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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Annual Radiological Environmental Operating Report

Gentlemen:

Attached is the subject 1990 annual report on radiological environmental monitoring which covers the period of January 1 through December 31, 1990. 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 D.A. Rothrock at (504) 739-6693.

Very truly yours,

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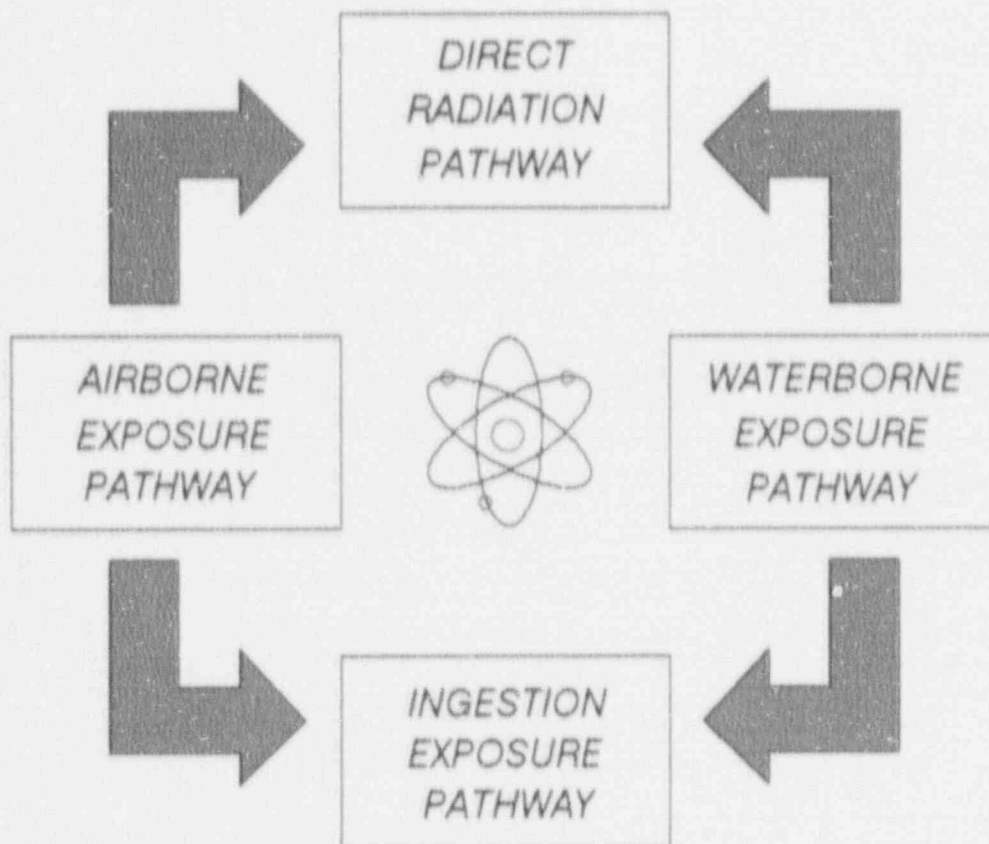
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WATERFORD 3

1990

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT



ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
FOR WATERFORD 3 STEAM ELECTRIC STATION

JANUARY 1 THROUGH DECEMBER 31, 1990

DOCKET NUMBER: 50-382

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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 1990, and 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 1990.

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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 1990. The results discussed in 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 objective of the monitoring program was to evaluate the radiological environmental impact of the plant. The evaluation included an assessment of actual 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 any radioactive materials or radiation in the environment associated with plant operation;
- b. compare the results obtained during the reporting period with past operational and preoperational data to identify any trends associated with 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 federal regulation requirements.

1.2 Plant and Site Description

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 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 between the towns of Killona and Taft. The Mississippi River is the closest prominent natural feature while others include Lac des Allemonds, about 5.5 miles southwest of the site, and Lake Ponchartrain, about 7 miles northeast of the site.

Most of the man-made features are located on the narrow strip of land between the Mississippi River and the wetlands. 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, 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).

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 are illustrated in Figures 2.1 through 2.3. A more detailed description of the 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 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), prior to initial criticality, were used to supplement the baseline data obtained during the PERS Program.

Waterford 3 personnel were responsible for implementing and insuring that the REMP complied with federal regulatory and Technical Specification requirements. Responsibilities of Waterford 3 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 and other relevant reports to the Nuclear Regulatory Commission.

The primary contractor, the Environmental Services Department of Arkansas Power & Light (AP&L) located in Little Rock, Arkansas, was responsible for performing radiological analyses; conducting initial data review; preparing 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 Waterford 3.

2.2 Sample Collection and Handling Procedures

Sample types, location, collection frequency, and the analyses performed are summarized in Tables 2.1 and 2.2. The information contained in these tables is based on requirements specified in Table 3.12-1 of Waterford 3 SES Technical Specification 3.12.1. The locations of the sampling stations are illustrated in Figures 2.1 through 2.3 as required by Technical Specification 6.9.1.7. Any deviations (i.e., unavailable samples and missed lower limits of detection) or changes made to the REMP during 1990 are 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 procedural overview rather than a step-by-step description.

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 Waterford 3 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 by low-volume air sampling devices housed in weather proof shelters. The devices sample continuously while recording the volume of air sampled.

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

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

2.2.3 Waterborne Exposure Pathway Samples

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

Composite drinking/surface water samples were obtained biweekly from the Mississippi River using automatic composite samplers placed at one upstream (DWP-7/SWP-7) and two downstream (DWG-2/SWG-2, DWE-5/SWE-5) locations from the plant. Hydrochloric acid was added to each sample prior to shipment to the contract laboratory. The contract laboratory analyzed the biweekly samples for iodine-131 then composited them monthly for gross beta and gamma spectroscopy analyses. The samples were then composited quarterly 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 Waterford 3 personnel from one sampling location (GWJ-1) using a grab sampling technique. Hydrochloric acid was added to the sample prior to shipment to the contract laboratory for tritium and gamma spectroscopy analyses.

Shoreline sediment samples were obtained semi-annually by Waterford 3 personnel from one sampling station at each plant discharge point. One station (SHWE-3) was located downstream on the shoreline of the Mississippi River and the second station (SHWJ-1) on the shoreline of the 40-Arpent canal. The samples were shipped to the contract laboratory without further processing.

2.2.4 Ingestion Exposure Pathway Samples

Milk samples were collected semi-monthly by Waterford 3 personnel. Control samples were obtained by Louisiana Radiation Protection 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 1990 (see Section 3.5). Formaldehyde was added to all samples prior to shipment to the contract laboratory for iodine-131 and gamma spectroscopy analyses.

Fish samples were collected by a contractor bi-annually upstream (FH-1) and downstream (FH-2) from the plant. The fish were obtained by netting. The contractor segregated the samples by species and location prior to delivery to Waterford 3. The samples were shipped frozen to the contract laboratory for analysis by gamma spectroscopy.

Waterford 3 SES Technical Specification 3.12.1 requires broad leaf vegetation to be sampled from 3 different locations within 5 miles of the plant 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 (BLK-15). Waterford 3 personnel collected broad leaf vegetation samples monthly by obtaining cuttings taken at least one inch above the ground. 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 in which plant wastes are discharged. Food products grown within the site boundary were collected however, to demonstrate the absence of radionuclide accumulation.

These samples (sugarcane and soybeans) were collected at the time of harvest by Waterford 3 personnel from three locations (FPP-1, FPQ-1, and FPQ-1). The samples were collected by normal harvesting techniques at the time of harvest, and 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 Waterford 3 are given in Appendix E. These synopses are intended to provide an overview rather than 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 identical to the ones 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 1990 AP&L performed a variety of quality assurance analyses. Spiked and blank samples prepared in-house and obtained from the Environmental Protection Agency (EPA) 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 1990 results of AP&L's participation in the cross-check program.

TABLE 2.1

RADIOLOGICAL ENVIRONMENTAL MONITORING
PROGRAM (REMP) SUMMARY^a

<u>SAMPLE TYPE</u>	<u>LOCATION</u>	<u>ANALYSIS</u>	<u>FREQUENCY</u>
Direct Radiation	A-2, B-1, C-1, D-2, E-1, F-2, G-2, H-2, J-2, K-1, L-1, M-1, N-1, P-1, Q-1, R-1, A-5, B-4, D-5, E-5, F-4, G-4, H-6, P-6, Q-5, R-6, F-9, G-9, E-15, J-15, E-30	TLD gamma	Quarterly
Radiiodine 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. 7

TABLE 2.2

DESCRIPTION OF REMP SAMPLING STATION LOCATIONS

LOCATION NUMBER	LOCATION DESCRIPTION	MILES FROM PLANT	SECTOR DIRECTION
<u>DIRECT RADIATION (TLD)</u>			
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 northwest 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
<u>AIRBORNE</u>			
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
<u>INGESTION</u>			
<u>MILK</u>			
MKF-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.	4.9	NW
MKQ-45*	(Eastbank) Located off of I-12 in Denham Springs, take LA 3002 south to LA 1034, then right to LA 1032, then left. Farm is 1 mile on the right.	42	NW
<u>FISH</u>			
FH-1*	Upstream of the plant intake structure.	NA**	NA**
FH-2	Downstream of the plant intake structure.	NA**	NA**
<u>BROAD LEAF</u>			
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
<u>FOOD PRODUCTS***</u>			
FPF-1	(Westbank) Located in sugarcane field on eastern edge of Killona, between air sample station APP-1 and APQ-1.	0.8	WNW
FPG-1	(Westbank) Located in a sugarcane 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

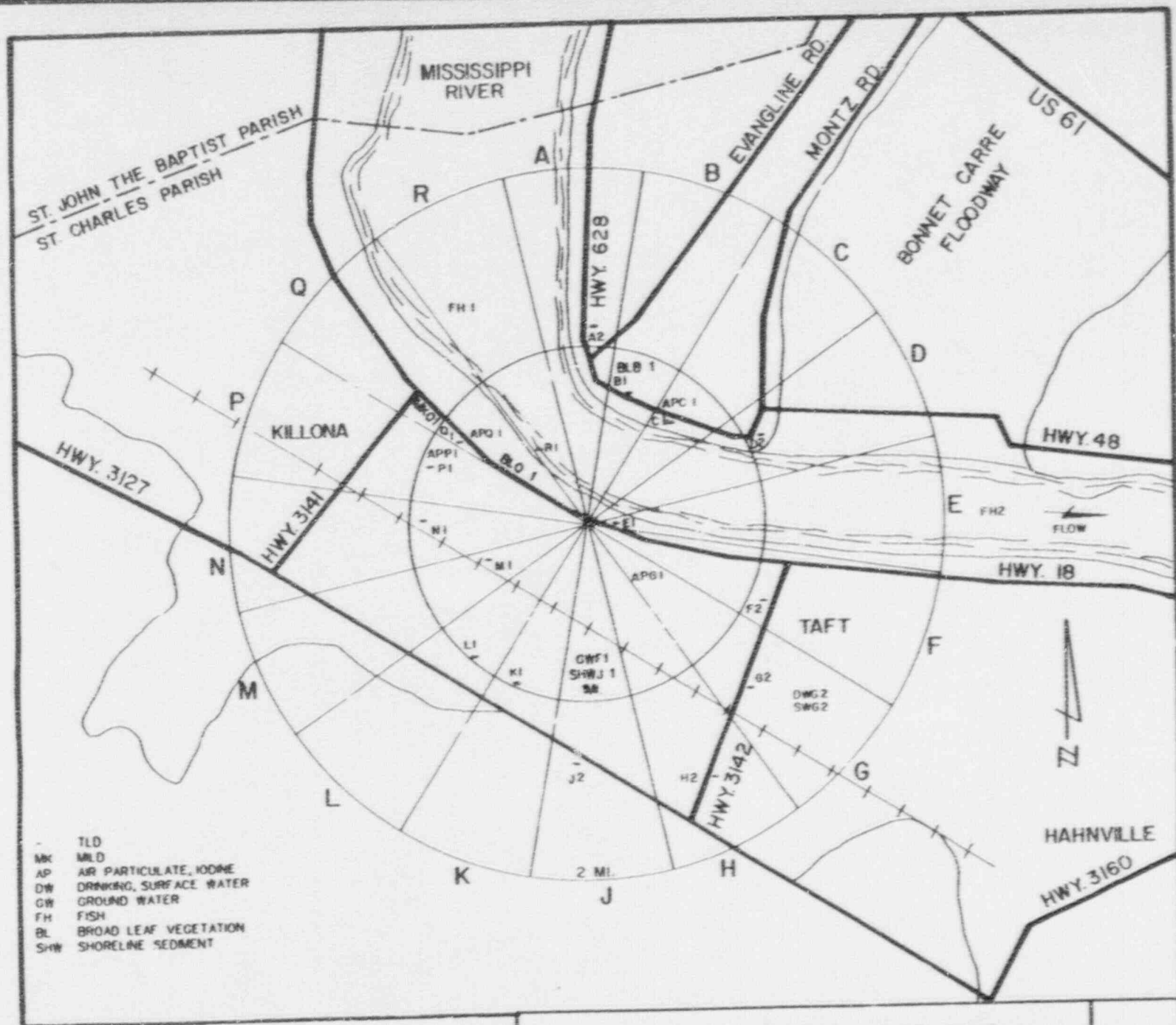
DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS

LOWER LIMIT OF DETECTION (LLD)^(a)

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GAS (pCi/m ³)	FISH (pCi/kg-wet)	MILK (pCi/l)	FOOD PRODUCTS ^(b) (pCi/kg-wet)	SEDIMENT (pCi/kg-dry)
gross beta	4	0.01				
H-3	2000					
Mn-54	15		130			
Fe-59	30		260			
Co-58, 60	15		130			
Zn-65	30		260			
Zr-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		

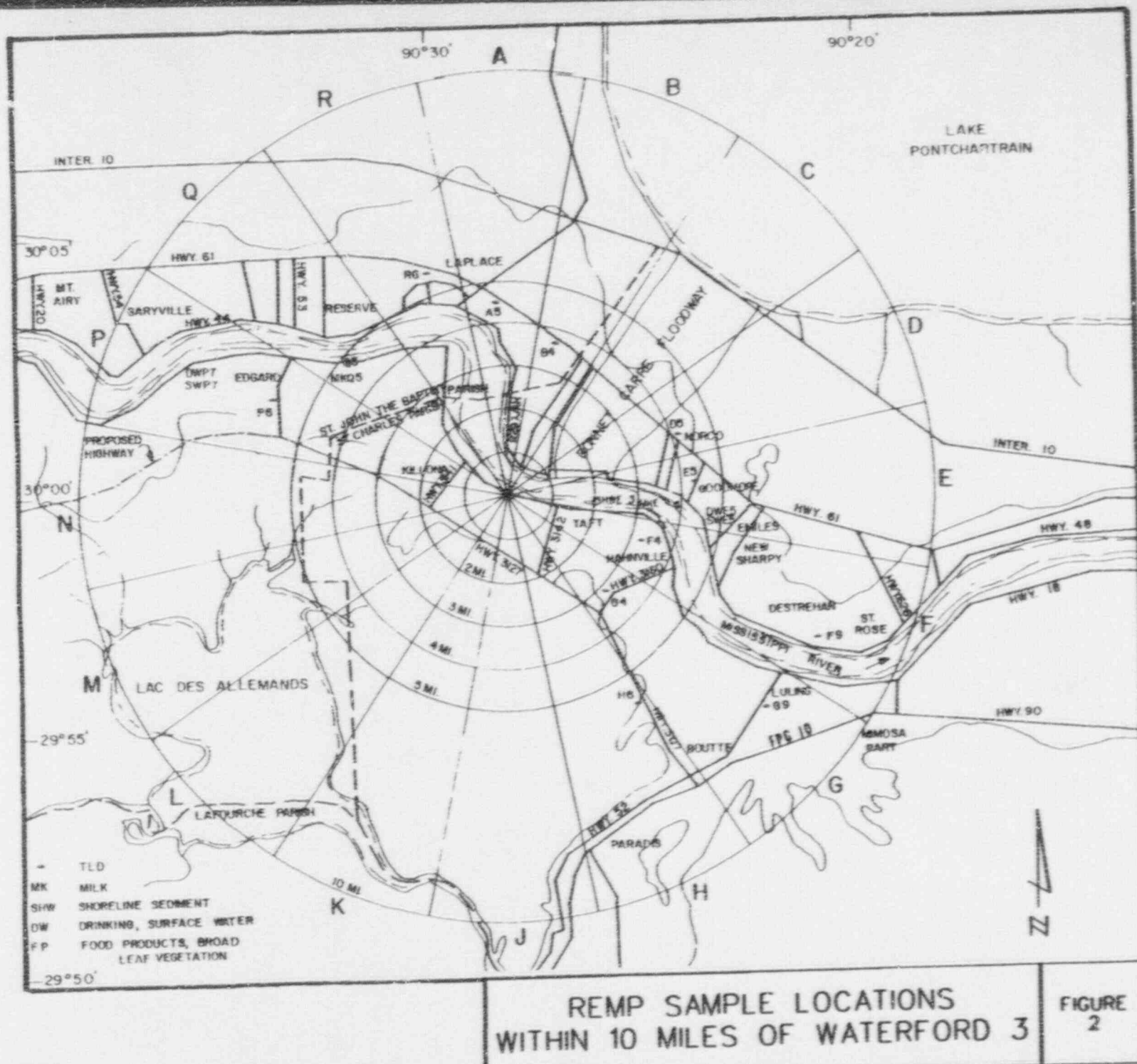
a. From Table 4.12-1 of Waterford 3 SES Technical Specification 3.12.1.

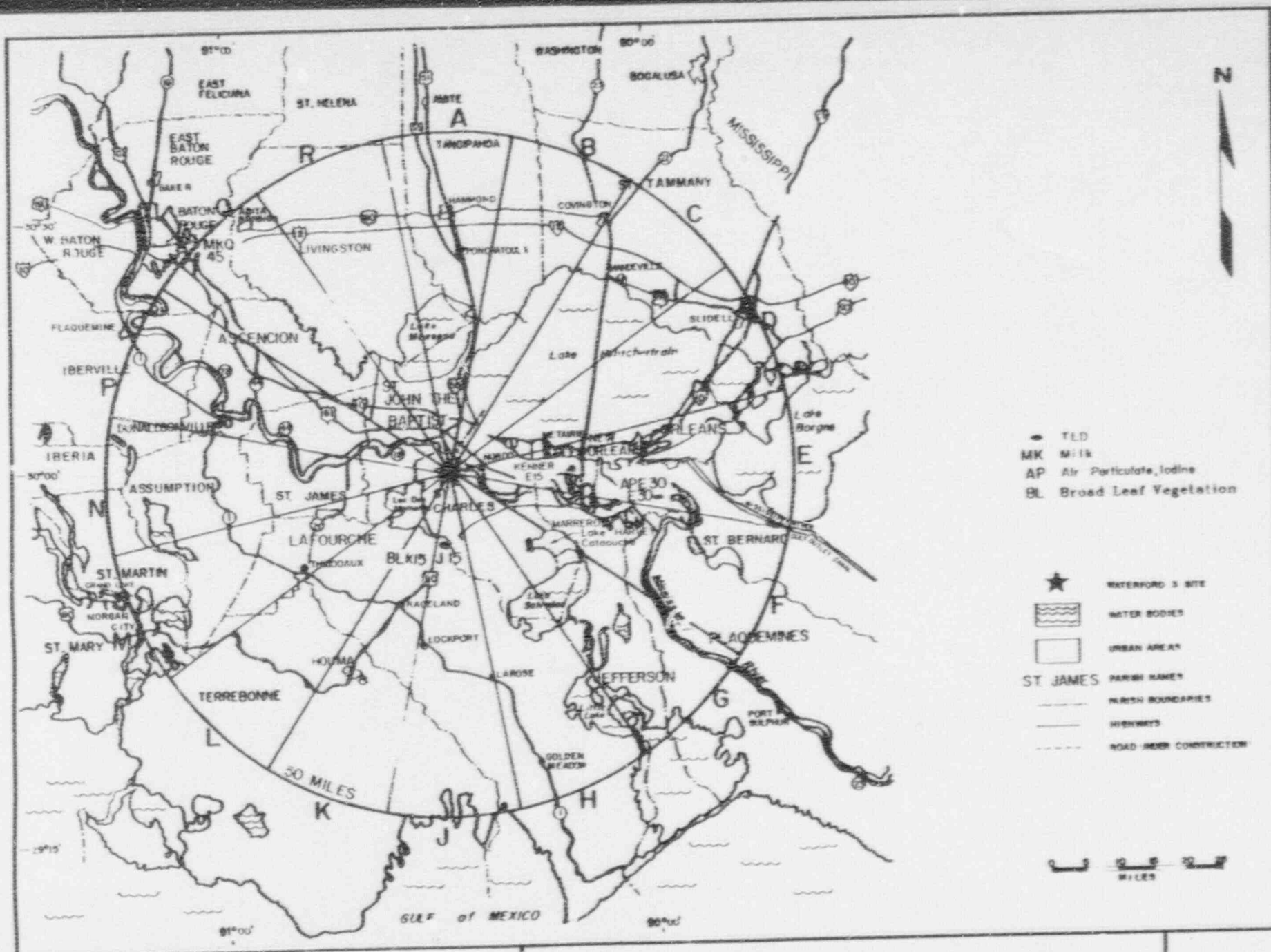
b. Applicable to broad leaf vegetation.



REMP SAMPLE LOCATIONS
WITHIN 2 MILES OF WATERFORD 3

FIGURE 1





REMP SAMPLE LOCATIONS
WITHIN 50 MILES OF WATERFORD 3

FIGURE
3

3.0 DISCUSSION OF RESULTS

Analytical results for the year 1990 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 on man-made radioactivity.

3.1 Direct Radiation Exposure Pathway

The average dose rates measured at all stations by both control and indicator Thermoluminescent Dosimeters (TLDs) were 12, 12, 14, and 12 mrem per standard quarter (90 days) for the first, second, third, and fourth quarters of 1990, respectively. The average of 119 indicator location TLD exposures was 13 mrem/standard quarter compared to 11 mrem/standard quarter for the average of four exposures at the control location. The lowest and highest individual exposures were 7 mrem/standard quarter (C-1, 2nd quarter) and 18 mrem/standard quarter (D-2, 3rd 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 14 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 0.005 pCi/cubic meter (APQ-1, 7/16-7/23 and APP-1 5/7-5/14) to 0.030 pCi/cubic meter (APE-30, 9/17-9/24) with an average of 0.016 pCi/cubic meter, for 264 measurements from all five sampling locations. The average gross beta activity for the control location, APE-30, was 0.016 pCi/cubic meter compared to 0.015 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 1990 are consistent with those from 1989, 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. From 1985-1989, the average gross beta activity for the control location was 0.020 pCi/cubic meter compared to 0.019 pCi/cubic meter for the four indicator locations.

3.2.2 Airborne Iodine

All of the 264 airborne iodine-131 results were below the required lower limit of detection (LLD). Sample LLDs ranged from 0.008 to 0.040 pCi/cubic meter (Table B-2). The variability of the lower limit of detection was due primarily to the difference in air sample volumes.

3.2.3 Gamma Isotopic Analysis

Gamma spectroscopy results indicated detectable levels of cosmogenically produced beryllium-7 and naturally occurring potassium-40 in the twenty quarterly composites (Table B-3). No man-made radionuclides were detected above their respective lower limits of detection.

3.3 Waterborne Exposure Pathway

3.3.1 Drinking/Surface Water

As mentioned previously, drinking water 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 the control station, and all measurements satisfied the LLD requirement. Iodine 131 was detected in one sample (1/2-1/15) from an indicator location (DWE-5) at a concentration of 0.5 ± 0.4 pCi/l. Iodine-131 was detected in several preoperational samples at an average concentration of 0.4 pCi/l. The level detected in the 1990 sample is well below reporting levels and the LLD required by Technical Specification Table 4.12-1, and has a high degree of uncertainty associated with it. Therefore, the radiological impact to the environment, in this instance, is insignificant.

The monthly composites were analyzed for gross beta activity. Gross beta activity was detected in thirty-three of the forty-two composites with an average activity of 3.9 pCi/l. The average activity for the control location was 4.1 pCi/l, compared to the averages of 4.0 and 3.6 pCi/l for indicator stations DWG-2 and DWE-5, respectively. The average gross beta activity detected at the indicator stations are statistically the same as that of the control station using the standard "t" test (see Table F-3, Appendix F).

Drinking/surface water samples were also composited quarterly and analyzed for tritium. Eleven of the twelve measurements were below the respective LLD. Tritium was detected in the second quarter of 1990 at a concentration of 330 ± 220 pCi/l at DWE-5, an indicator station.

Tritium is man-made and cosmogenically produced and was frequently detected in preoperational drinking water samples at concentrations ranging between 60 and 220 pCi/l. Although the level detected in the 1990 sample is slightly higher than the preoperational data, it is well below the reporting level and the LLD (2000 pCi/l) required by Technical Specifications. Because tritium was detected in only one sample from this location and was not found in the other indicator location (DWG-2) which is closer to the plant, it is not likely that Waterford 3 operations were responsible for the tritium detected in this sample.

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; however, tritium was detected in two of the four samples at concentrations of 650 ± 220 and 570 ± 220 pCi/l.

Tritium is man-made and cosmogenically produced and was frequently detected in preoperational ground water samples at concentrations ranging between 50 and 180 pCi/l. Although the concentrations detected in 1990 are higher than the preoperational data, they are well below the reporting levels and LLD (2000 pCi/l) required by Technical Specifications. In addition, radioactive effluent release permits for 1990 show that no tritium was discharged into the drainage canal at GWJ-1, indicating that it is not likely that the tritium detected at this location is a result of Waterford 3 operations.

3.3.3 Shoreline Sediment

Four shoreline soil samples were collected from the following sampling locations: two samples from the Mississippi River shoreline downriver of the plant (SHWE-3) and two samples from the shoreline of a drainage canal (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 66 ± 17 pCi/kg(dry). No other man-made radionuclides were detected in any of the samples.

During the preoperational survey for soil samples collected from the shoreline of the Mississippi River, 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, 1988, and 1989 cesium-137 was detected at this location at levels of 99, 65, 21, 142, and 28 pCi/kg (dry), respectively. These levels are consistent with preoperational values. In addition, radioactive release permits for the year 1990 show that no cesium-137 was discharged into the drainage canal from which SHWJ-1 came. Studies in Louisiana indicate that cesium-137 is commonly found in soils and sediments as a result of past atmospheric weapons testing. Because the cesium-137 levels are consistent with preoperational values and cesium-137 has been shown to be present in most Louisiana soils, these cesium-137 levels are likely attributable to past weapon testing fallout.

3.4 Ingestion Exposure Pathway

3.4.1 Milk

Forty-eight milk samples were collected from two sampling locations and analyzed by gamma spectroscopy. Naturally occurring potassium-40 was detected in all samples. The samples were also analyzed by a radiochemical procedure for iodine-131. Iodine-131 was detected in one sample (10/16) from an indicator location (MKQ-5) at a concentration of 0.3 ± 0.3 pCi/l. Iodine-131 was found in several preoperational samples at an average concentration of 0.9 pCi/l. The level detected in the 1990 sample is well below the LLD required by Technical Specification Table 4.12-1, is in the same range as preoperational samples, and has a high degree of uncertainty associated with it. Therefore, iodine is not attributable to Waterford operation, and the impact to the environment is negligible.

3.4.2 Fish

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

3.4.3 Broad Leaf Vegetation

Thirty-six broad leaf vegetation samples were collected and analyzed by 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 Products

Three food products 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 1990 several deviations from the REMP sampling schedule occurred. Deviations from the REMP associated with TLDs were beyond the control of Waterford 3 and resulted from theft of the dosimeters. When a dosimeter was discovered missing during a monthly inspection, the TLD was replaced and the deviation noted.

One air sample was missed in the second quarter of 1990 because of a malfunctioning sample pump. Upon discovery, the faulty instrument was replaced and returned for repair. This malfunction resulted in an insufficient sample volume for analysis. A routine maintenance schedule has been implemented to reduce instances of sampler malfunction.

Milk samples were not available during 1990 from the animal owners at station MKQ-1 since the cows at MKE-1 are currently not producing milk for human consumption. The goats previously located at MKQ-4 have been sold and this sample location will be removed from the ODCM in the next revision. With the absence of milk samples at these stations, broad leaf vegetation sampling was performed.

A listing of unavailable samples for 1990 and associated explanations is given in Appendix C.

3.5.2 Missed Lower Limits of Detection

All lower limit of detection requirements were met for 1990.

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.

3.5.4 Additional Samples

Although not required, additional food product samples were taken at a temporary sample location (FPL-1, approximately 0.5 miles SW of the plant). The crop at this location was changed from sugarcane to soybean and samples were taken to demonstrate the absence of man-made radionuclides. No man-made radionuclides were detected above their lower limit of detection.

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 August 15, 16, and 17, 1990. 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 1990 census are given in Table 3.2. Residence locations were unchanged except for Sector E. A residence previously identified as closest to the plant was removed. The difference in distance to the next closest residence is insignificant. The garden locations remain unchanged from the 1989 census.

Milk goats in Sector D 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 milking goats at location MKE-4 have been sold and will be deleted from the next revision of the ODCM. Although no samples were available from MKQ-1 during 1990, the station will remain as part of the REMP and owners will be contacted periodically to determine the status of obtaining samples.

TABLE 3.1

1990 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	14	1.4	8
B	NNE	13	1.1	8
C	NE	8	0.8	4
D	ENE	12	2.9	8
E(a)	E	13	1.9	12
F	ESE	13	1.5	12
G	SE	13	2.0	12
H	SSE	13	1.7	8
J	S	13	1.1	8
K	SSW	11	1.0	4
L	SW	12	0.8	4
M	WSW	12	1.5	4
N	W	13	1.5	4
P	WNW	12	3.0	8
Q	NW	13	2.2	8
R	NNW	12	2.1	8
CONTROL	E	11	1.5	4

BY DISTANCE FROM PLANT			
DISTANCE FROM PLANT (MILES)	AVERAGE DOSE RATE (mrem/std qtr)	STANDARD DEVIATION (mrem/std qtr)	NUMBER IN GROUP
0 - 2	12	2.3	64
2 - 5	13	1.5	28
5(a)	13	1.5	28
CONTROL	11	1.5	4

a. Does not include control station data.

TABLE 3.2
1990 ANNUAL LAND USE CENSUS RESULTS

SECTOR	DIRECTION	DISTANCE FROM PLANT (MILES)					FOOD PRODUCTS
		BEEF COW	MILK COW	MILK GOAT	GARDEN	RESIDENCE	
A	N	3.5	-	-	1.0	0.9	4.1
B	NNE	-	-	-	1.3	1.3	-
C	NE	1.3	-	-	0.9	0.9	-
D	ENE	-	-	1.0 ^c	0.9	0.9	-
E	E	2.7	-	-	2.2	2.2	0.3
F	ESE	3.5	-	-	2.2	3.1	0.3
G	SE	4.0	-	-	2.3	4.0	0.3
H	SSE	-	-	-	-	-	0.3
J	S	-	-	-	-	-	0.7
K	SSW	-	-	-	-	-	0.5
L	SW	-	-	-	-	-	0.5
M	WSW	1.0	-	-	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 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 1990 are consistent with the data obtained during the prior five years of plant operation (1985-89), 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 1990 were iodine-131, cesium-137, and tritium.

Iodine-131 was detected in one drinking water sample in January and one milk sample in October of 1990. The activity detected in both instances was at levels less than the required Technical Specification's lower limit of detection and well below levels requiring notification. Both levels had a high degree of uncertainty associated with them and may be artifacts of counting statistics.

Cesium-137 was detected in one shoreline soil sample. The detected activity in both instances was at levels less than the required Technical Specification's lower limits of detection and well below levels requiring notification. The detected concentrations were consistent with levels detected during the preoperational program. Therefore, it is unlikely that the presence of cesium in these samples can be attributed to Waterford 3 operations.

Tritium was detected in one drinking/surface water and two groundwater samples at levels well below the reporting levels and LLDs required by Technical Specifications. Tritium is man-made and cosmogenically produced and was frequently detected in samples taken prior to Waterford 3 operation. Due to the absence of tritium in drinking/surface water samples located at a closer downstream location, the presence of tritium in preoperational samples, and the high degree of uncertainty associated with the detected levels, it is not likely that the tritium detected in the drinking water sample in 1990 was a result of plant operation. The radioactive effluent release data indication that no tritium was discharged into the drainage canal and the presence of tritium in preoperational samples indicates that it is unlikely that Waterford 3 operations were responsible for the presence of tritium in groundwater samples.

In conclusion, based on the evaluation of the REMP data collected during 1990 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 Dock # 50-382
 Location of Facility St. Charles, Louisiana Reporting Period January 1 to
(Parish, State) December 31, 1990

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
1. Direct Radiation (mrem/Std. Qtr.)	TLD 124	(c)	13(119/119) (7-18)	G-2 1.2 miles SE P-6 5.5 Miles WNW	15(8/8) (13-17) E-30 11(4/4) (10-13)	0
2. Airborne Particulates (10 ⁻³ pCi/m ³)	Gross Beta 264	10	15(211/211) (5-28)	APG-1 0.5 miles SE	15(53/53) (7-26) APE-30 16(53/53) (7-30)	0
	Gamma 20	(d)	<LLD (0/16) (-)	NA	NA APE-30 <LLD (0/4) (-)	0
3. Airborne Iodine (10 ⁻³ pCi/m ³)	I-131 264	70	<LLD (0/211) (-)	NA	NA APE-30 <LLD (0/53) (-)	0

NOTE: Footnotes at end of table.

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 Reporting Period January 1 to
(Parish, State) December 31, 1990

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 ^c
4. Drinking Water (pCi/l)	Gross Beta	42	4	4{21/28} {2-8}	DWG-2 2.0 miles ESE	4{12/14} {3-8}	DWP-7 4{11/14} {3-7}	0
	I-131	78	1	0.5 {1/52} {-}	DWE-5 4.5 miles E	0.5{1/52} {-}	DWP-7 <LLD{0/26} {-}	0
	Gamma	39	{d}	<LLD {0/26} {-}	NA	NA	DWP-7 <LLD {0/13} {-}	0
	Tritium	12	2000	330{1/8} {-}	DWE-5 4.5 miles E	NA	DWP-7 <LLD{0/4} {-}	0

NOTE: Footnotes at end of table.

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 Reporting Period January 1 to
(Parish, State) December 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION ^m {LLD}	ALL INDICATOR LOCATIONS MEAN ^m (RANGE) ^m	LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN ^m (RANGE) ^m	CONTROL LOCATION MEAN ^m (RANGE) ^m	NUMBER OF NONROUTINE REPORTED MEASUREMENT	
5. Surface Water {pCi/l}	Gross Beta	42	4	4{21/28} (2-8)	SWG-2 2.0 miles ESE	4{12/14} {3-8}	SWP-7 4{11/14} {3-7}	0
	I-131	78	1	0.5{1/52} {-}	SWT-5 6.5 miles E	0.5{1/52} {-}	SWP-7 <LLD {0/26} {-}	0
	Gamma	39	{d}	<LLD {0/26} {-}	NA	NA	SWP-7 <LLD {0/13} {-}	0
	Tritium	12	2000	330{1/8} {-}	SWE-5 4.5 miles E	NA	SWP-7 <LLD {0/4} {-}	0

NOTE: Footnotes at end of table.

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 Reporting Period January 1 to
(Parish, State) December 31, 1990

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 MEASUREMENTS	
6. Groundwater (pCi/l)	Gamma	4	(d)	<LLD (0/4) (-)	NA	NA	NONE	0
	Tritium	4	2000	610(2/4) {570-650}	GMJ-1	610(2/4) {570-650}	NONE	0
7. Shoreline Sediment (pCi/kg-dry)	Gamma Cs-137	4 180	66(1/4) (-)	SHWJ-1 1.0 miles S	66(1/2) (-)	NONE	0	

NOTE: Footnotes at end of table.

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 Reporting Period January 1 to
(Parish, State) December 31, 1990

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,c}	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	0.3 (1/24) (-)	MKQ-5 4.9 miles NW	0.3(1/24) (-)	MKQ-45 <LLD (1/24) (-)	0
	Gamma Cs-137 48	18	<LLD (0/24) (-)	MKQ-45 42 miles NW	3(1/24) (-)	MKQ-45 (1/24) (-)	0
9. Fish (pCi/kg-wet)	Gamma 20	(d)	<LLD (0/10) (-)	NA	NA	FH-1 <LLD (0/10) (-)	0

NOTE: Footnotes at end of table.

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 Reporting Period January 1 to
(Parish, State) December 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION ^a (LLD)	ALL INDICATOR LOCATIONS	LOCATION WITH HIGHEST ANNUAL MEAN		CONTROL LOCATION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
				MEAN ^b (RANGE) ^b	NAME	MEAN ^b (RANGE) ^b	MEAN ^b (RANGE) ^b	
10. Broad Leaf Vegetation (pCi/kg-wet)	I-131	36	60	<LLD (0/24) (-)	NA	NA	BLK-15 <LLD (0/12) (-)	0
	Gamma	36	(d)	<LLD (0/24) (-)	NA	NA	BLK-15 <LLD (0/12) (-)	0
11. Food/Garden Crop (pCi/kg-wet)	Gamma	4	(d)	<LLD (0/3) (-)	NA	NA	NONE	0

NOTE: Footnotes at end of table.

TABLE A-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

FOOTNOTES

^aNominal Lower Limit of Detection (LLD) as defined in Waterford 3 SES Technical Specifications.

^bMean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis.

^cLower Limit of Detection (LLD) not defined in Waterford 3 SES Technical Specifications.

^dLower 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 (07/06-10/06) DOSE RATE (mrem/std qtr)	4TH QUARTER (10/06-01/07) DOSE RATE (mrem/std qtr)	AVERAGE DOSE RATE (mrem/std qtr)
A-2	13	14	16	14	14
A-5	12	12	15	13	13
B-1	12	12	15	13	13
B-4	12	13	14	13	13
C-1	08	07	09	08	08
D-2	09	11*	18	09	12
D-5	11	11	13	11	12
E-1	10	10	12	10	11
E-5	12	13	15	13	13
E-15	13	13	16	13	14
E-30	13	10	12	10	11
F-2	11	12	13	11	12
F-4	13	13	15	14	14
F-9	12	12	15	12	13
G-2	14	15	17	15	15
G-4	11	11	12	11**	11
G-9	13	13	16	13	14
H-2	12	13*	16	13	14
H-6	11	11	14	12	12
J-2	12	12	15	12	13
J-15	12	12	13	12	12
K-1	10	11	12	10	11
L-1	11	12	13	12	12
M-1	11	11	14	11	12
N-1	12	12	15	12	13
P-1	09	09	11	09	10
P-6	13	14	17	14	15
Q-1	11	10	12	11	11
Q-5	13	13	17	14	14
R-1	10	10	11	10	10
R-6	13	14	15	14	14
Average	12	12	14	12	

* - 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

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
900004	12/26/89	01/02/90	0.020 +/-0.003	< 0.04
900050	01/02/90	01/08/90	0.011 +/-0.003	< 0.03
900082	01/08/90	01/15/90	0.025 +/-0.003	< 0.028
900116	01/15/90	01/22/90	0.012 +/-0.003	< 0.019
900184	01/22/90	03/29/90	0.014 +/-0.003	< 0.026
900202	01/29/90	02/05/90	0.014 +/-0.003	< 0.025
900254	02/05/90	02/12/90	0.017 +/-0.003	< 0.029
900295	02/12/90	02/19/90	0.014 +/-0.003	< 0.027
900323	02/19/90	02/26/90	0.014 +/-0.003	< 0.018
900353	02/26/90	03/05/90	0.017 +/-0.003	< 0.008
900418	03/05/90	03/12/90	0.017 +/-0.003	< 0.012
900453	03/12/90	03/19/90	0.012 +/-0.003	< 0.012
900481	03/19/90	03/26/90	0.015 +/-0.003	< 0.013
900527	03/26/90	04/02/90	0.015 +/-0.003	< 0.019
900594	04/02/90	04/09/90	0.016 +/-0.003	< 0.021
900643	04/09/90	04/16/90	0.015 +/-0.003	< 0.016
900669	04/16/90	04/23/90	0.014 +/-0.003	< 0.016
900710	04/23/90	04/30/90	0.016 +/-0.003	< 0.012
900771	04/30/90	05/07/90	0.009 +/-0.003	< 0.021
900802	05/07/90	05/14/90	0.008 +/-0.003	< 0.012
900828	05/14/90	05/21/90	0.009 +/-0.003	< 0.016
900879	05/21/90	05/29/90	0.011 +/-0.003	< 0.011
900915	05/29/90	06/04/90	0.015 +/-0.002	< 0.035
900991	06/04/90	06/11/90	0.008 +/-0.002	< 0.020
901023	06/11/90	06/18/90	0.011 +/-0.002	< 0.016
901064	06/18/90	06/25/90	0.012 +/-0.002	< 0.012

TABLE B-2 (continued)

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

SAMPLE LOCATION: APC-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
901117	06/25/90	07/02/90	6.015 +/-0.003	< 0.028
901149	07/02/90	07/09/90	0.014 +/-0.003	< 0.025
901211	07/09/90	07/16/90	0.009 +/-0.002	< 0.012
901270	07/16/90	07/23/90	0.006 +/-0.002	< 0.012
901294	07/23/90	07/30/90	0.014 +/-0.002	< 0.021
901339	07/30/90	08/06/90	0.015 +/-0.002	< 0.017
901378	08/06/90	08/13/90	0.021 +/-0.002	< 0.014
901407	08/13/90	08/19/90	0.017 +/-0.002	< 0.016
901444	08/19/90	08/27/90	0.015 +/-0.002	< 0.011
901483	08/27/90	09/04/90	0.012 +/-0.002	< 0.024
901540	09/04/90	09/10/90	0.022 +/-0.003	< 0.017
901567	09/10/90	09/17/90	0.009 +/-0.002	< 0.011
901599	09/17/90	09/24/90	0.026 +/-0.003	< 0.017
901649	09/24/90	10/01/90	0.017 +/-0.002	< 0.017
901719	10/01/90	10/08/90	0.011 +/-0.002	< 0.027
901760	10/08/90	10/15/90	0.012 +/-0.002	< 0.017
901809	10/15/90	10/22/90	0.017 +/-0.003	< 0.019
901836	10/22/90	10/29/90	0.020 +/-0.003	< 0.012
901914	10/29/90	11/05/90	0.021 +/-0.003	< 0.024
901959	11/05/90	11/12/90	0.017 +/-0.003	< 0.022
901996	11/12/90	11/19/90	0.027 +/-0.003	< 0.021
902028	11/19/90	11/26/90	0.019 +/-0.003	< 0.013

TABLE B-2 (continued)

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

SAMPLE LOCATION: APC-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
902090	11/26/90	12/04/90	0.015 +/-0.002	< 0.013
902140	12/04/90	12/10/90	0.016 +/-0.003	< 0.021
902176	12/10/90	12/17/90	0.008 +/-0.003	< 0.023
902200	12/17/90	12/24/90	0.011 +/-0.002	< 0.018
910011	12/24/90	12/31/90	0.019 +/-0.002	< 0.012

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date End Price	Gross-Beta	I-131
900002	12/26/90 01/02/90	0.017 +/-0.003	< 0.04
900048	01/02/90 01/08/90	0.013 +/-0.003	< 0.03
900080	01/08/90 01/13/90	0.025 +/-0.003	< 0.028
900114	01/13/90 01/22/90	0.012 +/-0.003	< 0.019
900142	01/22/90 01/29/90	0.015 +/-0.003	< 0.026
900200	01/29/90 02/05/90	0.016 +/-0.003	< 0.025
900254	02/05/90 02/12/90	0.016 +/-0.003	< 0.029
900283	02/12/90 02/19/90	0.019 +/-0.003	< 0.027
900321	02/19/90 02/26/90	0.012 +/-0.003	< 0.018
900353	02/26/90 03/05/90	0.015 +/-0.003	< 0.008
900416	03/05/90 03/12/90	0.016 +/-0.003	< 0.013
900451	03/12/90 03/19/90	0.010 +/-0.003	< 0.012
900489	03/19/90 03/26/90	0.018 +/-0.003	< 0.013
900525	03/26/90 04/02/90	0.014 +/-0.003	< 0.019
900582	04/02/90 04/09/90	0.014 +/-0.003	< 0.021
900641	04/09/90 04/16/90	0.013 +/-0.003	< 0.016
900667	04/16/90 04/23/90	0.012 +/-0.002	< 0.016
900708	04/23/90 04/30/90	0.016 +/-0.003	< 0.012
900769	04/30/90 05/07/90	0.012 +/-0.003	< 0.021
900800	05/07/90 05/14/90	0.006 +/-0.003	< 0.012
900826	05/14/90 05/21/90	0.008 +/-0.003	< 0.018
900877	05/21/90 05/29/90	0.011 +/-0.002	< 0.011
900913	05/29/90 06/04/90	FINE FAIL	
900990	06/04/90 06/11/90	0.009 +/-0.002	< 0.020
901021	06/11/90 06/18/90	0.010 +/-0.002	< 0.016
901062	06/18/90 06/25/90	0.011 +/-0.002	< 0.012

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross Beta	I-131
901115	06/25/90	07/02/90	0.013 +/-0.003	< 0.028
901147	07/02/90	07/09/90	0.011 +/-0.003	< 0.025
901209	07/09/90	07/16/90	0.010 +/-0.002	< 0.012
901264	07/16/90	07/23/90	0.005 +/-0.002	< 0.012
901292	07/24/90	07/30/90	0.009 +/-0.002	< 0.011
901337	07/30/90	08/06/90	0.014 +/-0.002	< 0.017
901376	08/06/90	08/13/90	0.018 +/-0.002	< 0.014
901405	08/13/90	08/19/90	0.015 +/-0.003	< 0.016
901442	08/19/90	08/27/90	0.013 +/-0.002	< 0.011
901481	08/27/90	09/04/90	0.009 +/-0.002	< 0.024
901538	09/04/90	09/10/90	0.020 +/-0.003	< 0.017
901565	09/10/90	09/17/90	0.009 +/-0.002	< 0.011
901597	09/17/90	09/24/90	0.022 +/-0.003	< 0.017
901647	09/24/90	10/01/90	0.018 +/-0.002	< 0.017
901717	10/01/90	10/08/90	0.011 +/-0.002	< 0.027
901758	10/08/90	10/15/90	0.015 +/-0.002	< 0.017
901807	10/15/90	10/22/90	0.014 +/-0.002	< 0.019
901834	10/22/90	10/29/90	0.019 +/-0.003	< 0.012
901912	10/29/90	11/05/90	0.024 +/-0.003	< 0.024
901957	11/05/90	11/12/90	0.020 +/-0.003	< 0.012
901994	11/12/90	11/19/90	0.028 +/-0.003	< 0.021
902026	11/19/90	11/26/90	0.022 +/-0.003	< 0.013

TABLE B-2 (continued)

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

SAMPLE LOCATION: APQ-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross Beta	I-131
902088	11/26/90	12/04/90	0.019 +/-0.002	< 0.013
902138	12/04/90	12/10/90	0.021 +/-0.003	< 0.021
902174	12/10/90	12/17/90	0.014 +/-0.002	< 0.025
902198	12/17/90	12/24/90	0.009 +/-0.002	< 0.018
910009	12/24/90	12/31/90	0.015 +/-0.002	< 0.012

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross Beta	I-131
900001	12/26/88	01/02/90	0.020 +/-0.003	< 0.04
900047	01/02/90	01/08/90	0.013 +/-0.003	< 0.030
900079	01/08/90	01/15/90	0.025 +/-0.003	< 0.028
900113	01/15/90	01/22/90	0.012 +/-0.003	< 0.019
900141	01/22/90	01/29/90	0.013 +/-0.002	< 0.025
900199	01/29/90	02/05/90	0.026 +/-0.003	< 0.025
900253	02/05/90	02/12/90	0.025 +/-0.003	< 0.029
900292	02/12/90	02/19/90	0.016 +/-0.003	< 0.027
900320	02/19/90	02/26/90	0.013 +/-0.002	< 0.018
900350	02/26/90	03/05/90	0.019 +/-0.003	< 0.008
900415	03/05/90	03/12/90	0.016 +/-0.003	< 0.013
900450	03/12/90	03/19/90	0.011 +/-0.003	< 0.012
900488	03/19/90	03/26/90	0.017 +/-0.003	< 0.013
900524	03/26/90	04/02/90	0.014 +/-0.003	< 0.019
900591	04/02/90	04/09/90	0.016 +/-0.003	< 0.021
900640	04/09/90	04/16/90	0.018 +/-0.003	< 0.016
900666	04/16/90	04/23/90	0.012 +/-0.002	< 0.016
900707	04/23/90	04/30/90	0.016 +/-0.003	< 0.012
900768	04/30/90	05/07/90	0.008 +/-0.003	< 0.021
900799	05/07/90	05/14/90	0.008 +/-0.003	< 0.012
900825	05/14/90	05/21/90	0.009 +/-0.003	< 0.018
900876	05/21/90	05/29/90	0.011 +/-0.003	< 0.011
900912	05/29/90	06/04/90	0.016 +/-0.002	< 0.035
900988	06/04/90	06/11/90	0.009 +/-0.002	< 0.020
901020	06/11/90	06/28/90	0.011 +/-0.002	< 0.016
901061	06/18/90	06/25/90	0.012 +/-0.002	< 0.012

TABLE B-2 (continued)

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

UNITS: pCi/CUBIC METER

SAMPLE LOCATION: APG-1

Lab No.	Begin Date	End Date	Gross-Beta	I-131
901114	06/25/90	07/02/90	0.014 +/-0.003	< 0.028
901146	07/02/90	07/09/90	0.014 +/-0.003	< 0.025
901208	07/09/90	07/16/90	0.012 +/-0.002	< 0.012
901257	07/16/90	07/23/90	0.007 +/-0.002	< 0.012
901291	07/23/90	07/31/90	0.013 +/-0.002	< 0.021
901336	07/30/90	08/06/90	0.015 +/-0.002	< 0.017
901378	08/06/90	08/13/90	0.024 +/-0.003	< 0.014
901404	08/13/90	08/19/90	0.016 +/-0.003	< 0.015
901441	08/19/90	08/27/90	0.014 +/-0.002	< 0.011
901480	08/27/90	09/04/90	0.012 +/-0.002	< 0.024
901537	09/04/90	09/10/90	0.019 +/-0.003	< 0.017
901564	09/10/90	09/17/90	0.009 +/-0.002	< 0.011
901596	09/17/90	09/24/90	0.021 +/-0.002	< 0.017
901645	09/24/90	10/01/90	0.020 +/-0.003	< 0.017
901716	10/01/90	10/08/90	0.012 +/-0.002	< 0.027
901757	10/08/90	10/15/90	0.011 +/-0.002	< 0.017
901806	10/15/90	10/22/90	0.018 +/-0.003	< 0.019
901833	10/22/90	10/29/90	0.020 +/-0.003	< 0.012
901911	10/29/90	11/05/90	0.022 +/-0.003	< 0.024
901956	11/05/90	11/12/90	0.015 +/-0.002	< 0.012
901993	11/12/90	11/19/90	0.023 +/-0.003	< 0.021
902025	11/19/90	11/26/90	0.019 +/-0.003	< 0.013

TABLE B-2 (continued)

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

SAMPLE LOCATION: APG-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross Beta	I-131
902087	11/26/90	12/04/90	0.014 +/- 0.002	< 0.013
902137	12/04/90	12/10/90	0.016 +/- 0.003	< 0.021
902173	12/10/90	12/17/90	0.009 +/- 0.002	< 0.025
902197	12/17/90	12/24/90	0.009 +/- 0.002	< 0.018
910006	12/24/90	12/31/90	0.017 +/- 0.002	< 0.012

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
900003	12/26/89	01/02/90	0.022 +/-0.003	< 0.04
900049	01/02/90	01/08/90	0.015 +/-0.003	< 0.03
900081	01/08/90	01/15/90	0.027 +/-0.003	< 0.028
900115	01/15/90	01/22/90	0.010 +/-0.003	< 0.019
900143	01/22/90	01/29/90	0.015 +/-0.003	< 0.025
900201	01/29/90	02/05/90	0.014 +/-0.003	< 0.025
900235	02/05/90	02/12/90	0.023 +/-0.003	< 0.029
900294	02/12/90	02/19/90	0.013 +/-0.003	< 0.027
900322	02/19/90	02/26/90	0.011 +/-0.003	< 0.019
900352	02/26/90	03/05/90	0.017 +/-0.003	< 0.008
900417	03/05/90	03/12/90	0.015 +/-0.003	< 0.013
900452	02/12/90	03/19/90	0.011 +/-0.003	< 0.012
900480	03/19/90	03/26/90	0.017 +/-0.003	< 0.013
900526	03/26/90	04/02/90	0.014 +/-0.003	< 0.019
900593	04/02/90	04/09/90	0.017 +/-0.003	< 0.021
900642	04/09/90	04/16/90	0.017 +/-0.003	< 0.015
900668	04/16/90	04/23/90	0.014 +/-0.003	< 0.015
900709	04/23/90	04/30/90	0.015 +/-0.003	< 0.012
900770	04/30/90	05/07/90	0.009 +/-0.003	< 0.021
900801	05/07/90	05/14/90	0.005 +/-0.003	< 0.012
900827	05/14/90	05/21/90	0.010 +/-0.003	< 0.018
900878	05/21/90	05/29/90	0.011 +/-0.002	< 0.011
900914	05/29/90	06/04/90	0.015 +/-0.002	< 0.035
900990	06/04/90	06/11/90	0.009 +/-0.003	< 0.020
901022	06/11/90	06/18/90	0.011 +/-0.002	< 0.015
901063	06/18/90	06/25/90	0.011 +/-0.002	< 0.012

TABLE B-2 (continued)

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

UNITS: pCi/CUBIC METER

SAMPLE LOCATION: APP-1

Lab No.	Begin Date	End Date	Gross-Beta	I-131
901116	06/25/90	07/02/90	0.015 +/-0.003	< 0.028
901148	07/02/90	07/09/90	0.011 +/-0.003	< 0.025
901210	07/09/90	07/16/90	0.011 +/-0.002	< 0.012
901268	07/16/90	07/23/90	0.008 +/-0.002	< 0.012
901293	07/23/90	07/30/90	0.014 +/-0.002	< 0.021
901338	07/30/90	08/06/90	0.013 +/-0.002	< 0.017
901377	08/06/90	08/13/90	0.021 +/-0.003	< 0.014
901406	08/13/90	08/19/90	0.020 +/-0.003	< 0.016
901443	08/19/90	08/27/90	0.015 +/-0.002	< 0.011
901482	08/27/90	09/04/90	0.011 +/-0.002	< 0.024
901539	09/04/90	09/10/90	0.023 +/-0.003	< 0.017
901586	09/10/90	09/17/90	0.008 +/-0.002	< 0.011
901598	09/17/90	09/24/90	0.022 +/-0.003	< 0.017
901648	09/24/90	10/01/90	0.022 +/-0.003	< 0.017
901718	10/01/90	10/08/90	0.014 +/-0.002	< 0.027
901758	10/08/90	10/15/90	0.013 +/-0.003	< 0.017
901808	10/15/90	10/22/90	0.018 +/-0.003	< 0.019
901835	10/22/90	10/29/90	0.018 +/-0.003	< 0.012
901913	10/29/90	11/05/90	0.023 +/-0.003	< 0.024
901958	11/05/90	11/12/90	0.018 +/-0.003	< 0.012
901995	11/12/90	11/19/90	0.025 +/-0.003	< 0.021
902027	11/19/90	11/26/90	0.019 +/-0.003	< 0.013

TABLE B-2 (continued)

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

SAMPLE LOCATION: APP-1

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
902089	11/26/90	12/04/90	0.013 +/-0.002	< 0.013
902139	12/04/90	12/10/90	0.016 +/-0.003	< 0.021
902175	12/10/90	12/17/90	0.008 +/-0.002	< 0.025
902199	12/17/90	12/24/90	0.008 +/-0.002	< 0.018
910010	12/24/90	12/31/90	0.018 +/-0.002	< 0.012

TABLE B-2 (continued)

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

UNITS: pCi/CUBIC METER

SAMPLE LOCATION: APE-30

Lab No.	Begin Date	End Date	Gross-Beta	I-131
900005	12/26/89	01/02/90	0.023 +/-0.003	< 0.04
900051	01/02/90	01/08/90	0.018 +/-0.003	< 0.03
900083	01/08/90	01/15/90	0.027 +/-0.003	< 0.028
900117	01/15/90	01/22/90	0.011 +/-0.003	< 0.019
900145	01/22/90	01/29/90	0.017 +/-0.003	< 0.026
900203	01/29/90	02/05/90	0.015 +/-0.003	< 0.025
900237	02/05/90	02/12/90	0.013 +/-0.003	< 0.029
900296	02/12/90	02/19/90	0.016 +/-0.003	< 0.027
900324	02/19/90	02/26/90	0.013 +/-0.003	< 0.018
900334	02/26/90	03/05/90	0.021 +/-0.003	< 0.008
900419	03/05/90	03/12/90	0.016 +/-0.003	< 0.013
900454	03/12/90	03/19/90	0.013 +/-0.003	< 0.012
900482	03/19/90	03/26/90	0.019 +/-0.003	< 0.013
900528	03/26/90	04/02/90	0.015 +/-0.003	< 0.019
900595	04/02/90	04/09/90	0.013 +/-0.008	< 0.021
900644	04/09/90	04/16/90	0.014 +/-0.003	< 0.016
900670	04/16/90	04/23/90	0.012 +/-0.003	< 0.016
900711	04/23/90	04/30/90	0.015 +/-0.003	< 0.012
900772	04/30/90	05/07/90	0.008 +/-0.003	< 0.021
900803	05/07/90	05/14/90	0.007 +/-0.003	< 0.012
900829	05/14/90	05/21/90	0.009 +/-0.003	< 0.018
900880	05/21/90	05/29/90	0.011 +/-0.003	< 0.011
900916	05/29/90	06/04/90	0.019 +/-0.003	< 0.035
900992	06/04/90	06/11/90	0.009 +/-0.002	< 0.020
901024	06/11/90	06/18/90	0.012 +/-0.002	< 0.016
901065	06/18/90	06/25/90	0.013 +/-0.002	< 0.012

TABLE B-2 (continued)

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

UNITS: pCi/CUBIC METER

SAMPLE LOCATION: APE-30

Lab No.	Begin Date	End Date	Gross Beta	I-131
901119	06/25/90	07/02/90	0.015 +/-0.003	< 0.028
901150	07/02/90	07/09/90	0.012 +/-0.003	< 0.025
901212	07/09/90	07/16/90	0.011 +/-0.002	< 0.012
901271	07/16/90	07/23/90	0.008 +/-0.003	< 0.012
901295	07/23/90	07/30/90	0.013 +/-0.002	< 0.021
901340	07/30/90	08/06/90	0.014 +/-0.002	< 0.017
901379	08/06/90	08/13/90	0.022 +/-0.003	< 0.014
901408	08/13/90	08/19/90	0.017 +/-0.003	< 0.016
901445	08/19/90	08/27/90	0.016 +/-0.002	< 0.011
901484	08/27/90	09/04/90	0.013 +/-0.002	< 0.024
901541	09/04/90	09/10/90	0.026 +/-0.003	< 0.017
901568	09/10/90	09/17/90	0.010 +/-0.002	< 0.011
901600	09/17/90	09/24/90	0.030 +/-0.003	< 0.017
901650	09/24/90	10/01/90	0.021 +/-0.003	< 0.017
901720	10/01/90	10/08/90	0.011 +/-0.002	< 0.027
901761	10/08/90	10/15/90	0.013 +/-0.003	< 0.017
901810	10/15/90	10/22/90	0.022 +/-0.003	< 0.019
901837	10/22/90	10/29/90	0.025 +/-0.003	< 0.012
901915	10/29/90	11/05/90	0.027 +/-0.003	< 0.024
901960	11/05/90	11/12/90	0.021 +/-0.003	< 0.012
901987	11/12/90	11/19/90	0.029 +/-0.003	< 0.021
902029	11/19/90	11/26/90	0.023 +/-0.003	< 0.013

TABLE B-2 (continued)

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

SAMPLE LOCATION: APE-30

UNITS: pCi/CUBIC METER

Lab No.	Begin Date	End Date	Gross-Beta	I-131
902091	11/26/90	12/04/90	0.020 +/-0.002	< 0.013
902141	12/04/90	12/10/90	0.004 +/-0.003	< 0.021
902177	12/10/90	12/17/90	0.017 +/-0.002	< 0.025
902701	12/17/90	12/24/90	0.010 +/-0.002	< 0.018
910012	12/24/90	12/31/90	0.015 +/-0.002	< 0.012

TABLE B-3

AIR PARTICULATE FILTERS
GAMMA ISOTOPIC ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL AIR SAMPLE SITES

UNITS: pci/CUBIC METER

Location	Lab No.	Begin Date	End Date	Cs-134	Cs-137
APC-1	900584	12/26/89	03/26/90	< 0.0015	< 0.0013
APC-1	901193	03/26/90	06/25/90	< 0.0016	< 0.0012
APC-1	901780	06/25/90	09/24/90	< 0.0009	< 0.0007
APC-1	910092	09/24/90	12/31/90	< 0.0002	< 0.0002
APC-30	900585	12/26/89	03/26/90	< 0.0015	< 0.0012
APC-30	901194	03/26/90	06/25/90	< 0.0024	< 0.0020
APC-30	901781	06/25/90	09/24/90	< 0.0012	< 0.0010
APC-30	910093	09/24/90	12/31/90	< 0.0008	< 0.0007
APG-1	900581	12/26/89	03/26/90	< 0.0014	< 0.0012
APG-1	901190	03/26/90	06/25/90	< 0.0022	< 0.0020
APG-1	901777	06/25/90	09/24/90	< 0.0009	< 0.0007
APG-1	910089	09/24/90	12/31/90	< 0.0001	< 0.0001
APP-1	900583	12/26/89	03/26/90	< 0.0018	< 0.0015
APP-1	901192	03/26/90	06/25/90	< 0.0019	< 0.0017
APP-1	901779	06/25/90	09/24/90	< 0.0008	< 0.0006
APP-1	910091	09/24/90	12/31/90	< 0.0015	< 0.0009
APQ-1	900582	12/26/89	03/26/90	< 0.0010	< 0.0007
APQ-1	901191	03/26/90	06/25/90	< 0.0020	< 0.0013
APQ-1	901778	06/25/90	09/24/90	< 0.0012	< 0.0010
APQ-1	910090	09/24/90	12/31/90	< 0.0008	< 0.0008

TABLE D-4

DRINKING WATER
IODINE-131 ANALYSIS

UNITS: pCi/LITER

SAMPLE LOCATION: DWG-2

Lab. No.	Begin Date	End Date	I-131
900006	12/18/89	01/02/90	< 0.3
900084	01/02/90	01/15/90	< 0.6
900166	01/15/90	01/29/90	< 0.3
900258	01/29/90	02/12/90	< 0.4
900325	02/12/90	02/26/90	< 0.3
900420	02/26/90	03/12/90	< 0.3
900493	03/12/90	03/26/90	< 0.3
900596	03/26/90	04/09/90	< 0.3
900671	04/09/90	04/23/90	< 0.3
900773	04/23/90	05/07/90	< 0.6
900830	05/07/90	05/21/90	< 0.3
900917	05/21/90	06/04/90	< 0.4
901025	06/04/90	06/18/90	< 0.3
901119	06/18/90	07/02/90	< 0.6
901213	07/02/90	07/16/90	< 0.2
901296	07/16/90	07/30/90	< 0.3
901380	07/30/90	08/13/90	< 0.3
901438	08/13/90	08/27/90	< 0.3
901542	08/27/90	09/10/90	< 0.4
901590	09/10/90	09/24/90	< 0.3
901721	09/24/90	10/08/90	< 0.3
901800	10/08/90	10/22/90	< 0.3
901916	10/22/90	11/05/90	< 0.3
901998	11/05/90	11/19/90	< 0.3
902094	11/19/90	12/04/90	< 0.3
902180	12/04/90	12/17/90	< 0.3
910015	12/17/90	12/31/90	< 0.3

TABLE B-4 (continued)

DRINKING WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: DWE-5

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	I-131
900007	12/18/89	01/02/90	< 0.2
900085	01/02/90	01/15/90	0.5 +/- 0.4
900147	01/15/90	01/29/90	< 0.3
900259	01/29/90	02/12/90	< 0.1
900326	02/12/90	02/26/90	< 0.3
900421	02/26/90	03/12/90	< 0.3
900494	03/12/90	03/26/90	< 0.3
900587	03/26/90	04/09/90	< 0.3
900672	04/09/90	04/23/90	< 0.3
900774	04/23/90	05/07/90	< 0.4
900831	05/07/90	05/21/90	< 0.3
900918	05/21/90	06/04/90	< 0.5
901026	06/04/90	06/18/90	< 0.3

Lab. No.	Begin Date	End Date	I-131
901120	06/18/90	07/07/90	< 0.5
901215	07/07/90	07/16/90	< 0.3
901297	07/16/90	07/30/90	< 0.3
901381	07/30/90	08/13/90	< 0.2
901439	08/13/90	08/27/90	< 0.3
901543	08/27/90	09/10/90	< 0.5
901591	09/10/90	09/24/90	< 0.3
901722	09/24/90	10/08/90	< 0.3
901801	10/08/90	10/22/90	< 0.2
901917	10/22/90	11/05/90	< 0.3
901999	11/05/90	11/19/90	< 0.4
902093	11/19/90	12/04/90	< 0.3
902178	12/04/90	12/17/90	< 0.3
910014	12/17/90	12/31/90	< 0.3

TABLE B-4 (continued)

DRINKING WATER
IODINE-131 ANALYSIS

UNITS: $\mu\text{Ci}/\text{LITER}$

SAMPLE LOCATION: DWP-7

Lab. No.	Begin Date	End Date	I-131	Lab. No.	Begin Date	End Date	I-131
900008	12/18/89	01/02/90	< 0.3	901121	06/18/90	07/02/90	< 0.5
900086	01/02/90	01/15/90	< 0.4	901215	07/02/90	07/16/90	< 0.4
900148	01/15/90	01/29/90	< 0.3	901298	07/10/90	07/30/90	< 0.3
900260	01/29/90	02/12/90	< 0.4	901382	07/30/90	08/13/90	< 0.3
900327	02/12/90	02/26/90	< 0.3	901440	08/13/90	08/27/90	< 0.3
900422	02/26/90	03/12/90	< 0.4	901544	08/27/90	09/10/90	< 0.3
900495	03/12/90	03/26/90	< 0.3	901592	09/10/90	09/24/90	< 0.4
900598	03/26/90	04/09/90	< 0.3	901723	09/24/90	10/08/90	< 0.3
900673	04/09/90	04/23/90	< 0.3	901802	10/08/90	10/22/90	< 0.2
900775	04/23/90	05/07/90	< 0.4	901918	10/22/90	11/05/90	< 0.4
900831	05/07/90	05/21/90	< 0.3	902070	11/05/90	11/19/90	< 0.5
900919	05/21/90	06/04/90	< 0.5	902092	11/19/90	12/04/90	< 0.3
901027	06/04/90	06/18/90	< 0.3	902178	12/04/90	12/17/90	< 0.3
				910013	12/17/90	12/31/90	< 0.3

TABLE B-5

DRINKING WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG-2

UNITS: pCi.LITER

Lab. No.	Begin Date	End Date	Beta
900149	01/02/90	01/29/90	< 4
900338	01/29/90	02/26/90	2.9+/- 2.9
900516	02/26/90	03/26/90	7.1+/-3.6
900674	03/26/90	04/23/90	3.7+/-2.7
900846	04/23/90	05/21/90	< 4.0
900917	05/21/90	06/04/90	8.0+/- 3.0
901123	06/04/90	07/02/90	4.0+/- 3.0
901299	07/02/90	07/30/90	4.8+/- 3.8
901458	07/30/90	08/27/90	6.8+/-2.9
901593	08/27/90	09/24/90	3.1+/- 2.9
901803	09/24/90	10/22/90	3.4+/- 2.3
901916	10/22/90	11/05/90	3.9 +/-2.5
902097	11/05/90	12/04/90	4.0 +/-2.0
910049	12/04/90	12/31/90	8.1+/-3.1

TABLE B-5 (continued)

DRINKING WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE-5

UNITS: pCi.LITER

Lab. No.	Begin Date	End Date	Beta
900150	01/02/90	01/29/90	< 4
900339	01/29/90	02/26/90	< 4
900517	02/26/90	03/26/90	5.5+/-3.0
900675	03/26/90	04/23/90	4.2+/-2.7
900847	04/23/90	05/21/90	< 3.9
900918	05/21/90	06/04/90	< 4.0
901124	06/04/90	07/02/90	3.0+/- 3.0
901300	07/02/90	07/30/90	3.9+/- 3.0
901459	07/30/90	08/27/90	< 3.9
901594	08/27/90	09/24/90	4.9+/- 3.0
901804	09/24/90	10/22/90	2.9+/- 2.2
901917	10/22/90	11/05/90	3.2 +/-2.4
902096	11/05/90	12/04/90	2.4 +/-1.8
910050	12/04/90	12/31/90	2.8+/-2.7

TABLE B-5 (continued)

DRINKING WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP-7

UNITS: pCi.LITER

Lab. No.	Begin Date	End Date	Beta
900131	01/02/90	01/29/90	5.2+/-2.9
900340	01/29/90	02/26/90	< 4
900518	02/26/90	03/26/90	6.7+/-3.0
900676	03/26/90	04/23/90	6.2+/-2.7
900848	04/23/90	05/21/90	< 3.9
900919	05/21/90	05/04/90	3.2+/- 2.6
901125	06/04/90	07/02/90	4.0+/- 3.0
901301	07/02/90	07/30/90	3.7+/- 3.0
901460	07/30/90	08/27/90	3.2+/-2.6
901595	08/27/90	09/24/90	3.9+/- 2.3
901805	09/24/90	10/22/90	4.5+/- 2.2
901918	10/22/90	11/05/90	< 3.8
902095	11/05/90	12/04/90	2.7 +/-1.8
910051	12/04/90	12/31/90	4.1+/-2.9

TABLE B-5 (continued)

DRINKING WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWG-2

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900149	01/02/90	01/29/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 7	< 2
900338	01/29/90	02/26/90	< 3	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
900516	02/26/90	03/26/90	< 2	< 2	< 3	< 2	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
900674	03/26/90	04/23/90	< 3	< 3	< 3	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 10	< 3
900846	04/23/90	05/21/90	< 3	< 3	< 3	< 2	< 6	< 3	< 6	< 3	< 3	< 3	< 10	< 3
900917	05/21/90	06/04/90	< 2	< 2	< 3	< 3	< 6	< 2	< 5	< 3	< 3	< 3	< 10	< 4
901123	06/04/90	07/02/90	< 3	< 3	< 4	< 3	< 6	< 3	< 6	< 5	< 3	< 3	< 14	< 5
901299	07/02/90	07/30/90	< 3	< 2	< 3	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 10	< 3
901593	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 6	< 2	< 5	< 3	< 3	< 3	< 10	< 3
901803	09/24/90	10/22/90	< 3	< 3	< 4	< 3	< 6	< 2	< 6	< 3	< 3	< 3	< 10	< 3
901916	10/22/90	11/05/90	< 2	< 3	< 4	< 6	< 6	< 3	< 6	< 5	< 3	< 3	< 12	< 5
902097	11/05/90	12/04/90	< 3	< 3	< 4	< 3	< 6	< 3	< 6	< 9	< 3	< 3	< 17	< 7
910049	12/04/90	12/31/90	< 3	< 3	< 4	< 3	< 6	< 3	< 6	< 6	< 3	< 3	< 13	< 5

TABLE B-5 (continued)

DRINKING WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWE-5

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900150	01/02/90	01/29/90	< 3	< 2	< 5	< 3	< 5	< 2	< 6	< 3	< 3	< 3	< 10	< 3
900339	01/29/90	02/26/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 8	< 3
900517	02/26/90	03/26/90	< 4	< 4	< 5	< 4	< 9	< 4	< 8	< 6	< 4	< 4	< 17	< 5
900675	03/26/90	04/23/90	< 2	< 2	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
900847	04/23/90	05/21/90	< 3	< 3	< 6	< 3	< 8	< 3	< 5	< 3	< 3	< 3	< 8	< 3
900918	05/21/90	06/04/90	< 4	< 4	< 6	< 4	< 9	< 4	< 9	< 5	< 5	< 4	< 15	< 4
901124	06/04/90	07/02/90	< 3	< 3	< 4	< 2	< 6	< 3	< 6	< 6	< 3	< 3	< 15	< 4
901300	07/02/90	07/30/90	< 2	< 2	< 4	< 2	< 6	< 2	< 4	< 2	< 2	< 2	< 7	< 3
901459	07/30/90	08/27/90	< 3	< 3	< 3	< 2	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
901594	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 8	< 3	< 7	< 4	< 4	< 3	< 13	< 4
901804	09/24/90	10/22/90	< 2	< 3	< 4	< 3	< 6	< 2	< 5	< 3	< 3	< 3	< 10	< 3
901917	10/22/90	11/05/90	< 2	< 2	< 3	< 5	< 4	< 2	< 4	< 3	< 2	< 2	< 10	< 3
902096	11/05/90	12/04/90	< 2	< 2	< 3	< 2	< 4	< 2	< 5	< 6	< 2	< 2	< 14	< 5
910950	12/04/90	12/31/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 8	< 2

TABLE B-5 (continued)

DRINKING WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: DWP-7

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Mb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900151	01/02/90	01/29/90	< 3	< 3	< 4	< 3	< 5	< 3	< 6	< 4	< 3	< 3	< 11	< 2
900340	01/29/90	02/26/90	< 4	< 4	< 6	< 4	< 9	< 4	< 9	< 6	< 5	< 4	< 17	< 5
900518	02/26/90	03/26/90	< 3	< 3	< 4	< 3	< 7	< 3	< 7	< 5	< 3	< 3	< 13	< 4
900676	03/26/90	04/23/90	< 4	< 4	< 5	< 5	< 9	< 4	< 9	< 5	< 5	< 4	< 16	< 4
900848	04/23/90	05/21/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 3
900919	05/21/90	06/04/90	< 3	< 3	< 5	< 4	< 7	< 3	< 7	< 4	< 4	< 4	< 14	< 4
901125	06/04/90	07/02/90	< 4	< 4	< 6	< 4	< 10	< 5	< 10	< 10	< 5	< 4	< 24	< 7
901301	07/02/90	07/30/90	< 2	< 2	< 5	< 3	< 10	< 2	< 5	< 3	< 3	< 3	< 10	< 4
901460	07/30/90	08/27/90	< 4	< 4	< 5	< 4	< 9	< 4	< 9	< 5	< 4	< 4	16	< 5
901595	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 7	< 3	< 7	< 5	< 3	< 3	< 15	< 5
901805	09/24/90	10/22/90	< 3	< 3	< 4	< 3	< 5	< 3	< 6	< 3	< 3	< 3	< 11	< 4
901918	10/22/90	11/05/90	< 6	< 6	< 8	< 6	< 14	< 6	< 14	< 8	< 7	< 6	< 25	< 8
902095	11/05/90	12/04/90	< 3	< 3	< 5	< 3	< 6	< 3	< 7	< 8	< 3	< 3	< 16	< 7
910051	12/04/90	12/31/90	< 1	< 2	< 2	< 1	< 3	< 2	< 4	< 4	< 2	< 2	< 10	< 3

TABLE B-6

DRINKING WATER
TRITIUM ANALYSIS ON QUARTERLY COMPOSITES

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/LITER

Location	Lab No.	Begin Date	End Date	E-3
DWE-5	900864	01/02/90	04/09/90	< 360
DWE-5	901433	04/09/90	07/02/90	330+/-220
DWE-5	901814	07/02/90	09/24/90	< 400
DWE-5	910053	09/24/90	12/31/90	< 350
DWG-2	900863	01/02/90	04/09/90	< 360
DWG-2	901432	04/09/90	07/02/90	< 360
DWG-2	901813	07/02/90	09/24/90	< 400
DWG-2	910052	09/24/90	12/31/90	< 350
DWP-7	900865	01/02/90	04/09/90	< 360
DWP-7	901434	04/09/90	07/02/90	< 360
DWP-7	901815	07/02/90	09/24/90	< 400
DWP-7	910054	09/24/90	12/31/90	< 350

TABLE B-7

SURFACE WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: SWG-2

UNITS: PCI/LITER

Lab. No.	Begin Date	End Date	I-131
900006	12/18/89	01/02/90	< 0.3
900084	01/02/90	01/15/90	< 0.6
900245	01/15/90	01/29/90	< 0.3
900256	01/29/90	02/12/90	< 0.4
900325	02/12/90	02/26/90	< 0.3
900420	02/26/90	03/12/90	< 0.3
900493	03/12/90	03/26/90	< 0.3
900596	03/26/90	04/09/90	< 0.3
900671	04/09/90	04/23/90	< 0.3
900773	04/23/90	05/07/90	< 0.6
900830	05/07/90	05/21/90	< 0.3
900917	05/21/90	06/04/90	< 0.4
901025	06/04/90	06/18/90	< 0.3
901119	06/18/90	07/02/90	< 0.6
901213	07/02/90	07/16/90	< 0.2
901296	07/16/90	07/30/90	< 0.3
901380	07/30/90	08/13/90	< 0.3
901438	08/13/90	08/27/90	< 0.3
901542	08/27/90	09/10/90	< 0.4
901590	09/10/90	09/24/90	< 0.3
901721	09/24/90	10/08/90	< 0.3
901800	10/08/90	10/22/90	< 0.3
901915	10/22/90	11/05/90	< 0.3
901998	11/05/90	11/19/90	< 0.3
902180	12/04/90	12/17/90	< 0.2
910015	12/17/90	12/31/90	< 0.3

TABLE B-7 (continued)

SURFACE WATER
IODINE-131 ANALYSIS

UNITS: pCi/LITER

SAMPLE LOCATION: SWE-5

Lab. No.	Begin		End		I-131
	Date		Date		
900007	08/89	01/02/90		< 0.2	
900085	02/90	01/15/90		0.5+/-0.4	
900147	01/15/90	01/29/90		< 0.3	
900259	01/29/90	02/12/90		< 0.4	
900326	02/12/90	02/26/90		< 0.3	
900421	02/26/90	03/12/90		< 0.3	
900494	03/12/90	03/26/90		< 0.3	
9005957	03/26/90	04/09/90		< 0.3	
900672	04/09/90	04/23/90		< 0.3	
900774	04/23/90	05/07/90		< 0.4	
900831	05/07/90	05/21/90		< 0.3	
900918	05/21/90	06/04/90		< 0.5	
901026	06/04/90	06/18/90		< 0.3	
901120	06/18/90	07/02/90		< 0.5	
901215	07/02/90	07/16/90		< 0.3	
901297	07/16/90	07/30/90		< 0.3	
901361	07/30/90	08/13/90		< 0.2	
901439	08/13/90	08/27/90		< 0.3	
901543	08/27/90	09/10/90		< 0.3	
901591	09/10/90	09/24/90		< 0.3	
901722	09/24/90	10/08/90		< 0.3	
901801	10/08/90	10/22/90		< 0.2	
901917	10/22/90	11/05/90		< 0.3	
901999	11/05/90	11/19/90		< 0.4	
902179	12/04/90	12/17/90		< 0.3	
910014	12/17/90	12/31/90		< 0.3	

TABLE B-7 (continued)

SURFACE WATER
IODINE-131 ANALYSIS

SAMPLE LOCATION: SWP-7

UNITS: pCi/LITER

Lab. No.	Begin		End		I-131
	Date		Date		
90008	12/18/89	01/02/90	< 0.3		
90008	01/02/90	01/15/90	< 0.4		
90014	01/15/90	01/29/90	< 0.3		
90026	01/29/90	02/12/90	< 0.4		
90037	02/12/90	02/26/90	< 0.3		
90042	02/26/90	03/12/90	< 0.4		
90049	03/12/90	03/26/90	< 0.3		
90058	03/26/90	04/09/90	< 0.3		
90063	04/09/90	04/23/90	< 0.3		
90075	04/23/90	05/07/90	< 0.4		
90082	05/07/90	05/21/90	< 0.3		
90089	05/21/90	06/04/90	< 0.5		
90107	06/04/90	06/18/90	< 0.3		
90112	06/18/90	07/02/90	< 0.5		
90121	07/02/90	07/16/90	< 0.4		
90128	07/16/90	07/30/90	< 0.5		
90132	07/30/90	08/13/90	< 0.3		
90140	08/13/90	08/27/90	< 0.3		
90154	08/27/90	09/10/90	< 0.3		
90159	09/10/90	09/24/90	< 0.4		
90173	09/24/90	10/08/90	< 0.3		
90180	10/08/90	10/22/90	< 0.2		
90198	10/22/90	11/05/90	< 0.4		
90200	11/05/90	11/19/90	< 0.5		
90218	12/04/90	12/17/90	< 0.3		
91001	12/17/90	12/31/90	< 0.3		

TABLE B-8

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWG-2

UNITS: pCi.LITER

Lab. No.	Begin Date	End Date	Beta
890149	01/02/90	01/29/90	< 4
900338	01/29/90	02/26/90	2.9+/- 2.9
900516	02/16/90	03/26/90	7.1+/-3.6
900674	03/26/90	04/23/90	3.7+/-2.7
900846	04/23/90	05/21/90	< 4.0
900917	05/21/90	06/04/90	8.0+/- 3.0
901123	06/04/90	07/02/90	4.0+/- 3.0
901299	07/02/90	07/30/90	4.4+/- 3.8
901458	07/30/90	08/27/90	6.8+/-2.9
901593	08/27/90	09/24/90	3.1+/- 2.9
901803	09/24/90	10/22/90	3.4+/- 2.3
901916	10/22/90	11/05/90	3.9 +/-2.5
902097	11/05/90	12/04/90	4.0 +/-2.0
910049	12/04/90	12/31/90	8.1+/-3.1

TABLE B-8 (continued)

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWE-5

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Beta
900150	01/02/90	01/29/90	< 4
900339	01/29/90	02/26/90	< 4
900517	02/26/90	03/26/90	5.5+/-3.0
900675	03/26/90	04/23/90	4.2+/-2.7
900848	04/23/90	05/21/90	< 3.9
900918	05/21/90	06/04/90	< 4.0
901124	06/04/90	07/02/90	3.0+/- 3.0
901300	07/02/90	07/30/90	3.8+/- 3.0
901459	07/30/90	08/27/90	< 3.9
901594	08/27/90	09/24/90	4.9+/- 3.0
901804	09/24/90	10/22/90	2.9+/- 2.2
901917	10/22/90	11/05/90	3.2 +/-2.4
902096	11/05/90	12/04/90	2.4 +/-1.8
910050	12/04/90	12/31/90	2.8+/-2.7

TABLE B-8 (continued)

SURFACE WATER
GROSS BETA ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWP-7

UNITS: pCi.LITER

Lab. No.	Begin Date	End Date	Beta
900151	01/02/90	01/29/90	5.2+/-2.9
900340	01/29/90	02/26/90	< 4
900518	02/26/90	03/26/90	6.7+/-3.0
900676	03/26/90	04/23/90	4.2+/-2.7
900848	04/23/90	05/21/90	< 3.9
900919	05/21/90	06/04/90	3.2+/- 2.6
901125	06/04/90	07/02/90	4.0+/- 3.0
901301	07/02/90	07/30/90	3.7+/- 3.0
901460	07/30/90	08/27/90	3.2+/-2.6
901595	08/27/90	09/24/90	3.9+/- 2.9
901805	09/24/90	10/22/90	4.5+/- 2.2
901918	10/22/90	11/05/90	< 3.8
902095	11/05/90	12/04/90	2.7 +/-1.8
910051	12/04/90	12/31/90	4.1+/-2.9

TABLE B-8 (continued)

SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWG-2

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Km-65	Nb-95	Kr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900149	01/02/90	01/29/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 7	< 2
900339	01/29/90	02/26/90	< 3	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
900516	02/26/90	03/26/90	< 2	< 2	< 3	< 2	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
900674	03/26/90	04/23/90	< 3	< 3	< 3	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 10	< 3
900846	04/23/90	05/21/90	< 3	< 3	< 3	< 2	< 6	< 3	< 6	< 3	< 3	< 3	< 10	< 3
900917	05/21/90	06/04/90	< 2	< 2	< 3	< 3	< 6	< 2	< 5	< 3	< 3	< 3	< 10	< 4
901123	06/04/90	07/02/90	< 3	< 2	< 4	< 3	< 6	< 3	< 6	< 5	< 3	< 3	< 14	< 5
901299	07/02/90	07/30/90	< 3	< 2	< 3	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 10	< 3
901458	07/30/90	08/27/90	< 2	< 2	< 3	< 3	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 3
901593	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 6	< 2	< 5	< 3	< 3	< 3	< 10	< 3
901803	09/24/90	10/22/90	< 3	< 3	< 4	< 3	< 6	< 2	< 6	< 3	< 3	< 3	< 10	< 3
901916	11/22/90	11/05/90	< 2	< 3	< 4	< 6	< 6	< 3	< 6	< 5	< 3	< 3	< 12	< 5
902097	11/05/90	12/04/90	< 3	< 3	< 4	< 3	< 6	< 3	< 3	< 9	< 3	< 3	< 17	< 7
910049	12/04/90	12/31/90	< 3	< 3	< 4	< 3	< 6	< 3	< 6	< 6	< 3	< 3	< 12	< 5

TABLE B-8 (continued)

SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWE-5

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Er-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900150	01/02/90	01/29/90	< 3	< 2	< 5	< 3	< 5	< 2	< 6	< 3	< 3	< 3	< 10	< 3
900339	01/29/90	02/26/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 8	< 3
900517	02/26/90	03/26/90	< 4	< 4	< 5	< 4	< 9	< 4	< 8	< 6	< 4	< 4	< 17	< 5
900675	03/26/90	04/23/90	< 2	< 2	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 2
900847	04/23/90	05/21/90	< 3	< 3	< 6	< 3	< 8	< 3	< 5	< 3	< 3	< 3	< 8	< 3
900918	05/21/90	06/04/90	< 4	< 4	< 6	< 4	< 9	< 4	< 9	< 5	< 5	< 4	< 15	< 4
901124	06/04/90	07/02/90	< 3	< 3	< 4	< 2	< 6	< 3	< 8	< 6	< 3	< 3	< 15	< 4
901300	07/02/90	07/30/90	< 2	< 2	< 4	< 2	< 6	< 2	< 4	< 2	< 2	< 2	< 7	< 3
901459	07/30/90	08/27/90	< 3	< 3	< 3	< 2	< 5	< 2	< 5	< 3	< 3	< 2	< 10	< 3
901594	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 8	< 3	< 7	< 4	< 4	< 3	< 13	< 4
901804	09/24/90	10/22/90	< 2	< 3	< 4	< 3	< 6	< 2	< 6	< 3	< 3	< 3	< 10	< 3
901917	11/22/90	11/05/90	< 2	< 2	< 3	< 5	< 4	< 2	< 4	< 3	< 2	< 2	< 10	< 3
902096	11/05/90	12/04/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 6	< 2	< 2	< 14	< 5
910050	12/04/90	12/31/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 8	< 2

TABLE B-8 (continued)

SURFACE WATER
GAMMA ISOTOPIC ANALYSIS
ON MONTHLY COMPOSITES

SAMPLE LOCATION: SWP-7

UNITS: pCi/LITER

Lab. No.	Begin Date	End Date	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
900151	01/02/90	01/29/90	< 3	< 3	< 4	< 3	< 5	< 3	< 6	< 4	< 3	< 3	< 11	< 2
900340	01/29/90	02/26/90	< 4	< 4	< 6	< 4	< 9	< 4	< 9	< 6	< 5	< 4	< 17	< 5
900518	02/26/90	03/26/90	< 3	< 3	< 4	< 3	< 7	< 3	< 7	< 5	< 3	< 3	< 13	< 4
900676	03/26/90	04/23/90	< 4	< 4	< 5	< 5	< 9	< 4	< 9	< 5	< 5	< 4	< 16	< 4
900848	04/23/90	05/21/90	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 7	< 3
900919	05/21/90	06/04/90	< 3	< 3	< 5	< 4	< 7	< 3	< 7	< 4	< 4	< 4	< 14	< 4
901460	07/30/90	08/27/90	< 4	< 4	< 5	< 4	< 9	< 4	< 9	< 5	< 4	< 4	< 16	< 5
901595	08/27/90	09/24/90	< 3	< 3	< 4	< 3	< 7	< 3	< 7	< 5	< 3	< 3	< 15	< 5
901805	09/24/90	10/22/90	< 3	< 3	< 4	< 3	< 5	< 3	< 6	< 3	< 3	< 3	< 11	< 4
901918	10/22/90	11/05/90	< 6	< 6	< 8	< 6	< 14	< 6	< 14	< 8	< 7	< 6	< 25	< 8
902095	11/05/90	12/04/90	< 3	< 3	< 4	< 3	< 6	< 5	< 7	< 8	< 3	< 3	< 16	< 7
910051	12/04/90	12/31/90	< 2	< 2	< 2	< 2	< 3	< 2	< 4	< 4	< 2	< 2	< 10	< 3

TABLE B-9

**SURFACE WATER
TRITIUM ANALYSIS ON QUARTERLY COMPOSITES**

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/LITER

Location	Lab No.	Begin Date	End Date	H-3
SWE-5	900864	01/02/90	04/09/90	< 360
SWE-5	901433	04/09/90	07/02/90	330+/-220
SWE-5	901814	07/02/90	09/24/90	< 400
SWE-5	910053	09/24/90	12/31/90	< 350
SWG-2	900863	01/02/90	04/09/90	< 360
SWG-2	901432	04/09/90	07/02/90	< 360
SWG-2	901813	07/02/90	09/24/90	< 400
SWG-2	910052	09/24/90	12/31/90	< 350
SWP-7	900865	01/02/90	04/09/90	< 360
SWP-7	901434	04/09/90	07/02/90	< 360
SWP-7	901815	07/02/90	09/24/90	< 400
SWP-7	910054	09/24/90	12/31/90	< 350

TABLE B-10

GROUNDWATER
TRITIUM AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: GWJ-1

UNITS: pCi/LITER

Lab. No.	Collection		H-3	Mn-54	Co-58	Fe-59	Co-60	En-65	Er-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	Date														
900009	01/01/90	650+/-220	< 4	< 4	< 4	< 7	< 4	< 8	< 8	< 4	< 7	< 4	< 4	< 19	< 5
900529	04/02/90	< 360	< 3	< 3	< 3	< 4	< 3	< 6	< 5	< 3	< 4	< 3	< 3	< 11	< 4
901122	07/02/90	570+/-220	< 3	< 3	< 3	< 4	< 3	< 6	< 6	< 3	< 5	< 3	< 3	< 14	< 5
901651	10/01/90	< 360	< 3	< 3	< 3	< 4	< 3	< 5	< 6	< 3	< 3	< 3	< 3	< 10	< 4

TABLE B-11

SHORELINE SOIL
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATIONS: ALL SAMPLE SITES

UNITS: pCi/Kg

Location	Lab No.	Collection Date	Mn-54	Co-58	Co-60	Cs-134	Cs-137
SHWC-3	900531	04/02/90	< 20	< 19	< 20	< 24	< 22
SHWC-3	901753	10/01/90	< 19	< 19	< 18	< 22	< 18
SHWY-1	900530	04/02/90	< 16	< 15	< 16	< 19	< 15
SHWY-1	901752	10/01/90	< 19	< 18	< 18	< 22	66 +/- 17

TABLE B-12

MILK
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: MKQ-5

UNIT8: pCi/LITER

Lab No.	Collection Date	I-131	Cs-134	Cs-137	Ba-140	La-140
900052	01/09/90	< 0.3	< 2	< 2	< 9	< 2
900118	01/23/90	< 0.3	< 3	< 3	< 10	< 2
900205	02/06/90	< 0.3	< 2	< 2	< 9	< 2
900297	02/20/90	< 0.4	< 3	< 3	< 11	< 3
900382	03/06/90	< 0.3	< 3	< 2	< 8	< 2
900460	03/20/90	< 0.2	< 3	< 2	< 8	< 2
900536	04/03/90	< 0.2	< 3	< 2	< 9	< 3
900647	04/17/90	< 0.4	< 4	< 3	< 11	< 3
900712	05/01/90	< 0.3	< 3	< 3	< 11	< 3
900811	05/15/90	< 0.5	< 3	< 2	< 7	< 2
900920	06/05/90	< 0.4	< 3	< 2	< 8	< 2
901042	06/19/90	< 0.3	< 4	< 3	< 11	< 3

TABLE B-12 (continued)

**MILK
IODINE-131 AND GAMMA ISOTOPIC ANALYSES**

SAMPLE LOCATION: MKQ-5

UNITS: pCi/LITER

Lab No.	Collection Date	I-131	Cs-134	Cs-137	Ba-140	La-140
901102	07/03/90	< 0.3	< 2	< 2	< 8	< 3
901216	07/17/90	< 0.3	< 3	< 2	< 7	< 2
901349	08/07/90	< 0.3	< 5	< 4	< 14	< 4
901416	08/21/90	< 0.3	< 3	< 2	< 8	< 2
901495	09/05/90	< 0.3	< 4	< 4	< 13	< 5
901569	09/18/90	< 0.3	< 2	< 2	< 7	< 4
901657	10/02/90	< 0.4	< 3	< 3	< 10	< 4
901762	10/16/90	0.3 +/- 0.3	< 3	< 3	< 10	< 3
901934	11/07/90	< 0.4	< 4	< 3	< 11	< 4
902001	11/20/90	< 0.4	< 2	< 2	< 7	< 2
902112	12/05/90	< 0.5	< 2	< 2	< 7	< 3
902171	12/18/90	< 0.3	< 3	< 3	< 9	< 3

TABLE B-12 (continued)

MILK
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: MKQ-45

UNITS: pCi/LITER

Lab No.	Collection Date	I-131	Ce-134	Ce-137	Ba-140	La-140
900053	01/08/90	< 0.4	< 4	< 4	< 17	< 3
900119	01/22/90	< 0.3	< 2	< 2	< 9	< 2
900206	02/05/90	< 0.4	< 3	< 3	< 12	< 3
900298	02/19/90	< 0.5	< 3	3+/-2	< 10	< 2
900383	03/05/90	< 0.3	< 4	< 3	< 11	< 3
900461	03/19/90	< 0.3	< 4	< 3	< 12	< 4
900537	04/02/90	< 0.3	< 4	< 3	< 11	< 4
900648	04/16/90	< 0.4	< 4	< 3	< 12	< 4
900713	04/30/90	< 0.3	< 5	< 5	< 17	< 5
900812	05/14/90	< 0.5	< 5	< 4	< 12	< 4
900921	06/04/90	< 0.3	< 3	< 3	< 11	< 4
901043	06/18/90	< 0.3	< 3	< 3	< 11	< 3

TABLE B-12 (continued)

**MILK
IODINE-131 AND GAMMA ISOTOPIC ANALYSES**

SAMPLE LOCATION: MKQ-45

UNITS: pCi/LITER

Lab No.	Collection Date	I-131	Cs-134	Cs-137	Ba-140	La-140
901103	07/02/90	< 0.3	< 5	< 5	< 18	< 5
901217	07/16/90	< 0.3	< 4	< 3	< 11	< 3
901350	08/06/90	< 0.3	< 9	< 7	< 29	< 8
901417	08/20/90	< 0.4	< 3	< 3	< 11	< 3
901496	09/04/90	< 0.3	< 3	< 3	< 11	< 3
901579	09/17/90	< 0.3	< 3	< 3	< 10	< 3
901658	10/01/90	< 0.5	< 4	< 3	< 12	< 4
901763	10/15/90	< 0.3	< 5	< 5	< 17	< 5
901935	11/05/90	< 0.5	< 4	< 3	< 10	< 4
902002	11/19/90	< 0.4	< 5	< 4	< 20	< 6
902113	12/03/90	< 0.6	< 2	< 2	< 9	< 3
902172	12/17/90	< 0.4	< 3	< 2	< 9	< 2

TABLE B-13

FISH
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATION: FH-1

UNITS: pCi/Kg

Lab No.	Collection Date	Sample type	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
900870	05/17/90	CATFISH	< 11	< 12	< 19	< 11	< 26	< 12	< 10
900871	05/23/90	DRUM	< 10	< 19	< 27	< 19	< 41	< 22	< 18
900872	05/23/90	SHAD	< 13	< 14	< 21	< 13	< 31	< 14	< 12
900873	05/23/90	MULLET	< 14	< 15	< 29	< 16	< 46	< 16	< 14
900875	05/23/90	STRIPED BASS	< 6	< 6	< 13	< 6	< 20	< 6	< 6
901706	10/03/90	CATFISH	< 8	< 9	< 16	< 11	< 25	< 12	< 9
901707	10/03/90	SHAD	< 13	< 13	< 18	< 12	< 30	< 14	< 12
901708	10/03/90	DRUM	< 21	< 23	< 32	< 22	< 52	< 25	< 21
901709	10/03/90	MULLET	< 9	< 10	< 16	< 11	< 22	< 12	< 9
901710	10/03/90	STRIPED BASS	< 16	< 18	< 25	< 17	< 43	< 20	< 17

TABLE B-13 (continued)

FISH
GAMMA ISOTOPIC ANALYSIS

SAMPLE LOCATION: FH-2

UNITS: pCi/Kg

Lab No.	Collection Date	Sample type	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
900866	05/17/90	CATFISH	< 8	< 10	< 14	< 9	< 21	< 10	< 8
900867	05/17/90	SHAD	< 10	< 11	< 17	< 10	< 24	< 11	< 10
900868	05/17/90	DRUM	< 11	< 13	< 21	< 12	< 30	< 12	< 11
900869	05/17/90	MULLET	< 14	< 15	< 22	< 15	< 34	< 16	< 14
900874	05/17/90	STRIPED BASS	< 25	< 26	< 37	< 23	< 56	< 28	< 21
901711	10/03/90	CATFISH	< 20	< 20	< 30	< 19	< 51	< 23	< 19
901712	10/03/90	SHAD	< 10	< 10	< 14	< 10	< 24	< 11	< 9
901713	10/03/90	DRUM	< 17	< 16	< 30	< 17	< 36	< 18	< 15
901714	10/03/90	MULLET	< 21	< 20	< 28	< 25	< 48	< 21	< 19
901715	10/03/90	STRIPED BASS	< 5	< 6	< 8	< 6	< 14	< 6	< 5

TABLE B-14

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLQ-1

UNITS: pCi/Kg

Lab No.	Collection Date	I-131	Cs-134	Cs-137
900449	01/30/90	< 15	< 14	< 11
900309	02/21/90	< 15	< 13	< 13
900472	03/22/90	< 19	< 21	< 19
900689	04/25/90	< 15	< 16	< 13
900900	05/24/90	< 14	< 9	< 8
901051	06/21/90	< 14	< 11	< 11
901288	07/26/90	< 8	< 7	< 6
901455	08/28/90	< 17	< 18	< 15
901523	09/25/90	< 10	< 10	< 9
901829	10/23/90	< 10	< 9	< 8
902030	11/27/90	< 13	< 15	< 12
902192	12/20/90	< 22	< 16	< 16

TABLE B-14 (continued)

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLB-1

UNITS: $\mu\text{Ci/Kg}$

Lab No.	Collection Date	I-131	Cs-134	Cs-137
900170	01/30/90	< 33	< 29	< 26
900310	02/21/90	< 19	< 19	< 16
900473	03/22/90	< 16	< 19	< 16
900690	04/26/90	< 10	< 11	< 9
900901	05/24/90	< 12	< 8	< 6
901052	06/21/90	< 22	< 19	< 15
901209	07/26/90	< 10	< 10	< 8
901456	08/28/90	< 14	< 16	< 14
901624	09/25/90	< 12	< 12	< 9
901830	10/25/90	< 21	< 20	< 16
902031	11/27/90	< 7	< 8	< 6
902193	12/20/90	< 26	< 22	< 19

TABLE B-14 (continued)

BROAD LEAF VEGETATION
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: BLK-15

UNITS: pCi/Kg

Lab No.	Collection Date	I-131	Cs-134	Cs-137
900171	01/30/90	< 21	< 20	< 18
900311	02/21/90	< 20	< 16	< 16
900474	03/22/90	< 19	< 22	< 19
900691	04/26/90	< 12	< 13	< 12
900902	05/24/90	< 23	< 14	< 12
901053	06/21/90	< 14	< 13	< 12
901290	07/26/90	< 18	< 15	< 13
901457	08/28/90	< 10	< 13	< 11
901625	09/25/90	< 15	< 14	< 12
901831	10/25/90	< 10	< 8	< 8
902032	11/27/90	< 12	< 12	< 11
902194	12/20/90	< 32	< 25	< 22

TABLE B-15

VEGETATION - FOOD PRODUCTS
IODINE-131 AND GAMMA ISOTOPIC ANALYSES

SAMPLE LOCATION: ALL SAMPLE SITES

UNITS: pCi/Kg

Location	Lab No.	Collection Date	Sample type	I-131	Cs-134	Cs-137
FPQ-1	901656	09/27/90	SUGAR CANE	< 16	< 11	< 9
FVL-1	901832	10/25/90	SOYBEANS	< 10	< 9	< 8
FVS-1	901654	09/28/90	SUGAR CANE	< 11	< 11	< 8
FPQ-1	901655	09/27/90	SUGAR CANE	< 20	< 16	< 13

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, 1990

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 sold; to be removed from ODCM.

TABLE C-2

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
APRIL 1 TO JUNE 30, 1990

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 sold; to be removed from ODCM.
3. Air Particles	I-131, Gross Beta	APQ-1	05/29/90-06/04/90	Sample pump failure. Pump replaced 06/05/90.

TABLE C-3

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
JULY 1 TO SEPTEMBER 30, 1990

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 sold; to be removed from ODCM.

TABLE C-4

SUMMARY OF UNAVAILABLE SAMPLES AND MISSED LOWER LIMITS
OF DETECTION DURING THE PERIOD OF
OCTOBER 1 TO DECEMBER 31, 1990

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 product milk for human consumption.
2. Milk	I-131, Gamma	MKE-4	October to December	No sample available; goats sold; to be removed from ODCM.

TABLE C-5

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

LOCATION	QUARTER	EXPLANATION
D-2	Second	TLD Missing; Replaced 5/4/90.
H-2	Second	TLD Missing; Replaced 4/26/90.
G-4	Fourth	TLD Missing; Replaced 11/2/90.

APPENDIX D
SUMMARY OF INTERLABORATORY COMPARISONS

EPA CROSS CHECK RESULTS

EPA PREP DATE	DATE EPA ISSUED RESULTS	MEDIA	NUCLIDE	EPA RESULTS	AP&L RESULTS	NORM DEV KNOWN
10/31/89	1/23/90	Water Sample B (pCi/L)	Gross B Cs-134 Cs-137	32.00 5.00 5.00	30.00 5.67 5.67	-0.69 0.23 0.23
01/26/90	03/30/90	Water (pCi/L)	Gross B	12.00	11.33	-0.23
02/09/90	03/30/90	Water (pCi/L)	Co-60 Zn-65 Ru-106 Cs-134 Cs-137 Ba-133	15.0 139.0 139.0 18.0 18.0 74.0	15.0 133.67 145.33 17.67 17.67 85.00	0 -0.66 0.78 -0.12 -0.12 2.72
02/23/90	03/30/90	Water (pCi/L)	H-3	4976.0	5226.67	0.87
03/30/90	06/29/90	Air Filter (pCi/filter)	Gross B Cs-137	31.0 10.0	34.00 15.00	1.04 1.73
04/17/90	07/08/90	Water Sample B (pCi/L)	Gross B Cs-134 Cs-137	52.0 15.0 15.0	47.0 17.33 14.33	-1.73 0.81 -0.23
05/11/90	07/10/90	Water (pCi/L)	Gross B	15.0	11.33	-1.27
04/27/90	07/27/90	Milk (pCi/L)	I-131 Cs-137 Potassium	99.0 24.0 1550.0	99.33 22.33 1493.33	0.06 -0.58 -1.26
Analytics, #CC35386-74	08/06/90	Analytics, Inc. Iodine Cartridge (uCi/cc)	I-131	3.17E-1	3.15E-1	Ratio: 0.99 Env. Lab: Analytics, Inc.
06/08/90	08/07/90	Water (pCi/L)	Co-60 Zn-65 Ru-106 Cs-134 Cs-137	24.0 148.0 210.0 24.0 25.0	26.0 144.67 194.0 25.0 26.0	0.69 -0.38 -1.32 0.35 0.35
06/22/90	08/07/90	Water (pCi/L)	H-3	2933.0	3350.0	2.02
08/10/90	10/03/90	Water (pCi/L)	I-131	39.0	40.0	0.29
09/21/90	10/10/90	Water (pCi/L)	Gross B	10.0	14.0	1.39

EPA CROSS CHECK RESULTS

EPA PREP DATE	DATE EPA ISSUED RESULTS	MEDIA	NUCLIDE	EPA RESULTS	AP&L RESULTS	NORM DEV KNOWN
10/19/90	12/05/90	Water (pCi/L)	H-3	7203	8100.	2.16
09/20/90	12/10/90	Milk (pCi/L)	I-131	58.0	56.00	-0.58
			Cs-137	20.0	20.00	0
10/05/90	12/17/90	Water (pCi/L)	Co-60	20.0	20.33	0.12
			Zn-65	115.0	118.67	0.53
			Ru-106	151.0	142.33	-1.00
			Cs-134	12.0	12.33	0.12
			Cs-137	12.0	13.00	0.35
			Ba-133	110.0	106.00	-0.63
08/31/90	12/12/90	Air Filter (pCi/Filter)	Beta	62.0	62.67	0.23
			Cs-137	20.0	28.00	2.77
Fourth Qtr. 1990 CC36036-74	1/11/91	Analytic, Inc. I-131 Iodine Cartridge (uCi/cc)		3.18E-2	3.43E-2	1.08 Ratio

APPENDIX E
SYNOPSIS 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 evaporated to dryness. The planchet was 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 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 eluted 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 level 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

The maximum amount possible (without drying) of the vegetation, food, or garden crop sample was loaded into a tared Marinelli beaker and weighed. The sample was 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.

The maximum amount possible of the edible portion of a fish was loaded into a tared Marinelli beaker and weighed. The sample was 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 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:

$$(F-1) \quad \bar{X} = \frac{\sum_{i=1}^n X_i}{n}$$

$$(F-2) \quad S = \left[\frac{\sum_{i=1}^n (X_i^2 - (n)(\bar{X})^2)}{(n-1)} \right]^{0.5}$$

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)):

$$(F-3) \quad t = \frac{(\bar{X} - \bar{Y})}{\left[\frac{(n_X - 1)s_X^2 + (n_Y - 1)s_Y^2}{n_X + n_Y - 2} \right]^{0.5} \left[\frac{1}{n_X} + \frac{1}{n_Y} \right]^{0.5}}$$

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)):

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

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 ($\sigma_x = \sigma_y$). 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 $\mu_x \neq \mu_y$;

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 1990 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 1990 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, APQ-1, and APP-1 and the mean from the control location.

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 1990 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.)	11.63(12)	12.86(13)	13.29(13)
Standard Deviation (mrem/std. qtr.)	2.3	1.5	1.5
Number in Sample	64	28	28
Calculated "t" Value to Comparisons with Stations Located more than 5 miles from the Plant	3.528	1.081	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 than 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 1990

	STATION				
	APC-1	APG-1	APP-1	APQ-1	APE-30
Mean (10^{-3} pCi/m ³)	14.9	15.2	15.0	14.5	16.3
Standard Deviation (10^{-3} pCi/m ³)	4.6	4.8	4.97	4.9	5.7
Number in Sample	53	53	53	52	53
Calculated "t" Value Comparing Control Station (APE-30) to Indicator Station	1.370	1.102	1.191	1.743	NA
Tabular "t" Value at 95% Confidence ($t_{0.025, n}$)	1.985	1.985	1.985	1.986	NA

NOTE: NA means Not Applicable

TABLE F-3
STATISTICAL COMPARISON OF GROSS BETA ACTIVITY
IN MONTHLY DRINKING WATER COMPOSITES FOR 1990

	STATION		
	DWG-2	DWE-5	DWP-7
Mean (pCi/l)	5.0	3.6	4.1
Standard Deviation (pCi/l)	2.0	1.0	1.1
Number in Sample	12	9	11
Calculated "t" Value Comparing Control Station (DWP-7) to Indicator Station	1.223	1.037	NA
Tabular "t" Value at 95% Confidence ($t_{0.025,n}$)	2.080	2.101	NA

NOTE: NA means Not Applicable