LP&L

Louisiana Power & Light Company
317 Baronne Street
P. O. Box 60340
New Orleans, LA 70160-0340
Tel. 504 595 2805

R. F. Burski
Nuclear Safety & Regulatory Affairs Manager

W3P90-1101
A4.05
QA

April 25, 1990

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:

Enclosed is the subject 1989 annual report on radiological environmental monitoring which covers the period of January 1 through December 31, 1989. This report is submitted per Section 6.9.1.7 in the Waterford 3 Technical Specifications (NUREG-1117).

If there are any questions, please contact Mr. L.W. Laughlin at (504) 464-3499.

Very truly yours,

R F Burski

RFB/LWL/ssf
Enclosure
cc (w/enclosure): Mr. R.D. Martin, NRC Region IV
NRC Resident Inspectors Office

cc (w/o enclosure): Messrs. F.J. Hebdon, NRC-NRR
D.L. Wigginton, NRC-NRR
E.L. Blake
W.M. Stevenson

IE25
1/1

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
FOR THE LOUISIANA POWER & LIGHT
WATERFORD 3 STEAM ELECTRIC STATION

JANUARY 1 THROUGH DECEMBER 31, 1988

Docket Number: 50-382

License Number: NPF-38

W391174.SA

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
FOR THE LOUISIANA POWER & LIGHT
WATERFORD 3 STEAM ELECTRIC STATION

JANUARY 1 THROUGH DECEMBER 31, 1989

Docket Number: 50-382

License Number: NPF-38

W391174.SA

ABSTRACT

This report is issued pursuant to Waterford 3 SES Technical Specification 6.9.1.7. Its purpose is to discuss the Waterford 3 SES Radiological Environmental Monitoring Program (REMP), present the results of the program for the year of 1989, and to evaluate the radiological impact on the environment resulting from plant operation.

The Waterford 3 SES REMP collected data on environmental radioactivity levels around the Waterford 3 SES 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 SES exhibited no discernable impact on the levels of radioactivity in the environment during 1989.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

LIST OF TABLES (CONTINUED)

LIST OF FIGURES

1.0 INTRODUCTION

This report describes the Radiological Environmental Monitoring Program (REMP) for the Waterford 3 Steam Electric Station (SES) nuclear power plant and discusses the results obtained during the calendar year 1989. The results discussed within this report were used to evaluate the radiological environmental impact resulting from the operation of Waterford 3 SES. The submission of this report to the Nuclear Regulatory Commission fulfills the requirements pursuant to Waterford 3 SES Technical Specification 6.9.1.7.

1.1 Program and Report Objectives

The overall objective of the monitoring program was to evaluate the radiological environmental impact of the plant. The evaluation included an assessment of actual or potential exposures of humans to radioactive materials or radiation resulting from plant operation. In order to conduct this evaluation, the data analyses and interpretations contained in this report fulfilled the following specific objectives:

a. identify if any radioactive materials or radiation in the environment was associated with plant operation;

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

c. estimate the maximum exposure to a member of the general public from any environmental data which indicates the presence of plant related radioactivity; and

d. verify compliance with relevant federal requirements.

1.2 Plant and Site Description

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

Waterford 3 SES 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 near the towns of Killona and Taft. The Mississippi River is the closest prominent natural feature while others include Lac des Allemends, 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 dry land between the Mississippi River and the wetlands. Near the Waterford 3 SES site are several large industrial facilities, including Waterford 1 and 2 Steam Electric Stations (0.4 miles northwest of the site), Little Gypsy Steam Electric Station (0.8 miles northeast of the site and across the river from Waterford 3 SES), Agrico (formerly Becker Industries) a fertilizer manufacturer (0.6 miles east southeast), Occidental Chemical Company (0.8 miles east southeast), and Union Carbide, a chemical manufacturer (1.2 miles east southeast). Louisiana Power & Light Company owns and operates the above mentioned steam electric stations.

Major urban centers in the region include New Orleans (approximately 25 miles east of the site) 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 (1.9 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 of the sampling stations and their locations are given in Table 2.2. The locations of the sampling stations with respect to the Waterford 3 SES site are illustrated in Figures 2.1 through 2.3. A more detailed description of the overall REMP is discussed in the following chapter.

2.1 History and Development

The Waterford 3 SES REMP was initiated in April of 1983. The program evolved from the Preoperational Environmental Radiological Surveillance (PERS) program which was conducted from 1978 through 1982. The equipment, procedures, techniques, and many of the same sampling locations used during the preoperational survey were incorporated into the operational program. The environmental data collected during the first two years of the REMP (1983 and 1984), when Waterford 3 SES had not yet achieved initial criticality, were used to supplement the baseline data obtained during the PERS Program.

LP&L personnel were responsible for the proper implementation of the REMP and insuring that the program complied with federal regulatory requirements and Technical Specification requirements. Specific responsibilities of LP&L personnel included 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 Monitoring Report as well as any other relevant report to the Nuclear Regulatory Commission.

The primary contractor, the Technical Services Department of Arkansas Power & Light (AP&L) located in Little Rock, Arkansas, was responsible for performing radiological analyses; conducting the initial data review; preparing monthly and annual results reports; and overseeing laboratory quality assurance and control. A separate contractor, the Fisheries Co-operative Extension Service of Louisiana State University, was responsible for the collection and delivery of fish samples to LP&L.

2.2 Sample Collection and Handling Procedures

The types of samples collected, the analyses performed, the sample collection frequencies, and the location of the sampling stations are summarized in Tables 2.1 and 2.2. The information contained in these tables is based on the requirements specified in Table 3.12-1 of Waterford 3 SES Technical Specification 3.12.1. The locations of the sampling stations with respect to the Waterford 3 SES site are illustrated in Figures 2.1 through 2.3. These are the maps required by Waterford 3 SES Technical Specification 6.9.1.7. Any deviations from the REMP (i.e., unavailable samples and missed

lower limits of detection) observed during 1989 are discussed in Section 3.5. Changes made to the REMP during 1989, as a result of the annual land use census, are also discussed in Section 3.5.

The environmental samples collected were classified into four general categories according to exposure pathways: direct radiation, airborne, waterborne, and ingestion. The collection and handling procedures used to obtain these samples are described in the following sections. The descriptions are intended to provide a concise overview of what was done rather than to be step-by-step procedures.

2.2.1 Direct Radiation Exposure Pathway Samples

Integrated external gamma exposures were determined using thermoluminescent dosimeters (TLDs). Multi-element TLDs manufactured by Panasonic were placed 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 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 LP&L personnel.

2.2.2 Airborne Exposure Pathway Samples

Samples of airborne particulates and radioiodines were collected at five locations. The locations included four indicator stations (APP-1, APQ-1, APG-1, APC-1) and one control station (APE-30). The samples were collected using low-volume air sampling devices. The devices were designed to sample air on a continuous basis and record the volume of air sampled. The pump and metering device were housed inside a weatherproof shelter.

Airborne particulate samples were obtained by passing air through a particulate filter using the device described above. The filters were collected weekly by LP&L personnel and sent to the contract laboratory for gross beta analysis. These filters were composited by the contract laboratory on a quarterly basis for isotopic analysis by gamma spectroscopy.

Airborne iodine sampling was done in conjunction with air particulate sampling. After the air passed through the particulate filter, it passed through a charcoal cartridge to collect airborne iodine. The cartridges were collected weekly by LP&L personnel and sent to the contract laboratory for iodine-131 analysis by gamma spectroscopy.

2.2.3 Waterborne Exposure Pathway Samples

The Mississippi River, which the plant discharges to is the major source of drinking water in the vicinity of Waterford 3 SES. Therefore, water samples taken from the Mississippi River were designated as both drinking water and surface water samples.

Composite drinking/surface water samples were obtained from the Mississippi River using automatic composite samplers placed at one upstream (DWP-7/SWP-7) and at two downstream (DWG-2/SWG-2, DWE-5/SWE-5) locations from the plant. These composite water samples were collected biweekly by LP&L personnel. LP&L personnel acidified the samples with hydrochloric acid prior to shipment to the contract laboratory. The contract laboratory analyzed the biweekly samples for iodine-131. The biweekly samples were composited on a monthly basis by the contract laboratory for gross beta and gamma spectroscopy analyses. The samples were also composited on a quarterly basis for tritium analysis.

Due to the high water table resulting from shallow aquifers in the vicinity of the site, groundwater discharge could be sampled from a drainage canal. Groundwater samples were obtained quarterly by LP&L personnel from one sampling location (GWJ-1) using a grab sampling technique. The samples were acidified with hydrochloric acid prior to shipment to the contract laboratory for tritium and gamma spectroscopy analyses.

Shoreline sediment samples were obtained semi-annually by LP&L personnel from two sampling stations. One station was located on the shoreline of the Mississippi River (SHWE-3) and the other was located on the shoreline of the 40-Arpent canal (SHWJ-1). The samples collected were shipped to the contract laboratory without further processing.

2.2.4 Ingestion Exposure Pathway Samples

Milk samples were collected semi-monthly by LP&L personnel. Control samples were obtained by Louisiana Nuclear Energy Division personnel from the control station (MKQ-45) located in Denham Springs, Louisiana. Indicator samples were collected locally from one station (MKQ-5). Although two additional indicator locations were identified (MKQ-1 and MKE-4), no samples were available from these locations during 1989 (see Section 3.5). All samples had formaldehyde added prior to shipment to the contract laboratory for iodine-131 and gamma spectroscopy analyses.

Fish samples were collected bi-annually upstream (FH-1) and downstream (FH-2) from the plant by a contractor. The fish were obtained by netting. The contractor segregated the samples by species and location sampled prior to delivery to LP&L. The samples were shipped frozen to the contract laboratory for analysis by gamma spectroscopy.

LP&L personnel collected broad leaf vegetation samples monthly by obtaining cuttings taken at least one inch above the ground. Samples were collected from two indicator locations (BLB-1, BLQ-1) and from one control location (BLK-15). The samples were shipped to the contract laboratory without further processing.

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 still boundary were collected however, in order to demonstrate the absence of man-made radionuclides.

These samples (sugarcane and soybeans) were collected at the time of harvest by LP&L personnel from three locations (FPP-1, FPG-1, and FPQ-1). The samples were collected by normal harvesting techniques at the time of harvest. The samples were sent to the contract laboratory without further processing for iodine-131 and gamma spectroscopy analyses.

2.3 Analytical Procedures

Brief synopses of the analytical procedures used by AP&L and LP&L are given in Appendix E. These synopses are intended to provide an overview of what was done rather than to be step-by-step procedures.

The minimum sensitivities for the analytical procedures used in the REMP are reflected by the Lower Limits of Detection (LLD) values presented in Table 2.3. These values are the same as the ones given in Table 4.12-1 of Waterford 3 SES Technical Specification 4.12.1. The LLD's are a priori estimates based on assumed sample volumes, counting times, detector efficiencies, etc. These values reflect the lower levels of detection that were to be attained for the majority of the analyses performed. All analyses that could not achieve these lower limits of detection are discussed in Section 3.5.

2.4 Laboratory Quality Assurance

During 1989 AP&L performed a variety of quality assurance analyses. Spiked and blank samples prepared in-house and Environmental Protection Agency (EPA) reference samples were analyzed. It was estimated that between 5% and 10% of all analyses were for quality assurance purposes.

AP&L also participated in the EPA radiological interlaboratory comparison (cross-check) program. This quality assurance program and EPA intercomparison satisfies the requirements of Waterford 3 SES Technical Specification 3.12.3 for interlaboratory comparison. Participation in this program involved a number of analyses on various sample media typically found in REMP's. As a result of participation in the program, an objective measure of analytical precision, accuracy, and an estimation of bias were obtained. In the event that any results obtained by AP&L were not within control limits, as specified by the EPA, an investigation was conducted to determine the cause and corrective action was taken to prevent a recurrence. Appendix D lists the 1989 results of AP&L's participation in the cross-check program.

TABLE 2.1

RADIOLOGICAL ENVIRONMENTAL 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-5, P-6, Q-5, R-6, F-9, G-9, E-15, J-15, E-30	TLD gamma	Quarterly
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 Gross beta, gamma isotopic, I-131	Quarterly composite Monthly composite Bi-weekly composite
Surface Water[b]	SWG-2, SWE-5, SWP-7	H-3 gamma isotopic	Quarterly composite Monthly composite
Ground Water	GWJ-1	gamma isotopic, H-3	Quarterly
Shoreline Sediment	SHWE-3, SHWJ-1	gamma isotopic	Semi-annually
Milk	MKE-4, MKQ-5, MKQ-1, MKQ-45	gamma isotopic, I-131	Semi-monthly/monthly
Fish	FH-1, FH-2	gamma isotopic	In season or semi-annually
Food Products	FPG-1, FPP-1, FPQ-1	gamma isotopic	At harvest time
Broad Leaf	BLQ-1, BLB-1, BLK-15	gamma isotopic, I-131	Monthly When milk samples not collected

a. Based on requirements in Table 3.12-1 of Waterford 3 SES Technical Specification 3.12.1.
b. Drinking and surface water samples are identical.

TABLE 2.2

DESCRIPTION OF REMP SAMPLING STATION LOCATIONS

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
DIRECT RADIATION (TLD)			
A-2	(Eastbank) On fence enclosure surrounding water tower west of Little Gypsy opposite Etienne St. Access from River Road (LA 628). The TLD's are located on the (S) fence opposite the entrance gate to the water tower.	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). TLD's 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. TLD's 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) near the west end of the Bonne Carre Spillway. TLD's are on the fence at the west entrance to the Spillway (located on levee).	1.1	ENE
E-1	(Westbank) Located on utility pole along River Road (LA 18) approximately 0.3 miles east of Waterford 3 SES plant entrance. Access from LA 18. TLD's are on the third utility pole east of the construction entrance road.	0.2	E

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
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. TLD's are on the southeast corner of the fence enclosure.	1.1	ESE
G-2	(Westbank) Located on utility pole on East side of LA 3142 near Witco entrance gate (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 LA 3142. Access from LA 3142 south of railroad overpass on east side of LA 3142. TLD's 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 behind "Private Road" sign at Gate 8 entrance off of LA 3127. Access from LA 3127, approximately 1.3 miles west of LA 3127/3142 intersection. (Gate 8 is the access to the Waterford 3 SES switchyard station)	1.0	SSW

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
L-1	(Westbank) Located behind "Private Road" sign at LP&L Gate 9 entrance off of LA 3127, approximately 1.6 miles west of LA 3127/3142 intersection. (Gate 9 is an access road for Waterford 3 SES)	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 8, Gate 9 off of LA 3127, the shell access road from LA 18 between Waterford 3 SES, or thru 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 off Short Street, in Killona. TLD is on fence at air sample station APP-1.	0.8	WNW
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. TLD's are on the southwest corner of fence.	0.5	NNW

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
A-5	(Eastbank) Located on utility pole just east of the Shady Nook Trailer Park on Hwy 61 in LaPlace. TLD's 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. TLD's 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. TLD's 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

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR 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 southwest side of the second canal bridge east of LA 3160 along LA 3127.	5.7	SSE
P-6	(Westbank) Located on utility pole at southwest corner of LA 640/ railroad track intersection. Utility pole is just west of LA 640 and east of radio transmission tower.	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. TLD's 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 0.3 miles east of Luling-Destrehan Ferry, onto Destrehan Road (west of Bunge Corp. Grain Elevator), and proceed to substation gate.	8.2	ESE

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
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 Mallard 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. TLD's are located on the north side of the fence enclosure, near a light pole.	11.8	E
J-15	(Westbank) Located on fence enclosure surrounding LP&L switchyard at LA 631/Hwy 90 intersection in Des Allemands. TLD's are on the northwest corner of fence. Access from LA 631 via shell road.	12.0	S
E-30*	(Westbank) Located on fence at LP&L General Office on Delaronde St. in Algiers. TLD's are on the fence, facing the Mississippi River, in the passageway to the transformer shop.	27.0	E
AIRBORNE			
APP-1	(Westbank) Located in soybean field at northwest corner of Short St. in Killona.	0.8	WNW
APQ-1	(Westbank) Located at northwest corner of soybean field on east side of Killona. Access from River Road (LA 18) approximately 0.6 miles east of LA 18/3141 intersection.	0.8	NW

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
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	ESE
DWE-5 SWE-5	(Eastbank) Located at the St. Charles Parish Waterworks off of River Road (LA 48) near New Sarpy.	4.5	E
DWP-7* SWP-7*	(Westbank) Located at the St. John Parish Waterworks off of LA 18 in Edgard.	6.5	WNW
SHWE-3	(Westbank) Located at the Foot Ferry Landing off of LA 18 in Taft.	3.0	E
SHWJ-1	(Westbank) Located at the 40 Arpent Canal south of the Plant. Access from LA 3127 through Gate 8.	1.0	S
GWJ-1	(Westbank) Located at 40 Arpent Canal south of the plant. Access from LA 3127 through LP&L Gate 8. The canal is northwest of the shell access road/railroad track intersection.	0.3	S

TABLE 2.2

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
INGESTION			
MILK			
MKE-4	(Westbank) Located 0.8 miles west of the Time Saver in Hahnville off of River Road.	4.0	E
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.	5.0	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
FISH			
FH-1*	Upstream of the plant intake structure.	NA**	NA**
FH-2	Downstream of the plant intake structure.	NA**	NA**
BROAD LEAF			
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

(CONTINUED)

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
FOOD PRODUCTS***			
FPP-1	(Westbank) Located in soybean field on eastern edge of Killona, between air sample station APP-1 and APQ-1.	0.8	WNW
FPG-1	(Westbank) Located in a soybean field adjacent to the plant near the meteorological towers.	0.3	SSE
FPQ-1	(Westbank) Located in a sugarcane field off LA 3127.	0.7	WSW

* DENOTES CONTROL LOCATION

** NA - NOT APPLICABLE

*** 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

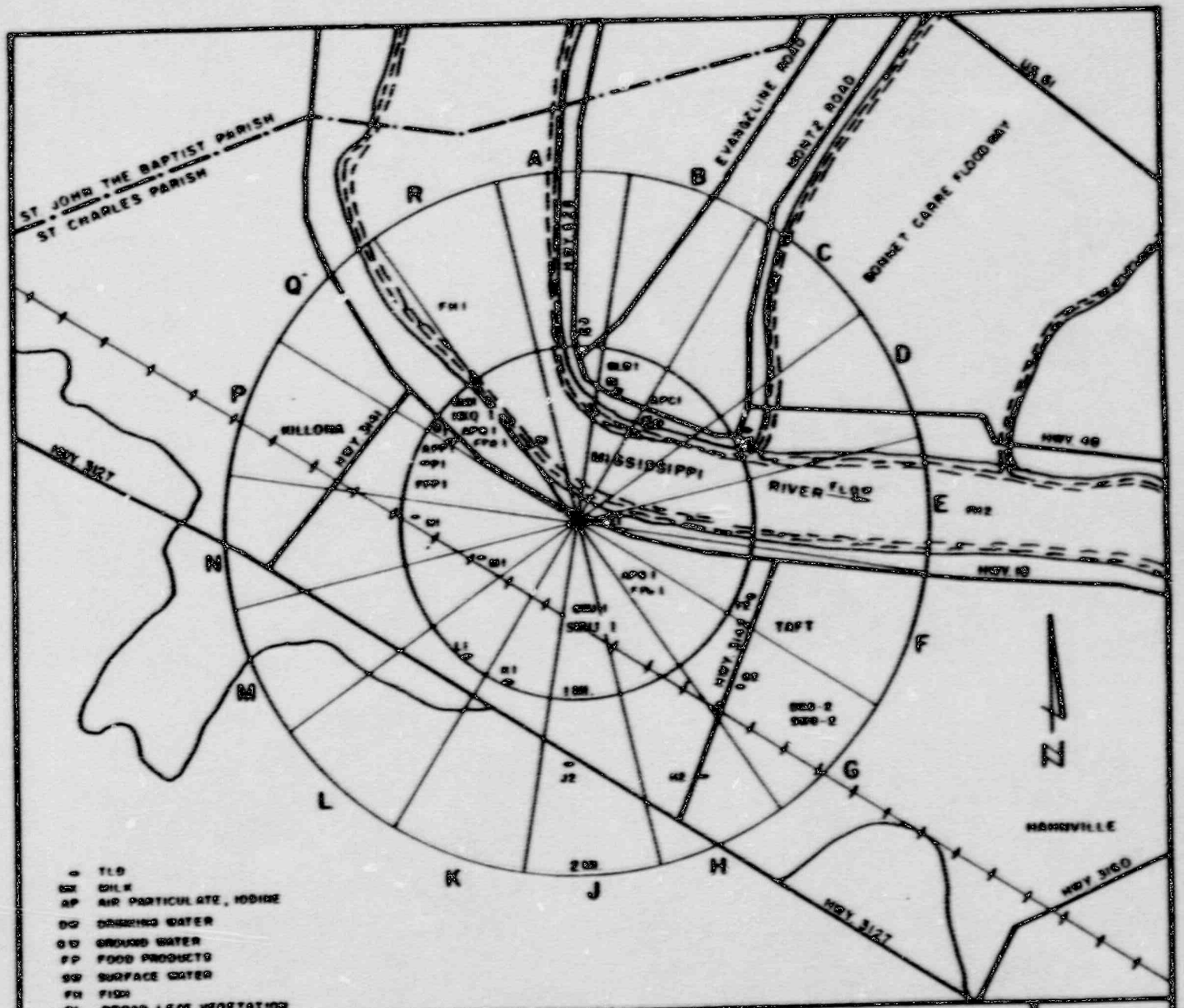
DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS

LOWER LIMIT OF DETECTION (LLD)[a]

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GAS (pCi/m³)	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-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-La-140	15			15		

a. From Table 4.12-1 of Waterford 3 SES Technical Specification 3.12.1.

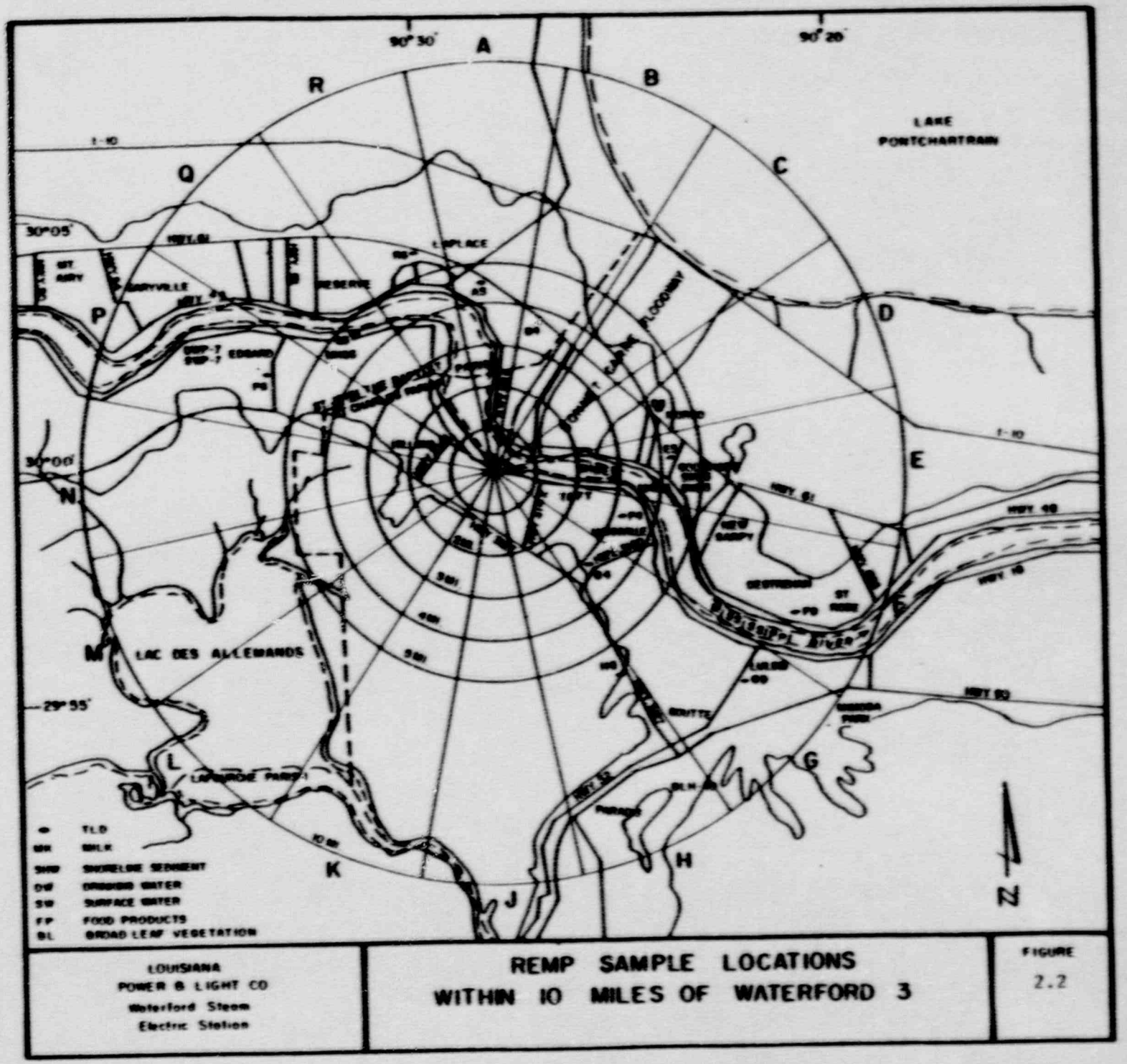
b. Applicable to broad leaf vegetation.



LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station
ODCM

REMP SAMPLE LOCATIONS
WITHIN 2 MILES OF WATERFORD 3

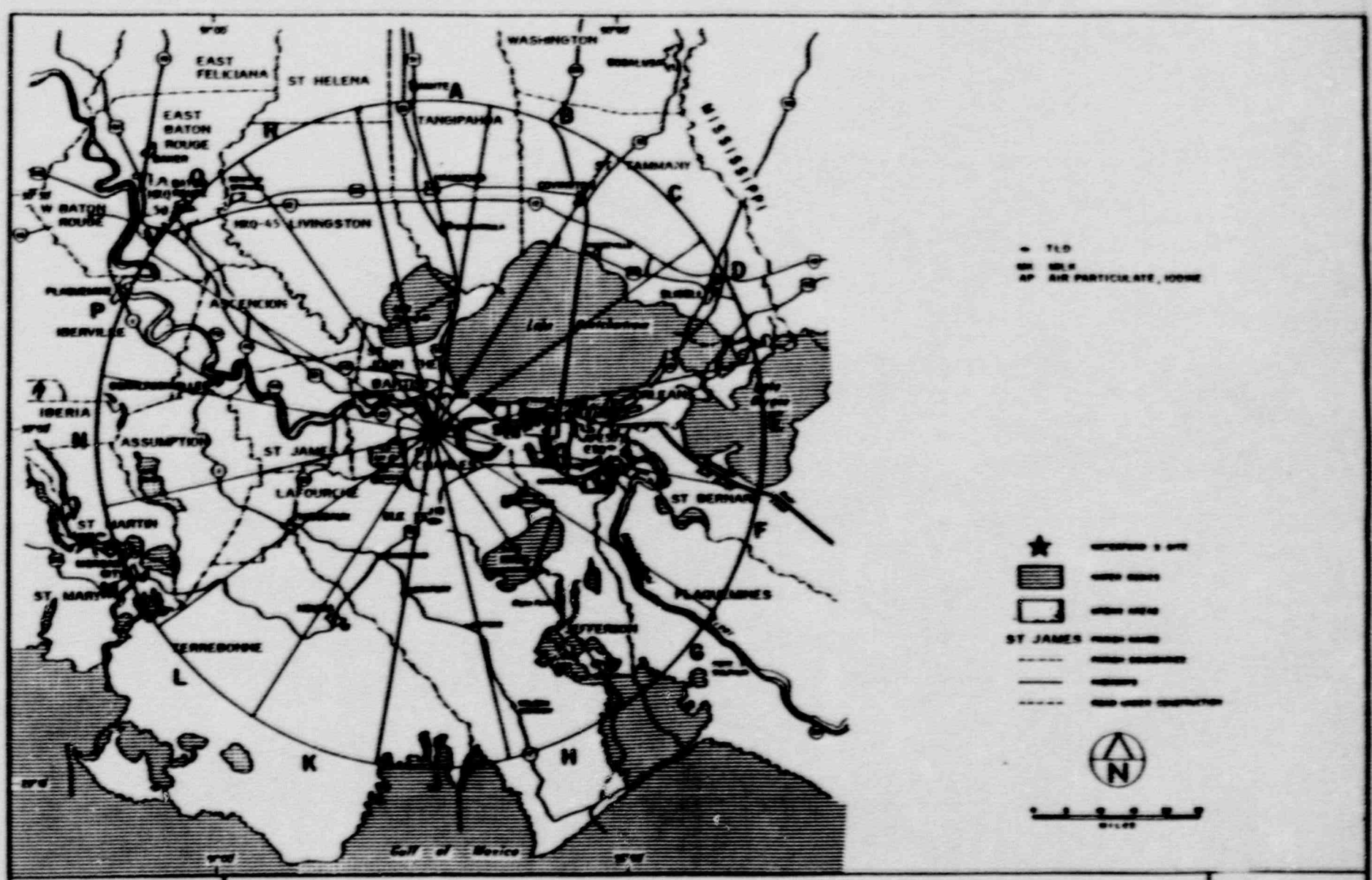
FIGURE
2.1



LOUISIANA
POWER & LIGHT CO
Waterford Steam
Electric Station

REMP SAMPLE LOCATIONS
WITHIN 10 MILES OF WATERFORD 3

FIGURE
2.2



LOUISIANA POWER & LIGHT Co. WATERFORD STEAM ELECTRIC STATION	REMP SAMPLE LOCATIONS WITHIN 50 MILES OF WATERFORD 3	FIGURE 2.3

3.0 DISCUSSION OF RESULTS

Analytical results for the year 1989 are discussed in this section by exposure pathway, type of sample, and analysis performed. The analytical results of the REMP are summarized in Appendix A and data for the individual analyses are presented in the tables of Appendix B. All of the results discussed in this section and summarized in the appendices of this report focus mainly on man-made radioactivity.

3.1 Direct Radiation Exposure Pathway

The average dose rates measured at all stations by both control and indicator Thermoluminscent Dosimeters (TLDs) were 15, 13, 14, and 13 mrem per standard quarter (90 days) for the first, second, third, and fourth quarters of 1989, respectively. The average of 119 indicator location TLD exposures was 14 mrem/standard quarter compared to 18 mrem/standard quarter for the average of four exposures at the control location. The lowest and highest individual exposures were 8 mrem/standard quarter (C-1, 2nd quarter) and 24 mrem/standard quarter (E-1, 1st quarter) for all locations.

Table 3.1 compares the TLD results by direction and distance from the facility. Of the 16 indicator sectors, Sector A demonstrated the highest average of 16 mrem/standard quarter; however, this average exposure is less than the control's 18 mrem/standard quarter. The average exposure rate from TLD's located within two miles from the plant was statistically lower than the average exposure from stations located more than five miles from the plant using the standard "t" test (see Table F-1, Appendix F). The average exposure rate from TLD's located between two and five miles from the plant was statistically the same as the average exposure rate from stations located greater than five miles of the plant. Therefore, Waterford 3 SES operation did not have a detectable impact on direct radiation exposures from gamma radiation.

3.2 Airborne Exposure Pathway

3.2.1 Airborne Particulates

Gross beta activity ranged from 0.003 pCi/cubic meter (APC-1, 8/21-8/29) to 0.038 pCi/cubic meter (APG-1, 12/18-12/26) with an average of 0.017 pCi/cubic meter, for 258 measurements from all five sampling locations. The average gross beta activity for the control location, APE-30, was 0.019 pCi/cubic meter compared to 0.016 pCi/cubic meter for the four indicator locations (APP-1, APQ-1, APG-1, APC-1). The control station average is statistically the same as the average from the APC-1, APG-1, and APP-1 indicator stations and is statistically higher than indicator station APQ-1 (see Appendix F) using the standard statistical "t" test .

The gross beta activity results obtained during 1989 are consistent with those from 1988, 1987, 1986, 1985 and the preoperational program. During the preoperational survey, in periods not significantly influenced by nuclear weapons detonations, the gross beta activity ranged between 0.02 and 0.04 pCi/cubic meter. During the first two years of the REMP prior to Waterford 3 SES operation, the average gross beta activity for all stations was 0.021 pCi/cubic meter with a range of 0.006 to 0.5 pCi/cubic meter. During 1985 the average gross beta activity for the control location was 0.022 pCi/cubic meter compared to 0.021 pCi/cubic meter for the four indicator locations. In 1986, during periods not influenced by the Chernobyl incident, the average weekly gross beta activities from the control and indicator stations were 0.020 and 0.021 pCi/cubic meter, respectively. In 1987, the average gross beta for the control location was 0.021 pci/cubic meter compared to the 0.020 pci/cubic meter for the four indicator locations. In 1988, the average gross beta for the control location was 0.020 pCi/cubic meter compared to 0.018 pCi/cubic meter for the four indicator stations.

3.2.2 Airborne Iodine

All but one of the 259 airborne iodine-131 results were below the required lower limit of detection and 258 ranged from 0.006 to 0.049 pCi/cubic meter (Table B-2). The one sample which did not meet the required LLD had an insufficient sample volume. (For specifics see Section 3.5.2.) The variability of the lower limit of detection was due primarily to the difference between air sample volumes.

3.2.3 Gamma Isotopic Analysis

Gamma spectroscopy results indicated detectable levels of cosmogenically produced beryllium-7 and naturally occurring potasium-40 in the twenty quarterly composites (Table B-3). 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 is the same as surface water. Therefore monthly and quarterly gamma spectral 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 a radiochemical procedure for iodine-131 (Table B-4). No activity was detected at any of the indicator stations and all measurements satisfied the LLD requirement. One of the control measurements indicated detectable levels of iodine at an average concentration of 0.5 pCi/l.

The monthly composites were analyzed for gross beta activity. Gross beta activity was detected in thirty-one of the forty-three composites with an average activity of 6.1 pCi/l. The average activity for the control location was 4.6 pCi/l, compared to the averages of 5.7 and 4.6 pCi/l for indicator stations DWG-2 and DWE-5, respectively. The average gross beta activity detected at indicator stations DWG-2 and DWE-5 are statistically the same as that of the control station DWP-7 using the standard "t" test (see Table F-3, Appendix F).

Drinking/surface water samples were also composited quarterly and analyzed for tritium. Ten of the twelve measurements were below the respective LLD. Tritium was found in the second quarter of 1989 at a concentration of 280 ±270 pCi/l at DWG-2, an indicator station, and 480 ±280 pCi/l at DWP-7 the control location.

Tritium is naturally occurring and during the preoperational program was frequently detected in drinking water samples at concentrations ranging between 60-220 pci/l. These detected concentrations are well below the required LLD of 2,000 pCi/l, have large associated error, and may be an artifact of counting statistics. Conservatively assuming that all of the tritium detected at DWG-2 originated at the plant, the maximum dose to a member of the general public was calculated. The methodology and the assumptions used were based on Regulatory Guide 1.109 (10/77). The dose to the maximum exposed individual, a child, was calculated by the following equation:

$$R = (C, (U) (D) \qquad (1)$$

where:

R is the annual dose to any organ or the total body in mrem/yr;

C is the radionuclide concentration in the drinking water sample in pCi/l;

U is the amount of water which is ingested, assuming that river water is ingested without treatment, in l/yr, given in Table E-5 of Regulatory Guide 1.109 (510 liters for a child); and

D is the internal dose conversion factor for ingesting contaminated water given in Table E-13 of Regulatory Guide 1.109; the values for tritium for each organ or the whole body are identical (2.03E-7 mrem/pCi ingested).

Using equation (1), which ignores trivial doses from the fish pathway, the maximum annual dose to a child drinking 510 liters of untreated riverwater was calculated to be 0.029 mrem/yr to any organ or the whole body. Therefore, the radiological impact to the general public is inconsequential.

3.3.2 Groundwater

Four groundwater samples were collected from one sampling location, GWJ-1, and analyzed for tritium and gamma emitters. Gamma emitters were not detected. Tritium was detected in two of the four samples at concentrations of 430 ± 190 and 290 ± 270 pCi/l. Tritium is naturally occurring and during the preoperational program, tritium was frequently detected in groundwater samples at concentrations ranging between 50 and 180 pCi/l. Although these detected concentrations are higher than these values, the concentrations have a high degree on uncertainty associated with them. These values are also below the required LLD. However, conservatively assuming that all of the tritium activity detected in the groundwater at station GWJ-1 originated from the plant, the maximum dose to a member of the general public was calculated using the larger of the two values. The methodology and assumptions used to calculate the maximum dose were based on the guidance provided in Regulatory Guide 1.109 (10/77). The dose to the maximum exposed individual, a child, was calculated by the following equation:

$$R = (C)\ (U)\ (D) \qquad (2)$$

where:

R is the annual dose to any organ or the total body in mrem/yr;

C is the radionuclide concentration in the groundwater sample in pCi/l;

U is the amount of water which is ingested, assuming that this groundwater is ingested without treatment, in l/yr, given in Table E-5 of Regulatory Guide 1.109 (510 liters for a child) and

D is the internal dose conversion factor for ingesting contaminated water given in Table E-13 of Regulatory Guide 1.109; the values for tritium for each organ or the whole body are identical (2.03E-7 mrem/pCi ingested).

Using equation (2), the maximum annual dose to a child drinking 510 liters of untreated groundwater was calculated to be 0.045 mrem/yr to any organ or to the total body. Therefore, the radiological impact to the general public is inconsequential. In addition, this is not a realistic pathway as it assumes that the child drinks untreated ditch water.

3.3.3 Shoreline Sediment

Four shoreline soil samples were collected from two 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 into which turbine building sumps are discharged (SHWJ-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 the sample from station SHWJ-1 at a concentration of 28 ± 12 pCi/kg(dry) and SHWE-3 at a concentration of 33 ± 12 pCi/kg (dry). No other man-made radionuclides were detected in any of the samples.

Radioactive release permits for the year 1989 show that no cesium-137 was discharged into the drainage canal from which SHWJ-1 came. Therefore, the presence of the cesium-137 is most likely attributable to fallout from past nuclear weapons detonations or the Chernobyl incident. This assumption is consistent with observations made during the preoperational survey for soil samples collected from the shoreline of the Mississippi River. During the preoperational program, cesium-137 was detected in 13 of 18 soil samples at concentrations ranging between 30 and 890 pCi/kg(dry) with an average concentration of 138 pCi/kg(dry). In 1985, 1986, 1987, and 1988 cesium-137 was detected at this location at levels of 99, 65, 21, and 142 pCi/kg (dry), respectively.

However, conservatively assuming that all of the cesium-137 activity detected in the shoreline sediment at the higher of the two stations, SHWJ-1 originated from the plant, the maximum dose to a member of the general public was calculated. The methodology and assumptions used to calculate the maximum dose were based on the guidance provided in Regulatory Guide 1.109 (10/77). The dose to the maximum exposed individual, a teenager, was calculated by the following equation:

$$R = (40)\ (C)\ (U)\ (D) \qquad (3)$$

where:

R is the annual dose to the skin or the total body in mrem/year;

40 is the area-mass conversion factor given in Appendix A of Regulatory Guide 1.109 in kg/square meter;

C is the radionuclide concentration in the shoreline soil sample in pCi/kg;

U is the maximum exposure time given in Table E-5 of Regulatory Guide 1.109 (67 hours for a teenager) and

D is the external dose conversion factor for standing on contaminated ground given in Table E-6 of Regulatory Guide 1.109 (the values for skin and total body are 4.9E-09 and 4.2E-09 mrem/hr per pCi/square meter, respectively).

Using equation (3), the maximum annual dose to a teenager spending 67 hours at the shoreline of the canal was calculated to be approximately 0.004 mrem/yr to the skin and 0.004 mrem/yr to the total body. Therefore, any radiological impact to the general public resulting from cesium-137 detected in the shoreline soil is insignificant.

3.4 Ingestion Exposure Pathway

3.4.1 Milk

Forty-eight milk samples were collected from two sampling locations and analyzed by a radiochemical procedure for iodine-131. All indicator station measurements were below the lower limits of detection. The samples were also analyzed by gamma spectroscopy. All man-made gamma emitters were below their respective lower limits of detection. Naturally occurring potassium-40 was detected in all samples.

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 all samples.

3.4.3 Broad Leaf Vegetation

Waterford 3 SES Technical Specification 3.12.1 requires broad leaf vegetation to be sampled in the event milk samples are unavailable. Since milk samples could be collected reliably from only one sampling location within five miles of Waterford 3 SES, broad leaf vegetation was sampled monthly at two indicator locations. Broad leaf vegetation was also collected from one control location.

Thirty-three broad leaf vegetation samples were collected and analyzed by a radiochemical procedure for iodine-131. All measurements were below the lower limits of detection. The samples were also analyzed by gamma spectroscopy. Naturally occurring radionuclides were detected in all of the samples, however no man-made radionuclides were detected above their lower limits of detection.

3.4.4 Food/Garden Crops

Three food/garden crop samples were collected and analyzed by a radiochemical procedure for iodine-131. Iodine-131 concentrations were below the lower limit of detection. The samples were also analyzed by gamma spectroscopy. Naturally occurring potassium-40 was the only radionuclide detected in all the samples. All man-made gamma emitters were below their respective lower limits of detection.

3.5 Deviation from the REMP

3.5.1 Unavailable Samples

During 1989 deviations from the REMP sampling schedule occurred. All of the deviations (with the exception of those associated with TLDs) were either the result of equipment malfunctions or the result of natural events beyond the control of LP&L. With respect to equipment malfunctions, the causes leading to the malfunction were identified and maintenance or replacement performed to prevent recurrence of the event. Deviations from the REMP associated with TLDs were beyond the control of LP&L and resulted from theft of a few of the dosimeters placed in the field. When a dosimeter was discovered missing during a monthly inspection, the TLD was replaced and the deviation noted. A listing of all unavailable samples for 1989 along with associated explanations of why the samples were not collected is given in Appendix C. A more detailed explanation for milk and vegetation sample unavailability follows.

Milk samples were not available during 1989 from the animal owners at station MKE-4 and MKQ-1 since neither the goats at MKE-4 nor the cows at MKR-1 are currently producing milk for human consumption. With the absence of milk samples at these stations, broad leaf vegetation sampling was performed.

Broad leaf vegetation was not sampled at the control location during the months of January, February, and March of 1989. No broad leaf vegetation was present at the control location due to cold weather during January, February, and March. Milk samples were available from the control location during each of these months. Control station broad leaf vegetation was sampled even when control station milk samples were available.

3.5.2 Missed Lower Limits of Detection

One lower limit of detection for an air sample, specified in Table 4.12-2 of the Waterford 3 SES Technical Specification 4.12.1, was not attained during 1989. The iodine LLD of 0.089 was above the required value 0.07 pCi/l due to the small sample size from 07/10/89 to 07/17/89 (Appendix C-3).

3.5.3 Changes to the REMP

Additional food product samples were added to the REMP although these were not required. See Section 2.2.4 for explanation.

3.6 Annual Land Use Census Results

In compliance with Waterford 3 SES Technical Specification 4.12.2, the annual land use census was conducted on September 2, 5, and 8, 1989. The nearest residence, garden, and milking animal; in each sector within a five mile radius of the plant, were found by visual inspection and verbal inquiry. The results of the 1989 census are given in Table 3.2. Residence locations were unchanged except for Sectors A and B. Residences previously identified at locations closer to the plant were determined to be non-existant after careful study of the maps. The garden locations which were identified in 1988 differ from those identified in 1989. This is due to the fact that large tracts of soybeans and sugarcane were properly reclassified as food products.

Milk goats were identified in Sector D, however the owner stated that these goats are not producing milk for human consumption. The owner of the animals at station MKQ-1 stated that the cows were not producing milk for human consumption. The owner of milking goats at location MKE-4 stated that the goats were not producing milk for human consumption and that she plans to sell them. Although no samples were available from either of the previously known locations during 1989, the stations will remain as part of the REMP and all three owners will be contacted periodically to determine the status of obtaining samples.

TABLE 3.1

1989 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	16	2.1	8
B	NNE	14	1.2	8
C	NE	9	1.3	4
D	ENE	12	2.0	7
E(a)	E	14	3.9	12
F	ESE	14	1.6	12
G	SE	15	2.4	12
H	SSE	14	1.5	8
J	S	15	3.0	8
K	SSW	12	1.3	4
L	SW	13	0.8	4
M	WSW	12	1.3	4
N	W	15	1.3	4
P	WNW	14	3.3	8
Q	NW	14	2.4	8
R	NNW	13	2.4	8
CONTROL	E	18	1.0	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	13	3.0	63
2 - 5	14	1.9	28
5(a)	15	1.3	28
CONTROL	18	1.0	4

a. Does not include control station data.

TABLE 3.2

1989 ANNUAL LAND USE CENSUS RESULTS

SECTOR	DIRECTION	DISTANCE FROM PLANT (MILES)					
		BEEF COW	MILK COW	MILK GOAT	GARDEN	RESIDENCE	FOOD PRODUCTS
A	N	-	-	-	1.0	0.9	4.1
B	NNE	-	-	-	1.3	1.3	-
C	NE	-	-	-	0.9	0.9	-
D	ENE	-	-	1.0[d]	0.9	0.9	-
E	E	3.2	-	3.3[c]	2.2	2.2	0.3
F	ESE	3.5	-	-	2.2	3.1	0.3
G	SE	4.5	-	-	2.3	4.0	0.3
H	SSE	-	-	-	-	-	0.3
J	S	-	-	-	-	-	0.7
K	SSW	-	-	-	-	-	0.5
L	SW	-	-	-	-	-	0.5
M	WSW	1.2	-	-	1.5	-	0.7
N	W	-	-	-	1.1	1.0	0.7
P	WNW	0.9	-	-	0.9	0.9	0.6
Q	NW	0.9	4.9[a,b]	-	0.9	0.9	0.6
R	NNW	2.3	-	-	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 (MKE-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 the availability of samples.

c Goats at Location MKE-4 are currently not producing milk for human consumption. The owner will be selling her goats in the near future. The location MKE-4 should be removed from the ODCM when the goats are removed.

d Goats located 1.0 miles ENE of the plant in Sector D 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 the availability of samples.

4.0 CONCLUSIONS

The radiological environmental data collected during 1989 are consistent with the data obtained during the prior four years of plant operation (1985-88), the Preoperational Environmental Radiological Surveillance (PERS) Program, and the first two years of the REMP prior to Waterford 3 SES initial criticality (1983-84). The only man-made radionuclides detected in the environmental samples analyzed during 1989 were cesium-137 and tritium.

Cesium-137 was detected in two shoreline soil samples. The detected activity in both instances was at levels less than the required Technical Specification's lower limits of detection and far below levels requiring notification. The origin of this man-made radioactivity is most likely attributable to fallout from past nuclear weapons detonations or the Chernobyl accident.

Tritium was detected in two drinking water and two groundwater samples. Tritium is naturally produced as well as man-made. Due to the large error, the low levels, and the presence of tritium in samples taken prior to Waterford 3 SES operation, it is not likely that Waterford 3 operations were responsible for the presence of tritium in the environment.

In conclusion, based on the evaluation of the REMP data collected during 1989 the operation of Waterford 3 SES had no significant radiological impact on the environment.

APPENDIX A
REMP DATA SUMMARY

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION* (LLD)	ALL INDICATOR LOCATIONS MEAN** (RANGE)**	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN** (RANGE)**	CONTROL LOCATION MEAN** (RANGE)**	NUMBER OF NONROUTINE REPORTED MEASUREMENT
1. Direct Radiation (area/Std. Qtr.)	TLD	123	(c)	14(119/119) (8-24)	G-2 1.2 miles SE	17(4/4) (15-20)	E-30 18(4/4) (16-18)	0
2. Airborne Particulates (10^{-3} pCi/m^3)	Gross Beta	258	10	16(206/206) (3-38)	APG-1 0.5 miles SE	17(50/52) (4-38)	APE-30 19(52/52) (6-37)	2
	Gamma	20	(d)	<LLD (0/16) (-)	NA	NA	APE-30 <LLD (0/4) (-)	0
3. Airborne Iodine (10^{-3} pCi/m^3)	I-131	250	70	<LLD (0/206) (-)	NA	NA	APE-30 <LLD (0/52) (-)	0

NOTE: Footnotes at end of table.

W391147.SA

TABLE A-1 (Cont.)

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION[a] (LLD)	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b]	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENT
4. Drinking Water (pCi/l)	Gross Beta	45	4	5(22/31) (3-10)	DRG-2 2.0 miles ESE	6(11/14) (4-10)	DRP-7 5(9/14) (3-8)	0
	I-131	78	1	<LLD (0/52) (-)	NA	NA	DRP-7 0.5(1/26) (-)	0
	Gamma	51	(d)	<LLD (0/35) (-)	NA	NA	DRP-7 <LLD (0/16) (-)	0
	Tritium	12	2000	280(1/8) (-)	DRG-2 2.0 miles ESE	NA	DRP-7 480(1/4) (-)	0

NOTE: Footnotes at end of table.

W391147.SA

TABLE A-1 (Cont.)

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION[a] (LLD)	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b]	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENT
5. Surface Water (pCi/l)	Gross Beta	45	4	5(22/31) (3-10)	SWG-2 2.0 miles ESE	6(11/14) (4-10)	SWP-7 5(9/14) (3-8)	0
	I-131	78	1	<LLD (0/52) (-)	NA	NA	SWP-7 0.5(1/26) (-)	
	Gamma	51	(d)	<LLD (0/35) (-)	NA	NA	SWP-7 <LLD (0/16) (-)	0
	Tritium	12	2000	280(1/8) (-)	SWG-2 2.0 miles ESE	NA	SWP-7 480(1/4) (-)	0

NOTE: Footnotes at end of table.

W91147.SA

TABLE A-1 (Cont.)

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION[a] (LLD)	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b]	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATIONS MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
6. Groundwater (pCi/l)	Gamma	4	(d)	<LLD (0/4) (-)	NA	NA	NONE	0
	Tritium	4	2000	360(2/4) (290-430)	GSJ-1	360(2/4) (290-430)	NONE	0
7. Shoreline Sediment (pCi/kg-dry)	Gamma Cs-137	4	180	31(2/4) (28-33)	SWSJ-3 3.0 miles E	33(1/2) (-)	NONE	0

NOTE: Footnotes at end of table.

W391147.SA

TABLE A-1 (Cont.)

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION[a] (LLD)	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b]	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION (RANGE)[b]		CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
8. Milk (pCi/l)	I-131	48	1	<LLD (0/24) (-)	NA	NA	WKQ-45 1.1 (1/24) (-)	0
	Gamma Cs-137	48	18	<LLD (0/24) (-)	NA	NA	WKQ-45 <LLD (0/24) (-)	0
9. Fish (pCi/kg-wet)	Gamma	16	(d)	<LLD (0/8) (-)	NA	NA	PH-1 <LLD (0/8) (-)	0

NOTE: Footnotes at end of table.

W391174.SA

TABLE A-1 (Cont.)

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, 1989

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION[a] (LLD)	ALL INDICATOR LOCATIONS MEAN[b] (RANGE)[b]	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN[b] (RANGE)[b]	CONTROL LOCATION MEAN[b] (RANGE)[b]	NUMBER OF NONROUTINE REPORTED MEASUREMENT
10. Broad Leaf Vegetation (pCi/kg-wet)	I-131	33	60	<LLD (0/24) (-)	NA	NA	BLK-15 <LLD (0/9) (-)	0
	Gamma	33	(d)	<LLD (0/24) (-)	NA	NA	BLK-15 <LLD (0/9) (-)	0
11. Food/Garden Crop (pCi/kg-wet)	Gamma	3	(d)	<LLD (0/3) (-)	NA	NA	NONE	0

NOTE: Footnotes at end of table.

W391174.SA

TABLE A-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

FOOTNOTES

[a]Nominal Lower Limit of Detection (LLD) as defined in Waterford 3 SES Technical Specifications.

[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 SES Technical Specifications.

[d]Lower Limit of Detection (LLD) for individual radionuclides using gamma spectroscopy are given in Waterford 3 SES Technical Specifications.

APPENDIX B
REMP DATA

TABLE B-1

QUARTERLY TLD DOSE RATES

LOCATION	1ST QUARTER (01/12-04/06) DOSE RATE (mrem/std qtr)	2ND QUARTER (04/06-07/06) DOSE RATE (mrem/std qtr)	3RD QUARTER (07/06-10/05) DOSE RATE (mrem std qtr)	4TH QUARTER (10/05-01/04) DOSE RATE (mrem/std qtr)	AVERAGE DOSE RATE (mrem/std qtr)
A-2	17	15	19	15	17
A-5	15	13	17	13	15
B-1	16	13	15	13	14
B-4	15	13	15	14	14
C-1	11	08	09	09	09
D-2	NA	10	12	11**	11
D-5	14	12	16	12	14
E-1	24	10	11	10	14
E-5	18	15	12	12	14
E-15	15**	14	15	14	15
E-30	18	18	18	16	18
F-2	15	12	13	12	13
F-4	15	17	16	14	16
F-9	15	13	13	13	14
G-2	20	15	16	15	17
G-4	14	11	14	12	15
G-9	16	13	17	14	14
H-2	15	14	15	14	15
H-6	13	12	15	15	14
J-2	14	22**	14	13	16
J-15	16	13	14	13	14
K-1	14	11	12	12	12
L-1	14	12	13	13	13
M-1	12	11	14	12	12
N-1	15	13	14	16	15
P-1	19	10	12	09**	13
P-6	16	15	16	15	16
Q-1	14	11	12	12	12
Q-5	16	18	15	15	16
R-1	12	10	12	11	11
R-6	16	15	16	15	16
Average	15	13	14	13	

NA - Results not Available: See Table C-5 for Explanation

* - One TLD in package damaged - See Table C-5

** - TLD stolen, replaced - See Table C-5

TABLE B-2

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

SAMPLE LOCATION: APC-1 | SAMPLE TYPE: AIR PARTICULATES | UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
890016	12/27/88	01/03/89	0.019+/-0.003
890038	01/03/89	01/09/89	0.014+/-0.003
890096	01/09/89	01/16/89	0.008+/-0.002
890142	01/16/89	01/23/89	0.023+/-0.003
890170	01/23/89	01/30/89	0.022+/-0.003
890207	01/30/89	02/06/89	0.006+/-0.002
890236	02/06/89	02/13/89	0.027+/-0.003
890291	02/13/89	02/20/89	0.018+/-0.003
890327	02/20/89	02/27/89	0.023+/-0.003
890376	02/27/89	03/06/89	0.010+/-0.003
890421	03/06/89	03/13/89	0.020+/-0.003
890479	03/13/89	03/20/89	0.021+/-0.003
890503	03/20/89	03/27/89	0.011+/-0.002
890533	03/27/89	04/03/89	0.010+/-0.003
890594	04/03/89	04/10/89	0.014+/-0.003
890663	04/10/89	04/17/89	0.020+/-0.003
890713	04/17/89	04/24/89	0.022+/-0.003
890746	04/24/89	05/01/89	0.014+/-0.002
890778	05/01/89	05/08/89	0.017+/-0.003
890834	05/08/89	05/15/89	0.014+/-0.003
890879	05/15/89	05/22/89	0.016+/-0.003
890915	05/22/89	05/30/89	0.022+/-0.002
890944	05/30/89	06/05/89	0.008+/-0.003
890998	06/05/89	06/12/89	0.009+/-0.002
891033	06/12/89	06/19/89	0.014+/-0.002
891091	06/19/89	06/27/89	0.008+/-0.002

TABLE B-2 (continued)

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

SAMPLE LOCATION: APC-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	GROSS BETA
891112	06/27/89 07/03/89	0.015+/-0.003
891171	07/03/89 07/10/89	0.009+/-0.002
891215	07/10/89 07/17/89	0/007+/-0.002
891292	07/17/89 07/24/89	0.009+/-0.002
891316	07/24/89 08/01/89	0.009+/-0.002
891354	08/01/89 08/07/89	0.012+/-0.003
891406	08/07/89 08/14/89	0.016+/-0.003
891442	08/14/89 08/21/89	0.018+/-0.003
891472	08/21/89 08/28/89	0.003+/-0.002
891528	08/28/89 09/05/89	0.009+/-0.002
891577	09/05/89 09/11/89	0.007+/-0.003
891606	09/11/89 09/18/89	0.015+/-0.003
891642	09/18/89 09/25/89	0.022+/-0.003
891707	09/25/89 10/02/89	0.011+/-0.003
891776	10/02/89 10/09/89	0.030+/-0.003
891819	10/09/89 10/16/89	0.024+/-0.003
891855	10/16/89 10/23/89	0.016+/-0.003
891912	10/23/89 10/30/89	0.022+/-0.003
891953	10/30/89 11/06/89	0.028+/-0.003
891990	11/06/89 11/13/89	0.016+/-0.003
892020	11/13/89 11/20/89	0.021+/-0.003
892043	11/20/89 11/27/89	0.022+/-0.003
892076	11/27/89 12/04/89	0.025+/-0.003
892141	12/04/89 12/11/89	0.013+/-0.003
892170	12/11/89 12/18/89	0.027+/-0.003
892216	12/18/89 12/26/89	0.036+/-0.003

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1

SAMPLE TYPE: AIR PARTICULATES

UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
890013	12/27/88	01/03/89	0.010+/-0.002
890035	01/03/89	01/09/89	0.021+/-0.003
890093	01/09/89	01/16/89	0.010+/-0.002
890139	01/16/89	01/23/89	0.017+/-0.003
890167	01/23/89	01/30/89	0.022+/-0.003
890204	01/30/89	02/06/89	0.010+/-0.002
890233	02/06/89	02/13/89	0.026+/-0.003
890288 *	02/13/89	02/20/89	0.018+/-0.005
890324	02/21/89	02/27/89	0.029+/-0.004
890373	02/27/89	03/06/89	0.010+/-0.003
890418	03/06/89	03/13/89	0.021+/-0.003
890476	03/13/89	03/20/89	0.024+/-0.003
890500	03/20/89	03/27/89	0.011+/-0.002
890530	03/27/89	04/03/89	0.009+/-0.003
890591	04/03/89	04/10/89	0.014+/-0.003
890660	04/10/89	04/17/89	0.022+/-0.003
890710	04/17/89	04/24/89	0.022+/-0.003
890743	04/24/89	05/01/89	0.010+/-0.003
890775	05/01/89	05/08/89	0.016+/-0.003
890831	05/08/89	05/15/89	0.013+/-0.003
890876	05/15/89	05/22/89	0.016+/-0.002
890912	05/22/89	05/30/89	0.010+/-0.002
890941	05/30/89	06/05/89	0.008+/-0.003
890995	06/05/89	06/12/89	0.011+/-0.002
891030	06/12/89	06/19/89	0.013+/-0.002
891088	06/19/89	06/27/89	0.009+/-0.002

* SEE APPENDIX C-1 FOR EXPLANATION

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
891109	06/27/89	07/03/89	0.016+/-0.003
891168	07/03/89	07/10/89	0.011+/-0.002
891212 *	07/10/89	07/17/89	< 0.010
891289	07/17/89	07/24/89	0.008+/-0.002
891313	07/24/89	08/01/89	0.007+/-0.002
891351	08/01/89	08/07/89	0.009+/-0.003
891403	08/07/89	08/14/89	0.015+/-0.002
891439	08/14/89	08/21/89	0.017+/-0.002
891469	08/21/89	08/28/89	0.004+/-0.002
891525	08/28/89	09/05/89	0.010+/-0.002
891574	09/05/89	09/11/89	0.008+/-0.003
891603	09/11/89	09/18/89	0.016+/-0.003
891639	09/18/89	09/25/89	0.026+/-0.003
891704	09/25/89	10/02/89	0.009+/-0.002
891773	10/02/89	10/09/89	0.035+/-0.003
891816	10/09/89	10/16/89	0.024+/-0.003
891852	10/16/89	10/23/89	0.019+/-0.003
891909	10/23/89	10/30/89	0.029+/-0.003
891950	10/30/89	11/06/89	0.030+/-0.003
891987	11/06/89	11/13/89	0.015+/-0.003
892017	11/13/89	11/20/89	0.018+/-0.003
892040	11/20/89	11/27/89	0.019+/-0.003
892073	11/27/89	12/04/89	0.025+/-0.003
892138	12/04/89	12/11/89	0.013+/-0.003
**	12/11/89	12/18/89	SAMPLE MISSING
892213	12/18/89	12/26/89	0.038+/-0.003

* SEE APPENDIX C 3 FOR EXPLAINATION
** SEE APPENDIX C 4 FOR EXPLAINATION

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
890015	12/27/88	01/03/89	0.015+/-0.003
890037	01/03/89	01/09/89	0.019+/-0.003
890095	01/09/89	01/16/89	0.008+/-0.002
890141	01/16/89	01/23/89	0.020+/-0.003
890169	01/23/89	01/30/89	0.019+/-0.003
890206	01/30/89	02/06/89	0.006+/-0.002
890235	02/06/89	02/13/89	0.023+/-0.003
890290	02/13/89	02/20/89	0.019+/-0.003
890326	02/20/89	02/27/89	0.022+/-0.003
890375	02/27/89	03/06/89	0.009+/-0.002
890420	03/06/89	03/13/89	0.016+/-0.003
890478	03/13/89	03/20/89	0.020+/-0.003
890502	03/20/89	03/27/89	0.012+/-0.002
890532	03/27/89	04/03/89	0.010+/-0.003
890593	04/03/89	04/10/89	0.014+/-0.003
890662	04/10/89	04/17/89	0.026+/-0.003
890712	04/17/89	04/24/89	0.022+/-0.003
890745	04/24/89	05/01/89	0.014+/-0.002
890777	05/01/89	05/08/89	0.015+/-0.003
890833	05/08/89	05/15/89	0.015+/-0.003
890878	05/15/89	05/22/89	0.016+/-0.002
890914	05/22/89	05/30/89	0.022+/-0.002
890943	05/30/89	06/05/89	0.008+/-0.002
890997	06/05/89	06/12/89	0.013+/-0.002
891032	06/12/89	06/19/89	0.012+/-0.002
891090	06/19/89	06/27/89	0.009+/-0.002

W391174.SA

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	GROSS BETA
891111	06/27/89 07/03/89	0.013+/-0.003
891170	07/03/89 07/10/89	0.009+/-0.002
891214	07/10/89 07/17/89	0.007+/-0.002
891291	07/17/89 07/24/89	0.008+/-0.002
891315	07/24/89 08/01/89	0.010+/-0.002
891353	08/01/89 08/07/89	0.008+/-0.003
891405	08/07/89 08/14/89	0.013+/-0.002
891441	08/14/89 08/21/89	0.019+/-0.003
891471	08/21/89 08/28/89	0.006+/-0.002
891527	08/28/89 09/05/89	0.009+/-0.002
891576	09/05/89 09/11/89	0.008+/-0.003
891605	09/11/89 09/18/89	0.014+/-0.003
891641	09/18/89 09/25/89	0.017+/-0.003
891706	09/25/89 10/02/89	0.008+/-0.002
891775	10/02/89 10/09/89	0.031+/-0.003
891818	10/09/89 10/16/89	0.024+/-0.003
891854	10/16/89 10/23/89	0.016+/-0.003
891911	10/23/89 10/30/89	0.029+/-0.003
891952	10/30/89 11/06/89	0.031+/-0.003
891989	11/06/89 11/13/89	0.017+/-0.003
892019	11/13/89 11/20/89	0.018+/-0.003
892042	11/20/89 11/27/89	0.021+/-0.003
892075	11/27/89 12/04/89	0.022+/-0.003
892140	12/04/89 12/11/89	0.016+/-0.003
892169	12/11/89 12/18/89	0.028+/-0.003
892215	12/18/89 12/26/89	0.036+/-0.003

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
890014	12/27/88	01/03/89	0.014+/-0.002
890036	01/03/89	01/09/89	0.018+/-0.003
890094	01/09/89	01/16/89	0.007+/-0.002
890140	01/16/89	01/23/89	0.018+/-0.003
890168	01/23/89	01/30/89	0.022+/-0.003
890205	01/30/89	02/06/89	0.005+/-0.002
890234	02/06/89	02/13/89	0.021+/-0.003
890289	02/13/89	02/20/89	0.017+/-0.003
890325	02/20/89	02/27/89	0.020+/-0.003
890374	02/27/89	03/06/89	0.010+/-0.002
890419	03/06/89	03/13/89	0.018+/-0.003
890477	03/13/89	03/20/89	0.023+/-0.003
890501	03/20/89	03/27/89	0.013+/-0.003
890531	03/27/89	04/03/89	0.009+/-0.003
890592	04/03/89	04/10/89	0.013+/-0.003
890661	04/10/89	04/17/89	0.018+/-0.003
890711	04/17/89	04/24/89	0.025+/-0.003
890744	04/24/89	05/01/89	0.012+/-0.002
890776	05/01/89	05/08/89	0.014+/-0.003
890832	05/08/89	05/15/89	0.014+/-0.003
890877	05/15/89	05/22/89	0.016+/-0.002
890913	05/22/89	05/30/89	0.021+/-0.002
890942	05/30/89	06/05/89	0.007+/-0.003
890996	06/05/89	06/12/89	0.010+/-0.002
891031	06/12/89	06/19/89	0.013+/-0.002
891089	06/19/89	06/27/89	0.008+/-0.002

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	GROSS BETA
891110	06/27/89 07/03/89	0.014+/-0.003
891169	07/03/89 07/10/89	0.010+/-0.002
891213	07/10/89 07/17/89	0.006+/-0.002
891290	07/17/89 07/24/89	0.009+/-0.002
891314	07/24/89 08/01/89	0.006+/-0.002
891352	08/01/89 08/07/89	0.006+/-0.003
891404	08/07/89 08/14/89	0.013+/-0.002
891440	08/14/89 08/21/89	0.017+/-0.003
891470	08/21/89 08/28/89	0.005+/-0.002
891525	08/28/89 09/05/89	0.010+/-0.002
891574	09/05/89 09/11/89	0.008+/-0.003
891603	09/11/89 09/18/89	0.016+/-0.003
891639	09/18/89 09/25/89	0.026+/-0.003
891705	09/25/89 10/02/89	0.011+/-0.003
891774	10/02/89 10/09/89	0.027+/-0.003
891817	10/09/89 10/16/89	0.023+/-0.003
891853	10/16/89 10/23/89	0.016+/-0.003
891910	10/23/89 10/30/89	0.028+/-0.003
891951	10/30/89 11/06/89	0.029+/-0.003
891988	11/06/89 11/13/89	0.011+/-0.003
892018	11/13/89 11/20/89	0.018+/-0.003
892041	11/20/89 11/27/89	0.022+/-0.003
892074	11/27/89 12/04/89	0.021+/-0.003
892139	12/04/89 12/11/89	0.013+/-0.003
892168	12/11/89 12/18/89	0.028+/-0.003
892214	12/18/89 12/26/89	0.033+/-0.003

W391174.SA

TABLE B-2 (continued)

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

SAMPLE LOCATION: APE-30 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		GROSS BETA
890017	12/27/88	01/03/89	0.022+/-0.003
890039	01/03/89	01/09/89	0.026+/-0.003
890097	01/09/89	01/16/89	0.009+/-0.002
890143	01/16/89	01/23/89	0.027+/-0.003
890171	01/23/89	01/30/89	0.022+/-0.003
890208	01/30/89	02/06/89	0.007+/-0.002
890237	02/06/89	02/13/89	0.029+/-0.003
890292 *	02/13/89	02/21/89	0.017+/-0.002
890328	02/21/89	02/27/89	0.023+/-0.003
890377	02/27/89	03/06/89	0.008+/-0.003
890422	03/06/89	03/13/89	0.020+/-0.003
890480	03/13/89	03/20/89	0.023+/-0.003
890504	03/20/89	03/27/89	0.010+/-0.002
890534	03/27/89	04/03/89	0.013+/-0.003
890595 *	04/03/89	04/10/89	0.030+/-0.00[illegible]
890664	04/10/89	04/17/89	0.021+/-0.00[illegible]
890714	04/17/89	04/24/89	0.022+/-0.00[illegible]
890747	04/24/89	05/01/89	0.015+/-0.002
890779	05/01/89	05/08/89	0.018+/-0.003
890835	05/08/89	05/15/89	0.017+/-0.003
890880	05/15/89	05/22/89	0.019+/-0.003
890916	05/22/89	05/30/89	0.025+/-0.003
890945	05/30/89	06/05/89	0.008+/-0.003
890999	06/05/89	06/12/89	0.013+/-0.002
891034	06/12/89	06/19/89	0.015+/-0.003
891092	06/19/89	06/27/89	0.010+/-0.002

* LOW SAMPLE VOLUME

TABLE B-2 (continued)

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

SAMPLE LOCATION: APE-30 SAMPLE TYPE: AIR PARTICULATES UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	GROSS BETA
891113	06/27/89 07/03/89	0.018+/-0.003
891172	07/03/89 07/10/89	0.011+/-0.002
891216	07/10/89 07/17/89	0.009+/-0.002
891293	07/17/89 07/24/89	0.010+/-0.002
891317	07/24/89 08/01/89	0.010+/-0.002
891355	08/01/89 08/07/89	0.010+/-0.003
891407	08/07/89 08/14/89	0.017+/-0.003
891443	08/14/89 08/21/89	0.021+/-0.003
891473	08/21/89 08/28/89	0.006+/-0.002
891529	08/28/89 09/05/89	0.010+/-0.002
891578	09/05/89 09/11/89	0.010+/-0.003
891608	09/11/89 09/18/89	0.019+/-0.003
891643	09/18/89 09/25/89	0.024+/-0.00[illegible]
891708	09/25/89 10/02/89	0.012+/-0.003
891777	10/02/89 10/09/89	0.034+/-0.003
891820	10/09/89 10/16/89	0.027+/-0.003
891856	10/16/89 10/23/89	0.018+/-0.003
891913	10/23/89 10/30/89	0.030+/-0.003
891954	10/30/89 11/06/89	0.034+/-0.003
891991	11/06/89 11/13/89	0.015+/-0.003
892021	11/13/89 11/20/89	0.019+/-0.003
892044	11/20/89 11/27/89	0.022+/-0.003
892077	11/27/89 12/04/89	0.026+/-0.003
892142	12/04/89 12/11/89	0.017+/-0.003
892171	12/11/89 12/18/89	0.029+/-0.003
892217	12/18/89 12/26/89	0.037+/-0.003

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1

SAMPLE TYPE: AIR IODINE

UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
890013	12/27/88	01/03/89	< 0.009
890035	01/03/89	01/09/89	< 0.006
890093	01/09/89	01/16/89	< 0.014
890139	01/16/89	01/23/89	< 0.010
890167	01/23/89	01/30/89	< 0.008
890204	01/30/89	02/06/89	< 0.009
890233	02/06/89	02/13/89	< 0.016
890288 *	02/13/89	02/20/89	< 0.024
890324	02/21/89	02/27/89	< 0.011
890373	02/27/89	03/06/89	< 0.008
890418	03/06/89	03/13/89	< 0.046
890476	03/13/89	03/20/89	< 0.027
890500	03/20/89	03/27/89	< 0.020
890530	03/27/89	04/03/89	< 0.017
890591	04/03/89	04/10/89	< 0.029
890660	04/10/89	04/17/89	< 0.035
890710	04/17/89	04/24/89	< 0.024
890743	04/24/89	05/01/89	< 0.019
890775	05/01/89	05/08/89	< 0.034
890831	05/08/89	05/15/89	< 0.020
890876	05/15/89	05/22/89	< 0.027
890912	05/22/89	05/30/89	< 0.023
890941	05/30/89	06/05/89	< 0.031
890995	06/05/89	06/12/89	< 0.026
891030	06/12/89	06/19/89	< 0.022
891088	06/19/89	06/27/89	< 0.018

* SEE APPENDIX C-1 FOR EXPLANATION

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
891109	06/27/89	07/03/89	< 0.042
891168	07/03/89	07/10/89	< 0.019
891212 *	07/10/89	07/17/89	< 0.089
891289	07/17/89	07/24/89	< 0.029
891313	07/24/89	08/01/89	< 0.022
891351	08/01/89	08/07/89	< 0.030
891403	08/07/89	08/14/89	< 0.024
891439	08/14/89	08/21/89	< 0.019
891469	08/21/89	08/28/89	< 0.017
891525	08/28/89	09/05/89	< 0.021
891574	09/05/89	09/11/89	< 0.033
891603	09/11/89	09/18/89	< 0.020
891639	09/18/89	09/25/89	< 0.024
891704	09/25/89	10/02/89	< 0.033
891773	10/02/89	10/09/89	< 0.024
891816	10/09/89	10/16/89	< 0.019
891852	10/16/89	10/23/89	< 0.025
891909	10/23/89	10/30/89	< 0.027
891950	10/30/89	11/06/89	< 0.036
891987	11/06/89	11/13/89	< 0.023
892017	11/13/89	11/20/89	< 0.017
892040	11/20/89	11/27/89	< 0.016
892073	11/27/89	12/04/89	< 0.037
892138	12/04/89	12/11/89	< 0.020
SAMPLE MISSING **	12/11/89	12/18/89	
892213	12/18/89	12/26/89	< 0.049

* SEE APPENDIX C-3 FOR EXPLAINATION
** SEE APPENDIX C-4 FOR EXPLAINATION

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
890014			< 0.009
890036	12/27/88	01/03/89	< 0.006
890094	01/03/89	01/09/89	< 0.014
890140	01/09/89	01/16/89	< 0.010
890168	01/16/89	01/23/89	< 0.008
	01/23/89	01/30/89	
890205			< 0.009
890234	01/30/89	02/06/89	< 0.016
890289	02/06/89	02/13/89	< 0.024
890325	02/13/89	02/20/89	< 0.011
	02/20/89	02/27/89	
890374			< 0.008
890419	02/27/89	03/06/89	< 0.046
890477	03/06/89	03/13/89	< 0.027
890501	03/13/89	03/20/89	< 0.020
	03/20/89	03/27/89	
890531			< 0.017
890592	03/27/89	04/03/89	< 0.029
890661	04/03/89	04/10/89	< 0.035
890711	04/10/89	04/17/89	< 0.024
	04/17/89	04/24/89	
890744			< 0.019
890776	04/24/89	05/01/89	< 0.034
890832	05/01/89	05/08/89	< 0.020
890877	05/08/89	05/15/89	< 0.027
890913	05/15/89	05/22/89	< 0.023
	05/22/89	05/30/89	
890942			< 0.031
890996	05/30/89	06/05/89	< 0.026
891031	06/05/89	06/12/89	< 0.022
891089	06/12/89	06/19/89	< 0.018
	06/19/89	06/27/89	

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1 | SAMPLE TYPE: AIR IODINE | UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	I-131
891110	06/27/89 07/03/89	< 0.042
891169	07/03/89 07/10/89	< 0.019
891213	07/10/89 07/17/89	< 0.029
891290	07/17/89 07/24/89	< 0.029
891314	07/24/89 08/01/89	< 0.022
891352	08/01/89 08/07/89	< 0.030
891404	08/07/89 08/14/89	< 0.024
891440	08/14/89 08/21/89	< 0.019
891470	08/21/89 08/28/89	< 0.017
891525	08/28/89 09/05/89	< 0.021
891574	09/05/89 09/11/89	< 0.033
891603	09/11/89 09/18/89	< 0.020
891639	09/18/89 09/25/89	< 0.024
891705	09/25/89 10/02/89	< 0.033
891774	10/02/89 10/09/89	< 0.024
891817	10/09/89 10/16/89	< 0.019
891853	10/16/89 10/23/89	< 0.025
891910	10/23/89 10/30/89	< 0.027
891951	10/30/89 11/06/89	< 0.036
891988	11/06/89 11/13/89	< 0.023
892018	11/13/89 11/20/89	< 0.017
892041	11/20/89 11/27/89	< 0.016
892074	11/27/89 12/04/89	< 0.037
892139	12/04/89 12/11/89	< 0.020
892168	12/11/89 12/18/89	< 0.025
892214	12/18/89 12/26/89	< 0.049

TABLE B-2 (continued)

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

SAMPLE LOCATION: APC-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
890016	12/27/88	01/03/89	< 0.009
890038	01/03/89	01/09/89	< 0.006
890096	01/09/89	01/16/89	< 0.014
890142	01/16/89	01/23/89	< 0.010
890170	01/23/89	01/30/89	< 0.008
890207	01/30/89	02/06/89	< 0.009
890236	02/06/89	02/13/89	< 0.016
890291	02/13/89	02/20/89	< 0.024
890327	02/20/89	02/27/89	< 0.011
890376	02/27/89	03/06/89	< 0.008
890421	03/06/89	03/13/89	< 0.046
890479	03/13/89	03/20/89	< 0.027
890503	03/20/89	03/27/89	< 0.020
890533	03/27/89	04/03/89	< 0.017
890594	04/03/89	04/10/89	< 0.029
890663	04/10/89	04/17/89	< 0.035
890713	04/17/89	04/24/89	< 0.024
890746	04/24/89	05/01/89	< 0.019
890778	05/01/89	05/08/89	< 0.034
890834	05/08/89	05/15/89	< 0.020
890879	05/15/89	05/22/89	< 0.027
890915	05/22/89	05/30/89	< 0.023
890944	05/30/89	06/05/89	< 0.031
890998	06/05/89	06/12/89	< 0.026
891033	06/12/89	06/19/89	< 0.022
891091	06/19/89	06/27/89	< 0.018

TABLE B-2 (continued)

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

SAMPLE LOCATION: APC-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	I-131
891112	06/27/89 07/03/89	< 0.042
891171	07/03/89 07/10/89	< 0.019
891215	07/10/89 07/17/89	< 0.029
891292	07/17/89 07/24/89	< 0.029
891316	07/24/89 08/01/89	< 0.022
891354	08/01/89 08/07/89	< 0.030
891406	08/07/89 08/14/89	< 0.024
891442	08/14/89 08/21/89	< 0.019
891472	08/21/89 08/28/89	< 0.017
891528	08/28/89 09/05/89	< 0.021
891577	09/05/89 09/11/89	< 0.033
891606	09/11/89 09/18/89	< 0.020
891642	09/18/89 09/25/89	< 0.024
891707	09/25/89 10/02/89	< 0.033
891776	10/02/89 10/09/89	< 0.024
891819	10/09/89 10/16/89	< 0.019
891855	10/16/89 10/23/89	< 0.025
891912	10/23/89 10/30/89	< 0.027
891953	10/30/89 11/06/89	< 0.036
891990	11/06/89 11/13/89	< 0.023
892020	11/13/89 11/20/89	< 0.017
892043	11/20/89 11/27/89	< 0.016
892076	11/27/89 12/04/89	< 0.037
892141	12/04/89 12/11/89	< 0.020
892170	12/11/89 12/18/89	< 0.025
892216	12/18/89 12/26/89	< 0.049

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
890015	12/27/88	01/03/89	< 0.009
890037	01/03/89	01/09/89	< 0.006
890095	01/09/89	01/16/89	< 0.014
890141	01/16/89	01/23/89	< 0.010
890169	01/23/89	01/30/89	< 0.008
890206	01/30/89	02/06/89	< 0.009
890235	02/06/89	02/13/89	< 0.016
890290	02/13/89	02/20/89	< 0.024
890326	02/20/89	02/27/89	< 0.011
890375	02/27/89	03/06/89	< 0.008
890420	03/06/89	03/13/89	< 0.046
890478	03/13/89	03/20/89	< 0.027
890502	03/20/89	03/27/89	< 0.020
890532	03/27/89	04/03/89	< 0.017
890593	04/03/89	04/10/89	< 0.029
890662	04/10/89	04/17/89	< 0.035
890712	04/17/89	04/24/89	< 0.024
890745	04/24/89	05/01/89	< 0.019
890777	05/01/89	05/08/89	< 0.034
890833	05/08/89	05/15/89	< 0.020
890878	05/15/89	05/22/89	< 0.027
890914	05/22/89	05/30/89	< 0.023
890943	05/30/89	06/05/89	< 0.031
890997	06/05/89	06/12/89	< 0.026
891032	06/12/89	06/19/89	< 0.022
891090	06/19/89	06/27/89	< 0.018

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	I-131
891111	06/27/89 07/03/89	< 0.042
891170	07/03/89 07/10/89	< 0.019
891214	07/10/89 07/17/89	< 0.029
891291	07/17/89 07/24/89	< 0.029
891315	07/24/89 08/01/89	< 0.022
891353	08/01/89 08/07/89	< 0.030
891405	08/07/89 08/14/89	< 0.024
891441	08/14/89 08/21/89	< 0.019
891471	08/21/89 08/28/89	< 0.017
891527	08/28/89 09/05/89	< 0.021
891576	09/05/89 09/11/89	< 0.033
891605	09/11/89 09/18/89	< 0.020
891641	09/18/89 09/25/89	< 0.024
891706	09/25/89 10/02/89	< 0.033
891775	10/02/89 10/09/89	< 0.024
891818	10/09/89 10/16/89	< 0.019
891854	10/16/89 10/23/89	< 0.025
891911	10/23/89 10/30/89	< 0.027
891952	10/30/89 11/06/89	< 0.036
891989	11/06/89 11/13/89	< 0.023
892019	11/13/89 11/20/89	< 0.017
892042	11/20/89 11/27/89	< 0.016
892075	11/27/89 12/04/89	< 0.037
892140	12/04/89 12/11/89	< 0.020
892169	12/11/89 12/18/89	< 0.025
892215	12/18/89 12/26/89	< 0.049

TABLE B-2 (continued)

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

SAMPLE LOCATION: APE-30 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD		I-131
890017	12/27/88	01/03/89	< 0.009
890039	01/03/89	01/09/89	< 0.006
890097	01/09/89	01/16/89	< 0.014
890143	01/16/89	01/23/89	< 0.010
890171	01/23/89	01/30/89	< 0.008
890208	01/30/89	02/06/89	< 0.009
890237	02/06/89	02/13/89	< 0.016
890292 *	02/13/89	02/21/89	< 0.024
890328	02/21/89	02/27/89	< 0.011
890377	02/27/89	03/06/89	< 0.008
890422	03/06/89	03/13/89	< 0.046
890480	03/13/89	03/20/89	< 0.027
890504	03/20/89	03/27/89	< 0.020
890534	03/27/89	04/03/89	< 0.017
890595 *	04/03/89	04/10/89	< 0.029
890664	04/10/89	04/17/89	< 0.035
890714	04/17/89	04/24/89	< 0.024
890747	04/24/89	05/01/89	< 0.019
890779	05/01/89	05/08/89	< 0.034
890835	05/08/89	05/15/89	< 0.020
890880	05/15/89	05/22/89	< 0.027
890916	05/22/89	05/30/89	< 0.023
890945	05/30/89	06/05/89	< 0.031
890999	06/05/89	06/12/89	< 0.026
891034	06/12/89	06/19/89	< 0.022
891092	06/19/89	06/27/89	< 0.018

* LOW SAMPLE VOLUME

TABLE B-2 (continued)

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

SAMPLE LOCATION: APE-30 SAMPLE TYPE: AIR IODINE UNITS: pCi/CUBIC METER

LAB NO.	COLLECTION PERIOD	I-131
891113	06/27/89 07/03/89	< 0.042
891172	07/03/89 07/10/89	< 0.019
891216	07/10/89 07/17/89	< 0.029
891293	07/17/89 07/24/89	< 0.029
891317	07/24/89 08/01/89	< 0.022
891355	08/01/89 08/07/89	< 0.030
891407	08/07/89 08/14/89	< 0.024
891443	08/14/89 08/21/89	< 0.019
891473	08/21/89 08/28/89	< 0.017
891529	08/28/89 09/05/89	< 0.021
891578	09/05/89 09/11/89	< 0.033
891608	09/11/89 09/18/89	< 0.020
891643	09/18/89 09/25/89	< 0.024
891708	09/25/89 10/02/89	< 0.033
891777	10/02/89 10/09/89	< 0.024
891820	10/09/89 10/16/89	< 0.019
891856	10/16/89 10/23/89	< 0.025
891913	10/23/89 10/30/89	< 0.027
891954	10/30/89 11/06/89	< 0.036
891991	11/06/89 11/13/89	< 0.023
892021	11/13/89 11/20/89	< 0.017
892044	11/20/89 11/27/89	< 0.016
892077	11/27/89 12/04/89	< 0.037
892142	12/04/89 12/11/89	< 0.020
892171	12/11/89 12/18/89	< 0.025
892217	12/18/89 12/26/89	< 0.049

TABLE B-3

AIR PARTICULATE FILTERS
GAMMA ISOTOPIC ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL AIR SAMPLE SITES

UNITS: pCi/CUBIC METER

LAB NO.	LOCATION	COLLECTION PERIOD START	STOP	Cs-134	Cs-137
890614	APG-1	12/27/88	03/27/89	< 0.0009	< 0.0007
890615	APQ-1	12/27/88	03/27/89	< 0.0008	< 0.0008
890616	APP-1	12/27/88	03/27/89	< 0.0008	< 0.0007
890617	APC-1	12/27/88	03/27/89	< 0.0008	< 0.0007
890618	APE-30	12/27/88	03/27/89	< 0.0010	< 0.0008
891151	APG-1	03/27/89	06/27/89	< 0.0006	< 0.0005
891152	APQ-1	03/27/89	06/27/89	< 0.0011	< 0.0010
891153	APP-1	03/27/89	06/27/89	< 0.0009	< 0.0008
891154	APC-1	03/27/89	06/27/89	< 0.0010	< 0.0009
891155	APE-30	03/27/89	06/27/89	< 0.0009	< 0.0007
891783	APG-1	06/27/89	10/02/89	< 0.0012	< 0.0008
891784	APQ-1	06/27/89	10/02/89	< 0.0011	< 0.0008
891785	APP-1	06/27/89	10/02/89	< 0.0008	< 0.0008
891786	APC-1	06/27/89	10/02/89	< 0.0008	< 0.0007
891787	APE-30	06/27/89	10/02/89	< 0.0009	< 0.0007
892247	APG-1	10/02/89	12/26/89	< 0.0012	< 0.0010
892248	APQ-1	10/02/89	12/26/89	< 0.0018	< 0.0016
892249	APP-1	10/02/89	12/26/89	< 0.0007	< 0.0007
892250	APC-1	10/02/89	12/26/89	< 0.0011	< 0.0009
892251	APE-30	10/02/89	12/26/89	< 0.0008	< 0.0008

TABLE B-4

DRINKING WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWG-2 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD	I-131
882508	12/19/88 01/03/89	< 0.5
890098	01/03/89 01/16/89	< 0.3
890172 *	01/16/89 01/23/89	< 0.4
890238	01/30/89 02/13/89	< 0.4
890329	02/13/89 02/27/89	< 0.4
890415	02/27/89 03/13/89	< 0.2
890505	03/13/89 03/27/89	< 0.3
890596	03/27/89 04/10/89	< 0.6
890715	04/10/89 04/24/89	< 0.4
890780	04/24/89 05/08/89	< 0.3
890881	05/08/89 05/22/89	< 0.3
890946	05/22/89 06/05/89	< 0.2
891035 **	06/05/89 06/12/89	< 0.8
891115	06/19/89 07/03/89	< 0.3
891217	07/03/89 07/17/89	< 0.4
891318	07/17/89 08/01/89	< 0.3
891408	08/01/89 08/14/89	< 0.4
891474	08/14/89 08/28/89	< 0.3
891579	08/28/89 09/11/89	< 0.4
891644	09/11/89 09/25/89	< 0.3
891778	09/25/89 10/09/89	< 0.4
891859	10/09/89 10/23/89	< 0.3
891955	10/23/89 11/06/89	< 0.2
892022	11/06/89 11/20/89	< 0.3
892078	11/20/89 12/04/89	< 0.3
892172	12/04/89 12/18/89	< 0.3

*SEE APPENDIX C-1 FOR EXPLANATION
**SEE APPENDIX C-2 FOR EXPLANATION

TABLE B-4 (continued)

DRINKING WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWE-5 UNITS: pCi/L

LAB NO.		COLLECTION PERIOD	I-131
882509		12/19/88 01/03/89	< 0.4
890099		01/03/89 01/16/89	< 0.3
890173		01/16/89 01/30/89	< 0.4
890239		01/30/89 02/13/89	< 0.5
890330	*	02/13/89 02/20/89	< 0.8
890416	*	02/27/89 03/13/89	< 0.2
890506		03/13/89 03/27/89	< 0.3
890597		03/27/89 04/10/89	< 0.7
890716		04/10/89 04/24/89	< 0.3
890781		04/24/89 05/08/89	< 0.3
890882		05/08/89 05/22/89	< 0.3
890947		05/22/89 06/05/89	< 0.3
891036		06/05/89 06/19/89	< 0.3
891116		06/19/89 07/03/89	< 0.3
891218		07/03/89 07/17/89	< 0.4
891319		07/17/89 08/01/89	< 0.3
891409	**	08/01/89 08/07/89	< 0.9
891475		08/14/89 08/28/89	< 0.2
891580		08/28/89 09/11/89	< 0.5
891645		09/11/89 09/25/89	< 0.3
891779		09/25/89 10/09/89	< 0.4
891858		10/09/89 10/23/89	< 0.4
891956		10/23/89 11/06/89	< 0.2
892023		11/06/89 11/20/89	< 0.3
892079		11/20/89 12/04/89	< 0.3
892173		12/04/89 12/18/89	< 0.3

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-4 (continued)

DRINKING WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWP-7 — UNITS: pCi/L

LAB NO.	COLLECTION PERIOD	I-131
882510	12/19/88 01/03/89	< 0.5
890100	01/03/89 01/16/89	< 0.3
890174	01/16/89 01/30/89	< 0.4
890240	01/30/89 02/13/89	0.5+/-0.3
890331	02/13/89 02/27/89	< 0.5
890417	02/27/89 03/13/89	< 0.2
890507	03/13/89 03/27/89	< 0.3
890598	03/27/89 04/10/89	< 0.6
890717	04/10/89 04/24/89	< 0.3
890782	04/24/89 05/08/89	< 0.2
890883	05/08/89 05/22/89	< 0.3
890948	05/22/89 06/05/89	< 0.3
891037	06/05/89 06/19/89	< 0.3
891117	06/19/89 07/03/89	< 0.3
891219	07/03/89 07/17/89	< 0.4
891320	07/17/89 08/01/89	< 0.3
891410	08/01/89 08/14/89	< 0.5
891476	08/14/89 08/28/89	< 0.3
891581	08/28/89 09/11/89	< 0.4
891646	09/11/89 09/25/89	< 0.3
891780	09/25/89 10/09/89	< 0.3
891857	10/09/89 10/23/89	< 0.3
891957	10/23/89 11/06/89	< 0.2
892024	11/06/89 11/20/89	< 0.3
892080	11/20/89 12/04/89	< 0.3
892174	12/04/89 12/18/89	< 0.5

TABLE B-5

DRINKING WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG-2

UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Rb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
882508	12/19/88	01/03/89		< 3	< 2	< 3	< 2	< 3	< 2	< 8	< 2	< 2	< 2	< 7	< 2
890090	01/03/89	01/16/89		< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
890172	01/16/89	01/23/89	*	< 4	< 4	< 7	< 4	< 7	< 4	< 8	< 6	< 4	< 4	< 16	< 4
890230	01/30/89	02/13/89		< 2	< 2	< 5	< 2	< 4	< 2	< 5	< 7	< 2	< 2	< 16	< 4
890435	02/13/89	03/13/89		< 3	< 4	< 7	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 16	< 4
890509	03/13/89	04/10/89		< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 8	< 2
890821	04/10/89	05/08/89		< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 5	< 2	< 2	< 10	< 3
890949	05/08/89	06/05/89		< 2	< 2	< 4	< 3	< 5	< 2	< 6	< 4	< 3	< 3	< 10	< 3
891120	06/05/89	07/03/89	**	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 8	< 2
891321	07/03/89	08/01/89		< 2	< 2	< 4	< 3	< 4	< 2	< 6	< 3	< 2	< 2	< 7	< 2
891477	08/01/89	08/28/89		< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 8	< 2
891647	08/28/89	09/25/89		< 2	< 2	< 5	< 2	< 5	< 2	< 5	< 3	< 3	< 3	< 10	< 3
891778	09/25/89	10/09/89		< 2	< 2	< 5	< 3	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 3
891958	10/09/89	11/06/89		< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 8	< 2
892001	11/06/89	12/04/89		< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 3	< 2	< 8	< 2
892172	12/04/89	12/18/89		< 3	< 3	< 6	< 3	< 6	< 3	< 7	< 4	< 4	< 3	< 12	< 4
900020	12/18/89	01/02/90		< 4	< 3	< 8	< 4	< 7	< 4	< 9	< 5	< 4	< 4	< 20	< 6

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-2 FOR EXPLANATION

TABLE B-5 (continued)

DRINKING WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE-5

UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP		Na-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
882509	12/19/88	01/03/89		< 3	< 4	< 6	< 4	< 7	< 4	< 8	< 6	< 6	< 4	< 15	< 4
890099	01/03/89	01/16/89		< 3	< 3	< 5	< 3	< 5	< 2	< 6	< 4	< 3	< 3	< 10	< 3
890173	01/16/89	01/30/89		< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 7	< 2
890239	01/30/89	02/13/89		< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 9	< 2	< 2	< 16	< 5
890330	02/13/89	02/20/89	*	< 3	< 3	< 7	< 3	< 7	< 4	< 7	< 9	< 4	< 3	< 10	< 4
890416	02/27/89	03/13/89	*	< 2	< 2	< 5	< 2	< 5	< 2	< 5	< 4	< 3	< 3	< 11	< 3
890600	03/13/89	04/10/89		< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
890822	04/10/89	05/08/89		< 2	< 3	< 5	< 3	< 5	< 3	< 6	< 5	< 3	< 3	< 13	< 4
890950	05/08/89	06/05/89		< 2	< 2	< 4	< 2	< 5	< 2	< 5	< 4	< 3	< 3	< 11	< 3
891121	06/05/89	07/03/89		< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 4	< 3	< 3	< 11	< 3
891322	07/03/89	08/01/89		< 4	< 3	< 6	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 14	< 3
891609	08/01/89	08/07/89	**	< 2	< 2	< 4	< 4	< 5	< 2	< 4	< 3	< 2	< 2	< 8	< 2
891670	08/14/89	08/28/89		< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 3
891840	08/28/89	09/25/89		< 2	< 2	< 2	< 2	< 3	< 2	< 3	< 2	< 2	< 2	< 6	< 2
891779	09/25/89	10/09/89		< 4	< 3	< 7	< 4	< 8	< 4	< 8	< 5	< 4	< 4	< 15	< 4
891959	10/09/89	11/06/89		< 2	< 3	< 5	< 3	< 5	< 2	< 5	< 3	< 3	< 3	< 10	< 2
892062	11/06/89	12/04/89		< 3	< 2	< 5	< 2	< 5	< 2	< 6	< 3	< 3	< 3	< 10	< 3
900021	12/04/89	01/02/90		< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 9	< 2	< 2	< 21	< 4

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-5 (continued)

DRINKING WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP-7

UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
890510	12/19/88	01/03/89	< 2	< 2	< 6	< 3	< 5	< 2	< 5	< 6	< 3	< 3	< 9	< 3
890100	01/03/89	01/16/89	< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 6	< 3	< 2	< 10	< 2
890174	01/16/89	01/30/89	< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 6	< 3	< 3	< 10	< 2
890240	01/30/89	02/13/89	< 3	< 3	< 7	< 3	< 7	< 8	< 7	< 11	< 6	< 3	< 22	< 5
890437	02/13/89	03/13/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 9	< 2
890601	03/13/89	04/10/89	< 3	< 3	< 7	< 4	< 7	< 4	< 8	< 5	< 6	< 3	< 15	< 4
890823	04/10/89	05/08/89	< 2	< 2	< 6	< 2	< 5	< 3	< 6	< 7	< 3	< 3	< 13	< 4
890951	05/08/89	06/05/89	< 2	< 3	< 6	< 3	< 5	< 2	< 5	< 5	< 2	< 2	< 13	< 3
891122	06/05/89	07/03/89	< 3	< 6	< 7	< 6	< 7	< 6	< 8	< 5	< 6	< 6	< 16	< 6
891323	07/03/89	08/01/89	< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 2
891479	08/01/89	08/28/89	< 2	< 2	< 6	< 2	< 5	< 3	< 6	< 6	< 3	< 3	< 11	< 3
891649	08/28/89	09/25/89	< 3	< 3	< 6	< 3	< 6	< 4	< 8	< 5	< 6	< 3	< 14	< 3
891780	09/25/89	10/09/89	< 6	< 6	< 7	< 6	< 7	< 6	< 8	< 6	< 6	< 6	< 16	< 6
891960	10/09/89	11/06/89	< 3	< 6	< 7	< 6	< 7	< 6	< 8	< 5	< 6	< 6	< 15	< 6
892083	11/06/89	12/04/89	< 2	< 2	< 6	< 2	< 3	< 3	< 4	< 5	< 2	< 2	< 11	< 3
900022	12/06/89	01/02/90	< 3	< 3	< 6	< 3	< 5	< 5	< 7	< 11	< 3	< 3	< 21	< 5

TABLE B-5 (continued)

DRINKING WATER
GROSS BETA ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG-2 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890298	12/19/88	01/16/89	7.7+/-2.9
890472 *	01/16/89	02/13/89	9.8+/-3.3
890435	02/13/89	03/13/89	< 4
890599	03/13/89	04/10/89	6.4+/-2.8
890821	04/10/89	05/08/89	4.1+/-2.7
890949	05/08/89	06/05/89	3.8+/-2.3
891120 **	06/05/89	07/03/89	5.1+/-2.9
891321	07/03/89	08/01/89	< 4
891477	08/01/89	08/28/89	< 4
891647	08/28/89	09/25/89	7.0+/-3.0
891778	09/25/89	10/09/89	4.7+/-2.9
891958	10/09/89	11/06/89	3.8+/-2.9
892081	11/06/89	12/04/89	5.2+/-3.0
900110	12/04/89	01/02/90	4.9+/-2.9

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-5 (continued)

DRINKING WATER
GROSS BETA ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE-5 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890299	12/19/88	01/16/89	6.9+/-2.9
890473	01/16/89	02/13/89	6.0+/-2.9
890330 *	02/13/89	02/20/89	< 4
890416*	02/27/89	03/13/89	< 4
890436*	02/27/89	03/13/89	4.2+/-3.1
890600	03/13/89	04/10/89	2.9+/-2.7
890822	04/10/89	05/08/89	4.0+/-2.7
890950	05/08/89	06/05/89	3.7+/-2.2
891121	06/05/89	07/03/89	3.9+/-2.7
891322	07/03/89	08/01/89	< 4
891409 **	08/01/89	08/14/89	< 4
891478	08/14/89	08/28/89	< 4
891648	08/28/89	09/25/89	< 4
891779	09/25/89	10/09/89	4.5+/-2.8
891959	10/09/89	11/06/89	3.4+/-2.9
892082	11/06/89	12/04/89	6.0+/-3.2
900021	12/04/89	01/02/90	4.7+/-2.8

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-5 (continued)

DRINKING WATER
GROSS BETA ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP-7 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890300	12/19/88	01/16/89	7.7+/-3.0
890474	01/16/89	02/13/89	4.6+/-2.9
890437	02/13/89	03/13/89	< 4
890601	03/13/89	04/10/89	2.5+/-2.4
890823	04/10/89	05/08/89	4.2+/-2.7
890951	05/08/89	06/05/89	3.8+/-2.2
891122	06/05/89	07/03/89	< 4
891323	07/03/89	08/01/89	< 4
891479	08/01/89	08/28/89	< 3
891649	08/28/89	09/25/89	< 4
891780	09/25/89	10/09/89	4.2+/-2.7
891959	10/09/89	11/06/89	3.4+/-2.9
892082	11/06/89	12/04/89	6.0+/-3.2
900021	12/04/89	01/02/90	4.7+/-2.8

TABLE B-6

DRINKING WATER
TRITIUM ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/L

LAB NO.	LOCATION	COLLECTION PERIOD START	STOP	H-3
890701	DWG-2	01/03/89	03/27/89	< 370
890702	DWE-5	01/03/89	03/27/89	< 370
890703	DWP-7	01/03/89	03/27/89	< 370
891254	DWG-2	03/27/89	06/12/89	280+/-270
891255	DWE-5	03/27/89	06/19/89	< 450
891256	DWP-7	03/27/89	06/19/89	480+/-280
891849	DWG-2	06/19/89	10/09/89	< 450
891850	DWE-5	06/19/89	10/09/89	< 450
891851	DWP-7	06/19/89	10/09/89	< 450
900107	DWG-2	10/09/89	01/02/90	< 370
900108	DWE-5	10/09/89	01/02/90	< 370
900109	DWP-7	10/09/89	01/02/90	< 370

TABLE B-7

SURFACE WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWG-2 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD	I-131
882508		
890098	12/19/88 01/03/89	< 0.5
890172 *	01/03/89 01/16/89	< 0.3
	01/16/89 01/30/89	< 0.4
890238		
890329	01/30/89 02/13/89	< 0.4
	02/13/89 02/27/89	< 0.4
890415		
890505	02/27/89 03/13/89	< 0.2
	03/13/89 03/27/89	< 0.3
890596		
890715	03/27/89 04/10/89	< 0.6
	04/10/89 04/24/89	< 0.4
890780		
890881	04/24/89 05/08/89	< 0.3
	05/08/89 05/22/89	< 0.3
890946		
891035 **	05/22/89 06/05/89	< 0.2
	06/05/89 06/12/89	< 0.8
891115		
891217	06/19/89 07/03/89	< 0.3
	07/03/89 07/17/89	< 0.4
891318		
891408	07/17/89 08/01/89	< 0.3
891474	08/01/89 08/14/89	< 0.4
	08/14/89 08/28/89	< 0.3
891579		
891644	08/28/89 09/11/89	< 0.4
	09/11/89 09/25/89	< 0.3
891778		
891859	09/25/89 10/09/89	< 0.4
	10/09/89 10/23/89	< 0.3
891955		
892022	10/23/89 11/06/89	< 0.2
	11/06/89 11/20/89	< 0.3
892078		
892172	11/20/89 12/04/89	< 0.3
	12/04/89 12/18/89	< 0.3

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-7 (continued)

SURFACE WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWE-5 LAB NO.	COLLECTION PERIOD	UNITS: pCi/L I-131
882509	12/19/88 01/03/89	< 0.4
890099	01/03/89 01/16/89	< 0.3
890173	01/16/89 01/30/89	< 0.4
890239	01/30/89 02/13/89	< 0.5
890330 .	02/13/89 02/20/89	< 0.8
890416 *	02/27/89 03/13/89	< 0.2
890506	03/13/89 03/27/89	< 0.3
890597	03/27/89 04/10/89	< 0.7
890716	04/10/89 04/24/89	< 0.3
890781	04/24/89 05/08/89	< 0.3
890882	05/08/89 05/22/89	< 0.3
890947	05/22/89 06/05/89	< 0.3
891036	06/05/89 06/19/89	< 0.3
891116	06/19/89 07/03/89	< 0.3
891218	07/03/89 07/17/89	< 0.4
891319	07/17/89 08/01/89	< 0.3
891409**	08/01/89 08/14/89	< 0.9
891475	08/14/89 08/28/89	< 0.2
891580	08/28/89 09/11/89	< 0.5
891645	09/11/89 09/25/89	< 0.3
891779	09/25/89 10/09/89	< 0.4
891858	10/09/89 10/23/89	< 0.4
891956	10/23/89 11/06/89	< 0.2
892023	11/06/89 11/20/89	< 0.3
892079	11/20/89 12/04/89	< 0.3
892173	12/04/89 12/18/89	< 0.3

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-7 (continued)

SURFACE WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWP-7

LAB NO.	COLLECTION PERIOD	UNITS: pCi/L I-131
882510	12/19/88 01/03/89	< 0.5
890100	01/03/89 01/16/89	< 0.3
890174	01/16/89 01/30/89	< 0.4
890240	01/30/89 02/13/89	0.5+/-0.3
890331	02/13/89 02/27/89	< 0.5
890417	02/27/89 03/13/89	< 0.2
890507	03/13/89 03/27/89	< 0.3
890598	03/27/89 04/10/89	< 0.6
890717	04/10/89 04/24/89	< 0.3
890782	04/24/89 05/08/89	< 0.2
890883	05/08/89 05/22/89	< 0.3
890948	05/22/89 06/05/89	< 0.3
891037	06/05/89 06/19/89	< 0.3
891117	06/19/89 07/03/89	< 0.3
891219	07/03/89 07/17/89	< 0.4
891320	07/17/89 08/01/89	< 0.3
891410	08/01/89 08/14/89	< 0.5
891476	08/14/89 08/28/89	< 0.3
891581	08/28/89 09/11/89	< 0.4
891646	09/11/89 09/25/89	< 0.3
891780	09/25/89 10/09/89	< 0.3
891857	10/09/89 10/23/89	< 0.3
891957	10/23/89 11/06/89	< 0.2
892024	11/06/89 11/20/89	< 0.3
892080	11/20/89 12/04/89	< 0.3
892174	12/04/89 12/18/89	< 0.5

TABLE B-8

SURFACE WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWG-2

UNITS: pCi/L

LAB ID.	COLLECTION PERIOD START	END	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
882508	12/19/88	01/03/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 2	< 2	< 2	< 7	< 2
890090	01/03/89	01/16/89	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
890172	01/16/89	01/23/89 *	< 4	< 4	< 7	< 4	< 7	< 6	< 8	< 6	< 4	< 4	< 16	< 4
890230	01/30/89	02/13/89	< 2	< 2	< 5	< 2	< 4	< 2	< 5	< 7	< 2	< 2	< 14	< 6
890035	02/13/89	03/13/89	< 3	< 4	< 7	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 16	< 4
890590	03/13/89	04/10/89	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 8	< 2
890821	04/10/89	05/08/89	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 5	< 2	< 2	< 10	< 3
890949	05/08/89	06/05/89	< 2	< 2	< 4	< 3	< 5	< 2	< 6	< 4	< 3	< 3	< 10	< 3
891120	06/05/89	07/03/89 **	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 8	< 2
891321	07/03/89	08/01/89	< 2	< 2	< 4	< 3	< 4	< 2	< 4	< 3	< 2	< 2	< 7	< 2
891477	08/01/89	08/28/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 8	< 2
891647	08/28/89	09/25/89	< 2	< 2	< 5	< 2	< 5	< 2	< 5	< 3	< 3	< 3	< 10	< 3
891778	09/25/89	10/09/89	< 2	< 2	< 5	< 3	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 3
891958	10/09/89	11/06/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 8	< 2
892091	11/06/89	12/04/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 3	< 2	< 8	< 2
892172	12/04/89	12/18/89	< 3	< 3	< 6	< 3	< 6	< 3	< 7	< 4	< 4	< 3	< 12	< 4
900020	12/18/89	01/02/90	< 4	< 3	< 8	< 4	< 7	< 4	< 9	< 9	< 4	< 4	< 20	< 6

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-2 FOR EXPLANATION

TABLE B-8 (continued)

SURFACE WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWE-5

UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	END	Mn-54	[illegible]	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
002909	12/19/88	01/03/89	< 3	< 3	< 6	< 4	< 7	< 4	< 9	< 6	< 4	< 4	< 15	< 4
000099	01/03/89	01/16/89	< 3	< 3	< 5	< 3	< 5	< 2	< 6	< 4	< 3	< 3	< 10	< 3
000173	01/16/89	01/30/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 7	< 2
000239	01/30/89	02/13/89	< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 9	< 2	< 2	< 16	< 5
000330	02/13/89	02/20/89 *	< 3	< 3	< 7	< 3	< 7	< 4	< 7	< 9	< 4	< 3	< 10	< 4
000416	02/27/89	03/13/89	< 2	< 2	< 5	< 2	< 5	< 2	< 5	< 4	< 3	< 3	< 11	< 3
000500	03/13/89	04/10/89	< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
000822	04/10/89	05/09/89	< 2	< 3	< 5	< 3	< 5	< 3	< 6	< 5	< 3	< 3	< 13	< 4
000950	05/08/89	06/05/89	< 2	< 2	< 4	< 2	< 5	< 2	< 5	< 4	< 3	< 3	< 11	< 3
001121	06/05/89	07/03/89	< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 4	< 3	< 3	< 11	< 3
001322	07/03/89	08/01/89	< 4	< 3	< 6	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 14	< 3
001409	08/01/89	08/07/89 **	< 2	< 2	< 4	< 4	< 5	< 2	< 4	< 3	< 2	2	< 8	< 2
001479	08/14/89	08/20/89	< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 3
001648	08/20/89	09/25/89	< 2	< 2	< 2	< 2	< 3	< 2	< 3	< 2	< 2	< 2	< 6	< 2
001779	09/25/89	10/09/89	< 4	< 3	< 7	< 4	< 8	< 4	< 8	< 5	< 4	< 4	< 15	< 4
001959	10/09/89	11/06/89	< 2	< 3	< 5	< 3	< 5	< 2	< 5	< 3	< 3	< 3	< 10	< 2
002002	11/06/89	12/04/89	< 3	< 2	< 5	< 2	< 5	< 2	< 6	< 3	< 3	< 3	< 10	< 3
000021	12/04/89	01/02/90	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 9	< 2	< 2	< 21	< 4

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-8 (continued)

SURFACE WATER
GAMMA ISOTOPIC ANALYSES
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWP-7

UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	END	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
882510	12/19/88	01/03/89	< 2	< 2	< 4	< 3	< 5	< 2	< 5	< 4	< 3	< 3	< 9	< 3
890100	01/03/89	01/16/89	< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 4	< 3	< 2	< 10	< 2
890174	01/16/89	01/30/89	< 2	< 2	< 5	< 3	< 5	< 2	< 5	< 4	< 3	< 3	< 10	< 2
890240	01/30/89	02/13/89	< 3	< 3	< 7	< 3	< 7	< 8	< 7	< 11	< 4	< 3	< 22	< 5
890437	02/13/89	03/13/89	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 9	< 2
890501	03/13/89	04/10/89	< 3	< 3	< 7	< 4	< 7	< 4	< 8	< 5	< 4	< 3	< 15	< 4
890823	04/10/89	05/08/89	< 2	< 2	< 4	< 2	< 5	< 3	< 6	< 7	< 3	< 3	< 13	< 4
890951	05/08/89	06/05/89	< 2	< 3	< 4	< 3	< 5	< 2	< 5	< 5	< 2	< 2	< 13	< 3
891122	06/05/89	07/03/89	< 3	< 4	< 7	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 16	< 4
891323	07/03/89	08/01/89	< 2	< 2	< 5	< 2	< 5	< 3	< 6	< 3	< 3	< 3	< 10	< 2
891479	08/01/89	08/28/89	< 2	< 2	< 4	< 2	< 5	< 3	< 6	< 4	< 3	< 3	< 11	< 3
891649	08/28/89	09/25/89	< 3	< 3	< 6	< 3	< 6	< 4	< 8	< 5	< 4	< 3	< 14	< 3
891700	09/25/89	10/09/89	< 4	< 4	< 7	< 4	< 7	< 4	< 8	< 6	< 4	< 4	< 16	< 4
891960	10/09/89	11/06/89	< 3	< 4	< 7	< 4	< 7	< 4	< 8	< 5	< 4	< 4	< 15	< 4
892083	11/06/89	12/04/89	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 5	< 2	< 2	< 11	< 3
900022	12/04/89	01/02/90	< 3	< 3	< 6	< 3	< 5	< 3	< 7	< 11	< 3	< 3	< 21	< 5

TABLE B-8 (continued)

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWG-2 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890298	12/19/88	01/16/89	7.7+/-2.9
890472 .	01/16/89	02/13/89	9.8+/-3.3
890435	02/13/89	03/13/89	< 4
890599	03/13/89	04/10/89	6.4+/-2.8
890821	04/10/89	05/08/89	4.1+/-2.7
890949	05/08/89	06/05/89	3.8+/-2.3
891120 ..	06/05/89	07/03/89	5.1+/-2.9
891321	07/03/89	08/01/89	< 4
891477	08/01/89	08/28/89	< 4
891647	08/28/89	09/25/89	7.0+/-3.0
891778	09/25/89	10/09/89	4.7+/-2.9
891958	10/09/89	11/06/89	3.8+/-2.9
892081	11/06/89	12/04/89	5.2+/-3.0
900110	12/04/89	01/02/90	4.9+/-2.9

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-8 (continued)

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWE-5 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890299	12/19/88	01/16/89	6.9+/-2.9
890473	01/16/89	02/13/89	6.0+/-2.9
890330*	02/13/89	02/20/89	< 4
890416*	02/27/89	03/13/89	< 4
890436.	02/27/89	03/13/89	4.2+/-3.1
890600	03/13/89	04/10/89	2.9+/-2.7
890822	04/10/89	05/08/89	4.0+/-2.7
890950	05/08/89	06/05/89	3.7+/-2.2
891121	06/05/89	07/03/89	3.9+/-2.7
891322	07/03/89	08/01/89	< 4
891409**	08/01/89	08/14/89	< 4
891478	08/14/89	08/28/89	< 4
891648	08/28/89	09/25/89	< 4
891779	09/25/89	10/09/89	4.5+/-2.8
891959	10/09/89	11/06/89	3.4+/-2.9
892082	11/06/89	12/04/89	6.0+/-3.2
900021	12/04/89	01/02/90	4.7+/-2.8

* SEE APPENDIX C-1 FOR EXPLANATION
** SEE APPENDIX C-3 FOR EXPLANATION

TABLE B-8 (continued)

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWP-7 UNITS: pCi/L

LAB NO.	COLLECTION PERIOD START	STOP	GROSS BETA
890300	12/19/88	01/16/89	7.7+/-3.0
890474	01/16/89	02/13/89	4.6+/-2.9
890437	02/13/89	03/13/89	< 4
890601	03/13/89	04/10/89	2.5+/-2.4
890823	04/10/89	05/08/89	4.2+/-2.7
890951	05/08/89	06/05/89	3.8+/-2.2
891122	06/05/89	07/03/89	< 4
891323	07/03/89	08/01/89	< 4
891479	08/01/89	08/28/89	< 3
891649	08/28/89	09/25/89	< 4
891780	09/25/89	10/09/89	4.2+/-2.7
891959	10/09/89	11/06/89	3.4+/-2.9
892082	11/06/89	12/04/89	6.0+/-3.2
900021	12/04/89	01/02/90	4.7+/-2.8

TABLE B-9

SURFACE WATER
TRITIUM ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/L

LAB NO.	LOCATION	COLLECTION PERIOD START	COLLECTION PERIOD STOP	H-3
890701	SWG-2	01/03/89	03/27/89	< 370
890702	SWE-5	01/03/89	03/27/89	< 370
890703	SWP-7	01/03/89	03/27/89	< 370
891254	SWG-2	03/27/89	06/12/89	280+/-270
891255	SWE-5	03/27/89	06/19/89	< 450
891256	SWP-7	03/27/89	06/19/89	480+/-280
891849	SWG-2	06/19/89	10/09/89	< 450
891850	SWE-5	06/19/89	10/09/89	< 450
891851	SWP-7	06/19/89	10/09/89	< 450
900107	SWG-2	10/09/89	01/02/90	< 370
900108	SWE-5	10/09/89	01/02/90	< 370
900109	SWP-7	10/09/89	01/02/90	< 370

TABLE B-10

GROUNDWATER
TRITIUM AND GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATION: GWJ-1

UNITS: pCi/L

LAB ID.	COLLECTION DATE	H-3	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
890110	01/17/89	< 390	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 2	< 2	< 2	< 7	< 2
890621	06/12/89	< 460	< 2	< 2	< 3	< 2	< 3	< 2	< 4	< 3	< 2	< 2	< 7	< 2
891116	07/03/89	430+/-190	< 3	< 3	< 7	< 4	< 7	< 3	< 7	< 5	< 3	< 3	< 13	< 3
891709	10/02/89	290+/-270	< 3	< 2	< 5	< 3	< 5	< 3	< 5	< 3	< 3	< 2	< 10	< 3

TABLE B-11

SHORELINE SOIL
GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/Kg

LAB NO.	LOCATION	COLLECTION DATE	Co-58	Co-60	Cs-134	Cs-137
890623	SHWE-3	04/12/89	< 14	< 19	< 20	33+/-12
890622	SHWJ-1	04/12/89	< 17	< 22	< 23	28+/-12
891781	SHWE-3	10/09/89	< 12	< 14	< 15	< 12
891782	SHWJ-1	10/09/89	< 14	< 19	< 20	< 15

TABLE B-12

IODINE-131 AND GAMMA ISOTOPIC ANALYSES

LOCATION: MKQ-5 UNITS: pCi/L

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137	Ba-140	La-140
890018	01/04/89	< 0.6	< 4	< 3	< 12	< 3
890113	01/17/89	< 0.2	< 2	< 2	< 9	< 2
890212	02/08/89	< 0.7	< 2	< 2	< 9	< 2
890293	02/21/89	< 0.5	< 3	< 3	< 9	< 2
890378	03/07/89	< 0.3	< 4	< 4	< 14	< 4
890481	03/21/89	< 0.2	< 2	< 2	< 9	< 2
890535	04/04/89	< 0.7	< 2	< 2	< 8	< 2
890565	04/18/89	< 0.3	< 3	< 3	< 12	< 3
890748	05/02/89	< 0.3	< 3	< 3	< 11	< 3
890836	05/16/89	< 0.3	< 3	< 3	< 12	< 3
890957	06/06/89	< 0.3	< 2	< 2	< 9	< 2
891051	06/20/89	< 0.3	< 3	< 3	< 11	< 2
891118	07/05/89	< 0.2	< 3	< 3	< 13	< 3
891236	07/18/89	< 0.4	< 2	< 2	< 9	< 2
891387	08/08/89	< 0.4	< 2	< 2	< 9	< 2
891450	08/22/89	< 0.3	< 3	< 3	< 11	< 3
891547	09/06/89	< 0.3	< 4	< 4	< 16	< 3
891608	09/19/89	< 0.3	< 3	< 3	< 11	< 2
891711	10/03/89	< 0.8	< 2	< 2	< 9	< 2
891821	10/17/89	< 0.3	< 3	< 3	< 10	< 2
891983	11/07/89	< 0.5	< 4	< 4	< 16	< 4
892027	11/21/89	< 0.4	< 2	< 2	< 7	< 2
892106	12/05/89	< 0.2	< 4	< 2	< 9	< 2
892175	12/19/89	< 0.6	< 3	< 3	< 13	< 3

TABLE B-12 (continued)

IODINE-131 AND GAMMA ISOTOPIC ANALYSES

LOCATION: MKQ-45 UNITS: pCi/L

LAB NO.	COLLECTION DATE	I-131	Cs-134	Cs-137	Ba-140	La-140
890019	01/03/89	< 0.5	< 5	< 4	< 16	< 3
890114	01/17/89	< 0.3	< 3	< 3	< 11	< 2
890213	02/06/89	1.0+/-0.4	< 3	< 3	< 11	< 3
890294	02/20/89	< 0.5	< 3	< 3	< 11	< 3
890379	03/06/89	< 0.3	< 3	< 3	< 13	< 3
890482	03/20/89	< 0.3	< 3	< 3	< 11	< 3
890536	04/03/89	< 0.7	< 3	< 3	< 11	< 3
890666	04/17/89	< 0.3	< 2	< 2	< 9	< 2
890749	05/01/89	< 0.3	< 5	< 4	< 16	< 3
890837	05/15/89	< 0.3	< 5	< 4	< 15	< 4
890958	06/05/89	< 0.4	< 4	< 4	< 14	< 3
891052	06/19/89	< 0.4	< 4	< 4	< 15	< 3
891119	07/05/89	< 0.3	< 2	< 2	< 9	< 2
891237	07/17/89	< 0.4	< 4	< 4	< 16	< 3
891388	08/07/89	< 0.4	< 3	< 3	< 12	< 3
891451	08/21/89	< 0.4	< 5	< 4	< 15	< 4
891548	09/05/89	< 0.3	< 3	< 3	< 14	< 3
891609	09/18/89	< 0.3	< 4	< 3	< 12	< 3
891712	10/02/89	< 0.2	< 3	< 3	< 12	< 3
891822	10/16/89	< 0.4	< 2	< 3	< 10	< 2
891984	11/06/89	< 0.3	< 2	< 2	< 10	< 2
892028	11/20/89	< 0.3	< 3	< 4	< 14	< 3
892107	12/04/89	< 0.3	< 3	< 2	< 10	< 2
892176	12/18/89	< 0.5	< 3	< 2	< 10	< 3

TABLE B-13

FISH
GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: FH-1

UNITS: pCi/Kg

LAB NO.	COLLECTION DATE	SAM. TYPE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
890884	05/18/89	SHAD	< 12	< 13	< 27	< 15	< 26	< 14	< 13
890885	05/18/89	CATFISH	< 12	< 11	< 24	< 13	< 24	< 13	< 11
890886	05/18/89	DRUM	< 12	< 12	< 25	< 13	< 26	< 13	< 13
890887	05/18/89	BASS	< 11	< 13	< 29	< 16	< 32	< 15	< 13
891901	10/25/89	SHAD	< 7	< 8	< 17	< 9	< 18	< 9	< 8
891902	10/25/89	MULLET	< 14	< 14	< 29	< 16	< 27	< 15	< 14
891903	10/25/89	DRUM	< 9	< 9	< 19	< 10	< 20	< 10	< 9
891904	10/25/89	CATFISH	< 6	< 6	< 14	< 8	< 14	< 7	< 7

TABLE B-13 (continued)

FISH
GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: FH-2

UNITS: pCi/Kg

LAB NO.	COLLECTION DATE	SAM. TYPE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
890888	05/18/89	SHAD	< 11	< 12	< 24	< 13	< 26	< 13	< 11
890889	05/18/89	CATFISH	< 9	< 8	< 19	< 11	< 20	< 9	< 10
890890	05/18/89	DRUM	< 11	< 12	< 25	< 14	< 25	< 12	< 12
890891	05/18/89	BASS	< 11	< 12	< 26	< 13	< 26	< 13	< 11
891905	10/25/89	SHAD	< 7	< 7	< 17	< 9	< 16	< 8	< 7
891906	10/25/89	MULLET	< 6	< 6	< 13	< 7	< 14	< 7	< 7
891907	10/25/89	DRUM	< 11	< 10	< 23	< 12	< 24	< 12	< 11
891908	10/25/89	CATFISH	< 9	< 11	< 20	< 11	< 22	< 11	< 9

TABLE B-14

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

LOCATION: ALL SAMPLE SITES

UNITS: pCi/Kg

LAB NO.	LOCATION	COLLECTION DATE	I-131	Cs-134	Cs-137
890111	BLQ-1	01/17/89	< 25	< 20	< 17
890112	BLB-1	01/17/89	< 16	< 13	< 13
	BLK-15	01/17/89	SAMPLE NOT AVAILABLE		
890295	BLQ-1	02/22/89	< 25	< 18	< 16
890296	BLB-1	02/22/89	< 14	< 14	< 12
890297	BLQ-1	02/22/89	< 23	< 18	< 16
	BLK-15	02/22/89	SAMPLE NOT AVAILIBLE		
890495	BLB-1	03/22/89	< 19	< 18	< 16
890496	BLQ-1	03/22/89	< 19	< 15	< 14
	BLK-15	03/22/89	SAMPLE NOT AVAILIBLE		
890729	BLQ-1	04/26/89	< 17	< 16	< 16
890730	BLB-1	04/26/89	< 15	< 15	< 13
890731	BLK-15	04/26/89	< 14	< 12	< 11
890920	BLQ-1	05/31/89	< 17	< 18	< 16
890921	BLB-1	05/31/89	< 16	< 13	< 14
890922	BLK-15	05/31/89	< 24	< 23	< 22
891072	BLQ-1	06/22/89	< 19	< 13	< 15
891073	BLB-1	06/22/89	< 20	< 13	< 12
891074	BLK-15	06/22/89	< 24	< 19	< 16

TABLE B-14 (continued)

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

LOCATION: ALL SAMPLE SITES

UNITS: pCi/Kg

LAB NO.	LOCATION	COLLECTION DATE	I-131	Cs-134	Cs-137
891286	BLQ-1	07/26/89	< 23	< 17	< 18
891287	BLB-1	07/26/89	< 15	< 16	< 14
891288	BLK-15	07/26/89	< 22	< 22	< 21
891464	BLQ-1	08/24/89	< 20	< 15	< 15
891465	BLB-1	08/24/89	< 13	< 12	< 11
891466	BLK-15	08/24/89	< 18	< 18	< 16
891665	BLQ-1	09/27/89	< 21	< 19	< 18
891666	BLB-1	09/27/89	< 25	< 25	< 22
891667	BLK-15	09/27/89	< 17	< 17	< 16
891883	BLQ-1	10/26/89	< 18	< 13	< 12
891884	BLB-1	10/26/89	< 20	< 14	< 16
891885	BLK-15	10/26/89	< 13	< 13	< 11
892055	BLQ-1	11/28/89	< 10	< 9	< 9
892056	BLB-1	11/28/89	< 14	< 13	< 12
892057	BLK-15	11/28/89	< 13	< 11	< 10
892210	BLQ-1	12/28/89	< 26	< 17	< 17
892211	BLB-1	12/28/89	< 17	< 12	< 8
892212	BLK-15	12/28/89	< 30	< 19	< 17

TABLE B-15

FOOD/GARDEN CROPS
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

UNITS: pCi/Kg

LAB NO.	LOCATION	COLLECTION DATE	I-131	Cs-134	Cs-137
891487	FPG-1	08/24/89	< 35	< 20	< 19
891488	FPQ-1	08/24/89	< 24	< 13	< 14
891486	FPP-1	08/28/89	< 11	< 10	< 9

APPENDIX C
SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS OF DETECTION

TABLE C-1

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
JANUARY 1 TO MARCH 31, 1989

	SAMPLE MEDIA	ANALYSIS	LOCATION	DATE	EXPLANATION OF SAMPLE UNAVAILABILITY OR MISSED LLD
1.	Milk	I-131, Gamma	MKQ-1	January to March	No samples available; cows did not supply milk for human consumption.
2.	Milk	I-131, Gamma	MKE-4	January to March	No samples available; goats not lactating.
3.	Broad Leaf Vegetation	I-131, Gamma	BLK-15	January	No sample available due to lack of vegetation.
4.	Broad Leaf Vegetation	I-131, Gamma	BLK-15	February	No sample available due to lack of vegetation.
5.	Broad Leaf Vegetation	I-131, Gamma	BLK-15	March	No sample available due to lack of vegetation.
6.	Drinking/ Surface Water	I-131, Gross Beta Gamma	DWG-2	01/23/89-01/30/89	Sampler malfunction. No sample collected.
7.	Drinking/ Surface Water	I-131, Gross Beta Gamma	DWG-2	02/20/89-02/27/89	Sampler malfunction. No sample collected.
8.	Air Particles	I-131, Gross Beta	APG-1	02/13/89-02/20/89	Pump did not have power when found on 2/20/89. Repairs implemented and pump restarted on 2/21/89.
9.	Drinking/ Surface Water	I-131, Gross Beta Gamma	DWE-5	02/20/89-02/27/89	Sample bottle stolen.
10.	Drinking/ Surface Water	I-131, Gross Beta Gamma	DWE-5	02/27/89-03/31/89	Sampler malfunction. Only 2 liters available on 03/06/89.

TABLE C-2

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
APRIL 1 TO JUNE 30, 1989

SAMPLE MEDIA	ANALYSIS	LOCATION	DATE	EXPLANATION OF SAMPLE UNAVAILABILITY OR MISSED LLD
1. Milk	I-131, Gamma	MKQ-1	April to June	No samples available; cows did not supply milk for human consumption.
2. Milk	I-131, Gamma	MKE-4	April to June	No samples available; goats not lactating.
3. Drinking/ Surface Water	I-131, Gross Beta Gamma	DWG-2	06/12/89-06/19/89	Water plant shutdown for repair.

TABLE C-3

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
JULY 1 TO SEPTEMBER 30, 1989

	SAMPLE MEDIA	ANALYSIS	LOCATION	DATE	EXPLANATION OF SAMPLE UNAVAILABILITY OR MISSED LLD
1.	Milk	I-131, Gamma	MKQ-1	July to September	No samples available; cows did not produce milk for human consumption.
2.	Milk	I-131, Gamma	MKE-4	July to September	No samples available; goats not lactating.
3.	Air Particulates	I-131	APG-1	07/10/89-07/17/89	Sampler Malfunction. Partial sample collected resulting in low sample volume and missed LLD.
4.	Drinking/ Surface Water	I-131, Gamma	DWE-5	08/01/89-08/14/89	Sampler malfunction. Low sample volume (4 liters).

TABLE C-4

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
OCTOBER 1 TO DECEMBER 31, 1989

	SAMPLE MEDIA	ANALYSIS	LOCATION	DATE	EXPLANATION OF SAMPLE UNAVAILABILITY OR MISSED LLD
1.	Milk	I-131, Gamma	MKQ-1	October to December	No samples available; cows did not produce milk for human consumption.
2.	Milk	I-131, Gamma	MKE-4	October to December	No sample available; goats not lactating.
3.	Air Particulates	I-131	APG-1	12/11/89-12/18/89	Sample lost in shipment.

TABLE C-5

SUMMARY OF UNAVAILABLE TLD MEASUREMENTS
DURING THE PERIOD OF JANUARY 1 TO DECEMBER 31, 1989

LOCATION	QUARTER	EXPLANATION
E-15	First	TLD Stolen; Replaced 3/13/89.
D-2	First	TLD Stolen; Missing at Changeout.
J-2	Second	TLD Stolen; Replaced 5/19/89.
D-2	Fourth	TLD Stolen; Replaced 11/2/89.
P-1	Fourth	TLD Stolen; Replaced 11/27 and 12/26/89.

APPENDIX D
SUMMARY OF INTERLABORATORY COMPARISONS

TABLE D-1

EPA CROSS CHECK RESULTS

EPA PREP DATE	DATE EPA ISSUED RESULTS	MEDIA	NUCLIDE	EPA RESULTS	AP&L RESULTS	NORM DEV KNOWN
6/10/88	8/02/88	Water (pCi/l)	H-3	5565	6136.67	1.78
06/03/88	08/08/88	Water (pCi/l)	Cr-51	302	306.67	0.27
			Co-60	15	14.33	-0.23
			Zn-65	101	97.33	-0.64
			Ru-106	195	203	0.69
			Cs-134	20	18.67	-0.46
			Cs-137	25	23.33	-0.58
07/22/88	08/26/88	Water (pCi/l)	Gross	15	4	-3.81***(1)
			Gross	4	7	1.04
06/24/88	08/27/88	Milk (pCi/l)	I-131	94	96.33	0.45
			Cs-137	51	48.67	-0.81
			Potassium (mg/l)	1600.	1656.67	1.23
08/05/88	10/10/88	Water (pCi/l)	I-131	76	84.33	1.80
09/23/88	11/28/88	Water (pCi/l)	Gross	10	8.33	-0.58
08/26/88	11/28/88	Air Filter (pCi/filter)	Gross	8	9	0.35
			Gross	29	23.67	-1.85
			Cs-137	12	9.67	-0.81
10/07/88	12/12/88	Water (pCi/l)	Cr-51	251	275.67	1.71
			Co-60	25	24.33	-0.23
			Zn-65	151	153	0.23
			Ru-106	152	151.67	-0.04
			Cs-134	25	24.67	-0.12
			Cs-137	15	14.33	-0.13
10/18/88	02/06/89	Water (pCi/l) Sample B	Gross B	54	42.67	-3.93***(2)
			Cs-134	15	15.67	0.23
			Cs-137	15	15.33	0.12

*** Greater than ± 3 sigma

NOTE: Footnotes at end of table

TABLE D-1 (continued)

EPA CROSS CHECK RESULTS

EPA PREP DATE	DATE EPA ISSUED RESULTS	MEDIA	NUCLIDE	EPA RESULTS	AP&L RESULTS	NORM DEV KNOWN
11/25/88	1/5/89	Water (pCi/l)	Gross B	9	3	-2.08
10/28/88	2/10/89	Milk (pCi/l)	I-131	91	91	0
			Cs-137	50	45.67	-1.50
			(Potassium) (mg/l)	1600	1630.00	0.65
1/20/89	5/1/89	Water (pCi/l)	Gross	4	8	1.39
2/24/89	5/1/89	Water (pCi/l)	H-3	2754	2343.3	-2.00
02/17/89	5/12/89	Water (pCi/l)	I-131	106	107.33	0.21
02/10/89	5/12/89	Water (pCi/l)	Cr-51	235	252	1.23
			Co-60	10	10	0
			Zn-65	159	161.33	0.25
			Ru-106	178	173.33	-0.45
			Cs-134	10	10	0
			Cs-137	10	10	0
05/12/89	07/25/89	Water (pCi/l)	Gross	50	45.33	-1.62
04/18/89	07/26/89	Water Sample B (pCi/l)	Gross	57	56.33	-0.23
			Cs-134	20	19.33	-0.23
			Cs-137	20	19.67	-0.12
03/31/89	06/27/89	Air Filter (pCi/filter)	Gross	62	67.67	1.96
			Cs-137	20	16.00	-1.39
04/28/89	08/21/89	Milk (pCi/l)	Cs-137	50	46.	-1.39
		Potassium (mg/l)		1600	1600	0

TABLE D-1 (continued)

EPA CROSS CHECK RESULTS

EPA PREP DATE	DATE EPA ISSUED RESULTS	MEDIA	NUCLIDE	EPA RESULTS	AP&L RESULTS	NORM DEV KNOWN
06/09/89	08/21/89	Water (pCi/l)	Ba-133	49	57.33	2.89
			Co-60	31	30.33	-0.23
			Zn-65	165	163.33	-0.17
			Ru-106	128	122.67	-0.71
			Cs-134	39	37	-0.69
			Cs-137	20	19.67	-0.12
06/23/89	08/21/89	Water (pCi/l)	H-3	4503	5123	2.39
08/04/89	10/25/89	Water	I-131	83.00	98.00	3.25 *** (3)
08/25/89	11/15/89	Air Filter (pCi/filter)	Cs-137	10.00	9.00	-0.35
10/06/89	12/1/89	Water (pCi/l)	Ba-133	59	59.00	0
			Co-60	30	28.69	-0.46
			Zn-65	129	129.67	0.09
			Ru-106	161	159.33	-0.18
			Cs-134	29	29.67	0.23
			Cs-137	59	59.00	0
10/20/89	12/5/89	Water (pCi/l)	H-3	3496	3423.33	-0.35

*** Greater than ± 3 sigma

NOTE: Footnotes at end of table

TABLE D-1 (continued)

EPA CROSS CHECK RESULTS

1. As of August 18, 1988, no environmental radiological monitoring program requires analysis for gross alpha activity. In the future, gross alpha activity will not be reported.

2. Gross beta activity is calculated from a Cs-137 liquid standard evaporated in diatomaceous earth. Sample B of the EPA sample contains Sr-90, Cs-134, and Cs-137. Probable cause for the difference in results is the counting efficiency, based upon Cs-137 beta energy, was not equivalent to the average efficiency of the other beta emitters in this cross-check sample.

3. An I-131 spike in 3.5 liters of water was prepared and analyzed using three separate Germanium detectors. It was determined that the efficiency of 3.5 liter geometry for detector No. 2, a 28% Ge(Li) had changed. A new efficiency curve was prepared and installed in the ND6600 gamma system for 3.5 liter water - Detector #2.

APPENDIX E
SYNOPSES OF ANALYTICAL PROCEDURES

E-1.0 ANALYSIS OF SAMPLES FOR GROSS BETA ACTIVITY

E-1.1 Air Particulates

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

E-1.2 Water

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

E-2.0 ANALYSIS OF WATER SAMPLES FOR TRITIUM

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

E-3.0 ANALYSIS OF SAMPLES FOR IODINE-131

E-3.1 Milk and Water

Up to four liters of sample were thoroughly mixed with a stable iodine carrier solution. The sample was then eluded through an anion exchange resin column to remove iodine from the sample. The iodine was stripped from the resin with sodium hypochlorite solution, reduced with hydroxylamine hydrochloride, and then extracted into carbon tetrachloride as free iodine. It was back-extracted as iodide into sodium bisulfite solution and precipitated as palladium iodide. The precipitate, palladium iodide, was weighed for chemical yield and mounted on a nylon planchet for beta analysis. The chemical yield was corrected by measuring the stable iodide content of the milk or water with a specific ion electrode.

E-3.2 Broad Leaf Vegetation

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. Refer to Section E-4.2 for a description of gamma spectroscopy procedure.

E-4.0 GAMMA SPECTROSCOPY ANALYSIS

E-4.1 Milk and Water

A 3.5 liter Marinelli beaker was filled with a representative aliquot of the sample. The sample was counted for a minimum of 420 minutes with a shielded Germanium detector coupled to a computer based data acquisition system that performed pulse height analysis.

E-4.2 Vegetation, Food and Garden Crops, and Fish

As much sample as possible (without drying) of vegetation, food, or garden crop sample was loaded into a tared Marinelli beaker and weighed. The sample was then counted for a minimum of 420 minutes with a shielded Ge(Li) detector coupled to a computer based data acquisition system which performed pulse height analysis.

As much as possible (up to the total sample) of the edible portion of a fish was loaded into a tared Marinelli beaker and weighed. The sample was then counted for a minimum of 420 minutes with a shielded Ge(Li) detector coupled to a computer based data acquisition system which performed pulse height analysis.

E-4.3 Soils and Sediment

Soils and sediments were dried at temperatures less than 100 degrees Centigrade. The soil or sediment was loaded into a tared Marinelli beaker and weighed. The sample was then counted for at least four hours with a shielded Ge(Li) detector coupled to a computer based data acquisition system which performed pulse height analysis.

E-4.4 Charcoal Cartridges (Air Iodine)

A screening count of charcoal cartridges was performed with several cartridges stacked in a Marinelli beaker. One cartridge was positioned on the face of a Germanium detector and up to six cartridges were placed on the side of the Germanium detector. If no iodine-131 was detected, the detection limit for the batch of cartridges counted together was determined using the smallest sample volume of the individual cartridges within the batch. If iodine-131 was observed in the screening count of a set of cartridges, each cartridge was then counted separately on the face of the detector.

E-4.5 Air Particulates

The weekly air particulate filters for a quarter were composited from each field station by stacking the filters on top of each other. The composites were counted for a minimum of four hours with a shielded Ge(Li) detector coupled to a computer based data acquisition system which performed pulse height analysis.

E-4.6 Computer Software

A computer software program defined peaks by certain changes in the slope of the spectrum. The program also compared the energy of each peak with library of peaks for isotope identification and then performed the radioactivity calculation using the appropriate fractional gamma ray abundance, half life, detector efficiency, and net counts in the peak region.

E-5.0 ENVIRONMENTAL DOSIMETRY

Thermoluminescent Dosimeters (TLDs) manufactured by Panasonic (model UD-814AQ) were used for environmental dosimetry. The Panasonic TLDs contain one lithium borate and three calcium sulfate phosphor elements; however, only the calcium sulfate phosphor elements were used. Two annealed dosimeters were placed inside a plastic bag and mounted in an aluminum frame for placement in the field. The dosimeters were exchanged and analyzed each quarter using an automatic TLD reader manufactured by Panasonic (Model UD-710).

APPENDIX F
STATISTICAL ANALYSES

F-1.0 CALCULATION OF MEAN AND STANDARD DEVIATION

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

$$(F\text{-}1) \qquad \bar{X} = \sum_{i=1}^{n} \frac{Xi}{n}$$

$$(F\text{-}2) \qquad S = \left(\frac{\sum_{i=1}^{n} \left(Xi^2 - (n)\ (X)^2 \right)}{(n - 1)} \right)^{0.5}$$

where:

$\bar{x}$ = 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.

F-2.0 COMPARING TWO SAMPLE POPULATION MEANS

The means of two sample populations can be compared for a 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)):

$$(F\text{-}3) \qquad t = \frac{(\bar{x} - \bar{y})}{\left(\frac{(n_x - 1)s_x^2 + (n_y - 1)s_y^2}{n_x + n_y - 2} \right)^{0.5} \left(\frac{1}{n_x} + \frac{1}{n_y} \right)^{0.5}}$$

where:

t = calculated "t" value,
$\bar{x}$ = mean of first data set,
$\bar{y}$ = 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.

If the data from both sample populations are treated as correlated pairs, the difference between individual measurements can be examined using the statistical "t" test. In this case, if the true means and true standard deviations for the sample populations are equal, the difference between the correlated data points should be normally distributed about a mean of zero. The "t" value can be calculated from the following equation (obtained from the CRC Standard Mathematical Tables, 26th Edition (1981)):

(F-4) $$t = \frac{\bar{d}\ (n)^{0.5}}{s_d}$$

where:

$\bar{d}$ = the average of the difference between the correlated data points from the two sample populations:

$$\bar{d} = \sum_{i=1}^{N} (x_i - y_i)/N$$

x_i = the i'th data point from population x,
y_i = the i'th data point from population y,
N = the number of correlated pairs of data points,
n = degrees of freedom, for equation F-4, n=N-1, and
s_d = the standard deviation of the difference between the correlated data points.

The calculated "t" value in both cases is used to test the hypothesis that the true mean of the first population (μ_x) is equal to the true mean of the second population (μ_y) assuming that the true standard deviations of both populations are equal ($\mu_x = \mu_y$). The calculated "t" value is compared to a tabular "t" value such that:

a. if $t > t_{\alpha,n}$ then reject the hypothesis when $\mu_x > \mu_y$.

b. if $t < -t_{\alpha,n}$ then reject the hypothesis when $\mu_x < \mu_y$,

c. if $|t| > t_{\alpha/2,n}$ then reject the hypothesis when $\mu_x = \mu_y$,

where $t_{\alpha/2,n}$ and $t_{\alpha,n}$ are the tabular "t" values, with a preselected error (5 percent in this case), confidence level $(1-\alpha)$ or $(1-\alpha/2)$, 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).

F-3.0 TLD MEASUREMENTS

The TLD measurements made during 1989 were grouped into categories based on distance from the plant. The means and standard deviations obtained for each category are given in Table F-1. The mean dose from the stations located more than five miles away from the plant were compared to the mean dose from stations located within two miles from the plant and to the mean dose from stations located between two and five miles from the plant using the standard "t" test. The "t" values were calculated using Equation F-3 and are given in Table F-1. Comparing the calculated and tabular "t" values show that the mean dose for stations within two miles from the plant is statistically lower than the mean dose from stations located greater than five miles from the plant. The mean dose for stations located between two and five miles from the plant is statistically the same as the mean dose for stations located more than five miles from the plant.

F-4.0 GROSS BETA ACTIVITY ON AIR PARTICULATE FILTERS

The means and standard deviations for airborne gross beta results obtained during 1989 from the control and indicator stations are given in Table F-2. The mean from each indicator station was compared to the mean from the control station using the standard "t" test to determine if there was a statistical difference. The calculated (using Equation F-3) and tabular "t" values for each indicator/control station comparison are given in Table F-2. Comparing the calculated and tabular values indicate that there is no statistical difference between the means from indicator locations APC-1, APG-1, and APP-1 and the mean from the control location. The mean from APQ-1 is statistically smaller than the control value.

F-5.0 GROSS BETA ACTIVITY IN MONTHLY DRINKING WATER COMPOSITES

The mean and standard deviations for gross beta activity detected in the monthly drinking water composites obtained during 1989 from the control and indicator stations are given in Table F-3. The mean from each indicator station was compared to the mean from the control station using the standard "t" test to determine if there was a statistical difference. The calculated (using Equation F-3) and tabular "t" values for each indicator/control station comparison are given in Table F-3. Comparing the calculated and tabular values indicate that there is no statistical difference between indicator stations DWG-2 and DWE-5 and control station DWP-7 means.

TABLE F-1

STATISTICAL COMPARISON OF TLD MEASUREMENTS FROM
STATIONS GROUPED BY DISTANCE FROM WATERFORD 3 SES

	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.)	13.32(13)	14.39(14)	14.54(15)
Standard Deviation (mrem/std. qtr.)	3.0	1.9	1.3
Number in Sample	63	28	28
Calculated "t" Value to Comparisons with Stations Located more than 5 miles from the Plant	2.051	0.347	NA
Tabular "t" Value at 95% Confidence ($t_{0.025,n}$)	1.990(a)	2.007(a)	NA

a. Results indicate that the mean for stations located 0-2 miles from the plant is lower thatn those greater than 5 miles and for 2-5 miles from the plant means are statistically identical to stations located more than 5 miles from the plant. NOTE: NA means Not Applicable

TABLE F-2

STATISTICAL COMPARISONS OF GROSS BETA ACTIVITY
ON AIR PARTICULATE FILTERS FOR 1989

	STATION				
	APC-1	APG-1	APP-1	APQ-1	APE-30
Mean (10^{-3} pCi/m^3)	16.4	16.8	16.1	15.6	18.5
Standard Deviation (10^{-3} pCi/m^3)	7.1	7.6	7.2	7.0	7.9
Number in Sample	52	50	52	52	52
Calculated "t" Value Comparing Control Station (APE-30) to Indicator Station	1.4726	1.148	1.640	2.000	NA
Tabular "t" Value at 95% Confidence ($t_{0.025,n}$)	1.986	1.987	1.986	1.986	NA

NOTE: NA means Not Applicable

TABLE F-3

STATISTICAL COMPARISON OF GROSS BETA ACTIVITY
IN MONTHLY DRINKING WATER COMPOSITES FOR 1989

	STATION		
	DWG-2	DWE-5	DWP-7
Mean (pCi/l)	5.7	4.6	4.6
Standard Deviation (pCi/l)	1.9	1.2	1.5
Number in Sample	11	11	9
Calculated "t" Value Comparing Control Station (DWP-7) to Indicator Station	-1.350	0.0157	NA
Tabular "t" Value at 95% Confidence ($t_{0.025,n}$)	2.101	2.101	NA

NOTE: NA means Not Applicable