504	08/22/95	09/05/95	< 0.5
9520493	09/05/95	09/19/95	< 0.9
9521416	09/19/95	10/03/95	< 0.9
9522655	10/03/95	10/17/95	< 0.7
9523475	10/17/95	10/31/95	< 0.6
9524377	10/31/95	11/14/95	< 0.7
9525283	11/14/95	11/27/95	< 0.6
9525820	11/27/95	12/11/95	< 0.6
9526794	12/11/95	12/27/95	< 0.6

TABLE B-4 (continued)

DRINKING/SURFACE WATER IODINE-131 ANALYSIS

SAMPLE LOCATION: DWE/SWE-5 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	I-131
9500673	12/27/94	01/10/95	< 0.7
9501386	01/10/95	01/24/95	< 0.5
9502210	01/24/95	02/07/95	< 0.5
9503384	02/07/95	02/21/95	< 0.7
9504193	02/21/95	03/07/95	< 0.7
9505242	03/07/95	03/21/95	< 0.9
9506224	03/21/95	04/04/95	< 0.6
9507526	04/04/95	04/18/95	< 0.5
9508695	04/18/95	05/02/95	< 0.7
9509698	05/02/95	05/16/95	< 0.7
9510738	05/16/95	05/30/95	< 0.5
9512038	05/30/95	06/13/95	< 0.6
9513238	06/13/95	06/27/95	< 0.6
9514350	06/27/95	07/11/95	< 0.4
9515407	07/11/95	07/25/95	< 0.8
9516682	07/25/95	08/08/95	< 0.7
9518267	08/08/95	08/22/95	< 0.7
9519505	08/22/95	09/05/95	< 0.6
9520494	09/05/95	09/19/95	< 0.9
9521417	09/19/95	10/03/95	< 0.6
9522656	10/03/95	10/17/95	< 0.9
9523476	10/17/95	10/31/95	< 0.7
9524378	10/31/95	11/14/95	< 0.6
9525284	11/14/95	11/27/95	< 0.8
9525821	11/27/95	12/11/95	< 0.9
9526795	12/11/95	12/27/95	< 0.6

TABLE B-4 (continued)

DRINKING/SURFACE WATER IODINE-131 ANALYSIS

SAMPLE LOCATION: DWP/SWP-7 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	I-131
9500674	12/27/94	01/10/95	< 0.7
9501387	01/10/95	01/24/95	< 0.7
9502211	01/24/95	02/07/95	< 0.5
9503385	02/07/95	02/21/95	< 0.7
9504194	02/21/95	03/07/95	< 0.7
9505243	03/07/95	03/21/95	< 0.9
9506225	03/21/95	04/04/95	< 0.8
9507527	04/04/95	04/18/95	< 0.6
9508696	04/18/95	05/02/95	< 0.5
9509699	05/02/95	05/16/95	< 0.4
9510739	05/16/95	05/30/95	< 0.4
9512039	05/30/95	06/13/95	< 0.5
9513239	06/13/95	06/27/95	< 0.8
9514351	06/27/95	07/11/95	< 0.7
9515408	07/11/95	07/25/95	< 0.5
9516683	07/25/95	08/08/95	< 0.6
9518268	08/08/95	08/22/95	< 0.8
9519506	08/22/95	09/05/95	< 0.4
9520495	09/05/95	09/19/95	< 0.8
9521418	09/19/95	10/03/95	< 0.9
9522657	10/03/95	10/17/95	< 0.8
9523477	10/17/95	10/31/95	< 0.9
9524379	10/31/95	11/14/95	< 0.6
9525285	11/14/95	11/27/95	< 0.9
9525822	11/27/95	12/11/95	< 0.7
9526796	12/11/95	12/27/95	< 0.6

TABLE B-5

DRINKING/SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG/SWG-2 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	BETA
9501388	12/27/94	01/24/95	2.6 +/- 1.4
9503386	01/24/95	02/21/95	12.1 +/- 1.9
9505258	02/21/95	03/21/95	< 1.8
9507528	03/21/95	04/18/95	< 2.3
9509700	04/18/95	05/16/95	1.9 +/- 1.4
9512040	05/16/95	06/13/95	2.8 +/- 1.6
9513240	06/13/95	06/27/95	12.0 +/- 2.2
9515411	06/27/95	07/25/95	3.9 +/- 1.8
9518269	07/25/95	08/22/95	1.8 +/- 1.7
9520496	08/22/95	09/19/95	1.8 +/- 1.3
9521419	09/19/95	10/03/95	3.9 +/- 1.7
9523478	10/03/95	10/31/95	2.4 +/- 1.7
9525286	10/31/95	11/27/95	8.9 +/- 2.0
9526797	11/27/95	12/27/95	4.1 +/- 1.6

TABLE B-5 (continued)

DRINKING/SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE/SWE-5 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	BETA
9501389	12/27/94	01/24/95	5.1 +/- 1.4
9503387	01/24/95	02/21/95	2.2 +/- 1.3
9505259	02/21/95	03/21/95	1.3 +/- 1.3
9507529	03/21/95	04/18/95	< 2.8
9509701	04/18/95	05/16/95	4.5 +/- 1.6
9512041	05/16/95	06/13/95	5.9 +/- 1.6
9513241	06/13/95	06/27/95	< 2.8
9515412	06/27/95	07/25/95	2.6 +/- 1.7
9518270	07/25/95	08/22/95	< 2.7
9520497	08/22/95	09/19/95	2.6 +/- 1.6
9521420	09/19/95	10/03/95	2.7 +/- 1.6
9523479	10/03/95	10/31/95	3.1 +/- 1.7
9525287	10/31/95	11/27/95	2.5 +/- 1.5
9526798	11/27/95	12/27/95	2.3 +/- 1.3

TABLE B-5 (continued)

DRINKING/SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP/SWP-7 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	BETA
9501390	12/27/94	01/24/95	5.3 +/- 1.5
9503388	01/24/95	02/21/95	3.9 +/- 1.4
9505260	02/21/95	03/21/95	1.9 +/- 1.3
9507530	03/21/95	04/18/95	< 2.8
9509702	04/18/95	05/16/95	5.5 +/- 1.6
9512042	05/16/95	06/13/95	4.3 +/- 1.6
9513242	06/13/95	06/27/95	4.5 +/- 1.9
9515413	06/27/95	07/25/95	1.8 +/- 1.7
9518271	07/25/95	08/22/95	2.5 +/- 1.7
9520498	08/22/95	09/19/95	2.9 +/- 1.6
9521421	09/19/95	10/03/95	3.8 +/- 1.7
9523480	10/03/95	10/31/95	< 2.6
9525288	10/31/95	11/27/95	5.3 +/- 1.6
9526799	11/27/95	12/27/95	2.8 +/- 1.4

TABLE B-5 (continued)

DRINKING/SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG/SWG-2 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
9501388	12/27/94	01/24/95	< 2	< 3	< 2	< 2	< 5	< 5	< 3	< 3	< 3	< 12	< 3
9503386	01/24/95	02/21/95	< 2	< 3	< 2	< 2	< 5	< 5	< 2	< 3	< 2	< 9	< 3
9505258	02/21/95	03/21/95	< 2	< 3	< 2	< 3	< 5	< 5	< 2	< 3	< 3	< 6	< 2
9507528	03/21/95	04/18/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 8	< 2
9509700	04/18/95	05/16/95	< 2	< 3	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 7	< 2
9512040	05/16/95	06/13/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 3	< 2	< 10	< 2
9513240	06/13/95	06/27/95	< 1	< 1	< 1	< 1	< 2	< 3	< 1	< 1	< 1	< 4	< 1
9515411	06/27/95	07/25/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 8	< 2
9518269	07/25/95	08/22/95	< 2	< 3	< 2	< 3	< 4	< 5	< 2	< 2	< 2	< 10	< 3
9520496	08/22/95	09/19/95	< 3	< 4	< 3	< 3	< 6	< 6	< 3	< 3	< 3	< 12	< 3
9521419	09/19/95	10/03/95	< 2	< 3	< 2	< 3	< 5	< 5	< 2	< 3	< 2	< 9	< 3
9523478	10/03/95	10/31/95	< 2	< 2	< 2	< 2	< 3	< 4	< 2	< 2	< 2	< 7	< 2
9525286	10/31/95	11/27/95	< 2	< 2	< 2	< 2	< 3	< 4	< 2	< 2	< 2	< 7	< 2
9526797	11/27/95	12/27/95	< 2	< 4	< 2	< 2	< 4	< 3	< 2	< 2	< 2	< 9	< 3

TABLE B-5 (continued)

DRINKING/SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE/SWE-5 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
9501389	12/27/94	01/24/95	< 3	< 4	< 3	< 3	< 6	< 6	< 3	< 3	< 3	< 12	< 4
9503387	01/24/95	02/21/95	< 2	< 3	< 2	< 3	< 5	< 5	< 2	< 3	< 2	< 10	< 3
9505259	02/21/95	03/21/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 9	< 2
9507529	03/21/95	04/18/95	< 2	< 3	< 2	< 2	< 5	< 5	< 2	< 2	< 2	< 10	< 3
9509701	04/18/95	05/16/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 11	< 2
9512041	05/16/95	06/13/95	< 2	< 3	< 2	< 2	< 5	< 5	< 2	< 3	< 2	< 9	< 3
9513241	06/13/95	06/27/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 8	< 2
9515412	06/27/95	07/25/95	< 1	< 1	< 1	< 1	< 2	< 2	< 1	< 1	< 1	< 4	< 2
9518270	07/25/95	08/22/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 7	< 2
9520497	08/22/95	09/19/95	< 1	< 1	< 1	< 1	< 2	< 3	< 1	< 1	< 1	< 4	< 1
9521420	09/19/95	10/03/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 7	< 2
9523479	10/03/95	10/31/95	< 2	< 5	< 3	< 3	< 6	< 5	< 3	< 3	< 3	< 13	< 3
9525287	10/31/95	11/27/95	< 2	< 4	< 2	< 2	< 5	< 4	< 2	< 2	< 2	< 12	< 3
9526798	11/27/95	12/27/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 3	< 2	< 8	< 3

TABLE B-5 (continued)

DRINKING/SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP/SWP-7 **UNITS: pCi/LITER**

LAB NO.	BEGIN DATE	END DATE	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
9501390	12/27/94	01/24/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 10	< 2
9503388	01/24/95	02/21/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 8	< 2
9505260	02/21/95	03/21/95	< 2	< 3	< 2	< 2	< 5	< 5	< 2	< 3	< 2	< 10	< 2
9507530	03/21/95	04/18/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 9	< 2
9509702	04/18/95	05/16/95	< 2	< 2	< 2	< 2	< 3	< 4	< 2	< 2	< 2	< 7	< 2
9512042	05/16/95	06/13/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 7	< 2
9513242	06/13/95	06/27/95	< 3	< 3	< 3	< 3	< 5	< 6	< 3	< 3	< 3	< 10	< 3
9515413	06/27/95	07/25/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 8	< 2
9518271	07/25/95	08/22/95	< 2	< 2	< 2	< 2	< 4	< 4	< 2	< 2	< 2	< 8	< 2
9520498	08/22/95	09/19/95	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 9	< 3
9521421	09/19/95	10/03/95	< 2	< 2	< 2	< 2	< 3	< 4	< 1	< 2	< 1	< 5	< 2
9523480	10/03/95	10/31/95	< 2	< 5	< 2	< 3	< 5	< 4	< 2	< 2	< 2	< 12	< 4
9525288	10/31/95	11/27/95	< 2	< 4	< 2	< 2	< 5	< 4	< 2	< 2	< 2	< 11	< 3
9526799	11/27/95	12/27/95	< 3	< 5	< 3	< 3	< 6	< 5	< 3	< 3	< 3	< 13	< 3

TABLE B-6

DRINKING/SURFACE WATER
TRITIUM ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL SAMPLE SITES **UNITS: pCi/LITER**

LOCATION	LAB NO.	BEGIN DATE	END DATE	H-3
DWG/SWG - 2	9505266	12/27/94	03/21/95	< 300
DWG/SWG - 2	9513243	03/21/95	06/27/95	< 320
DWG/SWG - 2	9521422	06/27/95	10/03/95	< 290
DWG/SWG - 2	9526800	10/03/95	12/27/95	< 290
DWE/SWE - 5	9505267	12/27/94	03/21/95	< 300
DWE/SWE - 5	9513244	03/21/95	06/27/95	< 320
DWE/SWE - 5	9521423	06/27/95	10/03/95	< 290
DWE/SWE - 5	9526801	10/03/95	12/27/95	< 290
DWP/SWP - 7	9505268	12/27/94	03/21/95	< 300
DWP/SWP - 7	9513245	03/21/95	06/27/95	< 320
DWP/SWP - 7	9521424	06/27/95	10/03/95	< 290
DWP/SWP - 7	9526802	10/03/95	12/27/95	< 290

TABLE B-7

GROUNDWATER
TRITIUM AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: GWJ-1 **UNITS: pCi/LITER**

LAB NO.	COLLECTION DATE	H-3	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
9500306	01/04/95	< 310	< 2	< 3	< 2	< 2	< 5	< 5	< 3	< 3	< 2	< 13	< 3
9506226	04/04/95	< 310	< 2	< 3	< 2	< 3	< 5	< 5	<2	< 2	< 2	< 9	< 3
9513918	07/03/95	< 320	< 2	< 3	< 2	< 2	< 4	< 5	< 2	< 2	< 2	< 10	< 3
9521425	10/03/95	< 290	< 2	< 2	< 2	< 2	< 3	< 4	< 2	< 2	< 2	< 6	< 2

TABLE B-8

SHORELINE SOIL
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATIONS: ALL SAMPLE SITES **UNITS: pCi/Kg**

LOCATION	LAB NO.	COLLECTION DATE	Mn-54	Co-58	Co-60	Cs-134	Cs-137
SHWK-1	9506227	04/04/95	< 7	< 11	< 10	< 13	31 +/- 8
SHWK-1	9521427	10/03/95	< 9	< 11	< 12	< 15	34 +/- 9
SHWE-3	9506228	04/04/95	< 13	< 13	< 11	< 16	44 +/- 9
SHWE-3	9521426	10/03/95	< 10	< 10	< 10	< 13	45 +/- 8

TABLE B-9

MILK - IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: MKQ-5 **UNITS: pCi/LITER**

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137	Ba-140	La-140
9500304	01/04/95	< 0.5	< 4	< 3	< 15	< 4
9501023	01/18/95	< 0.5	< 3	< 3	< 12	< 2
9501754	02/01/95	< 0.8	< 4	< 3	< 13	< 3
9503033	02/16/95	< 0.8	< 3	< 3	< 9	< 3
9503917	03/01/95	< 0.9	< 4	< 3	< 13	< 3
9504713	03/15/95	< 0.6	< 3	< 2	< 9	< 3
9506229	04/05/95	< 0.7	< 3	< 3	< 10	< 3
9507594	04/19/95	< 0.6	< 2	< 2	< 8	< 2
9508796	05/03/95	< 0.9	< 4	< 3	< 14	< 4
9509669	05/17/95	< 0.6	< 3	< 3	< 10	< 3
9511114	06/07/95	< 0.4	< 2	< 2	< 7	< 2
9512690	06/21/95	< 0.5	< 1	< 1	< 4	< 1
9513916	07/05/95	< 0.5	< 2	< 2	< 8	< 2
9514836	07/19/95	< 0.4	< 2	< 2	< 8	< 2
9516101	08/02/95	< 0.5	< 2	< 2	< 9	< 2
9517546	08/16/95	< 0.6	< 2	< 2	< 6	< 2
9519562	09/06/95	< 0.6	< 4	< 3	< 13	< 3
9520499	09/20/95	< 0.6	< 2	< 2	< 8	< 2
9521650	10/04/95	< 0.5	< 4	< 3	< 13	< 3
9522659	10/18/95	< 0.6	< 2	< 1	< 6	< 2
9523642	11/01/95	< 0.8	< 3	< 3	< 9	< 3
9524370	11/14/95	< 0.6	< 4	< 4	< 13	< 4
9525608	12/05/95	< 0.7	< 2	< 2	< 11	< 2
9526537	12/19/95	< 0.6	< 2	< 2	< 9	< 3

TABLE B-9 (continued)

MILK - IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: MKQ-45 **UNITS: pCi/LITER**

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137	Ba-140	La-140
9500305	01/03/95	< 0.5	< 3	< 2	< 13	< 3
9501043	01/17/95	< 0.5	< 3	< 3	< 11	< 3
9501758	01/30/95	< 0.9	< 3	< 3	< 11	< 2
9503034	02/14/95	< 0.8	< 2	< 2	< 9	< 2
9503918	02/27/95	< 0.9	< 3	< 3	< 13	< 4
9504714	03/13/95	< 0.7	< 2	< 2	< 9	< 2
9506230	04/04/95	< 0.6	< 3	< 2	< 9	< 2
9507595	04/18/95	< 0.6	< 3	< 3	< 11	< 3
9508797	05/02/95	< 0.9	< 3	< 2	< 10	< 3
9509670	05/16/95	< 0.9	< 3	< 3	< 11	< 2
9511115	06/06/95	< 0.6	< 2	< 1	< 5	< 2
9512691	06/20/95	< 0.7	< 2	< 2	< 7	< 2
9513917	07/03/95	< 0.7	< 2	< 1	< 5	< 1
9514838	07/18/95	< 0.5	< 3	2 +/- 2	< 8	< 2
9516102	08/01/95	< 0.6	< 2	< 2	< 8	< 2
9517547	08/15/95	< 0.6	< 2	< 2	< 6	< 2
9519563	09/05/95	< 0.4	< 2	< 2	< 8	< 2
9520500	09/19/95	< 0.7	< 2	< 2	< 8	< 2
9521651	10/02/95	< 0.6	< 2	< 2	< 7	< 2
9522660	10/17/95	< 0.7	< 3	3 +/- 2	< 9	< 3
9523643	10/31/95	< 0.8	< 2	< 3	< 12	< 3
9524371	11/13/95	< 0.7	< 3	< 3	< 11	< 3
9525609	12/04/95	< 0.6	< 3	< 3	< 14	< 3
9526538	12/18/95	< 0.6	< 2	< 3	< 14	< 3

TABLE B-10

FISH
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATION: FH-1 **UNITS: pCi/Kg**

LAB NO.	COLLECTION DATE	SPECIES	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Cs-134	Cs-137
9512214	05/30/95	CATFISH	< 16	< 29	< 20	< 15	< 37	< 17	< 12
9512215	05/30/95	MULLET	< 9	< 14	< 11	< 10	< 21	< 10	< 9
9512216	05/30/95	CARP	< 17	< 31	< 20	< 18	< 37	< 19	< 14
9512217	05/30/95	BUFFALO	< 8	< 12	< 8	< 7	< 17	< 7	< 7
9525933	12/06/95	CATFISH	< 9	< 15	< 9	< 10	< 25	< 11	< 9
9525934	12/06/95	MULLET	< 7	< 19	< 7	< 9	< 20	< 7	< 8
9525935	12/06/95	SHAD	< 10	< 17	< 10	< 10	< 24	< 11	< 9
9525936	12/06/95	STRIPED BASS	< 7	< 14	< 8	< 10	< 24	< 9	< 9

TABLE B-10 (continued)

FISH
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATION: FH-2 **UNITS: pCi/Kg**

LAB NO.	COLLECTION DATE	SPECIES	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Cs-134	Cs-137
9512218	05/30/95	CATFISH	< 16	< 32	< 17	< 17	< 41	< 19	< 15
9512219	05/30/95	MULLET	< 12	< 19	< 12	< 11	< 24	< 14	< 12
9512220	05/30/95	CARP	< 22	< 34	< 21	< 18	< 40	< 21	< 17
9512221	05/30/95	BUFFALO	< 9	< 16	< 9	< 11	< 21	< 10	< 8
9525937	12/06/95	CATFISH	< 10	< 26	< 12	< 12	< 29	< 10	< 12
9525938	12/06/95	MULLET	< 7	< 11	< 9	< 7	< 19	< 10	< 7
9525939	12/06/95	SHAD	< 8	< 21	< 9	< 9	< 22	< 8	< 8
9525940	12/06/95	STRIPED BASS	< 8	< 11	< 8	< 8	< 18	< 9	< 6

TABLE B-11

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLQ-1 **UNITS: pCi/Kg**

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137
9501377	1/25/95	< 24	< 28	< 24
9503374	02/21/95	< 29	< 26	< 22
9505233	03/21/95	< 31	< 25	< 24
9508509	04/25/95	< 18	< 12	< 9
9510221	05/23/95	< 28	< 23	< 22
9512687	06/21/95	< 14	< 15	< 13
9515415	07/25/95	< 23	< 23	< 21
9518272	08/22/95	< 25	< 27	< 20
9520898	09/26/95	< 20	< 17	< 15
9522998	10/24/95	< 14	< 13	< 12
9525017	11/20/95	< 24	< 29	< 24
9526534	12/18/95	< 14	< 10	< 11

TABLE B-11 (continued)

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLB-1 **UNITS: pCi/Kg**

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137
9501378	1/25/95	< 26	< 33	< 29
9503375	02/21/95	< 19	< 23	< 19
9505234	03/21/95	< 28	< 30	< 27
9508510	04/25/95	< 18	< 14	< 12
9510222	05/23/95	< 23	< 18	< 20
9512688	06/21/95	< 10	< 11	< 9
9515416	07/25/95	< 27	< 27	< 22
9518273	08/22/95	< 23	< 21	< 21
9520899	09/26/95	< 32	< 24	< 28
9522999	10/24/95	< 19	< 24	< 18
9525018	11/20/95	< 25	< 30	< 26
9526535	12/18/95	< 19	< 18	< 15

TABLE B-11 (continued)

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLK-15 **UNITS: pCi/Kg**

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137
9501379	1/25/95	< 20	< 22	< 20
9503376	02/21/95	< 24	< 21	< 19
9505235	03/21/95	< 27	< 28	< 25
9508511	04/25/95	< 19	< 12	< 10
9510223	05/23/95	< 20	< 23	< 21
9512689	06/21/95	< 20	< 18	< 15
9515417	07/25/95	< 24	< 20	< 21
9518274	08/22/95	< 21	< 24	< 21
9520900	09/26/95	< 23	< 20	< 16
9523000	10/24/95	< 26	< 24	< 20
9525019	11/20/95	< 23	< 18	< 16
9526536	12/18/95	< 14	< 9	< 11

TABLE B-12

VEGETATION - FOOD PRODUCTS
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: ALL SAMPLE SITES **UNITS: pCi/Kg**

LAB NO.	LOCATION	COLLECTION DATE	I-131	Cs-134	Cs-137
9522661	FPG-1	10/17/95	< 11	< 10	< 8
9522662	FPP-1	10/17/95	< 13	< 15	< 13