MARYLAND DEPARTMENT OF NATURAL RESOURCES

DNR 12-6252010-464
PPRP-R-31

PPRP

ENVIRONMENTAL RADIONUCLIDE CONCENTRATIONS IN THE VICINITY OF THE CALVERT CLIFFS NUCLEAR POWER PLANT AND THE PEACH BOTTOM ATOMIC POWER STATION: 2006-2007

June 23, 2010

MARYLAND POWER PLANT RESEARCH PROGRAM

Martin O'Malley, Governor ♦ Anthony G. Brown, Lt. Governor

The Maryland Department of Natural Resources (DNR) seeks to preserve, protect and enhance the living resources of the State. Working in partnership with the citizens of Maryland, this worthwhile goal will become a reality. This publication provides information that will increase your understanding of how DNR strives to reach that goal through its many diverse programs.

John R. Griffin, Secretary
Maryland Department of Natural Resources

The facilities and services of the Maryland Department of Natural Resources are available to all without regard to race, color, religion, sex, sexual orientation, age, national origin or physical or mental disability.

This document is available in alternative format upon request from a qualified individual with a disability.

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401-2397
Toll Free in Maryland: 1-877-620-8DNR x8660
Outside Maryland: 1-410-260-8660
TTY users call via the Maryland Relay
www.dnr.maryland.gov

Printed on Recycled Paper

PPRP-R-31

ENVIRONMENTAL RADIONUCLIDE CONCENTRATIONS IN THE VICINITY OF THE CALVERT CLIFFS NUCLEAR POWER PLANT AND PEACH BOTTOM ATOMIC POWER STATION: 2006-07

Prepared for

Ms. Susan T. Gray
Maryland Department of Natural Resources
Power Plant Assessment Division
Tawes State Office Building, B-3
580 Taylor Avenue
Annapolis, MD 21401

Prepared by

Thomas S. Jones
Brent S. Hood
Versar, Inc.
9200 Rumsey Road
Columbia, Maryland 21045

June 23, 2010

FOREWORD

This report, Environmental Radionuclide Concentrations in the Vicinity of the Calvert Cliffs Nuclear Power Plant and The Peach Bottom Atomic Power Station: 2006-2007, contains the results of monitoring and research programs conducted by the Maryland Department of Natural Resources, Power Plant Research Program (PPRP), to evaluate the fate and effects of radionuclides released from the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station in 2006 and 2007. This is the 18th in a series of radiological assessment reports detailing PPRP's monitoring efforts since 1975. This report was prepared under Contract Number K00B5200176 between the Maryland Department of Natural Resources, Power Plant Research Program, and Versar, Inc.

The authors thank Captain Rick Younger and Jake Hollinger of the R/V Kerhin (Maryland Geological Survey) for assistance with collecting sediments for radiological analysis. We thank Mr. George R. Abbe and staff (Morgan State University, Estuarine Research Center) for designing equipment and collecting oyster samples. We thank Martin Berlett, Craig Bruce, Katherine Dillow, J. Peyton Emerson, and David Wong (Versar, Inc.) for collecting samples of sediment and biota and Francis E. Abell (Maryland Department of the Environment) for collecting samples of air, water, and milk. We thank Constellation Energy Group for providing radionuclide-release data for the Calvert Cliffs Nuclear Power Plant and Exelon Nuclear for providing radionuclide-release data for the Peach Bottom Atomic Power Station.

Brent Hood of the PPRP Radioecology Laboratory provided assistance with collecting samples of sediment and biological materials, preparing samples, analyzing sediment particle size, and preparing tables and graphics from accumulated radiological data. The Radiation Chemistry Laboratory of the Maryland Department of Health and Mental Hygiene (DHMH) provided assistance with analyzing samples of air, water, and milk. Jodi Dew provided assistance with controlling data quality, calculating results, and managing the long-term database. Carol DeLisle provided technical editing, and Gail Lucas supervised the production of this report.

The preferred citation for this report is:

Jones, T.S. and B.S. Hood. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 2006-2007. PPRP-R-31. June 2010. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

ABSTRACT

The Maryland Power Plant Research Program monitors concentrations of radionuclides from natural sources, weapons-related sources, and power plants in environmental samples collected from the vicinity of the Calvert Cliffs Nuclear Power Plant (CCNPP) and from the vicinity of Peach Bottom Atomic Power Station (PBAPS). The purpose of this monitoring is to evaluate the consequences of nuclear power generation for the environment and human health by determining the fate, transport, and potential effects of radionuclides released from these power plants. This report describes monitoring activities and data collected during the 2006 and 2007 calendar years and is the 18th in a series that documents results of monitoring studies conducted at CCNPP since 1975 and at PBAPS since 1979.

The concentrations of radionuclides in shellfish, finfish, aquatic vegetation, sediment, air, water, and milk were measured using high-resolution gamma spectrometry. Radionuclides in environmental samples originated from natural sources, historic atmospheric testing of weapons, and normal operations of CCNPP and PBAPS. A naturally occurring radioactive isotope of potassium (^{40}K) and decay products of uranium and thorium were detected in most samples of biota and all samples of sediment collected during the monitoring period. Background levels of an isotope of beryllium (^{7}Be), alpha radiation, and beta radiation were detected in samples of air and precipitation. Concentrations of naturally occurring radionuclides were typically orders of magnitude greater than those of radionuclides released from power plants. Cesium-137 was the only radionuclide associated with the fallout from weapons testing detected in environmental samples collected in 2006 and 2007.

Small concentrations (when compared to naturally-occuring concentrations) of radionuclides originating from CCNPP and PBAPS were detected in many samples of sediment collected from the vicinity of the plants. The principal power plant-related radionuclide was an isotope of cobalt (^{60}Co) detected in sediments at PBAPS. Radionuclides attributable to CCNPP and PBAPS represented a small (e.g., less than 0.5% in PBAPS sediment) fraction of the total radionuclides detected in the sediments and biota collected near CCNPP and PBAPS. The estimated dose of radiation that biota near power plants could deliver to humans did not exceed any of the U.S. Nuclear Regulatory Commission’s action levels.

The concentrations of radionuclides found in sediments and biota during this monitoring period do not represent a risk to the ecological health of Chesapeake Bay or Susquehanna River. The concentrations of radionuclides in sediments and biota would increase the radiological dose to humans by no more than 0.3% above the dose received from natural and other man-made sources. The incremental contribution of radioactivity and the corresponding dose of radiation attributable to the operation of CCNPP and PBAPS are minimal when compared with natural levels of radioactivity and the associated natural dose of radiation.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

Table **Page**

ACRONYMS, CHEMICAL ABBREVIATIONS, AND UNITS OF MEASUREMENT

ACRONYMS

BGE	-	Baltimore Gas and Electric Company
BWR	-	boiling water reactor
CCNPP	-	Calvert Cliffs Nuclear Power Plant
DHMH	-	Maryland Department of Health and Mental Hygiene
DNR	-	Maryland Department of Natural Resources
LLD	-	lower limit of detection
MDE	-	Maryland Department of the Environment
NIST	-	National Institute of Science of Technology
PBAPS	-	Peach Bottom Atomic Power Station
PECO	-	Philadelphia Electric Company
PPRP	-	Power Plant Research Program
PWR	-	pressurized water reactor
USAEC	-	United States Atomic Energy Commission
USEPA	-	United States Environmental Protection Agency
USGS	-	United States Geological Survey
USNRC	-	United States Nuclear Regulatory Commission
WSSC	-	Washington Suburban Sanitary Commission

CHEMICALS

Ag	silver
Ac	actinium
Be	beryllium
Bi	bismuth
C	carbon
Ce	cerium
Co	cobalt
Cr	chromium
Cs	cesium
Cu	copper
Fe	iron
Ge	germanium
H	hydrogen
^{3}H	tritium
I	iodine
K	potassium
La	lanthanum
Li	lithium
Na	sodium
Nb	niobium
P	phosphorus
Pb	lead
Ra	radium
Ru	ruthenium
Sb	antimony
Se	selenium
Sr	strontium
Th	thorium
Tl	thallium
U	uranium
Xe	xenon
Zn	zinc
Zr	zirconium

UNITS OF MEASUREMENT

Ci	curies
cc	cubic centimeters
cm	centimeters
dpm	disintegrations per minute
ft^3/s	cubic feet per second
ha	hectares
keV	thousand electron volts
kg	kilograms
km	kilometers
l	liters
m	meters
m^3/s	cubic meters per second
mi^2	square miles
min	minutes
mm	millimeters
mrem	millirem
MW	megawatts
pCi	picocuries
ppm	parts per million
ppt	parts per thousand
µm	micrometers
yr	years

RADIOLOGICAL DEFINITIONS

Activity. The quantification of the rate of radioactive decay of radioactive material.

Becquerel. A unit of radioactivity. One becquerel is defined as 1 disintegration per second.

Curie (Ci). A unit of radioactivity. One curie is defined as 3.7×10^{10} disintegrations per second.

Dose. The energy imparted to matter by ionizing radiation. The unit of absorbed dose is the rad, equal to 0.01 joules per kilogram for irradiated material in any medium.

Dose commitment. The dose that an organ or tissue would receive during a specified period of time (i.e., a 50-year period is used in dose calculations in this report) as a result of intake (as by ingestion or inhalation) of one or more radionuclides from one year's release.

Environmentally significant. As used in this report, refers to radionuclides that are known to be assimilated by biological organisms and are discharged in detectable amounts. Not included are aqueous release of noble gases, tritium, or very short-lived radionuclides because they are not bioaccumulated or decay rapidly to stable forms.

Half-life. The time required for a radioactive substance to lose one-half of its activity by decay. Each radionuclide has a unique half-life.

Ionizing radiation. Any electromagnetic or particulate radiation capable of producing ions (electrically charged atoms or atomic particles), directly or indirectly, in its passage through matter.

Maximally exposed individual. A hypothetical individual who remains in an uncontrolled area and would, when all potential routes of exposure from a facility's operations are considered, receive the greatest possible dose.

Radioactive decay. The spontaneous transformation of one nuclide into a different radioactive or nonradioactive nuclide, or into a different energy state of the same nuclide.

Radionuclide. An unstable nuclide capable of spontaneous transformation into other nuclides by changing its nuclear configuration or energy level. This transformation is accompanied by the emission of photons or particles.

Rem. The effective dose equivalent (i.e., the absorbed dose in rads multiplied by the quality factor associated with the type of radiation).

Stable. Not radioactive or not easily decomposed or otherwise modified chemically.

1.0 INTRODUCTION

The Calvert Cliffs Nuclear Power Plant (CCNPP) and the Peach Bottom Atomic Power Station (PBAPS) generate gaseous and liquid radioactive wastes that are discharged into the atmosphere, Chesapeake Bay, and lower Susquehanna River. Although atmospheric releases consist mainly of radioactive noble gases, which have little environmental significance, aqueous discharges to Chesapeake Bay and lower Susquehanna River may contain radionuclides that can become associated with sediments and can be accumulated by biota. Ultimately, these radionuclides may contribute to a radiation dose to humans by being transported through the food chain.

This report examines and summarizes the results of monitoring and research programs conducted in the vicinity of CCNPP, the vicinity of PBAPS, lower Susquehanna River, and upper Chesapeake Bay in 2006 and 2007 by the Maryland Department of Natural Resources (DNR), Power Plant Research Program (PPRP). The report includes:

- quantities of environmentally significant radionuclides discharged from the nuclear power plants to the atmosphere, Chesapeake Bay, and Susquehanna River;
- descriptions of procedures for collecting, preparing, and analyzing environmental samples;
- concentrations of radionuclides measured in approximately 400 samples of aquatic vegetation, shellfish, finfish, and sediment collected from lower Susquehanna River and Chesapeake Bay;
- concentrations of radionuclides measured in approximately 1,900 samples of air, water, and milk collected from the vicinity of CCNPP and PBAPS; and
- an assessment of the environmental and health-related effects of radioactive discharges from CCNPP and PBAPS that were detected in Susquehanna River, Chesapeake Bay, and elsewhere in the vicinity of CCNPP and PBAPS.

1.1 MONITORING OBJECTIVES

PPRP has conducted research and monitoring to assess the effects of radioactive material released from CCNPP (since 1975) and PBAPS (since 1979) on Maryland's ecological resources. These programs primarily evaluate radiological effects within individual trophic levels of the ecosystems of Chesapeake Bay and Susquehanna River and provide information concerning the behavior and fate of radionuclides released to Chesapeake Bay and Susquehanna River. These monitoring data also are used to estimate the radiological dose to human populations resulting from the discharge of radionuclides from these power plants.

Additionally, PPRP has partially funded continuous monitoring of air, as well as periodic sampling of precipitation, processed milk, and community drinking water from the vicinities of CCNPP and PBAPS in order to assess the public health effects of non-aqueous pathways to humans. Prior to 2009, these samples were obtained by Maryland Department of the Environment (MDE 2007, 2008) and tested at the DHMH Radiation Chemistry Laboratory. Results of air, water, and milk monitoring are presented in this report.

1.1.1 Sediment

Sediment sampling is part of PPRP's long-term monitoring program to determine the areal extent of deposition of radionuclides discharged from the respective power plants' cooling-water outfalls. Such deposition serves as a confirmatory indicator of the power plants' radionuclide discharge reports. Quantifying radionuclide deposition in the sediment layer provides a measure of long-term radionuclide storage compared to naturally occurring radionuclides and a determination of their potential availability to the food web and potential dose to humans.

1.1.2 Tray Oysters

PPRP exposes oysters to discharges from CCNPP for a variety of predefined exposure periods to determine the mechanisms that regulate uptake and elimination of radionuclides. Oysters are sessile; therefore, oysters in the vicinity of CCNPP are more likely than mobile biota such as finfish and crabs to be exposed to aqueous releases of radioactive material. Oysters filter large amounts of particulate material and plankton that may have adsorbed radionuclides and accumulated heavy metals and radionuclides (McLean et al. 1987).

Despite the decline in the commercial oyster fishery in recent years, oysters are still an important indicator of potential radionuclide uptake in humans. Testing and analysis of tray oysters provides data on the potential for a dose to humans. The estimated dose is used to verify whether CCNPP is in compliance with dose limits as required by its license.

1.1.3 Finfish

Testing of finfish provides data on radionuclide uptake directly from the water column, which provides a measure at PBAPS that is analogous to tray oyster testing at CCNPP. Past measurements of radionuclides in the muscle and gut content of finfish helped to identify the pathway of radionuclides through the food web. Currently, the estimated dose to humans reported in the biennial environmental assessments published by PPRP is used to verify whether PBAPS is in compliance with dose limits as required by its license.

1.1.4 Submerged Aquatic Vegetation

Measuring the concentrations of radionuclides in samples of submerged aquatic vegetation (SAV) provides a determination of radionuclide uptake in these aquatic plants SAV in the sampling areas continues to efficiently absorb detectable amounts of iodine-131, which probably originates from sources that are not related to power plans.

1.1.5 Air and Air Particulates

Air is sampled to monitor the potential effects of airborne radiation on public health. Air monitoring also serves as an "early warning" indicator of the presence in Maryland of radioactive particles or gases from sources other than CCNPP or PBAPS. Sample results could provide an estimate of potential effect over a wide geographic area if an airborne release of radiation occurs in Maryland or elsewhere.

1.1.6 Potable Water

Testing drinking water from surface sources and wells in Calvert County near CCNPP provides assurance that operations at CCNPP do not compromise drinking water standards. Although such sampling is not a required element of nuclear power plant monitoring, Washington Suburban Sanitary Commission (WSSC) submits samples of potable and raw water as part of routine quality testing of its drinking water product, which also includes testing for chemical contaminants and other water quality parameters. Baltimore City tap water (taken within the DHMH Radiation Chemistry Laboratory) serves as a control for radioactive content in drinking water.

1.1.7 Precipitation

Sampling rainfall provides information about radionuclide deposition via precipitation. Such sampling has been used as an indicator of radioactive fallout during active, above-ground nuclear weapons testing. Presently, rainfall sampling is an auxiliary indicator of airborne radiation originating from nuclear power generation.

1.1.8 Milk

Monitoring locally produced raw and processed milk focuses on one portion of the ingestion pathway for power plant-related radionuclide emissions. Airborne radioactivity may be deposited on pastures, be ingested by cows, and become part of cow's milk. Slight concentrations of ^{90}Sr from the fall out from weapons testing continue to be present in milk samples. Prior to 2009, monitoring consisted of composite, processed milk only.

1.2 DESCRIPTION OF PLANTS AND STUDY SITES

1.2.1 Calvert Cliffs Nuclear Power Plant

Constellation Energy Nuclear Group, LLC owns and operates CCNPP. The plant is in Calvert County, Maryland, on the western shore of Chesapeake Bay. Each of CCNPP's two units is a pressurized water reactor (PWR) with an operating capacity of 845 megawatts. Unit 1 is licensed to operate until 2034, and Unit 2 until 2036. Controlled releases of radionuclides via the heat dissipation system are permitted at levels defined in CCNPP's license (issued July 31, 1974, for Unit 1 and November 30, 1976, for Unit 2, renewed March 23, 2000) from the United States Nuclear Regulatory Commission (10 CFR Part 20, Appendix B; USNRC 1991). CCNPP withdraws cooling water from Chesapeake Bay at a rate of approximately 2.3 million gallons per minute (CEIR 2008), which is approximately four times the withdrawal rate of PBAPS.

The western shore of Chesapeake Bay is scoured by tides, wind, and waves. The Bay in this area is approximately 4.5 km wide and relatively shallow. Water depth gradually increases to 10 m to 15 m about 0.8 km from the shoreline. This depth extends approximately 3 km and increases to 20 m at mid-bay. The area is tidally influenced and has a mean tidal range of 0.3 m to 0.6 m. The velocity of the current in the vicinity ranges between 5 cm/sec and 60 cm/sec (Lacy and Zeger 1979). Salinity varies seasonally and normally ranges from 7 ppt to 17 ppt. Bottom sediments are characterized by medium coarse sands at depths ranging between 0 m and 6 m, fine sands and clays at depths of 6 m to 9 m, and clays and organic silt at depths greater than 10 m (Domotor and McLean 1988). A detailed description of the Calvert Cliffs area can be found in the *Final Environmental Statement Related to the Operation of Calvert Cliffs Nuclear Power Plant, Units 1 and 2* (USAEC 1973) and in Baltimore Gas and Electric's license renewal application (USNRC 1999).

The Calvert Cliffs region of Chesapeake Bay supports an abundant and diverse macrobenthic assemblage (Llansó et al. 2009) and populations of commercially important finfish and shellfish (Lippson and Lippson 2006). Oysters are present near CCNPP and are commercially harvested from the area. Blue crabs also are abundant throughout the site and are harvested both commercially and recreationally. This area of Chesapeake Bay supports a diverse finfish community, including forage species (e.g., menhaden, anchovies, and silversides) and commercially important predatory species (e.g., weakfish, striped bass, and bluefish).

1.2.2 Peach Bottom Atomic Power Station

Exelon Generation Company, a subsidiary of Exelon Corporation, operates PBAPS, which began operations in 1974. The plant is jointly owned by Exelon Generation and Public Service Electric and Gas of New Jersey. The plant is located in York County, Pennsylvania, approximately 5 km north of the Pennsylvania-Maryland border, on the western shore of Conowingo Pond. Each of PBAPS's two units is a boiling water reactor (BWR) with a capacity of 1098 megawatts. Controlled releases of radionuclides are permitted at levels defined in PBAPS's license (issued October 25, 1973, for Unit 2 and July 2, 1974, for Unit 3, renewed May 7, 2003) from the United States Nuclear Regulatory Commission (10 CFR Part 20, Appendix B; USNRC 1991).

PBAPS withdraws cooling water from the portion of Susquehanna River known as Conowingo Pond at an average rate of 625,000 gal/min (PBAPS Communications Office 1997). Conowingo Pond also receives radionuclides in aqueous discharges from the plant during normal operations. Conowingo Pond is an impoundment created by Conowingo Hydroelectric Dam (13 km downstream from PBAPS) and Holtwood Dam (10 km upstream of PBAPS). It has an average surface area of approximately 3,700 ha (14 mi^2) and ranges in depth from about 3 m in upriver sections to a maximum of about 27 m at the face of Conowingo Dam. The annual average river flow at the dam is approximately 1170 m^3/s (41,270 ft^3/s; USGS 2008). Downriver flow may be perturbed by withdrawal and discharge of cooling water for PBAPS; periodic cycling of water at the Muddy Run Pumped Storage Facility on the eastern shore, north of the plant; and operation of the turbines at Conowingo Dam.

The Susquehanna River enters the tidal portion of Chesapeake Bay approximately 6 km downstream from Conowingo Dam. The location of the resulting interface between fresh and salt water fluctuates at the river mouth (Susquehanna Flats) or upper Chesapeake Bay and is controlled principally by river volume. The transition from fresh to brackish water is accompanied by changes in physical and chemical factors that affect the degree to which metals and radionuclides become or remain associated with particles suspended in the water column (Olsen et al. 1989). These factors influence the dispersion and distribution of radionuclides in the Susquehanna-Chesapeake Bay system.

The Susquehanna-Chesapeake Bay system supports an abundant and diverse macrobenthic assemblage as well as populations of recreationally and commercially important finfish (PPRP 1998, Llans\ et al. 2009). Conowingo Pond contains largemouth and smallmouth bass, walleye, sunfish, channel catfish, carp, and hybrids of white and striped bass, which are principal components of the recreational fishery below Conowingo Dam. Further downstream, white perch, channel catfish, blueback herring, American shad, and American eels are commercially fished on Susquehanna Flats. The Susquehanna Flats area supports seasonal stands of SAV, primarily Eurasian milfoil (*Myriophyllum spictum*), and is an important early wintering ground for migratory waterfowl (Lippson 1973).

2.0 METHODS AND MATERIALS

2.1 SAMPLE COLLECTION PROCEDURES

Environmental samples taken from the vicinity of CCNPP and PBAPS, and in control areas, for radiological analysis are summarized in Table 2-1.

2.1.1 Sediments

Sediments were collected periodically from the series of transects shown in Figure 2-1 and Figure 2-2. A hydraulic box-grab was used to collect sediments in the vicinity of CCNPP (quarterly), whereas a hand-operated Young grab was used to collect sediments at stations surrounding PBAPS (semi-annually). The top 10 cm (or less) of sediment were recovered from each grab, and grabs were repeated until approximately 3000 cc of sediment were collected at each station.

2.1.2 Biota

For the tray-oyster study at CCNPP, mature oysters were placed into partitioned trays (Abbe 1981) and submerged for a variety of exposure periods. Trays were placed 0.4 km north of the CCNPP cooling-water outfall (Figure 2-1) and were supported by a platform resting approximately 0.5 m from the bottom (approximately 5 m to 5.5 m from the surface). Each tray had four compartments designed to hold 50 oysters each. Oysters from individual compartments (50 per group) were retrieved and restocked on a schedule designed to evaluate radionuclide concentrations in oysters exposed to CCNPP discharges for 3, 6, 9, and 12 months. Natural bar oysters were collected quarterly.

Biota for radiological analysis collected from the PBAPS study site included forage finfish, recreationally and commercially important finfish, and SAV. Edible and forage finfish were collected by electrofishing or by gill net (1-, 2-, and 4-inch experimental mesh) near the outfall of PBAPS (Figure 2-2). Samples of SAV were collected by hand at various points along Susquehanna River and Susquehanna Flats (Figure 2-2).

2.1.3 Air and Air Particulate

Air and air particulate samples were taken using a permanently mounted AVS-28A Portable Constant Flow Air Sampler or an HD-28A Portable Air Sampler manufactured by RADēCO. The air samplers were mounted inside weather houses mounted on utility poles or other permanent fixtures (Figure 2-3) and connected to AC electric power. The samplers were fitted with open-face cartridge and filter holders and calibrated to pump at a continuous air flow rate of 1 cubic foot per minute. Sampling media for air and air particulate monitoring were 57.7 mm in diameter by 26.4 mm thick charcoal canisters and 47 mm glass fiber filters, respectively. Air sampling media were exchanged weekly.

Table 2-1. Environmental samples for radiological analysis collected in 2006-2007 from the vicinity of CCNPP and PBAPS.

Sample Media	Collection Frequency	Number of Sampling Locations	Description of Sampling Locations
Sediment	Quarterly	28	Chesapeake Bay in the vicinity of CCNPP along eight transects
Tray Oysters	Quarterly, Semi-annually, Tri-quarterly, Annually	2	Plant site and Kenwood Beach
Sediment	Spring and Fall	19	Conowingo Pond (12 stations); Susquehanna Flats (6 stations); upper Chesapeake Bay (1 station)
Finfish	Spring and Fall	1	Conowingo Pond (on the western shore downstream of the PBAPS discharge at station LYH-1)*
Submerged Aquatic Vegetation (SAV)	Spring and Fall	3	Susquehanna River (on the shores below the Rt. 95 bridge), Susquehanna Flats (near fishing battery), and Conowingo Pond (LYH-1)*
Air Filter	Continuously (exchanged weekly)	8	Calvert Co. (3), Baltimore (1), Cecil Co. (2), Harford Co. (1), Eastern Shore (1)
Charcoal Filter	Continuously (exchanged weekly)	8	Calvert Co. (3), Baltimore (1), Cecil Co. (2), Harford Co. (1), Eastern Shore (1)
Potable Water	Quarterly Monthly Quarterly Quarterly	7 1 1 1	Calvert Co. Baltimore City Patuxent River Potomac River
Raw Water	Monthly Monthly	1 1	Patuxent River Potomac River
Precipitation	Weekly	1	Baltimore City, on roof of 301 West Preston St.
Processed Milk	Weekly	1	Baltimore City

* LYH = Little Yellow Home, see Figure 2-2

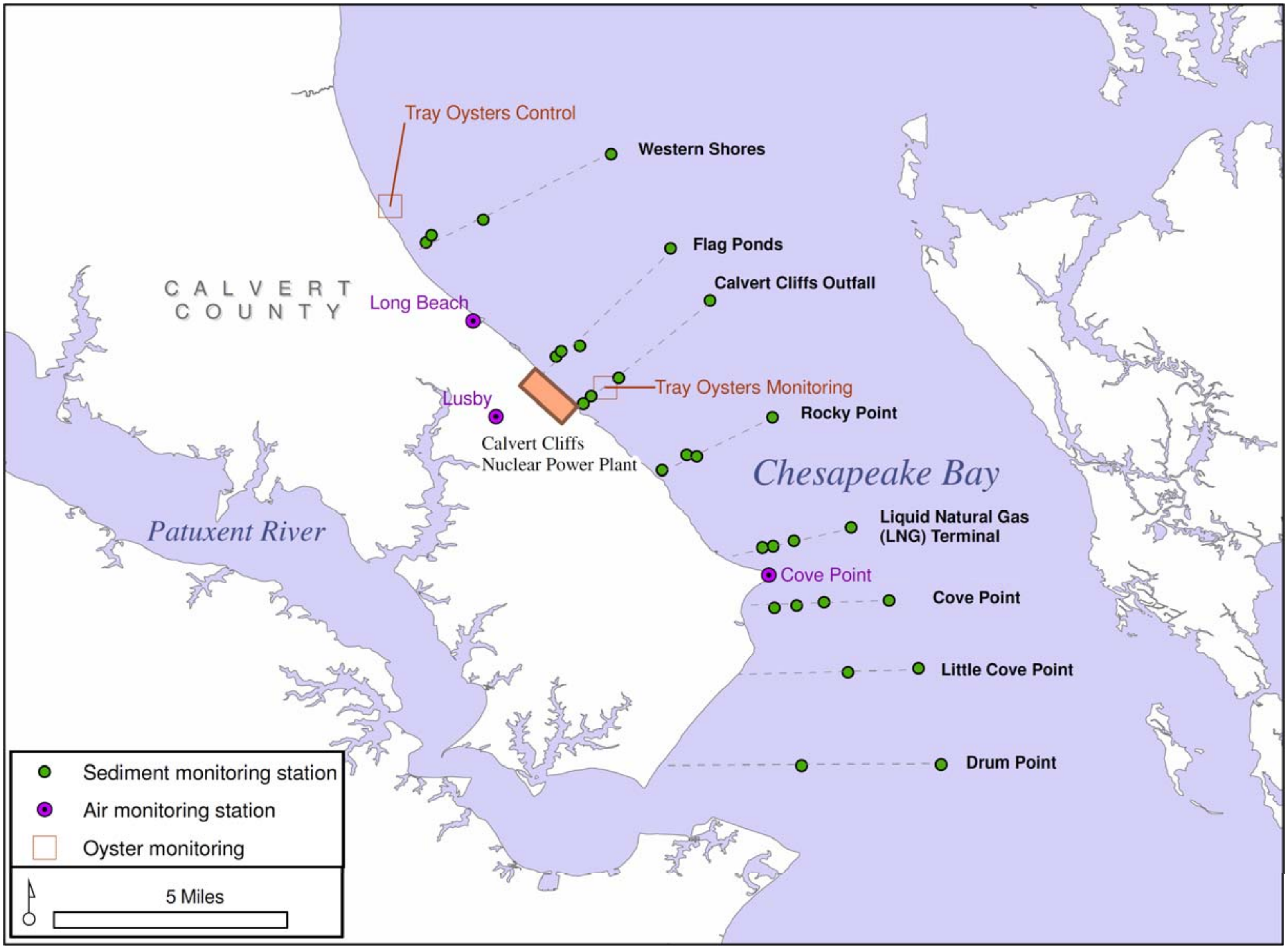


Figure 2-1. Transects and stations for samples collected from Chesapeake Bay. Appendix A contains a list of coordinates for all stations.

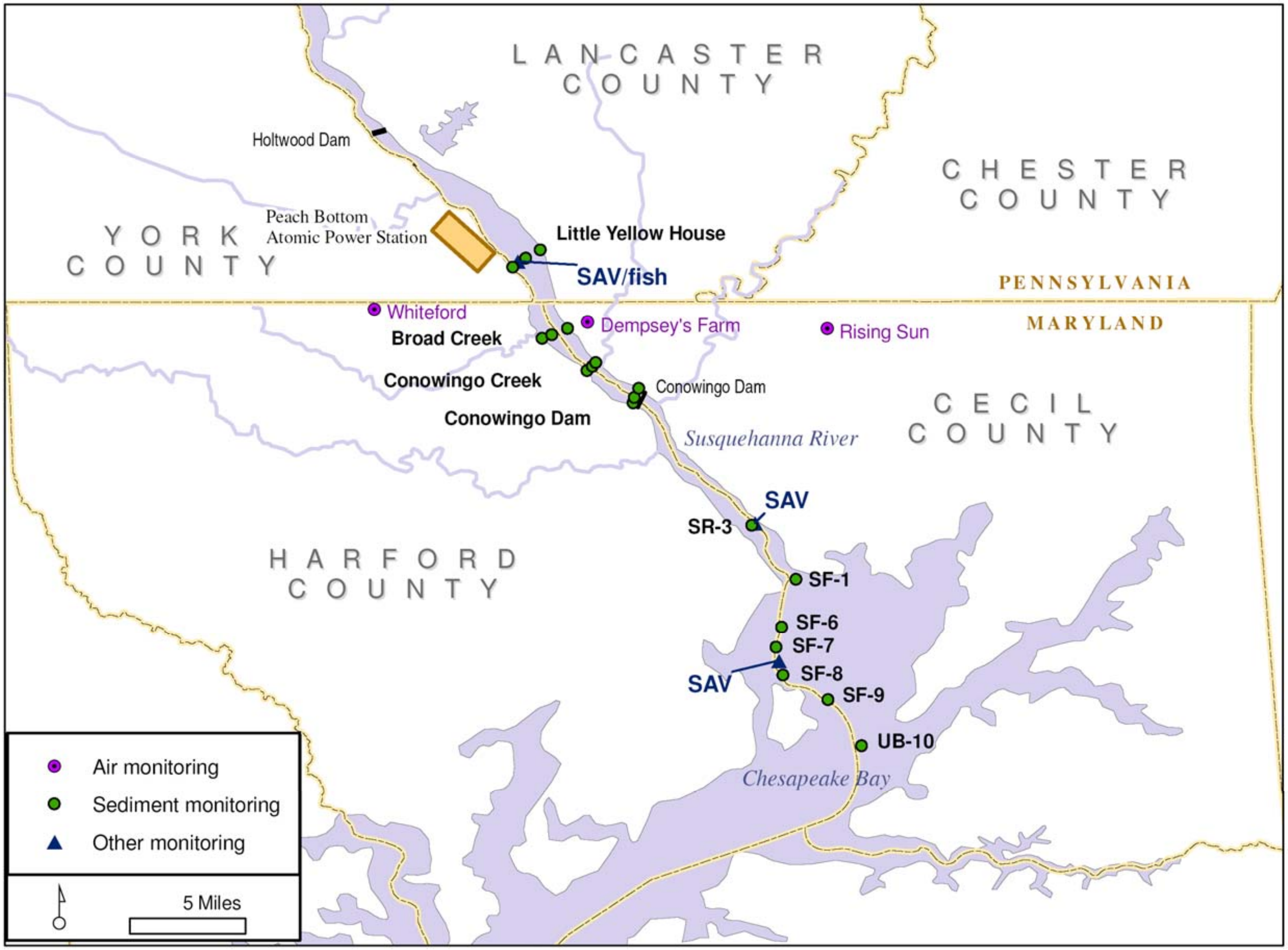


Figure 2-2. Transects and stations for samples collected from lower Susquehanna River and upper Chesapeake Bay. Appendix A contains a list of coordinates for all stations.

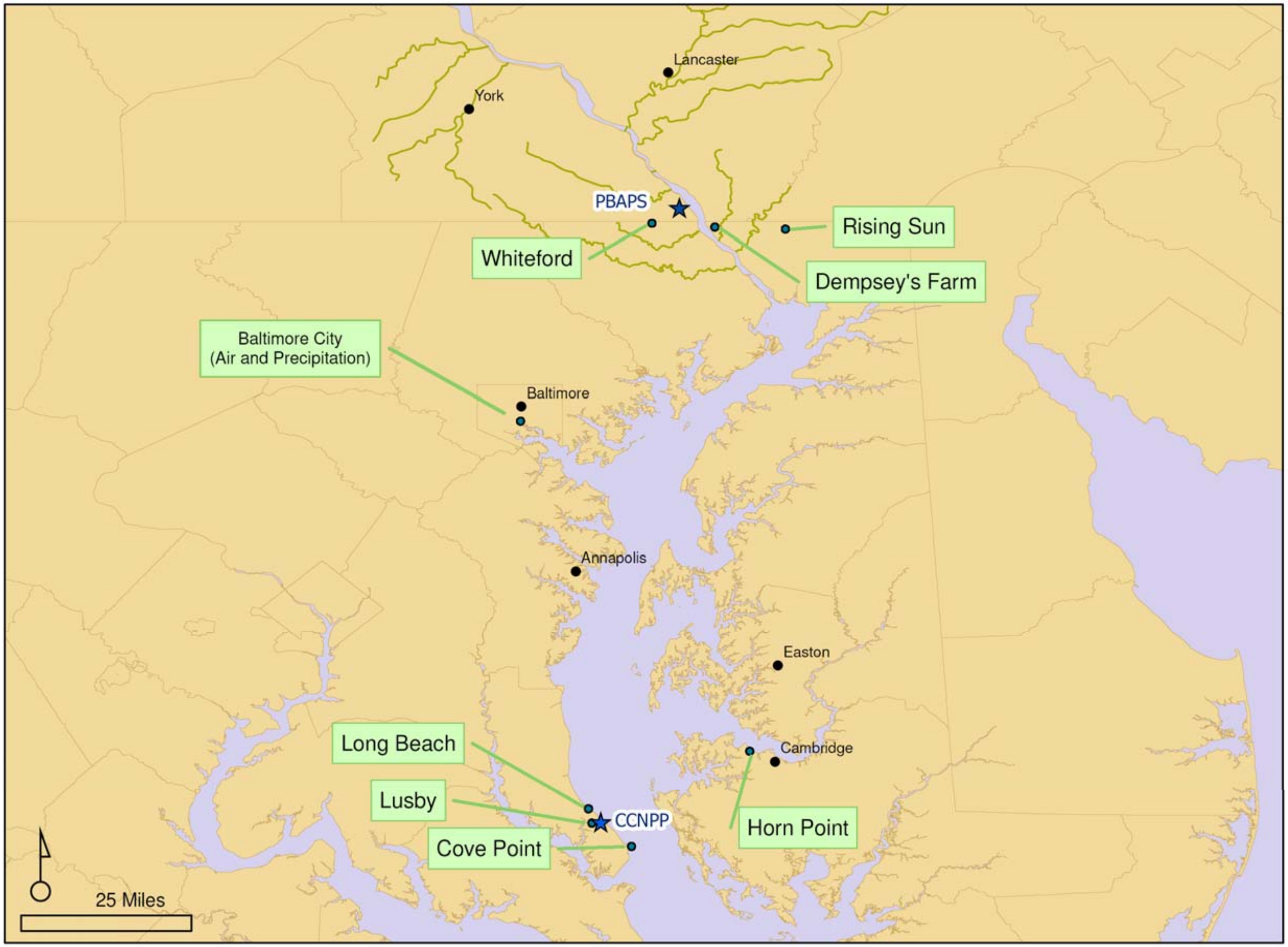


Figure 2-3. Air monitoring stations near CCNPP and PBAPS.

2.1.4 Potable Water

Samples of potable water were obtained quarterly from establishments (e.g., schools, government buildings) in the vicinity of CCNPP, north and south of the plant (Figure 2-4). Field personnel collected water from public drinking water fountains into a 1-liter plastic container. Control samples from Baltimore were collected monthly into 1-gallon cubitainers.

2.1.5 Precipitation

Precipitation was sampled weekly (when sufficient rain had been collected) from a 20-gallon carboy below an aluminum funnel that is mounted permanently on the roof of the Maryland State office building at 301 West Preston Street in Baltimore. If sufficient precipitation had been collected in the carboy, the analog rain gauge was read and the accumulated sample was transferred to a 1-gallon cubitainer.

2.1.6 Milk

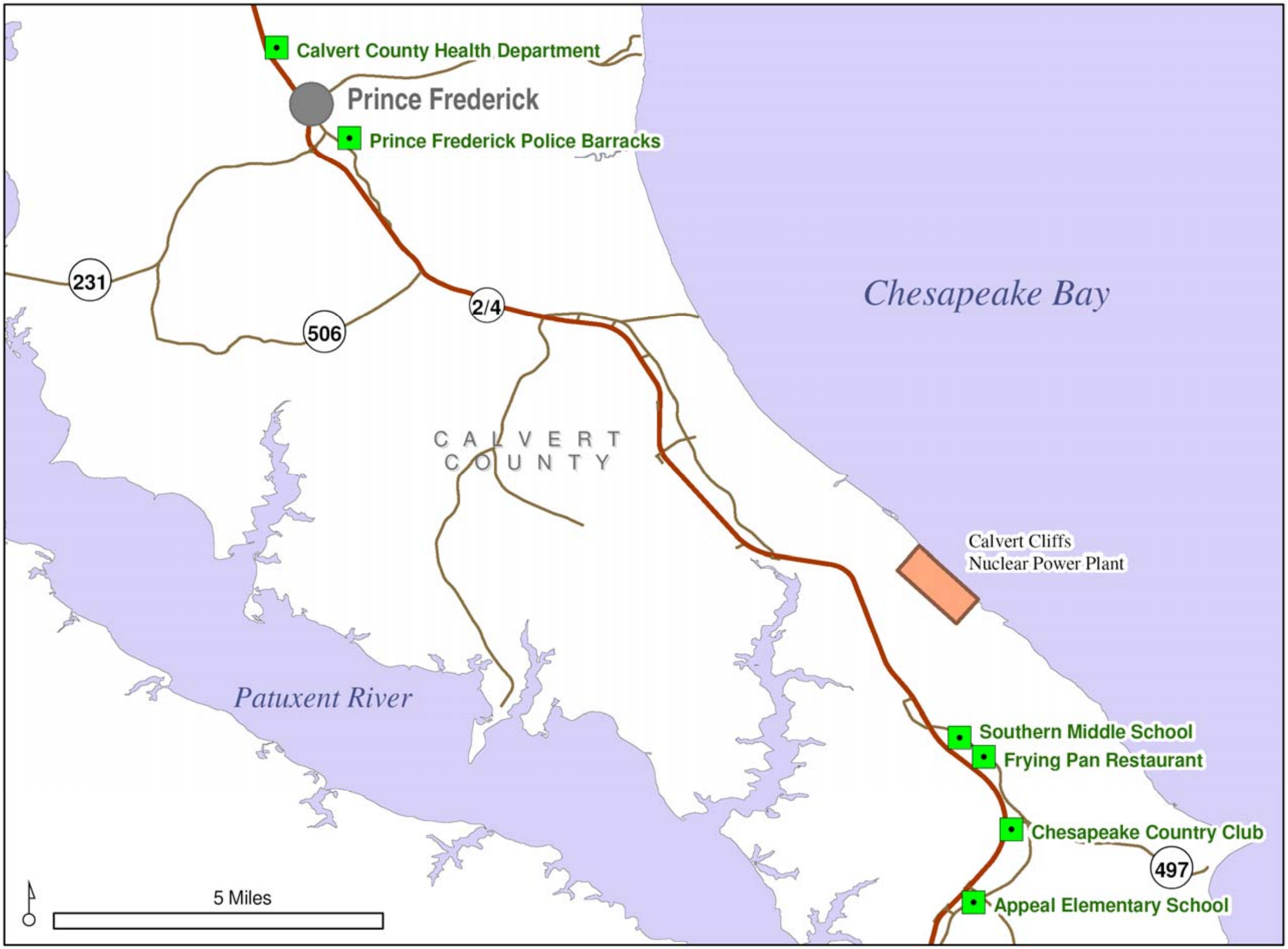
Samples of processed milk were collected weekly from Cloverland/Green Spring Dairy in Baltimore.

2.2 SAMPLE PREPARATION AND ANALYSIS PROCEDURES

The sample preparation and analysis procedures described below apply to sediment and biota samples analyzed by the PPRP Radioecology Laboratory. Other sample matrices described above, such as air, air particulates, water, and milk, were processed in the DHMH Radiation Laboratory using a variety of methods of sample preparation (e.g., evaporating to dryness, wet chemistry), sample analysis (e.g., gas-flow proportional counting, liquid scintillation analysis, and gamma spectrometry), and data analysis. Descriptions of portions of these methods can be found in other reports (Jones 1994; Krieger and Whittaker 1980; and DOE 1990).

2.2.1 Sample Preparation

Sediment samples were placed in a 2-liter Marinelli beaker and analyzed for radionuclide content using gamma spectrometry. After being counted, dried, and weighed, sediment samples were analyzed for particle size (Section 2.3) to determine their composition (e.g., sand, silt, or clay).



.

Figure 2-4. Potable water monitoring stations in Calvert County, Maryland.

Some forage finfish (e.g., shiners and silversides) and juveniles of other species (e.g., sunfish and gizzard shad) are important food sources for predatory finfish (e.g., smallmouth bass, largemouth bass, and striped bass) that are consumed by humans. These forage fish were analyzed whole (i.e., viscera and bone were not removed) to detect radioactivity that could be transferred through the food chain and potentially contribute to a radiation dose to humans. Edible finfish were filleted, and samples of flesh and gut were analyzed for gamma-emitting radionuclides.

Biological samples were prepared for analysis as follows:

Oyster flesh: Samples were homogenized in a blender, diluted to 1 or 2 liters with deionized water, and preserved in a 10% solution of formaldehyde.

Edible finfish flesh and forage finfish: Samples were diced into 3-cm cubes, packed to a volume of 1 or 2 liters, and preserved in a 10% formaldehyde solution.

Edible finfish gut: Samples were wet-digested in nitric acid and diluted to 1 or 2 liters with deionized water.

SAV: Samples were packed to a volume of 1 or 2 liters and preserved in a 10% solution of formaldehyde.

The prepared samples of biota were placed in a 1- or 2-liter Marinelli beaker and analyzed for radionuclide content using gamma spectrometry.

2.2.2 Gamma Spectrometry

Sediment and biota samples were prepared and analyzed on a gamma-ray counting system consisting of high-resolution, intrinsic germanium detectors, one manufactured by Ortec (Ortec, Inc., Oak Ridge, TN) and the other by Canberra (Canberra, Inc., Meriden, CT). The detectors were 25% and 23% efficient (relative to NaI), respectively, and were coupled to a Canberra Genie-2000 spectrum acquisition and analysis system (Stanek et al. 1996a).

Electronic files containing appropriate nuclide library data and counting efficiency curves by sample were used to produce reports of the concentrations of radionuclides in the samples. Gamma-ray energy and intensity values used in energy-to-channel calibration and in data reduction were based on library data incorporated into the Genie-2000 software, which were referenced to the National Nuclear Data Center of the Brookhaven National Laboratory (Stanek et al. 1996b).

Counting efficiency curves were determined using custom multi-gamma standards commercially purchased from Eckert and Ziegler Analytics, Atlanta, Georgia, which were traceable to the National Institute of Science and Technology (NIST). All spectra were acquired for 1,000 minutes. Radionuclide concentrations were corrected to collection date and time. Spectra for all samples were stored electronically for future reference.

For sediment and biota, radionuclide concentrations and pertinent sample-collection information and analysis parameters were entered into a SAS (Statistical Analysis System, Cary, NC.) computer database according to established procedures (Frithsen et al. 1996). SAS software was used to perform quality control on the sample-collection information and analytical results.

Results for samples of air, air particulates, milk, and water were entered into quarterly reports (MDE 2007, 2008) and submitted to DNR.

2.2.3 Quality Assurance

A spiked intercomparison (i.e., "cross-check") sample from Eckert and Ziegler Analytics was analyzed to independently verify instrument performance. Laboratory results and known values for the intercomparison study sample are presented in Appendix B. Seventy percent of laboratory results for gamma emitters in the intercomparison samples were within 2 sigma of the known results.

2.3 DETERMINATION OF SEDIMENT CHARACTERISTICS

The size of sediment particles was measured to provide a basis for comparing radionuclide concentrations detected in sediments of different composition (i.e., sand versus clay). Sediment particle size analysis accounts for composition changes that may affect measured radionuclide concentrations at a collection site. Sediments were classified as silt-clay if the mean grain size was less than 63 :m (Wentworth scale as published in Buchanan and Kain 1971). Sediments were classified as sand if the mean grain size was greater than 63 :m. Mean grain size was determined by wet- or dry-sieving 50-g (dry weight) aliquots through 250-:m, 125-:m, and 63-:m mesh. Each fraction was dried and weighed. That portion that passed through the 63-:m screen was determined by subtraction from the original 50g. Particle-size index values were calculated for each sample by multiplying the fraction of the total weight retained on the 250-:m mesh by 4, the fraction retained on 125-:m mesh by 5, the fraction retained on the 63-:m mesh by 6, and the fraction that passed through the 63-:m screen by 7. The sum of these products is the relative particle-size index for the sediment sample and ranges from the coarsest (400), in which all material was retained on the 250-:m screen, to the finest (700) in which all material passed through the 63-:m screen.

2.4 DATA ANALYSIS

Raw analytical results were calculated using gamma spectrum analysis software. Photopeaks distinguished from background were matched to radionuclide species and quantified based on factors such as instrument conditions, volume of sample, and radioactive decay. The concentration of a radionuclide of interest was reported as a value with a 2 sigma uncertainty.

The lower limit of detection (LLD) was calculated for radionuclides of interest that were not detected. The equation given in Table 2-2 defines the LLD for data included in this report. Common LLD quantities produced by sample analyses are given in Table 2-3. LLD quantities were disregarded when summarizing yearly averages of activity values.

Table 2-2. Determination of the lower limit of detection (Canberra 1998).

Lower limit of detection is given by:

$$LLD = \frac{L_D}{VEBTK_w}$$

where

- V = The mass or volume of sample
- E = The counting efficiency for the peak of interest
- B = The branching ratio of the gamma ray peak
- T = The sample counting time (live) in seconds
- K_w = The decay correction factor

$$K_w = e^{-\frac{ln(2)t_w}{T_{1/2}}}$$

- $T_{1/2}$ = The half life of the nuclide
- t_w = The elapsed clock time from the time the sample was taken to the beginning of the measurement
- L_D = The uncertainty in the continuum count rate at the peak of interest

$$L_D = K^2 + 2L_c$$

$$L_c = K\sigma_O = K\sqrt{\mu_F + \mu_I + \sigma_F^2 + \sigma_I^2}$$

- L_C = Critical level, below which a net signal cannot reliably be detected
- σ_0 = Variance of a null net signal
- K = 2.327 (based on a Poisson distribution at a confidence level of 99%)
- μ_F = The "true" calculated continuum under the peak
- μ_I = The "true" measured background interference -- net peak area
- σ_F = The variance of F (calculated continuum under the peak due to Compton scattering)
- σ_I = The variance of I (measured background interference -- net peak area)

Table 2-3. Approximate lower limits (99%) of detection for selected counting geometries (pCi/kg).

Radionuclide	Energy (keV)*	Biota (1L) (1 kg wet)	Biota (2L) (2 kg wet)	Sand (2L) (3 kg dry)	Clay (2L) (1.5 kg dry)
^{7}Be	478	27	17	15	56
^{58}Co	811	3	2	3	6
^{60}Co	1333	4	2	3	7
^{65}Zn	1116	7	6	8	19
^{95}Nb	766	3	3	3	8
^{95}Zr	757	5	4	5	12
^{103}Ru	497	3	2	3	6
^{106}Ru	622	28	21	23	55
^{110m}Ag	885	3	2	3	8
^{125}Sb	601	8	6	7	17
^{134}Cs	605	3	2	3	8
^{137}Cs	662	3	2	2	5
^{144}Ce	134	19	13	26	52

* keV = thousand electron-volts.
Note: A seven-day decay period between sample collection and counting is assumed.

2.5 IDENTIFICATION OF CESIUM-137 FROM POWER PLANTS

Cesium-137 (^{137}Cs) is a constituent of both fallout from historic weapons tests and aqueous effluent from nuclear power plants. The fraction of ^{137}Cs that is attributable to power plants was estimated by determining the activity of cesium-134 (^{134}Cs) in the environmental samples. Cesium-134 is chemically identical to ^{137}Cs, and power plants release both in a generally consistent ratio over time. Following a correction for decay of ^{134}Cs since the time of release, the ^{134}Cs activity was multiplied by the release ratio of ^{137}Cs to ^{134}Cs in the aqueous effluents of the plants to estimate the concentration of ^{137}Cs from power plants in a sample. If ^{134}Cs was not present in the sample, then the entire concentration of ^{137}Cs was assumed to be the result of fallout from weapons tests. The LLD of ^{137}Cs from power plants is higher than the LLD of ^{137}Cs from fallout because its concentration is dependent on the detection of ^{134}Cs, which has a higher LLD due to its shorter half-life. The concentration ^{137}Cs from power plants is likely to be under-estimated because of the high probability of false-negatives in this analysis.

2.6 DATA PRESENTATION

Appendix C contains concentration data for samples collected in the vicinity of CCNPP and PBAPS during the 2006-2007 monitoring period. The radioactivity reported in these tables include specific radionuclides, gross alpha, and gross beta from natural sources, historical weapons test fallout, and power plant effluent. Separate tables are provided for sediments, oysters (*Crassostrea virginica*), finfish, SAV, air, air particulates, water, precipitation, and milk. Within each table, specific sample stations are arranged approximately north to south, and data are presented by date along with the yearly and overall means for the monitoring period.

Radiation concentration data are decay-corrected to the date of sample collection. The counting uncertainty is reported as " 2 sigma. Concentrations for alpha, beta, and specific gamma-emitters of interest that were not detected in specific samples were recorded as less than (<) the lower limit of detection for that sample.

3.0 RESULTS AND DISCUSSION

Data for plant discharges and monitoring results collected in 2006-2007 were used to identify and quantify sources of radionuclides, determine the concentration of radionuclides in environmental samples, and estimate potential radiological risks to ecological resources and humans. The results of these assessments are presented in separate sections below.

The origins of the more commonly observed radionuclides in environmental samples were identified to assess the magnitude of the contribution of radionuclides from power plants relative to those from fallout and natural sources. The quantities of individual radionuclides released from CCNPP and PBAPS during 2006-2007 are provided to compare to quantities observed in environmental samples collected during the same period. Curie and millicurie levels of environmentally significant radionuclides discharged from power plants into the aqueous pathway generally translate into nanocurie and picocurie quantities of plant-related radionuclides in the environmental samples collected for this monitoring program.

3.1 SOURCES OF RADIONUCLIDES

Nature, past atmospheric tests of nuclear weapons, and discharges from nuclear power plants are the three primary sources of radioactive material in Chesapeake Bay and Susquehanna River. Radionuclides attributable to each of these sources were detected in samples of biota and sediment collected in 2006-2007.

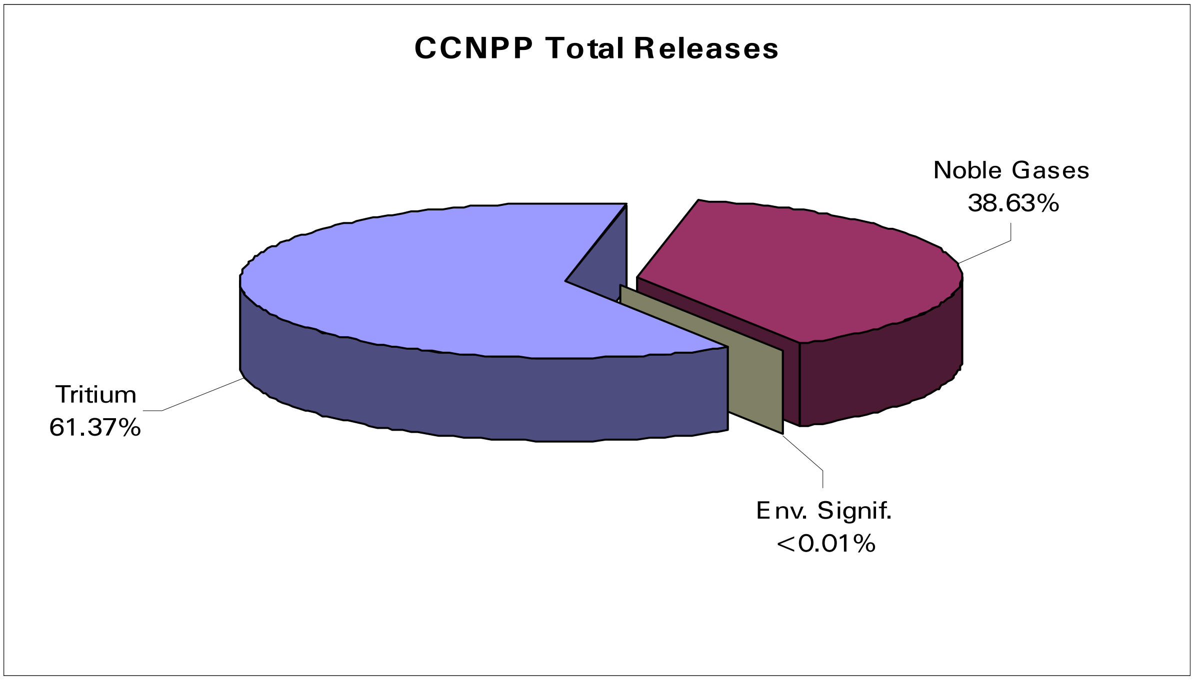
3.1.1 Radionuclides from CCNPP and PBAPS

3.1.1.1 Total Radionuclides

Radionuclide releases from nuclear power plants generally fall into three classes: noble gases, tritium, and iodines and particulates. The quantities and proportions of these three classes of radionuclides released into the atmosphere and into waterways vary based on plant design (Figure 3-1, Figure 3-2, and Table 3-1). PBAPS is a BWR, whereas CCNPP is a PWR.

During the 2006-2007 monitoring period, the most radioactive effluent from CCNPP was tritium released to the aqueous pathway (61%). The most radioactive effluent from PBAPS was noble gases released to the atmosphere (91%).

Noble gases are chemically inert, are not readily incorporated into biological tissues, and are not bioconcentrated. They disperse in the environment and generally have short half-lives, decaying rapidly to stable forms. Tritium also disperses readily in the environment and rapidly reduces to background levels.



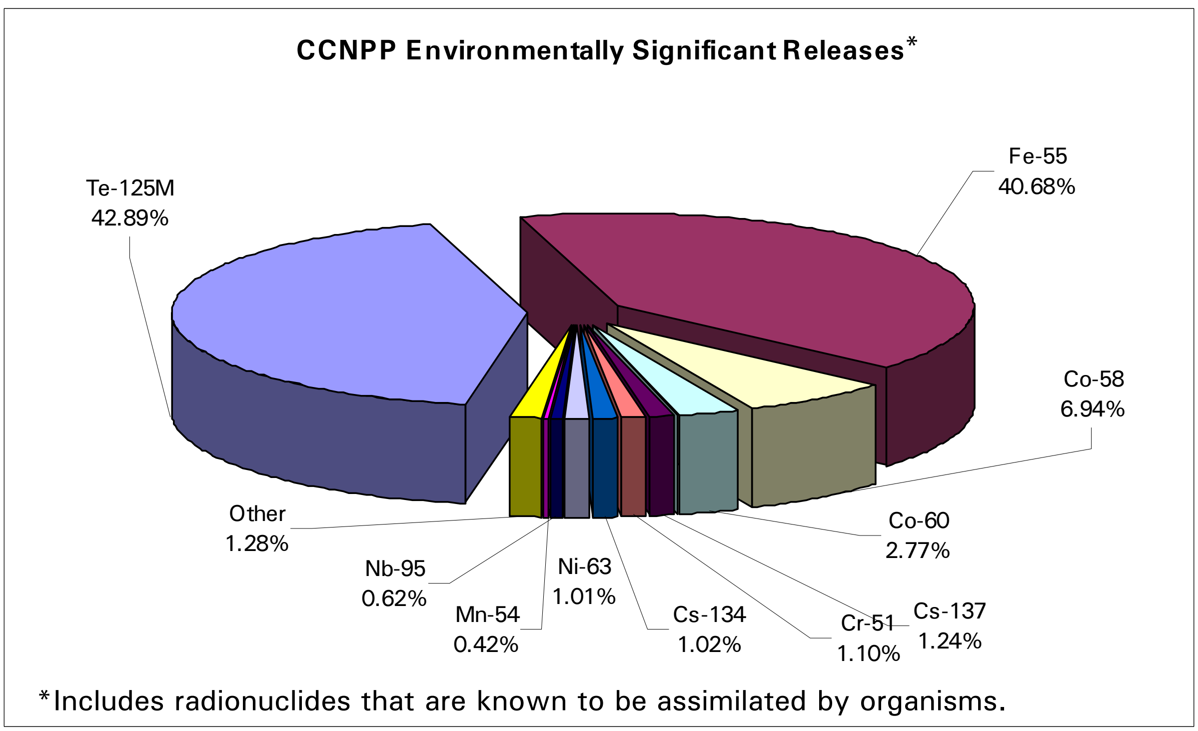
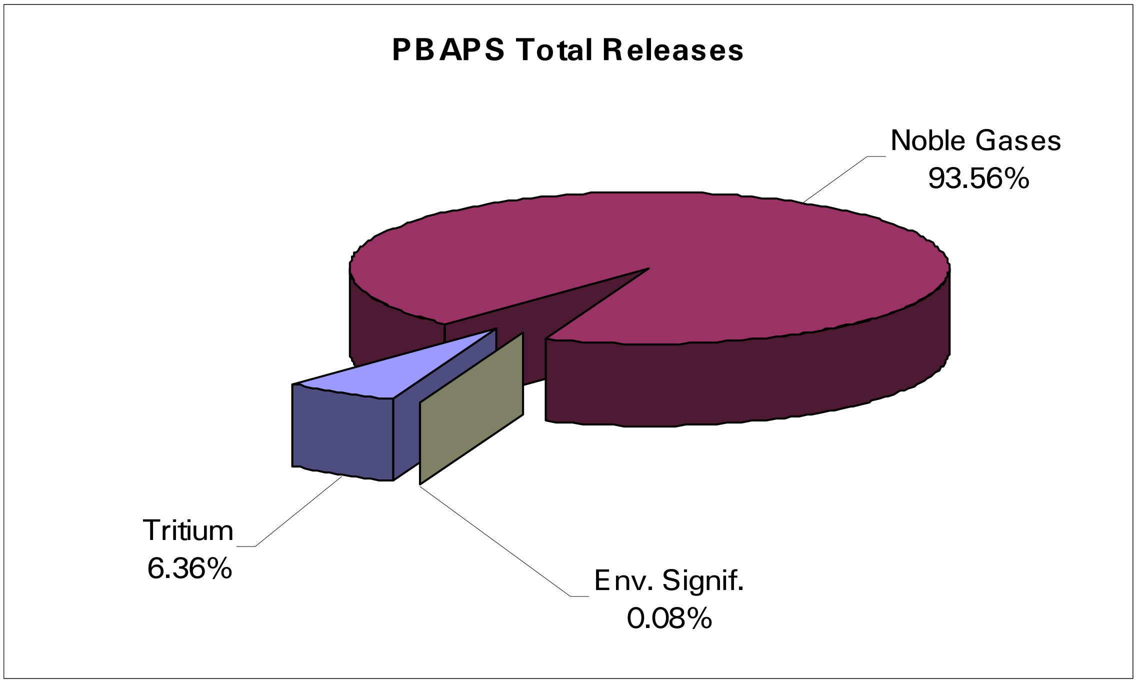
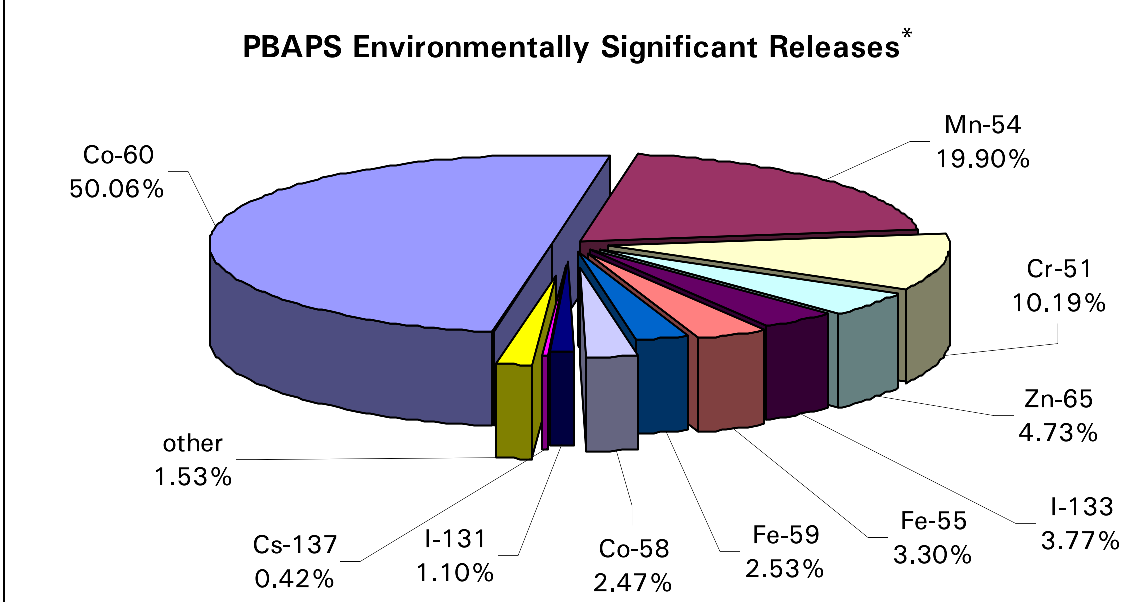


Figure 3-1. Relative contributions of noble gases, tritium, and environmentally significant radionuclides released from CCNPP, 2006-2007. Noble gases include atmospheric and dissolved gases.





*Includes radionuclides that are known to be assimilated by organisms.

Figure 3-2. Relative contributions of noble gases, tritium, and environmentally significant radionuclides released from PBAPS, 2006-2007. Noble gases include atmospheric and dissolved gases.

Table 3-1. Annual releases (curies) from all pathways of noble gases, tritium, iodines and particulates from CCNPP and PBAPS, 2006-2007 (Constellation Energy 2007, 2008;Exelon 2007, 2008).

Type	CCNPP			PBAPS		
	air	liq.	total	air	liq.	total
Iodines and Particulates	0.0771	0.0784	0.16	0.0796	1.29	1.37
Tritium	10.74	2383.10	2393.84	137.20	10.80	148.00
Noble Gases	1504.82	2.12	1506.94	1558.23	0.0003	1558.23
Total	1515.64	2385.30	3900.94	1695.51	12.09	1707.60

Certain radioiodines and radioactive particulates (i.e., metal isotopes) are considered environmentally significant. Environmentally significant radionuclides are those that have a strong tendency to adsorb onto particles, can accumulate in biological tissues, and can be concentrated through trophic transfer (Section 3.1.1.2).

Releases of environmentally significant radionuclides into the aqueous pathway from both CCNPP and PBAPS were very small. CCNPP and PBAPS released 0.92 mCi and 5.63 mCi of ^{137}Cs, respectively. CCNPP and PBAPS released 2.0 mCi and 685 mCi of ^{60}Co, respectively (Figures 3-3 through 3-6). All releases of radionuclides from PBAPS and CCNPP were the result of normal operation and maintenance at the plants and were within regulatory limits established by the USNRC and USEPA.[1] Quantities of releases from CCNPP and PBAPS were obtained from Constellation Energy Group's and Exelon Nuclear's semi-annual reports to the USNRC, respectively (Constellation Energy Group 2007, 2008; Exelon Nuclear 2007, 2008).

3.1.1.2 Environmentally Significant Radionuclides

During 2006-2007, CCNPP released approximately 78 mCi (0.0020% of total) of environmentally significant radionuclides to Chesapeake Bay. PBAPS released approximately 1290 mCi (0.076% of total) of environmentally significant radionuclides to Susquehanna River during the same period. Releases of environmentally significant radionuclides vary annually (Table 3-2) due to changes in maintenance procedures, operating conditions, and waste filtration technology at the plants (Conatser 2005).

At CCNPP, releases of environmentally significant radionuclides have varied in the past ten years due to factors such as outages, component replacement, and major efforts such as replacing steam generators and reactor vessel heads. Larger projects require more grinding and pipe replacement, which causes deposited radionuclides to be mobilized and released (Nuse 2010). Releases of radionuclides from PBAPS increased during 2006-2007

[1] USEPA 40CFR190 limits: 25 mrem whole body or individual organ; USNRC 10CFR50 limits: 3 mrem whole body and 10 mrem individual organ.

compared to the 2004-2005 monitoring period as a result of a fuel clad defect which has since been repaired. Leakage from some heat exchanger components were also a source of radionuclide release to the cooling water outfall during this period (Lucas 2010).

Table 3-2. Total releases (mCi) of environmentally significant radionuclides from CCNPP and PBAPS to the aqueous pathway, 1996-2007.

	CCNPP	PBAPS
1996-1997	1028	13
1998-1999	958	25
2000-2001	990	57
2002-2003	342	324
2004-2005	138	182
2006-2007	78	1290

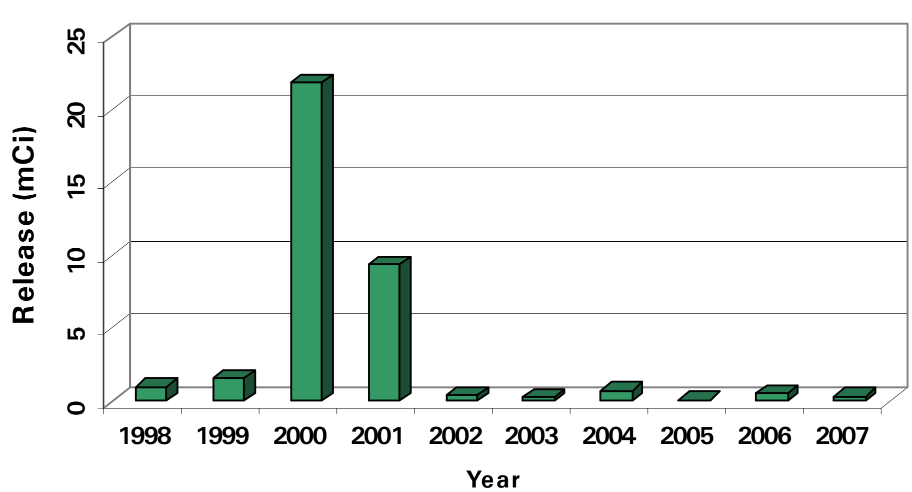


Figure 3-3. Annual aqueous releases of ^{137}Cs from CCNPP, 1998-2007 (BGE 1999-2000; Constellation Energy 2001-2008).

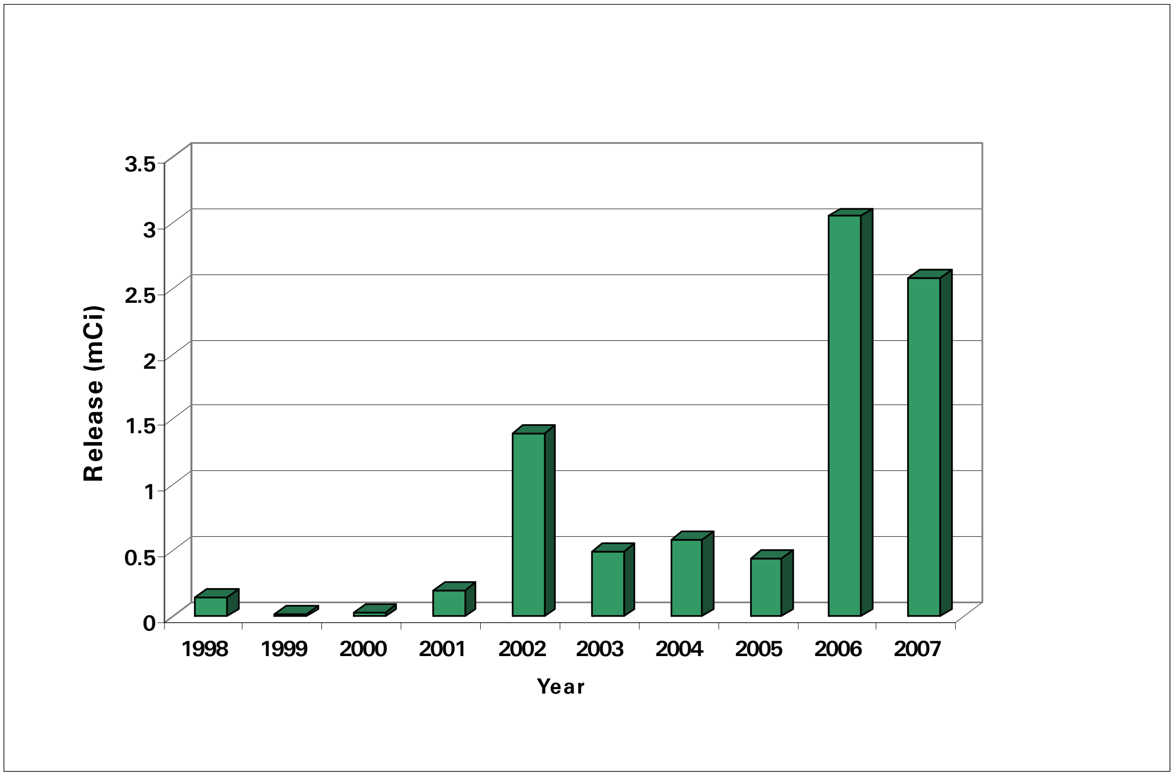


Figure 3-4. Annual aqueous releases of ^{137}Cs from PBAPS, 1998-2007 (PECO 1999-2000; Exelon 2001-2008).

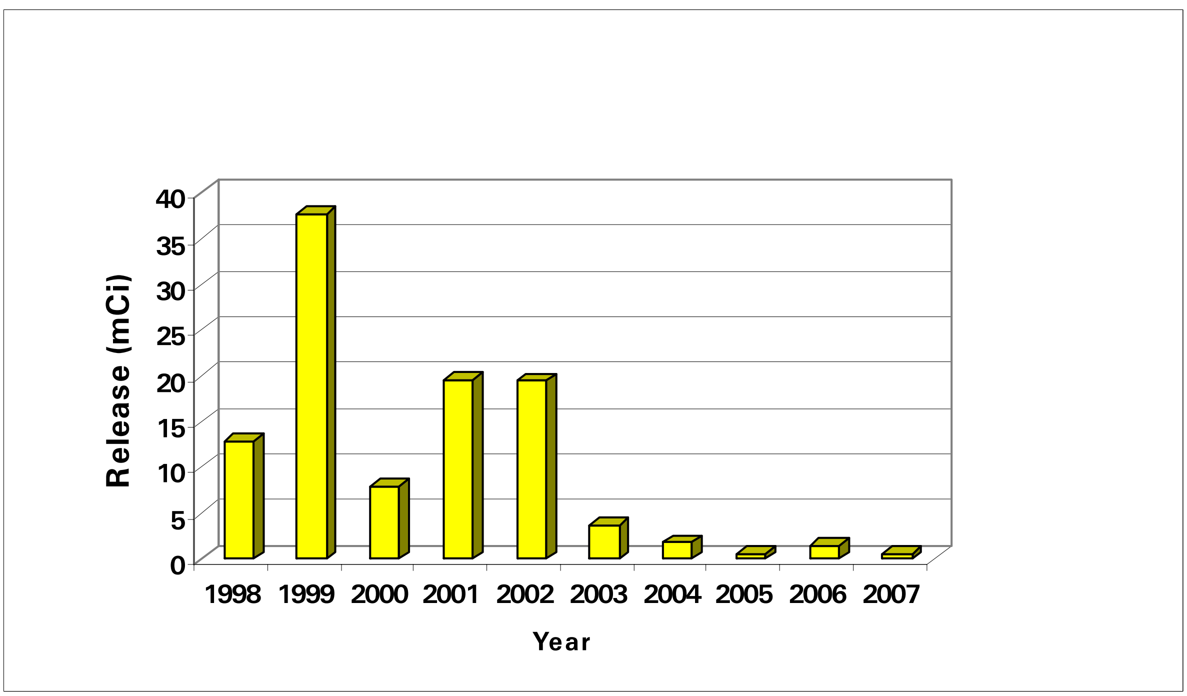


Figure 3-5. Annual aqueous releases of ^{60}Co from CCNPP, 1998-2007 (BGE 1999-2000; Constellation Energy 2001-2008).

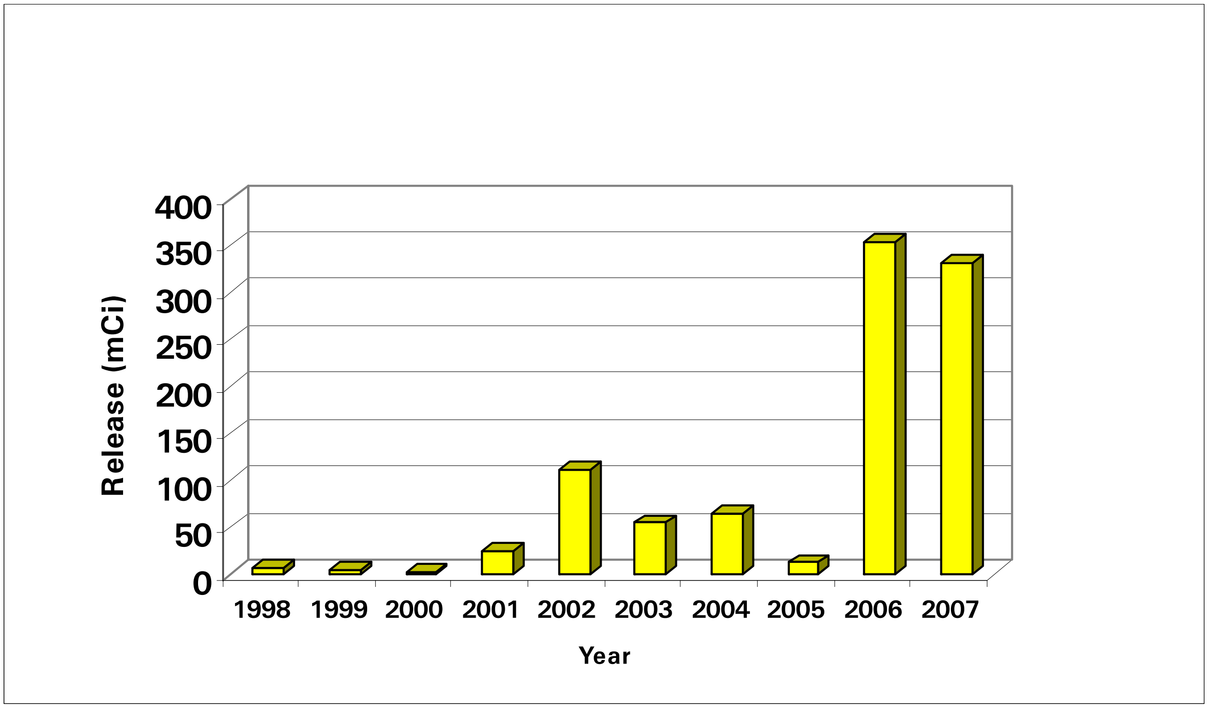


Figure 3-6. Annual aqueous releases of ^{60}Co from PBAPS, 1998-2007 (PECO 1999-2000; Exelon 2001-2008).

At CCNPP, liquid radioactive wastes are discharged through the cooling-water outfall approximately 0.3 km offshore and are diluted in the receiving water. At PBAPS, the cooling-water outfall is located at the extreme downstream end of the power plant site, along the western shore (near Station LYH-1).

Gaseous radioactive effluent is captured and stored on site until it has decayed to lower levels. Air monitoring in the vicinity of PBAPS indicates that the effluent is diluted and disperses to less than detectable levels in the environment (CEIR 2008); therefore, radioiodines and particulates released to the atmosphere are not considered environmentally significant.

Table 3-3 lists the quantities of the principal environmentally significant radionuclides released via the aqueous pathway during 2006-2007 and identifies which of these radionuclides were found in sediment samples (Section 3.2).

Table 3-3. Quantities of environmentally significant radionuclides released from CCNPP and PBAPS via the aqueous pathway during 2006-2007 (Constellation Energy 2007, 2008; Exelon 2007, 2008).

Radionuclide	Quantity Released (Ci)		Detected in Sediment	
	CCNPP	PBAPS	CCNPP	PBAPS
^{110m}Ag	0.00029	0.00022	n	n
^{58}Co	0.00511	0.03378	n	n
^{60}Co	0.00204	0.68514	n	y
^{51}Cr	0.00081	0.13945	n	n
^{134}Cs	0.00075	0.00260	n	n
^{137}Cs*	0.00092	0.00563	n	n
^{55}Fe	0.02998	0.04520	n	n
^{131}I	0.00460	0.00002	n	y
^{54}Mn	0.00031	0.27246	n	y
^{95}Nb	0.00046	0.00415	n	n
^{63}Ni	0.00075	0	n	n
^{125m}Te	0.03161	0	n	n
^{65}Zn	0	0.06476	n	n
^{95}Zr	0.00027	0.00038	n	n
other	0.00049	0.03553	n	n

Note: * = also present in environment as fallout from weapons tests (Section 3.1.3)

3.1.2 Natural Radionuclides

Naturally occurring radionuclides are present everywhere in the environment. The principal naturally occurring radionuclides that result in measurable radiological doses to human populations include potassium-40 (^{40}K) and radionuclides in the thorium (^{232}Th) and uranium (^{235}U, ^{238}U) decay series. Potassium-40 was detected in all samples. Specific gamma-emitting daughter radionuclides from the uranium and thorium decay series were detected less frequently.

Interactions between cosmic rays and oxygen and nitrogen in the atmosphere produce several radionuclides (Whicker and Schultz 1982). One of these, ^{7}Be, was detected frequently in sediments from both CCNPP and PBAPS and in SAV from PBAPS; however, the natural production of ^{7}Be (half-life = 53 days) in the atmosphere contributes only a small portion of the total radiation dose from natural background.

3.1.3 Radionuclides from Weapons Tests

Atmospheric tests of nuclear weapons conducted until 1980 have introduced a variety of manmade radionuclides into the environment. Cesium-137 was the only radionuclide attributable to weapons testing detected during the monitoring period. Due to its very long half-life (approx. 30 years), ^{137}Cs has persisted in the environment long after other testing-related radionuclides have decayed to stable states.

3.2 RADIONUCLIDES IN ENVIRONMENTAL SAMPLES

The environmentally significant radionuclides detected in samples from the study areas consisted principally of ^{60}Co, ^{137}Cs, and ^{131}I (SAV only). This has been the trend since the early 1990s, when reductions in radionuclide releases from both power plants resulted in a parallel decline in detection frequency and concentrations of plant-related, environmentally significant radionuclides. The reductions in release rates are due, in part, to improved ion-exchange technologies at the cooling water intake and more efficient use of existing methods for reducing radioactive waste.

3.2.1 Sediments

Sediments serve as sinks for both stable and radioactive metals. Suspended particulate material can scavenge metals through flocculation and adsorption, or the surface layer of bottom sediments may adsorb metals directly from the water column (Santschi et al. 1983); consequently, sediments can accumulate metal radionuclides over time. Measurements of spatial and temporal patterns in the concentrations of radionuclides in sediments collected from Chesapeake Bay and Susquehanna River have been used to track the physical transport of radionuclides and intra-annual variability in the release of radionuclides from the two nuclear power plants since 1975. PPRP's monitoring results for sediment collected during 2006-2007 are summarized below. Appendix C presents concentrations of selected environmentally significant radionuclides detected in all of the sediment samples collected during 2006-2007.

A variety of factors influence the concentrations of radionuclides in sediments, including rate of input; geographic location in relation to the power plant (e.g., distance, if applicable); half-life of the radionuclide; natural processes such as sedimentation, circulation, and bioturbation; and physical factors such as depth of the sediment layer from the water surface and sediment grain size. Sediment grain size was the only factor specifically analyzed for this report. Sediments collected at inshore stations of Chesapeake Bay and at Susquehanna Flats were composed predominantly of sand (particle size index values between 400 and 500). Sediments from Conowingo Pond and offshore stations of Chesapeake Bay, which were collected from depths greater than 8 m, were mostly clay (particle size index values between 600 and 700). Figures 3-7 and 3-8 show mean particle sizes for sediments collected from Chesapeake Bay and Susquehanna River during 2006-2007. Whalen and Jones (2000) prepared a detailed statistical exploration of physical factors that can determine spatial and temporal variability in measured radionuclide concentrations in sediment.

Radionuclides of natural origin (^{7}Be, ^{40}K, Th and U decay series), from weapons tests (^{137}Cs), and from power plants (^{60}Co) generally were detected at higher concentrations in clay sediments than in sand sediments during 2006-2007. Metal radionuclides have a greater affinity for clay than for sand due to the fine crystalline structure, greater surface area, and the higher cation exchange capacity of clay particles (Eisenbud 1987). Sandy sediments are coarser and less able to adsorb radionuclides (Olsen et al. 1989).

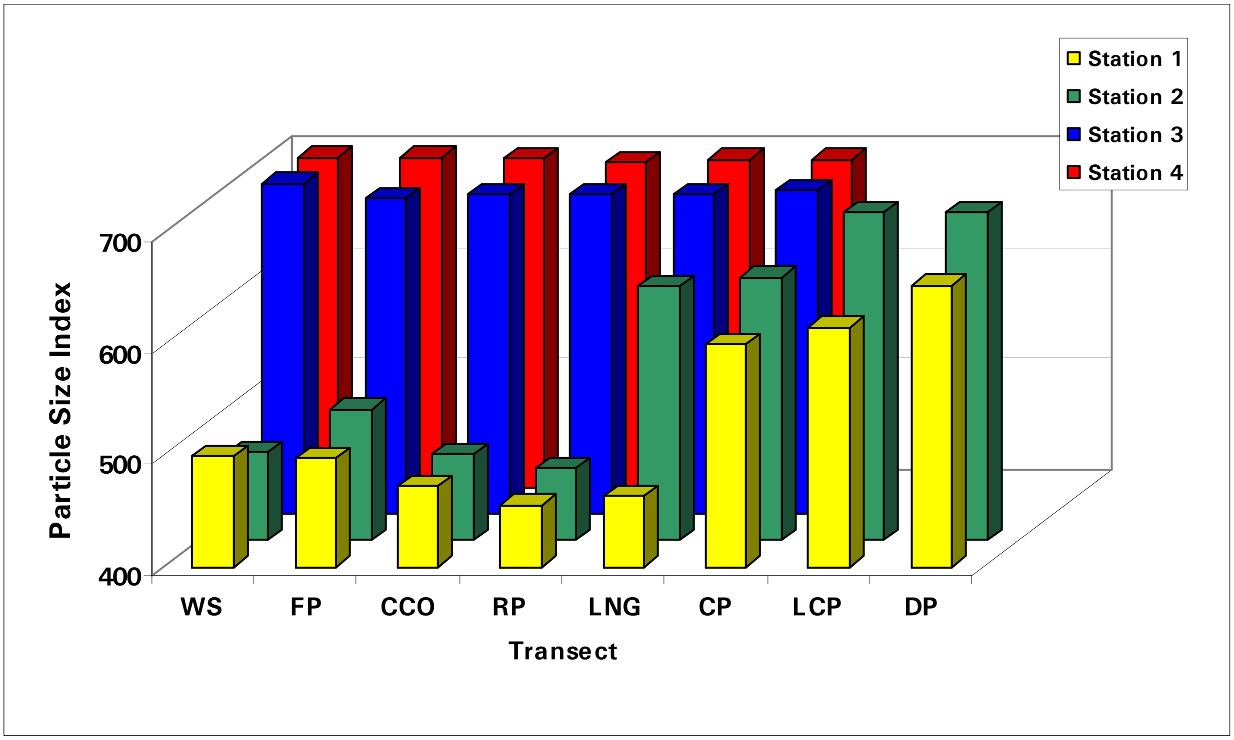


Figure 3-7. Mean particle sizes of sediments collected from the vicinity of CCNPP, 2006-2007. Horizontal axis arranged from North to South

3.2.1.1 Radionuclides from CCNPP and PBAPS in Sediment

Cs-137 from weapons tests and ^{60}Co from power plants made up most of the environmentally significant radionuclides found in sediment in both study areas. Cesium-137 was found in most sediment samples and is discussed in Section 3.2.1.3. All ^{137}Cs detected during this monitoring period is assumed to be from fallout because no ^{134}Cs was detected in samples collected during the period.

.

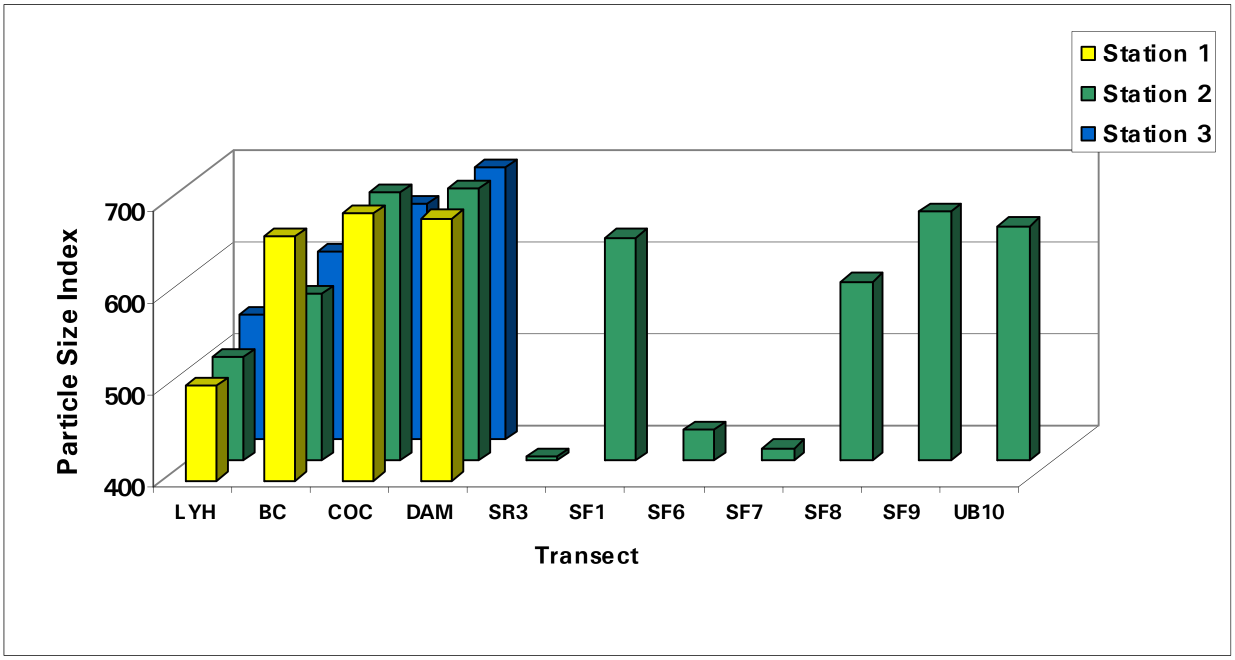


Figure 3-8. Mean particle sizes of sediments collected from the vicinity of PBAPS, 2006-2007. Horizontal axis arranged from north to south.

Cobalt-60 continued to be undetectable in all sediment samples for CCNPP due to decreased input of radiocobalt-labeled sediment, decay of legacy ^{60}Co, and burial (Table 3-4). In the vicinity of PBAPS, PPRP detected ^{60}Co in 31.6% of sediments, which continued the increasing trend evident since the 2000-2001 monitoring period. The recent increase in ^{60}Co detection rates at PBAPS generally reflects increased aqueous discharges of ^{60}Co from PBAPS during 2006-2007 (685 mCi) in contrast to 2001-2005 (265 mCi) and 1996-2000 (16 mCi). At PBAPS, maximum ^{60}Co concentrations were observed at Station LYH-1 (the station located closest to the outfall) and along the western shore of Conowingo Pond (Figure 3-9). Co-60 was detected once at one station below the dam, where sediments generally have a greater proportion of coarse particles.

Table 3-4. Percent detection frequency of ^{60}Co in sediments from CCNPP and PBAPS, 1996-2007.

Monitoring Period	CCNPP	PBAPS
1996-1997	25	5
1998-1999	12.5	2.6
2000-2001	6.3	6.6
2002-2003	3.6	15.8
2004-2005	0	18.4
2006-2007	0	31.6

Manganese-54 was found in six samples (three from Station LYH-1 closest to the outfall) from downstream of PBAPS in Conowingo Pond. PBAPS released 272 mCi of ^{54}Mn to the aqueous pathway during 2006-2007, second only to ^{60}Co among environmentally significant radionuclides.

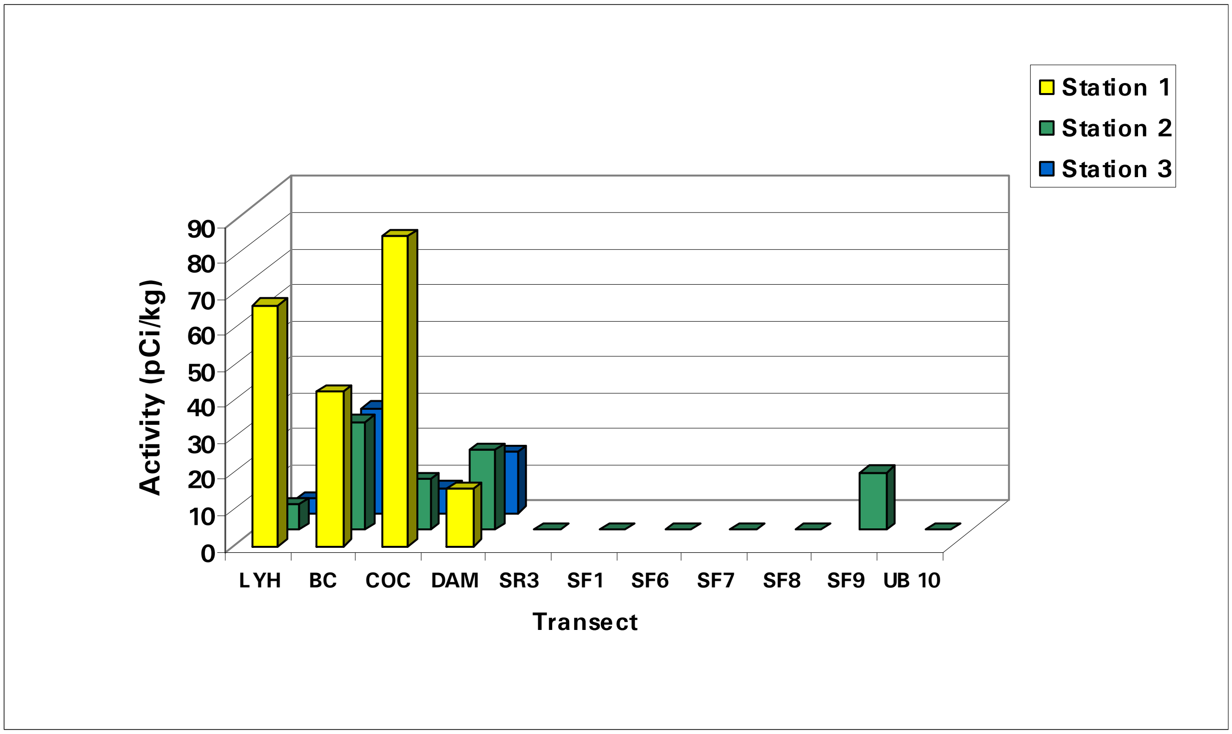


Figure 3-9. Geographical distribution of average activity of ^{60}Co near PBAPS, 2006-2007. Horizontal axis arranged from North to South.

3.2.1.2 Natural Radionuclides in Sediment

Generally, the major components of sediment radioactivity were the naturally occurring radionuclides of the thorium and uranium decay chains, ^{40}K, and ^{7}Be. Naturally occurring radionuclides were responsible for more than 99% of the gamma-emitting radionuclides found in most sediment samples (Figure 3-10 and Figure 3-11).

Thorium and Uranium. Nuclear decay of naturally occurring thorium (^{232}Th) and natural uranium (^{238}U) produces gamma-emitting daughter species (e.g., thorium: ^{228}Ac, ^{208}Tl, ^{212}Pb; uranium: ^{226}Ra, ^{214}Bi, ^{214}Pb) that accounted for most radionuclides present in sediments. The highest concentrations of these daughter radionuclides were observed at offshore stations with fine-grained sediment.

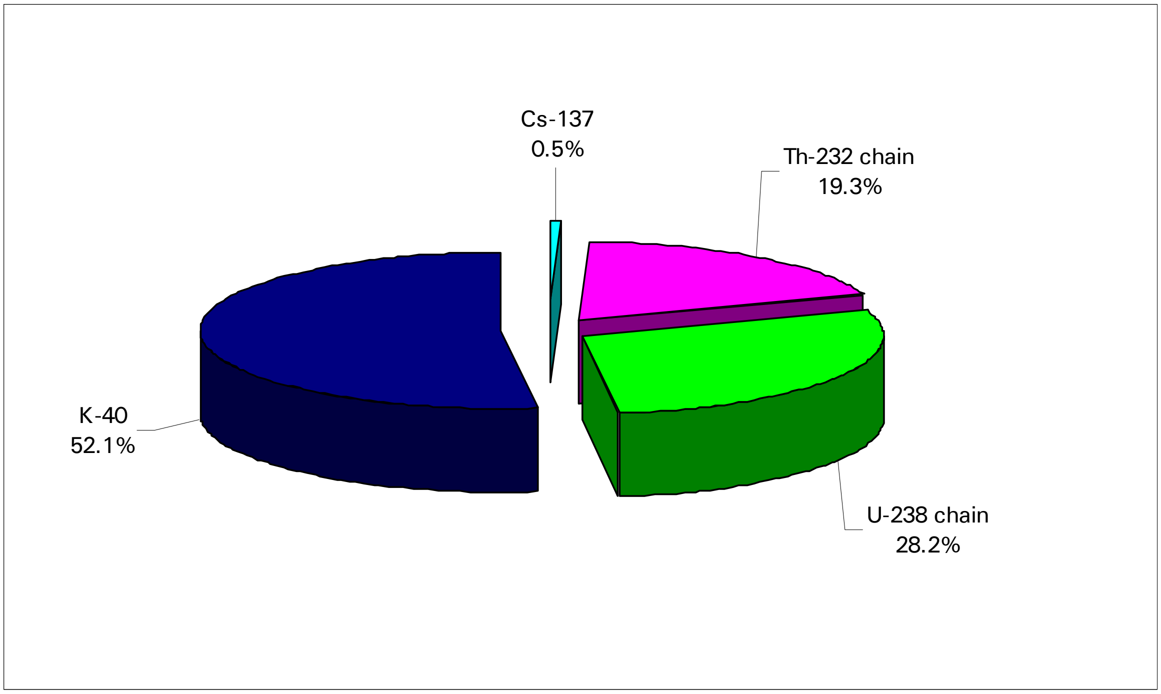


Figure 3-10. Proportion of gamma-emitting radionuclides in sediment samples. Example data from the Cove Point transect, station 2.

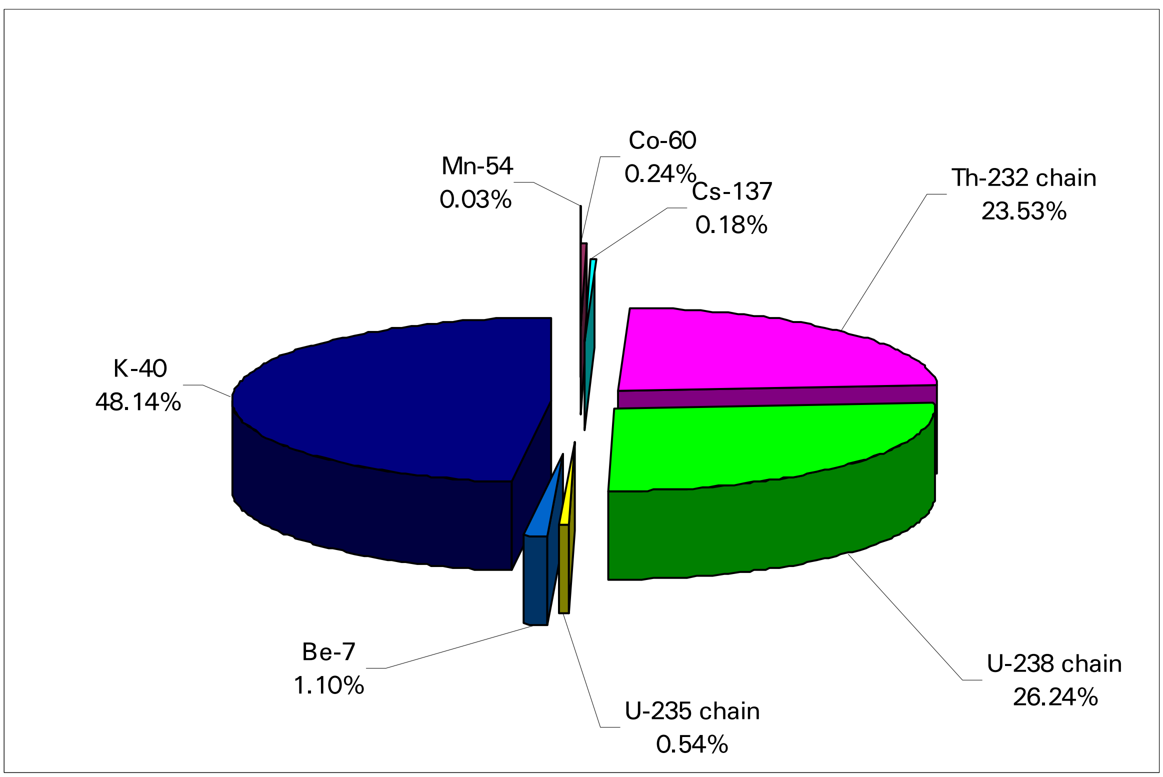


Figure 3-11. Proportion of gamma-emitting radionuclides in sediment samples. Example data from the Little Yellow House transect, station 1.

Potassium-40 is a primordial, naturally occurring radionuclide that was present in 100% of sediment samples collected during the monitoring period. Potassium-40 concentrations in nature are proportional to stable potassium content (0.0118%; CRC 1979). Potassium-40 concentrations were highest in predominantly fine-grained sediments.

Beryllium-7 is a natural radionuclide produced by the interaction of cosmic rays with atmospheric oxygen and nitrogen. It is deposited on water and soil surfaces through precipitation scavenging and may enter water systems through runoff from land. Particles suspended in the water column adsorb it rapidly, and it appears in sediments as a result of particulate deposition. Beryllium-7 was detected in 57% and 13% of sediment samples collected at PBAPS and CCNPP, respectively. Concentrations of ^{7}Be were generally less at CCNPP than at PBAPS. Beryllium-7 concentrations near PBAPS were generally greater in samples with greater proportions of clay particles, particularly those collected from stations in Conowingo Pond near Conowingo Dam (Conowingo Creek and Conowingo Dam transects). Concentrations at sampling stations below Conowingo Dam tended to be smaller than at above-dam stations with comparable particle sizes (e.g., Susquehanna Flats Stations 1 and 9, and Upper Bay Station 10) possibly due to station depth and resulting longer settlement time relative to half-life. Concentrations of ^{7}Be at CCNPP were generally greatest (when detected) in near-shore sediments, where most particles were silt-sized (e.g., Cove Point 1 and Cove Point 2 stations. Beryllium-7 was rarely detected at off-shore stations with clay sediments (one detection at Liquid Natural Gas Terminal Station 3). This contrast with results for clay sediments from the PBAPS study area may be due to high settlement time at the off-shore stations in relation to half-life.

3.2.1.3 Radionuclides from Weapons Tests in Sediment

The presence of ^{137}Cs in sediments is assumed to be from the fallout from atmospheric atomic weapons testing, which ended approximately three decades ago. Cesium-137 continued to be present in most sediment samples from Chesapeake Bay and Susquehanna River (81.3% at CCNPP, 93.4% at PBAPS). New inputs to the local ecosystem related to weapons testing continue to be nil; therefore, ^{137}Cs is likely to be the only fallout-related, gamma ray-emitting radionuclide to be considered in the future.

Concentrations of ^{137}Cs were less in sediments composed primarily of sand than in those composed primarily of clay. The concentrations of ^{137}Cs in sediments collected near PBAPS and CCNPP generally have decreased gradually since 1981 due to reductions in discharges, decay of the inventory of ^{137}Cs present in the sediment, and dilution by sedimentation (Figures 3-12 and 3-13). At most stations within representative study area transects (e.g., Flag Ponds at CCNPP and Broad Creek at PBAPS), average ^{137}Cs concentrations increased slightly during the 2006-2007 monitoring period compared to 2004-2005. At Flag Ponds, average ^{137}Cs concentrations generally have decreased by between 33% and 79% since the initiation of the monitoring program. Concentrations at Broad Creek have decreased by between 50% and 84%, demonstrating the effect of sedimentation for reducing ^{137}Cs concentrations and its apparent half-life (Table 3-5).

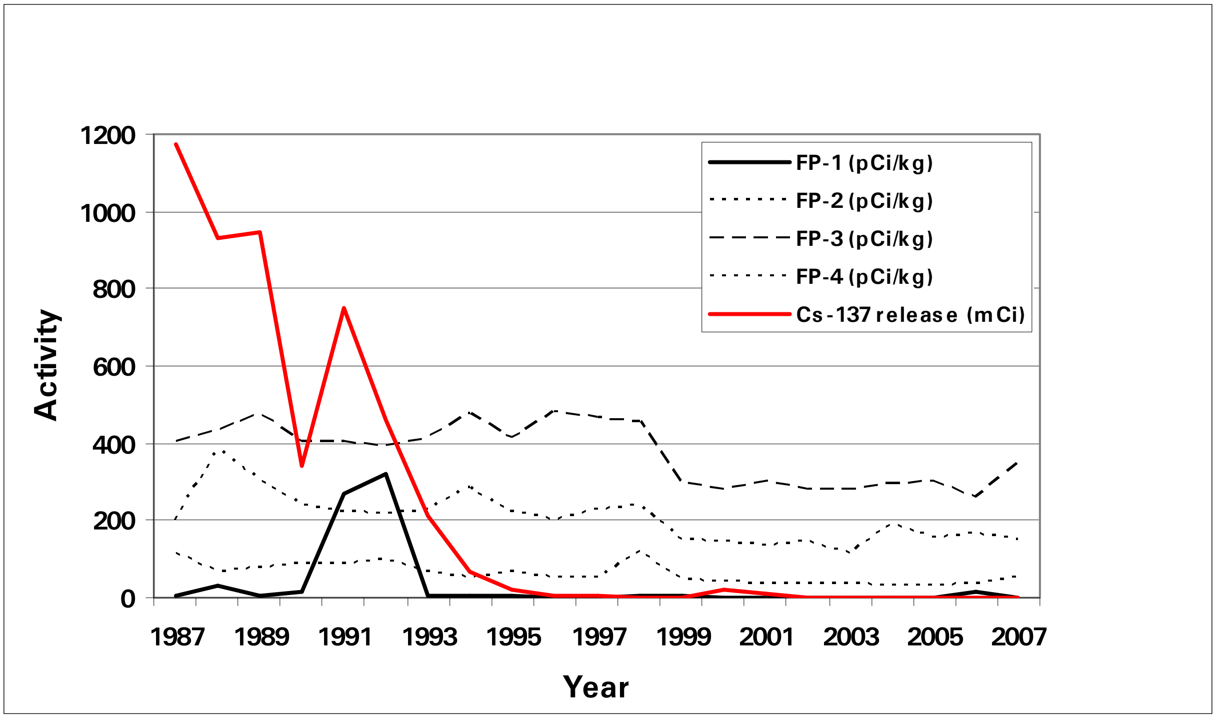


Figure 3-12. Total annual release of ^{137}Cs from CCNPP and average annual activity of ^{137}Cs in CCNPP sediments, Flag Ponds transect, 1987-2007.

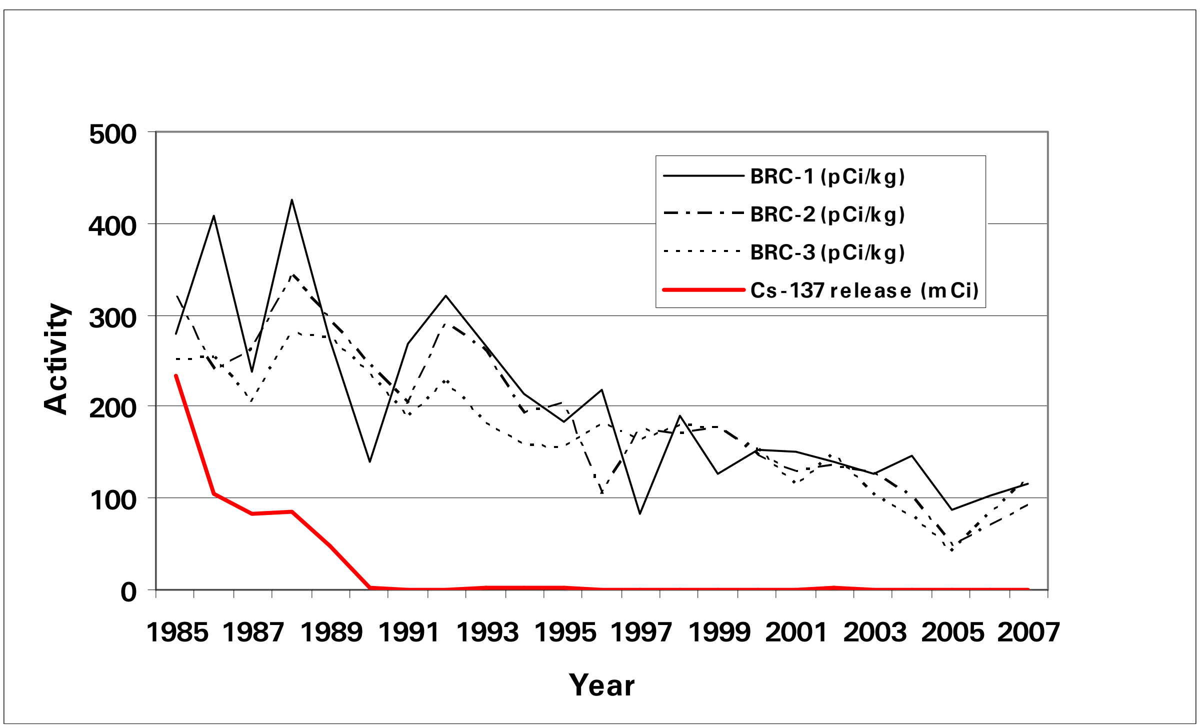


Figure 3-13. Total annual release of ^{137}Cs from PBAPS and average annual activity of ^{137}Cs in PBAPS sediments, Broad Creek transect, 1987-2007.

The greater rate of decrease of ^{137}Cs concentrations over time in Conowingo Pond reflects the greater sedimentation rate compared to Chesapeake Bay.

Table 3-5. Comparison of ^{137}Cs released from CCNPP and PBAPS and sediment activities at representative transects, 1981 and 2007

	1981	2007	% Reduction
CCNPP ^{137}Cs release (mCi)	103	0.357	99.7
Flag Ponds 1 (pCi/kg)	7	1.5	78.6
Flag Ponds 2 (pCi/kg)	98	50	49.0
Flag Ponds 3 (pCi/kg)	522	349	33.1
Flag Ponds 4 (pCi/kg)	361	148	59.0
PBAPS ^{137}Cs release (mCi)	170	2.58	98.5
Broad Creek 1 (pCi/kg)	707	115	83.7
Broad Creek 2 (pCi/kg)	232	92	60.3
Broad Creek 3 (pCi/kg)	243	121	50.2

3.2.2 Biota

No radionuclides from power plants were detected in any biological samples from the vicinity of CCNPP. In the vicinity of PBAPS, radionuclides from both the power plant and historical weapons testing were detected in biological samples, along with likely medically related ^{131}I in samples of Eurasian milfoil collected from Susquehanna Flats (AmerGen 2008). Diagnostic and therapeutic applications are typically in the 10 mCi to 100 mCi range and are discharged in patient excreta to the sanitary sewer system (Larsen et al. 2001).

The ability of biota to absorb environmentally significant radionuclides differs by species, habitat, availability of radionuclides, and sensitivity of biota to radionuclides. At CCNPP, test oysters are confined in trays placed in the immediate vicinity of the discharge for periods of three months to one year. Conversely, finfish in Conowingo Pond are mobile and may reside near the PBAPS outfall (and maximum effluent concentrations) for only short periods. Finfish tend to absorb radionuclides such as ^{137}Cs, ^{60}Co, and ^{65}Zn, indirectly from fallout and PBAPS; however, the availability of these radionuclides in the sediment layer has been very low compared to historically high release years such as 1989-1990.

PPRP's monitoring results for biota collected in 2006-2007 are summarized below.

3.2.2.1 Radionuclides from CCNPP in Oysters

No ^{110m}Ag was detected in tray-oysters placed in the vicinity of the cooling water discharge, in continually exposed oysters at the control location (Kenwood Beach), or in oysters collected from a natural bar at Camp Conoy near the plant site during the monitoring period. The inability to detect ^{110m}Ag in tray-oysters since spring, 2001, reflects a recent downward trend in ^{110m}Ag releases from CCNPP.

Uptake of radionuclides, particularly ^{110m}Ag, by oysters is governed by physical, chemical, and environmental conditions (e.g., plant releases, water temperature, and season of exposure). McLean et al. (1987) and Rose et al. (1988, 1989) have provided detailed discussions of the tray-oyster study and statistical modeling of radionuclide concentrations in tray-oysters.

3.2.2.2 Radionuclides from PBAPS in Finfish

During 2006-2007, PPRP detected ^{60}Co in one sample of the gut of a channel catfish and ^{137}Cs in four samples of finfish (catfish, sunfish, and mixed freshwater fish) collected from Conowingo Pond. Cobalt-60 has been detected only rarely in finfish samples from PBAPS over the past 20 years of monitoring. The fallout-related ^{137}Cs concentration levels and detection frequencies in samples of finfish were similar to those during monitoring periods prior to 2004-2005. As in those prior periods, radiocesium was found mostly in samples of flesh and whole fish and rarely in gut.

3.2.2.3 Radionuclides from PBAPS in SAV

One sample of Eurasian milfoil (*Myriophyllum spicatum*) collected from the Susquehanna River-Chesapeake Bay system in 2006-2007 contained detectable power plant-related ^{54}Mn. One fourth of the samples contained concentrations of ^{131}I. Releases of medical wastewater generally are regarded as the source of concentrations of ^{131}I found in SAV. Therapeutic doses of ^{131}I administered in nuclear medicine typically range as high as several hundred mCi (NCRPM 1996). PBAPS released approximately 17 μCi of ^{131}I during the monitoring period; therefore, PBAPS' contribution to the concentrations found in milfoil is likely to have been insignificant.

3.2.3 Air, Potable Water, Precipitation, and Milk

Detectable radioactivity in samples of air and air particulates consisted of naturally occurring ^{7}Be and undifferentiated, naturally occurring alpha and beta-emitters trapped on air particulate filters (Table 3-6). Radiation concentrations at stations associated with the study areas were comparable to concentrations at the control location (Baltimore City).

Table 3-6. Arithmetic means (fCi/m^3) and 2-sigma uncertainty of analytical results from air monitoring stations, 2006-2007.					
Station	**Gross Alpha**	**Gross Beta**	^{131}I	^{7}Be	^{137}Cs
Long Beach	1.0 ± 0.1	19 ± 1	N.D.	137 ± 7	N.D.
Lusby	1.1 ± 0.1	21.1 ± 0.3	N.D.	152 ± 8	N.D.
Cove Point	1.0 ± 0.2	18.7 ± 0.5	N.D.	138 ± 13	N.D.
Baltimore City	1.0 ± 0.2	19 ± 7	N.D.	143 ± 40	N.D.
Rising Sun	1.1 ± 0.2	18.8 ± 0.5	N.D.	136 ± 5	N.D.
Whiteford	1.1 ± 0.1	19 ± 2	N.D.	133 ± 0	N.D.
Horn Point	0.9 ± 0.1	17 ± 3	N.D.	123 ± 9	N.D.
Dempsey Farm	0.9 ± 0.1	18 ± 1	N.D.	128 ± 2	N.D.
N.D. = Below detection limit results for all samples.					

Detectable concentrations of naturally occurring alpha-emitting radioactivity in potable water were found in most control (Baltimore City) samples and in 35% of samples taken near the CCNPP study area during 2006-2007 (Table 3-7). No concentrations exceeded the 5 pCi/l action level that would require further testing (Federal Register 2000). Beta-emitting radioactivity was found in half of control samples and in all samples from the CCNPP study area during 2006-2007. Although average beta radioactivity near CCNPP was greater than in Baltimore City, the difference may be due to varying levels of naturally occurring radioactive material within the aquifer that serves as the water supply source. None of the gross beta results exceeded EPA's screening criterion, 50 pCi/l. Three samples of drinking water contained above-detection-limit concentrations of tritium during 2006-2007; however, none of the results were greater than EPA's maximum contaminant level, 20,000 pCi/l.

Table 3-7. Arithmetic means (pCi/l) and 2-sigma uncertainty of quarterly analytical results from potable water monitoring stations, 2006-2007.			
Station	**Gross Alpha**	**Gross Beta**	^{3}H
Baltimore City	1.4 ± 0.4	4 ± 1	300 ± 200*
Chesapeake Country Club	2 ± 1	5 ± 0	N.D.
Calvert Co. Courthouse	1 ± 0	11.3 ± 0.1	300 ± 200*
Appeal Elementary School	1 ± 0	11 ± 2	N.D.
Calvert Co. Health Department	1 ± 1	12 ± 0	N.D.
Southern Middle School	1 ± 0	9 ± 0	N.D.
Frying Pan Restaurant	1 ± 0	11 ± 1	300 ± 200*
N.D. = Below detection limit results for all samples. * = figure reflects one above-detection limit result for the two-year monitoring period.			

Quarterly ^{89}Sr and ^{90}Sr concentrations in processed milk ranged from 1.2 pCi/l to1.8 pCi/l and from 0.7 pCi/l to 1.2 pCi/l, respectively. The annual dose derived from the maximum concentrations found during the monitoring period are presented in Section 3.3.2. Milk purchased within the Baltimore area may originate from a composite of herds located in states neighboring Maryland; therefore, the source of radiostrontium (^{90}Sr) in the processed milk samples cannot be determined. Strontium-90 is present in the environment as a result of both weapons tests and nuclear power operations. Given that ^{89}Sr was detected in some milk samples, the ^{90}Sr that was detected may also originate from atmospheric power plant releases. The power plant-related fraction of ^{90}Sr in the environment can be estimated by multiplying the ^{89}Sr concentration in milk samples by the proportion of ^{90}Sr to ^{89}Sr that was released from a nuclear power plant identified as a likely source. Beginning in 2009, PPRP initiated raw milk sample collections from St. Mary's County (near CCNPP) and Cecil County (near PBAPS) in order to better define the source of radiostrontium that may be found in milk samples.

Samples of precipitation collected from the Baltimore station during the monitoring period contained an average gross alpha radioactivity concentration of 1.6 pCi/l and an average gross beta concentration of 4.6 pCi/l. One sample collected in January 2006 contained a tritium concentration of 400 pCi/l. Concentrations of tritium were below detection limits in all of the remaining samples.

3.3 RADIOLOGICAL EFFECTS ON THE ENVIRONMENT AND HUMAN HEALTH

3.3.1 Effect on the Environment

Although small concentrations of radionuclides attributable to fallout from weapons tests were detected in biota collected during 2006-2007, the maximum detected concentrations were orders of magnitude smaller than concentrations of natural radionuclides. Radiation doses to aquatic organisms attributable to discharges from power plants are an insignificant proportion of doses derived from natural radionuclides (Whicker and Schultz 1982). Living organisms normally receive most of their external and internal doses of radiation from naturally occurring radionuclides such as ^{40}K. Adverse effects on sensitive aquatic vertebrates have been detected at dose rates as low as 0.4 mGy/h (40 mrad/h or approximately 350 rem in one year). Adverse effects on mollusks appear at doses of 87,660 rem in one year (Eisler 1994). Doses that cause adverse effects in these organisms are far above what might be delivered to humans who ingest finfish from Conowingo Pond and oysters from Chesapeake Bay in given monitoring years (see Section 3.3.2).

3.3.2 Effect on Human Health

Potential radiation doses to human consumers of food were estimated based upon measured concentrations of radionuclides in edible finfish, oysters, and processed milk. Doses were expressed as "dose commitment," which refers to the total dose to a tissue or organ during a period of 50 years following ingestion, after allowing for the metabolic processes of excretion and radioactive decay. The dose-commitment calculations are based on three variables: (1) the maximum, or worst-case, estimated concentration of plant-related radionuclides in finfish collected from Conowingo Pond, oysters collected from the vicinity of CCNPP, or processed milk sold locally; (2) the estimated maximum quantity of finfish, oysters, or milk consumed by an individual according to age (i.e., child = 6.9 kg/yr; teen = 16 kg/yr; adult = 21 kg/yr; USNRC 1977); and (3) the dose to the target organ per quantity of radionuclide ingested (USNRC 1977).

Table 3-8 presents estimated dose commitments for adults, teenagers, and children based on a diet of finfish (no dose estimate based on oyster consumption is presented due to the absence of detectable concentrations of radionuclides from power plants in oyster tissue samples). The estimated maximum dose from consumption of finfish during 2006-2007 was 0.009 mrem/yr to an adult's liver. The estimated maximum total body dose to an adult was 0.006 mrem/yr.

Table 3-9 presents estimated dose commitments for adults, teenagers, and children resulting from ingestion of processed milk with detectable concentrations of radiostrontium. The estimated maximum dose from consumption of processed milk during 2006-2007 was 7.5 mrem/yr to a child’s bone. The estimated maximum total body dose to an adult was 0.7 mrem/yr.

The promulgated maximum annual effective dose equivalent allowed to the general population as a result of a licensee's activities involving the use of radioactive material is 100 mrem above background levels, exclusive of the dose contribution from the licensee's disposal of radioactive material (USNRC 1991). Plant-design objectives to maintain effective dose equivalents resulting from the release of radioactive material during normal operations to levels “as low as reasonably achievable” are stated in 10 CFR Part 50 Appendix I (USNRC 1996):

> The calculated annual total quantity of all radioactive material above background to be released from each light-water-cooled nuclear power reactor to unrestricted areas will not result in an estimated annual dose or dose commitment from liquid effluents for any individual in an unrestricted area from all pathways of exposure in excess of 3 millirems to the total body or 10 millirems to any organ.

The USEPA has set maximum permissible dose rules as part of the regulation of the uranium fuel cycle, which includes the mining of ore in addition to the operation of nuclear power plants (40 CFR Part 190 Subpart B; USEPA 1979):

> Operations covered by this subpart shall be conducted in such a manner as to provide reasonable assurance that: A) The annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations. B) The total quantity of radioactive materials entering the general environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129 and 0.5 millicuries combined of plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.

Table 3-8. Estimated maximum dose commitments* in millirem per year to individuals who consume finfish from Conowingo Pond, 2006-2007. Recommended consumption values and conversion factors derived from USNRC 1977.

Age Group	2006-2007		
	Adult	**Teen**	**Child**
Total Body			
^{65}Zn	0.0000	0.0000	0.0000
^{134}Cs	0.0000	0.0000	0.0000
^{137}Cs	0.0061	0.0034	0.0013
TOTAL	0.0061	0.0034	0.0013
Bone			
^{65}Zn	0.0000	0.0000	0.0000
^{134}Cs	0.0000	0.0000	0.0000
^{137}Cs	0.0068	0.0073	0.0092
TOTAL	0.0068	0.0073	0.0092
Liver			
^{65}Zn	0.0000	0.0000	0.0000
^{134}Cs	0.0000	0.0000	0.0000
^{137}Cs	0.0094	0.0097	0.0088
TOTAL	0.0094	0.0097	0.0088
Kidney			
^{65}Zn	0.0000	0.0000	0.0000
^{134}Cs	0.0000	0.0000	0.0000
^{137}Cs	0.0032	0.0033	0.0029
TOTAL	0.0032	0.0033	0.0029
Gastrointestinal tract - lower large intestine			
^{65}Zn	0.0000	0.0000	0.0000
^{134}Cs	0.0000	0.0000	0.0000
^{137}Cs	0.0002	0.0001	0.0001
TOTAL	0.0002	0.0001	0.0001

* Dose commitment: $\frac{kg}{yr} \times \frac{mrem}{pCi} \times \frac{pCi}{kg}$

Table 3-9. Estimated maximum dose commitments in millirem per year to individuals who consume processed milk in the Baltimore area, 2006-2007. Recommended consumption values and conversion factors derived from USNRC 1977.

Age Group	2006-2007		
	Adult	**Teen**	**Child**
Total Body			
^{89}Sr	0.0049	0.0091	0.0224
^{90}Sr	0.6919	0.9840	1.7068
TOTAL	0.6969	0.9931	1.7292
Bone			
^{89}Sr	0.1719	0.3168	0.7841
^{90}Sr	2.8198	3.9840	6.7320
TOTAL	2.9916	4.3008	7.5161
Gastrointestinal tract - lower large intestine			
^{89}Sr	0.0276	0.0377	0.0304
^{90}Sr	0.0815	0.1118	0.0907
TOTAL	0.1090	0.1496	0.1210

The dose commitment estimates given above show that the quantities of radionuclides found in sediment and biota do not pose a threat to human health as measured by their consequent effective dose equivalent as they migrate through trophic layers to humans. The estimated dose commitments resulting from the ingestion of processed milk containing small concentrations of radiostrontium also are below applicable federal limits and pose no threat to human health.

4.0 CONCLUSIONS

During the 2006-2007 monitoring period, CCNPP and PBAPS released radionuclides to the environment as a normal consequence of routine operations, and all quantities released resulted in estimated doses that were no more than 0.5% of the regulatory limits set by the USNRC (Table 4-1). No radionuclides released from CCNPP were detected in environmental samples collected from Chesapeake Bay. In the PBAPS study area, most plant-produced radionuclides were detected in sediment samples collected upstream of Conowingo Dam, especially at the station nearest to the cooling-water discharge. One finfish sample collected near the PBAPS outfall contained detectable plant-related radionuclides. The dose to a human resulting from consumption of finfish containing the same level of radionuclides for an entire year would be 0.2% of the NRC regulatory limit.

Radionuclides from nuclear power plants, nuclear weapons testing, and natural sources contributed to the total radioactivity measured in environmental samples. Generally, radionuclides from natural sources (primarily radionuclides from the uranium and thorium decay series, ^{40}K, and ^{7}Be) comprised over 99% of the total radioactivity of environmental samples.

Concentrations of radionuclides in sediments and biota do not represent a risk to the ecological health of Chesapeake Bay or Susquehanna River. The additional increment of radioactivity and radiation dose (1.7 mrem/year) attributable to the operation of CCNPP and PBAPS is minimal when compared with natural levels of radioactivity and the associated natural radioactive dose (approximately 625 mrem/year; NCRPM 2009).

The incremental increase in the dose to humans resulting from the consumption of biota and milk that contain plant-related radionuclides was no more than 0.3% (NCRPM 2009) during 2006-2007. This increase is insignificant when compared to the total dose attributable to natural background and other sources, which varies according to geographic region and elevation, kind of habitat (i.e., construction material used in residences), personal choices (e.g., smoking, occupation), routine medical procedures, and other sources of background radiation.

Table 4-1. Comparison of radiation doses to humans from nuclear power plant operations and applicable regulatory limits.

Exposure Route	Maximum Dose Estimate (2006)	Maximum Dose Estimate (2007)	EPA Regulatory Limit (40CFR190 Subpart B)	NRC Regulatory Limit (10CFR50 Appendix I)
Ingestion (mrem)				
Oyster ingestion, whole body dose (from CCNPP)	< 0.011 (child)		25	3
Oyster ingestion, other organ dose (from CCNPP)	< 0.057 (adult gastro-intestinal tract)		25	10
Finfish ingestion, whole body dose (from PBAPS)	0.006 maximum (adult)		25	3
Finfish ingestion, other organ dose (from PBAPS)	0.010 maximum (teen liver)		25	10
Inhalation (mrem)				
Whole body dose (gaseous, from CCNPP)	0.0022 (child)[a]	0.0013 (child)[a]	25	3
Other organ dose (gaseous, from CCNPP)	0.01 (child skin) [(a)]	0.0046 (adult skin)[(a)]	25	10
Whole body dose (gaseous, from PBAPS)	1.05 (adult) [(b)]	0.206 (infant)[(b)]	25	3
Other organ dose (gaseous, from PBAPS)	3.12 (infant thyroid) [(b)]	5.48 (infant thyroid)[b]	25	10

(a) Barnett, et al. 2007, 2008.
(b) Exelon Nuclear 2007b, 2008b

5.0 REFERENCES

Abbe, G.R. 1981. Oyster Tray Studies. *In*: Non-radiological Environmental Report for the Calvert Cliffs Nuclear Power Plant: January-December 1980, 1-131. Academy of Natural Sciences of Philadelphia, Philadelphia, PA.

AmerGen. 2008. Three Mile Island Nuclear Station Units 1 and 2 Annual Radiological Environmental Operating Report. January 1 - December 31, 2007.

Barnett, A.M., L.J. Bartal, and B.D. Nuse (Constellation Energy Group). 2007-2008. Annual Radiological Environmental Operating Report for the Calvert Cliffs Nuclear Power Plant Units 1 and 2 and the Independent Spent Fuel Storage Installation. January 1 - December 31, 2006-2007.

BGE (Baltimore Gas and Electric Company). 1999-2000. Annual Effluent Release Reports for Calvert Cliffs Nuclear Power Plant, January 1 - December 31, 1998-1999. Baltimore Gas and Electric Company, Baltimore, MD.

Buchanan, J.B. and J.M. Kain. 1971. Measurement of the Physical and Chemical Environment. *In:* Methods for the Study of Marine Benthos, 30-50. N.A. Holme and A.D. McIntyre, eds. Oxford, England: Blackwell Scientific Publications.

Canberra 1998. Model S500 Genie-2000 Spectroscopy System: Basic Operation, Advanced Topics, Application Options. Version 1.2. September 1998. Canberra Industries, Inc., Meriden, CT.

CEIR 1993-2008. Maryland Power Plants and the Environment: A Review of the Impacts of Power Plants and Transmission Lines on Maryland's Natural Resources. Maryland Power Plant Research Program. PPRP-CEIR-8 through PPRP-CEIR-14.

Conatser, R.L. (Constellation Energy Group). 2005. Personal communication, August 17, 2005.

Constellation Energy Group. 2001-2008. Annual Effluent Release Reports for Calvert Cliffs Nuclear Power Plant, January 1 - December 31, 2000-2007.

CRC (Chemical Rubber Company). 1979. CRC Handbook of Chemistry and Physics. CRC Press, Boca Raton, FL.

DOE (Department of Energy). 1990. EML Procedures Manual, HASL-300, 28th ed. HASL-300-ED.27-Vol 1. United States Department of Energy, Environmental Measurements Laboratory, New York, NY.

Domotor, S.L. and R.I. McLean. 1989. Environmental radionuclide concentrations in the vicinity of the Peach Bottom Atomic Power Station. 1985-1986. PPER-R-11. July 1989. Maryland Department of Natural Resources, Power Plant and Environmental Review Division, Annapolis, MD.

Domotor, S.L. and R.I. McLean. 1987. Environmental Radionuclide Concentrations in the Vicinity of the Calvert Cliffs Nuclear Power Plant: 1981-1984. PPRP-R-8. July 1987. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Domotor, S.L. and R.I. McLean. 1988. Environmental Radionuclide Concentrations in the Vicinity of the Calvert Cliffs Nuclear Power Plant: 1985-1986. PPRP-R-10. November, 1988. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Eisenbud, M. 1987. Environmental Radioactivity from Natural, Industrial, and Military Sources. Third edition. Orlando, FL: Academic Press, Inc.

Eisler, R. 1994. Radiation Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Department of the Interior, National Biological Service, Washington, DC. Biological Report 26.

Exelon Nuclear Company. 2001- 2006. Annual Effluent Reports for Peach Bottom Atomic Power Station, Units 2 and 3, January 1 - December 31, 2000-2005.

Exelon Nuclear Company. 2007a-2008a. Annual Effluent Reports for Peach Bottom Atomic Power Station, Units 2 and 3, January 1 - December 31, 2006-2007.

Exelon Nuclear Company. 2007b-2008b. Peach Bottom Atomic Power Station Unit Nos. 2 and 3 Radiation Dose Assessment Report. January 1 - December 31, 2006-2007.

Federal Register. 2000. National Primary Drinking Water Regulations; Radionuclides; Final Rule. 65 FR 76708. December 7, 2000. United States Environmental Protection Agency, Washington, D.C.

Frithsen, J.B., M.A. Stanek, J. Chaillou, M. Gaughan, and R.I. McLean. 1996. Documentation for the PPRP Radioecology Data Base: Data Formats and Data Entry Procedures. PPRP-R-22. April 5, 1996. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S. 1994. Radiation Laboratory Manual. April 1994. Maryland Department of Health and Mental Hygiene, Laboratories Administration, Environmental Chemistry Division, Baltimore, MD.

Jones, T.S. and R.I. McLean. 2005. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 2002-2003. PPRP-R-29. December 2005. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S. and R.I. McLean. 2003. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 2000-2001. PPRP-R-28. June 6, 2003. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S. and R.I. McLean. 2000. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 1998-1999. PPRP-R-27. December 12, 2000. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S. and R.I. McLean. 1998. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 1996-1997. PPRP-R-25. November 20, 1998. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S., B.S. Hood, and R.I. McLean. 2008. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 2004-2005. PPRP-R-30. April 2008. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Jones, T.S., J.B. Frithsen, and R.I. McLean. 1997. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station: 1995. PPRP-R-24. February 1997. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Krieger, H.L. and E. L. Whittaker. 1980. Prescribed Procedures for Measurement of Radioactivity in Drinking Water. Publication No. EPA-600/4-80-032. United States Environmental Protection Agency Environmental Monitoring and Support Laboratory, Cincinnati, OH.

Lacy, G. and S. Zeger. 1979. Thermal Plume Studies in the vicinity of Calvert Cliffs Nuclear Power Plant, April and May 1978. Academy of Natural Sciences of Philadelphia, Philadelphia, PA.

Larsen, I.L., E.A. Stetar, B.G. Giles, and B. Garrison. 2001. Concentrations of Iodine-131 Released from a Hospital Into a Municipal Sewer. *RSO Magazine* 6: 13-18.

Lippson, A.J. 1973. The Chesapeake Bay in Maryland: An Atlas of National Resources. Johns Hopkins University Press, Baltimore, MD.

Lippson, A.J. and R.L. Lippson. 2006. Life in the Chesapeake Bay, 3rd ed. Johns Hopkins University Press, Baltimore, MD.

Llansó, R.J., J. Dew, and L.C. Scott. 2009. Chesapeake Bay Water Quality Monitoring Program, Long-Term Benthic Monitoring and Assessment Component Level I Comprehensive Report, July 1984-December 2008, Volumes 1 and 2. Prepared for Maryland Department of Natural Resources by Versar, Inc., Columbia, Maryland.

Lucas, L. (Exelon Nuclear Company). 2010. Personal communication, June 17, 2010.

McLean, R.I., and S.L. Domotor. 1988. Environmental radionuclide concentrations in the Vicinity of the Peach Bottom Atomic Power Station: 1981-1984. PPRP-R-9. March 1988. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

McLean, R.I., and S.M. Long. 1978. Gamma-ray emitting radionuclide concentrations is selected environmental media from the vicinity of the Calvert Cliffs Nuclear Power Plant (August 1975 – May 1978). PPSP-R-3. May 1978. Maryland Power Plant Siting Program, Annapolis, MD.

McLean, R.I., J.K. Summers, K.A. Rose, and S.L. Domotor. 1987. Silver-110m, ^{58}Co, and ^{65}Zn Concentrations in the American oyster, *Crassostrea virginica* (Gmelin), Near the Calvert Cliffs Nuclear Power Plant. PPRP-R-7. December, 1987. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

McLean, R.I., T.E. Magette, and S.G. Zobel. 1983. Environmental radionuclide concentrations in the vicinity of the Peach Bottom Atomic Power Station: 1979-1980. PPSP-R-5. January 1983. Maryland Power Plant Siting Program, Annapolis, MD.

McLean, R.I., T.E. Magette, and S.G. Zobel. 1982. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant: 1978-1980. PPSP-R-4. December 1982. Maryland Power Plant Siting Program, Annapolis, MD.

MDE (Maryland Department of the Environment). 2007, 2008. Annual Report of Environmental Radiation Monitoring to the NRC, January 1-December 31, 2006, 2007.

NCRPM (National Council on Radiation Protection and Measurements). 2009. Ionizing Radiation Exposure of the Population of the United States. NCRPM, Bethesda, MD.

NCRPM (National Council on Radiation Protection and Measurements). 1996. Sources and Magnitude of Occupational and Public Exposure from Nuclear Medicine Procedures. NCRPM, Bethesda, MD.

Nuse, B.D. (Constellation Energy Nuclear, LLC). 2010. Personal communication, May 24, 2010.

Olsen, C.R., I.L. Larsen, P.D. Lowry, R.I. McLean, and S.L. Domotor. 1989. Radionuclide Distributions and Sorption Behavior in the Susquehanna-Chesapeake Bay System. PPRP-R-12. January, 1989. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

PBAPS (Peach Bottom Atomic Power Station), Communications Office. 1997. Personal communication, February 12, 1997.

PECO (Philadelphia Electric Company). 1999-2000. Semi-annual Effluent Reports for Peach Bottom Atomic Power Station, Units 2 and 3, January 1 - December 31, 1998-1999.

Power Plant Research Program (PPRP). 1998. Resolution of Winter Minimum Flow Issues at Conowingo Dam: Summary of Findings and Recommendation. February 1998. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Rose, K.A., R.I. McLean, and J.K. Summers. 1989. Development and Monte Carlo Analysis of an Oyster Bioaccumulation Model Applied to Biomonitoring Data. *Ecological Modeling* 45: 111-132.

Rose, K.A., R.I. McLean, J.K. Summers, and S.L. Domotor. 1988. Radiosilver (Ag-110m) Concentrations in Chesapeake Bay Oysters Maintained Near a Nuclear Power Plant: A Statistical Analysis. *Journal of Environmental Monitoring and Assessment* 10: 205-218.

Santschi, P.H., D.M. Adler, and M. Amdurer. 1983. The Fate of Particles and Particle-reactive Metals in Coastal Waters: Radioisotope Studies in Microcosms. *In*: Trace Metals in Sea Water, 331-349. C.S. Wong, E. Boyle, K.W. Bruland, J.D. Burton and E.D. Goldberg, eds. Plenum, NY.

Stanek, M.A., and R.I. McLean. 1995a. Environmental Radionuclide Concentrations in the Vicinity of the Calvert Cliffs Nuclear Power Plant: 1987-1990. PPRP-R-18. December 20, 1995. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Stanek, M.A., and R.I. McLean. 1995b. Environmental Radionuclide Concentrations in the Vicinity of the Peach Bottom Atomic Power Station: 1987-1990. PPRP-R-19. December 20, 1995. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Stanek, M.A., and R.I. McLean. 1995c. Environmental radionuclide concentrations in the vicinity of the Calvert Cliffs Nuclear Power Plant: 1991-1994. PPRP-R-20. February 1997. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Stanek, M.A., and R.I. McLean. 1995d. Environmental radionuclide concentrations in the vicinity of the Peach Bottom Atomic Power Station: 1991-1994. PPRP-R-21. February 1997. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

Stanek, M.A., T.S. Jones, and J.B. Frithsen. 1996a. Comparison of the ND9900 and Genie-PC Data Acquisition and Spectrum Processing Systems. Technical Memorandum, November 11, 1996. Prepared for the Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD, by Versar, Inc., Columbia, MD.

Stanek, M.A., T.S. Jones, and J.B. Frithsen. 1996b. Documentation of the PPRP Gamma Spectrometry Methods: A Guide to Data Acquisition and Spectral Processing. PPRP-R-23. December 10, 1996. Maryland Department of Natural Resources, Power Plant Research Program, Annapolis, MD.

USAEC (United States Atomic Energy Commission). 1973. Final environmental statement related to the operation of Calvert Cliffs Nuclear Power Plant Units 1 and 2, Baltimore Gas and Electric Company. Dockets Nos. 50-317 and 50-31.

USEPA (United States Environmental Protection Agency). 1979. 40 CFR Part 190. U.S. Government Printing Office, Washington, D.C.

USGS. 2008. Water-Data Report 2008. 01578310 SUSQUEHANNA RIVER AT CONOWINGO, MD. http://wdr.water.usgs.gov/wy2008/pdfs/01578310.2008.pdf Accessed 24 May 2010.

USNRC (United States Nuclear Regulatory Commission). 1999. Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Calvert Cliffs Nuclear Power Plant - Final Report. NUREG-1437, Supplement 1. Division of Regulatory Improvement Programs, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC.

USNRC (United States Nuclear Regulatory Commission). 1996. 10 CFR Part 50, Appendix I. U.S. Government Printing Office., Washington, D.C.

USNRC (United States Nuclear Regulatory Commission). 1977. Calculation of Annual Doses to Man From Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I. Regulatory Guide 1.109. Washington, DC: U.S. Government Printing Office.

USNRC (United States Nuclear Regulatory Commission). 1991. 10 CFR Part 20, Appendix B. Government Printing Office, Washington. D.C.

Whalen, K.G. and T.S. Jones. 2000. Integrative Evaluation of PPRP's Radionuclide Sampling Program and Database. PPRP-R-26. July 10, 2000. Maryland Power Plant Research Program, Annapolis, MD.

Whicker, F.W. and V. Schultz. 1982. Radioecology: Nuclear Energy and the Environment. Vol. 1. Boca Raton, FL: CRC Press, Inc.

APPENDIX A

COORDINATES OF SAMPLING STATIONS

Table A-1. Transects and Stations for Sediments Collected from Chesapeake Bay in the Vicinity of Calvert Cliffs Nuclear Power Plant		
Station	**North Latitude**	**West Longitude**
Western Shores		
WS-1	38E 29.321′	76E 29.336′
WS-2	38E 29.460′	76E 29.239′
WS-3	38E 29.752′	76E 28.272′
WS-4	38E 30.975′	76E 25.897′
Flag Ponds		
FP-1	38E 27.254′	76E 26.873′
FP-2	38E 27.302′	76E 26.820′
FP-3	38E 27.402′	76E 26.476′
FP-4	38E 29.211′	76E 24.790′
Calvert Cliffs Outfall		
CCO-1	38E 26.316′	76E 26.412′
CCO-2	38E 26.455′	76E 26.266′
CCO-3	38E 26.795′	76E 25.753′
CCO-4	38E 28.245′	76E 24.055′
Rocky Point		
RP-1	38E 25.074′	76E 24.949′
RP-2	38E 28.356′	76E 24.490′
RP-3	38E 25.327′	76E 24.300′
RP-4	38E 26.068′	76E 22.896′
Liquid Natural Gas Terminal		
LNG-1	38E 22.625′	76E 23.083′
LNG-2	38E 23.652′	76E 22.882′
LNG-3	38E 23.745′	76E 22.495′
LNG-4	38E 23.997′	76E 21.431′
Cove Point		
CP-1	38E 22.500′	76E 22.859′
CP-2	38E 22.541′	76E 22.446′
CP-3	38E 22.601′	76E 21.934′
CP-4	38E 22.635′	76E 20.725′
Little Cove Point		
LCP-1	38E 21.292′	76E 21.490′
LCP-2	38E 21.368′	76E 20.180′
Drum Point		
DP-1	38E 19.553′	76E 22.354′
DP-2	38E 19.574′	76E 19.757′

Table A-1. (Continued)			
Susquehanna River/Upper Bay Sediment Network			
Station	**Name/Location**	**North Latitude**	**West Longitude**
LYH-1	Little Yellow House	39°44.592′	76°15.120'
LYH-2		39°44.929′	76°14.635'
LYH-3		39°45.242'	76°14.082'
BC-1	Broad Creek	39°41.909'	76°14.017'
BC-2		39°42.044'	76°13.657'
BC-3		39°42.280'	76°13.063'
CONCK-1	Conowingo Creek	39°40.690'	76°12.327'
CONCK-2		39°40.848'	76°12.124'
CONCK-3		39°40.997'	76°11.996'
CONDAM-1	Conowingo Dam	39°39.475'	76°10.591'
CONDAM-2		39°39.675'	76°10.546'
CONDAM-3		39°40.026'	76°10.383'
SR-3	Susquehanna River (Rt. 95 Bridge)	39°34.858'	76°06.127'
SF-1	Susquehanna Flats (River Mouth (40'))	39°32.827'	76°04.467'
SF-6	Buoy R "14"	39°31.027'	76°05.007'
SF-7	Buoy N "12"	39°30.274'	76°05.216'
SF-8	Buoy N "8"	39°29.215'	76°04.955'
SF-9	Buoy N "2"	39°28.294'	76°03.261'
UB-10	Buoy RB "A"	39°26.555'	76°01.997'

Note:
Station #1 West
Station #2 Center of Reservoir
Station #3 East

APPENDIX B

INTERCOMPARISON RESULTS

Table B-1. Results of Laboratory Intercomparison Program				
Sample Date	**Sample Type and Units**	**Radionuclide**	**Laboratory's Results (avg) ± 1F**	**Analytics Results ± 1F**
9/13/07	Water-pCi/L	Cr-51	234 ± 45	249 ± 8
		Mn-54	153 ± 9	144 ± 5
		Co-58	107 ± 7	98 ± 3
		Fe-59	98 ± 8	95 ± 3
		Co-60	130 ± 7	127 ± 4
		Zn-65	197 ± 16	174 ± 6
		I-131	79 ± 10	80 ± 3
		Cs-134	115 ± 6	127 ± 4
		Cs-137	115 ± 8	112 ± 4
		Ce-141	187 ± 14	182 ± 6

APPENDIX C

CONCENTRATIONS OF RADIONUCLIDES IN ENVIRONMENTAL SAMPLES

INTRODUCTION

This appendix contains data for most of the radionuclides detected in the environmental samples collected in the vicinity of the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station during the 2006-2007 monitoring period. The radionuclides reported in these tables include the naturally occurring radionuclides ^{7}Be and ^{40}K, the weapons test fallout radionuclides ^{137}Cs and ^{90}Sr, and the power plant produced radionuclides ^{89}Sr, ^{110m}Ag, ^{58}Co, ^{60}Co, ^{131}I, and ^{65}Zn. Radionuclide concentrations in sediments and biological samples are reported as pCi/kg dry weight, except for finfish gut samples and natural bar oysters which are reported as pCi/kg wet weight. Data are organized in the following tables:

Within each table, specific sample stations are arranged approximately north to south and data are presented by date along with the mean for the monitoring period. Radionuclide data are decay corrected to the date of sample collection. Counting error is reported as " 2 sigma error. Concentrations for radionuclides that were not detected in specific samples are recorded as less than (<) the lower level of detection for that sample as determined by spectrum analysis programs. Annual means were calculated as a simple arithmetic average of concentrations and variability was expressed as 2 standard deviation units. Lower limits of detection were excluded from mean calculations.

Table C-1. Radionuclide concentrations in sediments (pCi/kg ± 2 sigma error)

	Be-7			K-40			Co-58			Co-60			Cs-137		
DATE	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
Station CCWES010 - Calvert Cliffs Western Shores Station 1															
3/29/2006		<	41	1208	±	64		<	4		<	3	5	±	1
5/19/2006		<	80	788	±	45		<	7		<	3		<	3
8/23/2006	60	±	16	910	±	51		<	4		<	3	3.3	±	0.5
11/29/2006		<	85	1255	±	67		<	7		<	4		<	5
Yearly	**60**	±	**16**	**1040**	±	**454**		--			--		**4**	±	**2**
2/26/2007		<	728	1443	±	107		<	51		<	13		<	16
6/7/2007		<	342	1253	±	68		<	22		<	5		<	6
9/26/2007		<	236	4928	±	252		<	17		<	7	43	±	4
12/18/2007		<	89	945	±	54		<	8		<	3	4	±	1
Yearly		--		**2142**	±	**3737**		--			--		**23**	±	**56**
Overall	**60**	±	**16**	**1591**	±	**1558**		--			--		**14**	±	**27**
Station CCWES020 - Calvert Cliffs Western Shores Station 2															
3/29/2006	112	±	27	5736	±	300		<	10		<	9	35	±	3
5/19/2006		<	69	886	±	49		<	6		<	3	8	±	1
8/23/2006	18	±	7	870	±	46		<	3		<	2	6	±	1
11/29/2006	47	±	20	953	±	54		<	5		<	3	6	±	1
Yearly	**59**	±	**96**	**2111**	±	**4834**		--			--		**14**	±	**28**
2/26/2007		<	701	1455	±	110		<	51		<	14		<	16
6/7/2007		<	186	722	±	44		<	13		<	4	5	±	1
9/26/2007		<	57	1013	±	56		<	3		<	1		<	2
12/18/2007	193	±	61	4069	±	208		<	17		<	7	29	±	4
Yearly	**193**	±	**61**	**1815**	±	**3066**		--			--		**17**	±	**34**
Overall	**126**	±	**190**	**1963**	±	**419**		--			--		**15**	±	**5**

Table C-1. (Continued)

DATE	Be-7 CONC	Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC	Co-58 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCWES030 - Calvert Cliffs Western Shores Station 3												
3/29/2006	<	862	18128	±	1040	<	76	<	48	294	±	25
5/19/2006	<	390	19330	±	975	<	32	<	15	417	±	23
8/23/2006	<	119	10910	±	555	<	12	<	10	331	±	17
11/29/2006	<	367	18936	±	959	<	33	<	19	251	±	18
Yearly	--		**16826**	±	**7951**	--		--		**323**	±	**142**
2/26/2007	<	2347	20996	±	1181	<	176	<	60	590	±	45
6/7/2007	<	1240	19671	±	992	<	81	<	21	572	±	31
9/26/2007	<	673	19288	±	973	<	51	<	21	403	±	23
12/18/2007	<	343	17615	±	898	<	31	<	17	323	±	19
Yearly	--		**19393**	±	**2785**	--		--		**472**	±	**261**
Overall	--		**18109**	±	**3630**	--		--		**397**	±	**210**
Station CCWES040 - Calvert Cliffs Western Shores Station 4												
3/29/2006	<	238	17643	±	899	<	25	<	17	139	±	8
5/19/2006	<	361	18411	±	941	<	34	<	18	220	±	13
8/23/2006	<	117	11031	±	556	<	11	<	8	159	±	10
11/29/2006	<	276	19043	±	973	<	28	<	19	159	±	10
Yearly	--		**16532**	±	**7424**	--		--		**169**	±	**70**
2/26/2007	<	1784	17103	±	984	<	140	<	52	151	±	25
6/7/2007	<	643	17510	±	889	<	49	<	14	188	±	11
9/26/2007	<	664	19261	±	973	<	52	<	22	199	±	14
12/18/2007	<	610	20927	±	1059	<	51	<	24	161	±	14
Yearly	--		**18700**	±	**3510**	--		--		**175**	±	**45**
Overall	--		**17616**	±	**3067**	--		--		**172**	±	**8**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCFLP010 - Calvert Cliffs Flag Ponds Station 1															
3/29/2006		<	86	5289	±	270		<	9		<	6	27	±	2
5/19/2006		<	65	885	±	48		<	6		<	3		<	3
8/23/2006		<	33	528	±	30		<	3		<	2	1.0	±	0.3
11/29/2006		<	42	424	±	26		<	4		<	3		<	3
Yearly		--		**1782**	±	**4693**		--			--		**14**	±	**37**
2/26/2007		<	55	536	±	34		<	5		<	3		<	3
6/7/2007		<	137	525	±	33		<	10		<	3	1.4	±	0.4
8/29/2007		<	120	925	±	54		<	10		<	4	1.6	±	0.5
12/18/2007		<	98	588	±	35		<	8		<	4		<	5
Yearly		--		**643**	±	**379**		--			--		**1.5**	±	**0.4**
Overall		--		**1213**	±	**1610**		--			--		**8**	±	**18**
Station CCFLP020 - Calvert Cliffs Flag Ponds Station 2															
3/29/2006		<	153	706	±	62		<	15		<	8		<	9
5/19/2006		<	163	7299	±	372		<	15		<	8	46	±	3
8/23/2006	111	±	24	4929	±	251		<	6		<	5	29	±	2
11/29/2006	114	±	37	5763	±	291		<	10		<	6	37	±	3
Yearly	**113**	±	**4**	**4674**	±	**5643**		--			--		**37**	±	**18**
2/26/2007	93	±	38	6338	±	320		<	13		<	6	44	±	5
6/7/2007		<	459	7148	±	360		<	31		<	8	56	±	5
9/26/2007	205	±	33	7200	±	364		<	21		<	9	58	±	5
12/18/2007		<	131	6776	±	345		<	12		<	7	41	±	3
Yearly	**149**	±	**158**	**6866**	±	**798**		--			--		**50**	±	**18**
Overall	**131**	±	**51**	**5770**	±	**3099**		--			--		**44**	±	**17**

Table C-1. (Continued)

DATE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Co-58 CONC	Co-58 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR
Station CCFLP030 - Calvert Cliffs Flag Ponds Station 3										
3/29/2006	<	227	15827 ±	806	<	22	<	15	287 ±	15
5/19/2006	<	318	16165 ±	822	<	29	<	15	393 ±	21
8/23/2006	<	109	10984 ±	553	<	11	<	8	59 ±	4
11/29/2006	<	237	16552 ±	843	<	23	<	15	304 ±	16
Yearly	--		**14882** ±	**5231**	--		--		**261** ±	**284**
2/26/2007	<	1452	17649 ±	988	<	116	<	47	457 ±	36
6/7/2007	<	633	16061 ±	816	<	47	<	15	392 ±	20
9/26/2007	<	305	14877 ±	755	<	27	<	13	285 ±	15
12/18/2007	<	451	16772 ±	847	<	38	<	19	263 ±	16
Yearly	--		**16340** ±	**2343**	--		--		**349** ±	**183**
Overall	--		**15611** ±	**2062**	--		--		**305** ±	**125**
Station CCFLP040 - Calvert Cliffs Flag Ponds Station 4										
3/29/2006	<	817	18014 ±	1034	<	80	<	48	128 ±	19
5/19/2006	<	377	19475 ±	984	<	32	<	16	158 ±	11
8/23/2006	<	113	10966 ±	558	<	12	<	10	220 ±	12
11/29/2006	<	334	19180 ±	969	<	31	<	18	159 ±	11
Yearly	--		**16909** ±	**8024**	--		--		**166** ±	**77**
2/26/2007	<	434	20497 ±	1036	<	39	<	19	172 ±	12
6/7/2007	<	1087	19333 ±	974	<	74	<	20	180 ±	13
9/26/2007	<	369	18280 ±	931	<	34	<	16	118 ±	8
12/18/2007	<	312	17423 ±	889	<	29	<	16	122 ±	9
Yearly	--		**18883** ±	**2659**	--		--		**148** ±	**66**
Overall	--		**17896** ±	**2792**	--		--		**157** ±	**26**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCCCO010 - Calvert Cliffs Outfall Station 1															
3/29/2006		<	216	1473	±	106		<	21		<	11		<	14
5/19/2006		<	85	1375	±	76		<	8		<	4	4	±	1
8/23/2006	58	±	16	1092	±	60		<	4		<	3	3	±	1
11/29/2006		<	86	1546	±	82		<	8		<	4		<	5
Yearly	**58**	±	**16**	**1372**	±	**398**		--			--		**4**	±	**1**
2/26/2007		<	112	1548	±	83		<	9		<	5		<	6
6/7/2007		<	288	1718	±	92		<	20		<	5		<	6
8/29/2007		<	211	1795	±	94		<	15		<	5		<	6
12/18/2007		<	83	1291	±	71		<	8		<	4	4	±	1
Yearly		--		**1588**	±	**447**		--			--		**4**	±	**1**
Overall	**58**	±	**16**	**1480**	±	**306**		--			--		**3.6**	±	**0.4**
Station CCCCO020 - Calvert Cliffs Outfall Station 2															
3/29/2006		<	53	1467	±	79		<	5		<	3	7	±	1
5/19/2006		<	73	1753	±	91		<	6		<	3	7	±	1
8/23/2006	82	±	16	1594	±	83		<	4		<	3	6	±	1
11/29/2006	116	±	22	1811	±	96		<	5		<	4	8	±	1
Yearly	**99**	±	**48**	**1656**	±	**312**		--			--		**7**	±	**1**
2/26/2007		<	65	1598	±	85		<	6		<	4	12	±	1
6/7/2007		<	162	1686	±	90		<	13		<	4	8	±	1
8/29/2007		<	122	1600	±	87		<	10		<	4	6	±	1
12/18/2007	42	±	12	1341	±	71		<	8		<	4		<	5
Yearly	**42**	±	**12**	**1556**	±	**299**		--			--		**9**	±	**7**
Overall	**70**	±	**81**	**1606**	±	**141**		--			--		**8**	±	**3**

Table C-1. (Continued)

DATE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Co-58 CONC	Co-58 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR
Station CCCCO030 - Calvert Cliffs Outfall Station 3										
3/29/2006	<	146	12303	± 620	<	14	<	9	157	± 10
5/19/2006	<	292	17173	± 876	<	29	<	17	213	± 14
8/23/2006	<	95	9940	± 505	<	10	<	9	234	± 12
11/29/2006	<	256	16539	± 834	<	23	<	15	399	± 22
Yearly	--		**13989**	± **6916**	--		--		**251**	± **209**
2/26/2007	<	351	18083	± 913	<	31	<	16	327	± 20
6/7/2007	<	810	18333	± 923	<	57	<	16	377	± 21
8/29/2007	<	698	17335	± 874	<	52	<	19	308	± 18
12/18/2007	<	242	14035	± 717	<	24	<	14	157	± 9
Yearly	--		**16947**	± **3974**	--		--		**292**	± **189**
Overall	--		**15468**	± **4183**	--		--		**271**	± **59**
Station CCCCO040 - Calvert Cliffs Outfall Station 4										
3/29/2006	<	213	18390	± 934	<	22	<	16	308	± 17
5/19/2006	<	299	18863	± 951	<	26	<	14	273	± 15
8/23/2006	<	97	11751	± 591	<	10	<	8	236	± 13
11/29/2006	<	201	17652	± 896	<	20	<	15	339	± 19
Yearly	--		**16664**	± **6627**	--		--		**289**	± **88**
2/26/2007	<	235	17729	± 898	<	23	<	14	276	± 16
6/7/2007	<	543	17841	± 902	<	43	<	14	342	± 18
8/29/2007	<	428	17366	± 882	<	37	<	15	256	± 14
12/18/2007	<	411	18527	± 935	<	36	<	20	156	± 12
Yearly	--		**17866**	± **971**	--		--		**258**	± **154**
Overall	--		**17265**	± **1700**	--		--		**273**	± **45**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCROP010 - Calvert Cliffs Rocky Point Station 1															
3/29/2006		<	31	416	±	26		<	3		<	2		<	3
5/19/2006	108	±	25	518	±	31		<	5		<	3		<	3
8/23/2006	51	±	13	669	±	38		<	3		<	3	2.2	±	0.4
11/29/2006		<	51	583	±	33		<	5		<	3		<	4
Yearly	**80**	±	**81**	**547**	±	**214**		--			--		**2.2**	±	**0.4**
2/26/2007	42	±	9	655	±	39		<	6		<	3		<	4
6/7/2007		<	180	518	±	32		<	13		<	4		<	4
8/29/2007	37	±	11	495	±	32		<	7		<	3		<	3
12/18/2007		<	82	596	±	35		<	7		<	4		<	4
Yearly	**40**	±	**6**	**566**	±	**146**		--			--			--	
Overall	**60**	±	**57**	**556**	±	**27**		--			--		**2.2**	±	**0.4**
Station CCROP020 - Calvert Cliffs Rocky Point Station 2															
3/29/2006		<	40	1228	±	66		<	4		<	3	6	±	1
5/19/2006		<	51	674	±	37		<	4		<	2		<	3
8/23/2006		<	27	551	±	33		<	3		<	2	1.5	±	0.3
11/29/2006		<	38	551	±	33		<	4		<	3		<	3
Yearly		--		**751**	±	**646**		--			--		**4**	±	**6**
2/26/2007		<	64	838	±	46		<	6		<	3		<	4
6/7/2007		<	120	543	±	33		<	10		<	3	2.2	±	0.4
8/29/2007		<	147	650	±	38		<	11		<	4		<	5
12/18/2007	81	±	18	837	±	48		<	5		<	3	3	±	1
Yearly	**81**	±	**18**	**717**	±	**292**		--			--		**3**	±	**2**
Overall	**81**	±	**18**	**734**	±	**48**		--			--		**3**	±	**1**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCROP030 - Calvert Cliffs Rocky Point Station 3															
3/29/2006		<	190	16736	±	855		<	20		<	17	158	±	11
5/19/2006		<	265	16352	±	834		<	26		<	16	159	±	11
8/23/2006		<	97	10083	±	509		<	10		<	8	144	±	8
11/29/2006		<	224	17202	±	878		<	23		<	18	183	±	11
Yearly		--		**15093**	±	**6717**		--			--		**161**	±	**33**
2/26/2007		<	228	15470	±	789		<	23		<	15	184	±	10
6/7/2007		<	744	17380	±	878		<	54		<	16	306	±	19
8/29/2007		<	434	17004	±	866		<	37		<	16	192	±	12
12/18/2007		<	376	17077	±	862		<	33		<	19	165	±	12
Yearly		--		**16733**	±	**1715**		--			--		**212**	±	**127**
Overall		--		**15913**	±	**2319**		--			--		**186**	±	**72**
Station CCROP040 - Calvert Cliffs Rocky Point Station 4															
3/29/2006		<	155	17874	±	898		<	16		<	12	183	±	11
5/19/2006		<	238	17914	±	906		<	22		<	14	259	±	14
8/23/2006		<	96	11281	±	572		<	10		<	9	212	±	11
11/29/2006		<	239	18587	±	936		<	23		<	15	237	±	16
Yearly		--		**16414**	±	**6875**		--			--		**223**	±	**65**
2/26/2007		<	265	18309	±	921		<	24		<	14	232	±	14
6/7/2007		<	706	18089	±	909		<	50		<	14	215	±	13
8/29/2007		<	631	19381	±	974		<	47		<	17	294	±	17
12/18/2007		<	201	15400	±	779		<	19		<	12	276	±	15
Yearly		--		**17795**	±	**3387**		--			--		**254**	±	**74**
Overall		--		**17105**	±	**1953**		--			--		**239**	±	**44**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCLNG010 - Calvert Cliffs LNG Plant Pipeline Station 1															
3/29/2006		<	34	690	±	38		<	3		<	2	2.2	±	0.4
5/19/2006		<	46	757	±	41		<	4		<	2	1.0	±	0.3
8/23/2006		<	25	712	±	39		<	2		<	2		<	2
11/29/2006		<	36	582	±	35		<	4		<	3		<	3
Yearly		--		**685**	±	**148**		--			--		**2**	±	**2**
2/26/2007		<	52	928	±	51		<	5		<	3		<	3
6/7/2007		<	123	1031	±	58		<	10		<	3		<	3
8/29/2007		<	130	823	±	46		<	10		<	4		<	4
12/18/2007		<	48	514	±	32		<	5		<	3		<	3
Yearly		--		**824**	±	**447**		--			--			--	
Overall		--		**755**	±	**196**		--			--		**2**	±	**2**
Station CCLNG020 - Calvert Cliffs LNG Plant Pipeline Station 2															
3/29/2006		<	92	9094	±	462		<	10		<	8	59	±	4
5/19/2006		<	137	9089	±	464		<	14		<	9	67	±	4
8/23/2006		<	54	6312	±	321		<	6		<	6	41	±	3
11/29/2006		<	141	9945	±	502		<	14		<	9	78	±	6
Yearly		--		**8610**	±	**3168**		--			--		**61**	±	**31**
2/26/2007		<	126	9869	±	502		<	13		<	10	70	±	4
6/7/2007		<	512	12200	±	615		<	38		<	11	98	±	7
8/29/2007		<	250	9677	±	493		<	22		<	10	61	±	4
12/18/2007		<	278	12937	±	652		<	24		<	14	113	±	9
Yearly		--		**11171**	±	**3288**		--			--		**85**	±	**48**
Overall		--		**9890**	±	**3622**		--			--		**73**	±	**34**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCLNG030 - Calvert Cliffs LNG Plant Pipeline Station 3															
3/29/2006		<	176	17762	±	898		<	19		<	15	139	±	10
5/19/2006	113	±	55	19903	±	1005		<	27		<	16	155	±	11
8/23/2006		<	87	9745	±	493		<	9		<	8	85	±	5
11/29/2006		<	189	17106	±	872		<	20		<	16	149	±	9
Yearly	**113**	±	**55**	**16129**	±	**8841**		--			--		**132**	±	**64**
2/26/2007		<	296	18983	±	960		<	29		<	19	169	±	14
6/7/2007		<	602	16943	±	866		<	49		<	17	139	±	12
8/29/2007		<	712	18528	±	937		<	55		<	22	160	±	13
12/18/2007		<	251	16245	±	832		<	26		<	18	120	±	9
Yearly		--		**17675**	±	**2587**		--			--		**147**	±	**44**
Overall	**113**	±	**55**	**16902**	±	**2186**		--			--		**140**	±	**21**
Station CCLNG040 - Calvert Cliffs LNG Plant Pipeline Station 4															
3/29/2006		<	124	19562	±	985		<	14		<	13	13	±	2
5/19/2006		<	152	18209	±	915		<	16		<	11	12	±	2
8/23/2006		<	68	13265	±	667		<	8		<	8	6	±	1
11/29/2006		<	159	18626	±	932		<	16		<	11		<	13
Yearly		--		**17416**	±	**5649**		--			--		**10**	±	**7**
2/26/2007		<	134	18020	±	906		<	15		<	11	5	±	1
6/7/2007		<	509	20018	±	1002		<	39		<	13		<	13
8/29/2007		<	270	18249	±	918		<	24		<	11	8	±	2
12/18/2007		<	268	20221	±	1013		<	25		<	15		<	16
Yearly		--		**19127**	±	**2305**		--			--		**7**	±	**4**
Overall		--		**18271**	±	**2420**		--			--		**8**	±	**5**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCCOV010 - Calvert Cliffs Cove Point Station 1															
3/29/2006	33	±	9	5432	±	277		<	7		<	6	21	±	2
5/19/2006		<	81	4993	±	255		<	8		<	6	21	±	2
8/23/2006	177	±	20	4327	±	221		<	5		<	5	20	±	2
11/29/2006		<	21	380	±	24		<	2		<	2		<	2
Yearly	**105**	±	**204**	**2703**	±	**5817**		--			--		**21**	±	**1**
2/26/2007		<	80	5303	±	270		<	8		<	6	19	±	2
6/7/2007		<	171	5179	±	262		<	14		<	6	34	±	3
8/29/2007	111	±	22	5145	±	262		<	13		<	6	19	±	2
12/18/2007		<	169	6024	±	305		<	15		<	8	39	±	4
Yearly	**111**	±	**22**	**5412**	±	**826**		--			--		**28**	±	**21**
Overall	**108**	±	**15**	**4057**	±	**3832**		--			--		**24**	±	**20**
Station CCCOV020 - Calvert Cliffs Cove Point Station 2															
3/29/2006	123	±	24	8045	±	405		<	8		<	6	55	±	3
5/19/2006	109	±	40	7704	±	388		<	10		<	6	47	±	3
8/23/2006	65	±	17	5890	±	297		<	5		<	5	38	±	2
11/29/2006	203	±	43	7637	±	388		<	9		<	7	47	±	3
Yearly	**125**	±	**116**	**7319**	±	**1939**		--			--		**47**	±	**14**
2/26/2007	327	±	50	9409	±	474		<	12		<	8	76	±	6
6/7/2007		<	208	6726	±	342		<	17		<	7	38	±	2
8/29/2007	278	±	72	8031	±	405		<	23		<	9	56	±	5
12/18/2007		<	107	7811	±	397		<	11		<	7	47	±	3
Yearly	**302**	±	**69**	**7994**	±	**2204**		--			--		**54**	±	**33**
Overall	**214**	±	**251**	**7657**	±	**955**		--			--		**51**	±	**11**

Table C-1. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC		Co-58 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCCOV030 - Calvert Cliffs Cove Point Station 3															
3/29/2006		<	155	16418	±	839		<	17		<	17	142	±	9
5/19/2006		<	195	14567	±	745		<	21		<	15	126	±	8
8/23/2006		<	78	10262	±	524		<	9		<	10	92	±	5
11/29/2006		<	140	2950	±	163		<	14		<	9		<	11
Yearly		--		**11049**	±	**11967**		--			--		**120**	±	**52**
2/26/2007		<	206	16644	±	849		<	20		<	16	149	±	9
6/7/2007		<	618	17435	±	881		<	48		<	17	154	±	12
8/29/2007		<	318	15289	±	778		<	29		<	14	127	±	8
12/18/2007		<	358	17509	±	885		<	32		<	20	161	±	13
Yearly		--		**16719**	±	**2062**		--			--		**148**	±	**30**
Overall		--		**13884**	±	**8019**		--			--		**134**	±	**39**
Station CCCOV040 - Calvert Cliffs Cove Point Station 4															
3/29/2006		<	105	18134	±	908		<	11		<	9	16	±	2
5/19/2006		<	143	16960	±	849		<	14		<	9	9	±	1
8/23/2006		<	68	13500	±	676		<	7		<	7	5	±	1
11/29/2006		<	128	18299	±	922		<	14		<	12	6	±	3
Yearly		--		**16723**	±	**4460**		--			--		**9**	±	**10**
2/26/2007		<	183	19603	±	982		<	18		<	12		<	13
6/7/2007		<	389	18463	±	929		<	33		<	12		<	12
8/29/2007		<	409	19040	±	953		<	33		<	14	24	±	5
12/18/2007		<	158	18120	±	913		<	17		<	12		<	12
Yearly		--		**18806**	±	**1305**		--			--		**24**	±	**5**
Overall		--		**17765**	±	**2946**		--			--		**17**	±	**21**

Table C-1. (Continued)

DATE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Co-58 CONC	Co-58 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR
Station CCLCP010 - Calvert Cliffs Little Cove Point Station 1										
3/29/2006	<	148	17156	± 877	<	17	<	17	154	± 12
5/19/2006	<	130	13058	± 656	<	12	<	9	131	± 7
8/23/2006	<	62	9830	± 494	<	7	<	7	233	± 12
11/29/2006	<	178	17280	± 871	<	18	<	15	341	± 20
Yearly	--		**14331**	± **7170**	--		--		**215**	± **189**
2/26/2007	<	115	10646	± 535	<	11	<	8	67	± 5
6/7/2007	<	209	11801	± 597	<	19	<	9	125	± 7
8/29/2007	<	248	8169	± 412	<	20	<	8	91	± 6
12/18/2007	<	218	17249	± 879	<	22	<	16	160	± 9
Yearly	--		**11967**	± **7668**	--		--		**111**	± **81**
Overall	--		**13149**	± **3344**	--		--		**163**	± **147**
Station CCLCP020 - Calvert Cliffs Little Cove Point Station 2										
3/29/2006	<	143	18721	± 943	<	15	<	14	324	± 18
5/19/2006	<	196	18301	± 931	<	20	<	16	223	± 13
8/23/2006	<	71	11698	± 593	<	8	<	10	122	± 7
11/29/2006	<	154	18007	± 919	<	17	<	18	150	± 9
Yearly	--		**16682**	± **6671**	--		--		**205**	± **180**
2/26/2007	<	181	17726	± 900	<	19	<	15	278	± 15
6/7/2007	<	472	19198	± 970	<	40	<	17	164	± 12
8/29/2007	<	364	18068	± 917	<	32	<	16	337	± 18
12/18/2007	<	392	19830	± 1003	<	36	<	23	155	± 12
Yearly	--		**18706**	± **1957**	--		--		**233**	± **178**
Overall	--		**17694**	± **2862**	--		--		**219**	± **41**

Table C-1. (Continued)

DATE	Be-7 CONC	Be-7 ERR	K-40 CONC		K-40 ERR	Co-58 CONC	Co-58 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC		Cs-137 ERR
Station CCDRP010 - Calvert Cliffs Drum Point Station 1												
3/29/2006	<	91	11008	±	560	<	10	<	10	98	±	6
5/19/2006	<	103	9503	±	482	<	11	<	8	103	±	6
8/23/2006	<	47	7432	±	376	<	6	<	6	56	±	3
11/29/2006	<	79	10159	±	515	<	9	<	9	91	±	5
Yearly	--		**9525**	±	**3051**	--		--		**87**	±	**43**
2/26/2007	<	110	10541	±	534	<	11	<	9	113	±	6
6/7/2007	<	231	10117	±	509	<	19	<	8	88	±	6
8/29/2007	<	178	9112	±	462	<	16	<	8	77	±	4
12/18/2007	<	132	11317	±	574	<	13	<	10	102	±	6
Yearly	--		**10272**	±	**1838**	--		--		**95**	±	**31**
Overall	--		**9899**	±	**1056**	--		--		**91**	±	**11**
Station CCDRP020 - Calvert Cliffs Drum Point Station 2												
3/29/2006	<	154	18712	±	957	<	19	<	18	150	±	10
5/19/2006	<	214	19092	±	963	<	20	<	14	195	±	12
8/23/2006	<	72	10542	±	532	<	8	<	8	110	±	6
11/29/2006	<	156	18727	±	945	<	16	<	14	232	±	14
Yearly	--		**16768**	±	**8309**	--		--		**172**	±	**106**
2/26/2007	<	227	19151	±	964	<	22	<	16	266	±	17
6/7/2007	<	337	17942	±	911	<	30	<	16	292	±	16
8/29/2007	<	523	18680	±	942	<	42	<	19	208	±	14
12/18/2007	<	203	17560	±	892	<	21	<	15	159	±	9
Yearly	--		**18334**	±	**1433**	--		--		**231**	±	**119**
Overall	--		**17551**	±	**2213**	--		--		**202**	±	**84**

Table C-2. Radionuclide concentrations in tray oysters (pCi/kg ± 2 sigma error dry weight) and natural bar oysters from Camp Conoy (pCi/kg ± 2 sigma error wet weight)

		Be-7			K-40			Ag-110m			Co-60			Cs-137		
DATE	EXPOSURE	CONC		ERR	CONC		ERR	CONC		ERR	CONC		ERR	CONC		ERR
Station CCKEB000 - Calvert Cliffs Kenwood Beach Station																
04/06/06	126		<	604	8125	±	567		<	48		<	50		<	46
06/12/06	67		<	631	12190	±	822		<	71		<	81		<	74
09/19/06	99		<	1337	15310	±	1124		<	117		<	127		<	119
12/12/06	84		<	572	13189	±	833		<	57		<	66		<	59
Yearly			--		**12203**	±	**6029**		--			--			--	
03/28/07	105		<	510	12959	±	851		<	62		<	73		<	68
06/12/07	76		<	2727	14975	±	1602		<	267		<	235		<	280
09/07/07	87		<	617	13595	±	963		<	78		<	95		<	84
12/11/07	95		<	446	12385	±	827		<	43		<	29		<	41
Yearly			--		**13479**	±	**2227**		--			--			--	
Overall			--		**12841**	±	**1803**		--			--			--	
Station CCPLS000 - Calvert Cliffs Plant Site Station																
04/06/06	126		<	677	14423	±	813		<	47		<	45		<	46
04/06/06	209		<	825	14230	±	895		<	64		<	68		<	63
06/12/06	67		<	413	13784	±	770		<	37		<	42		<	40
06/12/06	193		<	418	12289	±	752		<	44		<	50		<	47
06/12/06	349	382	±	159	13524	±	762		<	41		<	42		<	43
09/19/06	99		<	1079	19448	±	1147		<	83		<	80		<	85
12/12/06	84		<	552	13092	±	744		<	52		<	48		<	54
12/12/06	183		<	372	9382	±	582		<	35		<	44		<	37
12/12/06	339		<	399	10639	±	588		<	36		<	33		<	37
Yearly		**382**	±	**159**	**13423**	±	**5638**		--			--			--	
03/28/07	105		<	418	12368	±	699		<	44		<	44		<	48
06/12/07	76		<	1350	10662	±	966		<	116		<	120		<	121
06/12/07	182		<	1289	11802	±	1074		<	120		<	125		<	131
06/12/07	360		<	1949	12608	±	1235		<	191		<	182		<	195
09/07/07	87		<	680	18243	±	1061		<	76		<	77		<	82
09/07/07	269		<	545	14068	±	925		<	67		<	79		<	76
12/11/07	95		<	797	15295	±	884		<	72		<	70		<	75
12/11/07	182		<	412	14743	±	921		<	33		<	26		<	35
Yearly			--		**13723**	±	**4793**		--			--			--	
Overall		**382**	±	**159**	**13573**	±	**424**		--			--			--	

Table C-2. (Continued)

DATE	EXPOSURE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Ag-110m CONC	Ag-110m ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR
	Calvert Cliffs Camp Conoy Station										
3/24/2006				1161	± 360		< 27		< 27		
6/19/2006				175	± 34		< 2		< 2		
10/26/2006				1775	± 333		< 23		< 24		
Yearly				**1037**	± **1614**		--		--		
3/28/2007				3610	± 1190		< 46		< 48		
6/27/2007				6350	± 2100		< 82		< 80		
8/22/2007				2376	± 1224		< 61		< 52		
10/31/2007				1406	± 552		< 43		< 46		
Yearly				**3436**	± **4284**		--		--		
Overall				**2236**	± **3392**		--		--		

Table C-3. Radionuclide concentrations in sediments (pCi/kg ± 2 sigma error)

	Be-7			K-40			Co-60			Cs-137			Zn-65		
DATE	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
						Station PBLYH010 - Peach Bottom Little Yellow House Station 1									
06/06/06	44	±	23	10272	±	515	21	±	2	40	±	2		<	21
10/16/06	209	±	37	9150	±	460	46	±	3	34	±	2		<	22
Yearly	**127**	±	**234**	**9711**	±	**1586**	**34**	±	**35**	**37**	±	**9**		--	
05/17/07		<	280	10848	±	545		<	9	56	±	6		<	33
10/05/07		<	460	11345	±	570	101	±	6	47	±	5		<	40
Yearly		--		**11096**	±	**702**	**101**	±	**6**	**52**	±	**13**		--	
Overall	**127**	±	**234**	**10404**	±	**1959**	**67**	±	**95**	**44**	±	**20**		--	
						Station PBLYH020 - Peach Bottom Little Yellow House Station 2									
06/06/06	155	±	25	7332	±	371	9	±	2	29	±	2		<	19
10/16/06	85	±	11	7883	±	398		<	6	30	±	2		<	21
Yearly	**120**	±	**99**	**7608**	±	**779**	**9**	±	**2**	**30**	±	**2**		--	
05/17/07		<	190	9254	±	467	5	±	1	41	±	3		<	28
10/05/07		<	271	10467	±	528		<	8	50	±	3		<	36
Yearly		--		**9860**	±	**1715**	**5**	±	**1**	**45**	±	**14**		--	
Overall	**120**	±	**99**	**8734**	±	**3186**	**7**	±	**6**	**38**	±	**22**		--	
						Station PBLYH030 - Peach Bottom Little Yellow House Station 3									
06/06/06	133	±	27	8113	±	408		<	6	24	±	2		<	21
10/16/06		<	120	9271	±	465		<	6	36	±	2		<	21
Yearly	**133**	±	**27**	**8692**	±	**1638**		--		**30**	±	**16**		--	
05/17/07		<	281	14214	±	717	46	±	4	94	±	5		<	42
10/05/07		<	461	10297	±	518		<	11	45	±	5		<	40
Yearly		--		**12256**	±	**5538**	**46**	±	**4**	**70**	±	**69**		--	
Overall	**133**	±	**27**	**10474**	±	**5040**	**46**	±	**4**	**50**	±	**56**		--	

Table C-3. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR	Zn-65 CONC		Zn-65 ERR
Station PBBRC010 - Peach Bottom Broad Creek Station 1															
06/06/06	114	±	24	13054	±	659	35	±	3	88	±	5		<	31
10/16/06	493	±	78	18067	±	910	84	±	6	117	±	7		<	48
Yearly	**303**	±	**536**	**15560**	±	**7089**	**59**	±	**69**	**102**	±	**41**		--	
05/17/07		<	386	18477	±	933	24	±	4	117	±	7		<	57
10/05/07		<	439	19111	±	965	31	±	4	114	±	7		<	61
Yearly		--		**18794**	±	**896**	**28**	±	**10**	**115**	±	**4**		--	
Overall	**303**	±	**536**	**17177**	±	**4573**	**43**	±	**45**	**109**	±	**18**		--	
Station PBBRC020 - Peach Bottom Broad Creek Station 2															
06/06/06	121	±	26	8494	±	426	30	±	2	48	±	3		<	20
10/16/06	540	±	65	13519	±	678		<	9	91	±	7		<	27
Yearly	**331**	±	**592**	**11006**	±	**7106**	**30**	±	2	**70**	±	**61**		--	
05/17/07		<	357	14688	±	736		<	11	86	±	7		<	41
10/05/07		<	532	15267	±	766		<	14	98	±	8		<	50
Yearly		--		**14978**	±	**818**		--		**92**	±	**17**		--	
Overall	**331**	±	**592**	**12992**	±	**5616**	**30**	±	2	**81**	±	**31**		--	
Station PBBRC030 - Peach Bottom Broad Creek Station 3															
06/06/06	123	±	31	8659	±	440	16	±	2	51	±	3		<	25
10/16/06	386	±	39	16156	±	815	43	±	4	116	±	7		<	46
Yearly	**254**	±	**372**	**12408**	±	**10603**	**29**	±	**39**	**84**	±	**92**		--	
05/17/07	697	±	176	20739	±	1045		<	15	125	±	7		<	58
10/05/07		<	440	18581	±	936		<	14	118	±	7		<	58
Yearly	**697**	±	176	**19660**	±	**3051**		--		**121**	±	**10**		--	
Overall	**476**	±	**626**	**16034**	±	**10256**	**29**	±	**39**	**102**	±	**53**		--	

Table C-3. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR	Zn-65 CONC		Zn-65 ERR
Station PBCOC010 - Peach Bottom Conowingo Creek Station 1															
06/06/06	394	±	64	19149	±	962	116	±	7	152	±	9		<	46
10/16/06	716	±	93	18621	±	934	56	±	4	117	±	7		<	38
Yearly	**555**	±	**456**	**18885**	±	**747**	**86**	±	**86**	**135**	±	**49**		--	
05/04/07		<	1696	19396	±	1059		<	50	151	±	23		<	180
10/05/07		<	686	20675	±	1038		<	20	159	±	12		<	67
Yearly		--		**20035**	±	**1808**		--		**155**	±	**12**		--	
Overall	**555**	±	**456**	**19460**	±	**1626**	**86**	±	**86**	**145**	±	**29**		--	
Station PBCOC020 - Peach Bottom Conowingo Creek Station 2															
06/06/06	850	±	69	16611	±	840	13	±	3	116	±	7		<	39
10/16/06	571	±	90	19464	±	976	15	±	3	124	±	7		<	39
Yearly	**711**	±	**394**	**18037**	±	**4035**	**14**	±	**2**	**120**	±	**11**		--	
05/04/07	1719	±	192	17909	±	905		<	14	100	±	6		<	55
10/05/07	354	±	132	17644	±	890		<	13	101	±	6		<	53
Yearly	**1036**	±	**1929**	**17776**	±	**376**		--		**101**	±	**2**		--	
Overall	**874**	±	**461**	**17907**	±	**369**	**14**	±	**2**	**110**	±	**28**		--	
Station PBCOC030 - Peach Bottom Conowingo Creek Station 3															
06/06/06	249	±	34	12181	±	614	7	±	2	83	±	5		<	32
10/16/06	438	±	39	19894	±	1002		<	14	133	±	8		<	48
Yearly	**344**	±	**267**	**16038**	±	**10909**	**7**	±	**2**	**108**	±	**71**		--	
05/04/07	1059	±	175	20685	±	1044		<	17	128	±	8		<	61
10/05/07		<	648	21396	±	1072		<	19	155	±	12		<	65
Yearly	**1059**	±	**175**	**21040**	±	**1005**		--		**141**	±	**39**		--	
Overall	**701**	±	**1011**	**18539**	±	**7075**	**7**	±	**2**	**125**	±	**47**		--	

Table C-3. (Continued)

DATE	Be-7 CONC		ERR	K-40 CONC		ERR	Co-60 CONC		ERR	Cs-137 CONC		ERR	Zn-65 CONC		ERR
Station PBCOD010 - Peach Bottom Conowingo Dam Station 1															
06/06/06	242	±	48	15907	±	805	19	±	3	115	±	7		<	39
10/16/06	671	±	75	22011	±	1104	13	±	3	139	±	8		<	47
Yearly	**456**	±	**606**	**18959**	±	**8632**	**16**	±	**8**	**127**	±	**35**		--	
05/04/07		<	1489	21988	±	1219		<	59	134	±	22		<	202
10/05/07		<	600	21235	±	1065		<	19	147	±	11		<	66
Yearly		--		**21612**	±	**1065**		--		**140**	±	**19**		--	
Overall	**456**	±	**606**	**20285**	±	**3752**	**16**	±	**8**	**134**	±	**19**		--	
Station PBCOD020 - Peach Bottom Conowingo Dam Station 2															
06/06/06	914	±	73	21119	±	1062	22	±	4	143	±	8		<	48
10/16/06	563	±	84	22577	±	1139	22	±	3	140	±	8		<	56
Yearly	**738**	±	**496**	**21848**	±	**2061**	**22**	±	**1**	**141**	±	**5**		--	
05/04/07	1193	±	346	21607	±	1174		<	50	67	±	17		<	170
10/05/07		<	250	19510	±	985		<	7	102	±	7		<	16
Yearly	**1193**	±	**346**	**20559**	±	**2966**		--		**84**	±	**50**		--	
Overall	**966**	±	**642**	**21203**	±	**1824**	**22**	±	**1**	**113**	±	**81**		--	
Station PBCOD030 - Peach Bottom Conowingo Dam Station 3															
06/06/06	224	±	24	18020	±	909	17	±	3	131	±	8		<	40
10/16/06	793	±	95	22096	±	1108		<	14	138	±	8		<	46
Yearly	**509**	±	**804**	**20058**	±	**5765**	**17**	±	**3**	**135**	±	**10**		--	
05/04/07		<	1123	22525	±	1214		<	51	159	±	26		<	174
10/05/07		<	422	23513	±	1178		<	20	163	±	12		<	62
Yearly		--		**23019**	±	**1398**		--		**161**	±	**5**		--	
Overall	**509**	±	**804**	**21538**	±	**4187**	**17**	±	**3**	**148**	±	**37**		--	

Table C-3. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR	Zn-65 CONC		Zn-65 ERR
Station PBSRV030 - Peach Bottom Susquehanna River Station 3															
05/31/06	47	±	8	2935	±	149		<	3	5	±	1		<	10
10/04/06	52	±	15	3142	±	161		<	3	6	±	1		<	11
Yearly	**49**	±	**7**	**3038**	±	**293**		--		**6**	±	**1**		--	
05/04/07		<	185	3212	±	163		<	4	3	±	1		<	15
10/18/07		<	47	3279	±	168		<	2		<	2		<	4
Yearly		--		**3245**	±	**94**		--		**3**	±	**1**		--	
Overall	**49**	±	**7**	**3142**	±	**293**		--		**5**	±	**3**		--	
Station PBSFL010 - Peach Bottom Susquehanna Flats Station 1															
05/31/06	46	±	22	11677	±	587		<	8	4	±	1		<	24
10/04/06		<	134	13726	±	689		<	9	94	±	5		<	34
Yearly	**46**	±	**22**	**12702**	±	**2898**		--		**49**	±	**126**		--	
05/04/07		<	343	12702	±	639		<	9		<	9		<	38
10/18/07		<	389	20294	±	1016		<	15		<	16		<	51
Yearly		--		**16498**	±	**10737**		--			--			--	
Overall	**46**	±	**22**	**14600**	±	**5369**		--		**49**	±	**126**		--	
Station PBSFL060 - Peach Bottom Susquehanna Flat Station 6															
05/31/06	108	±	13	3836	±	194		<	4	9	±	1		<	12
10/04/06	79	±	19	3535	±	181		<	4	8	±	1		<	14
Yearly	**93**	±	**41**	**3686**	±	**426**		--		**8**	±	**2**		--	
05/04/07		<	278	4724	±	239		<	5		<	6		<	21
10/18/07		<	69	4145	±	212		<	2	8	±	2		<	4
Yearly		--		**4434**	±	**818**		--		**8**	±	**2**		--	
Overall	**93**	±	**41**	**4060**	±	**1059**		--		**8**	±	**1**		--	

Table C-3. (Continued)

DATE	Be-7 CONC		Be-7 ERR	K-40 CONC		K-40 ERR	Co-60 CONC		Co-60 ERR	Cs-137 CONC		Cs-137 ERR	Zn-65 CONC		Zn-65 ERR
Station PBSFL070 - Peach Bottom Susquehanna Flat Station 7															
05/31/06	50	±	9	2856	±	148		<	4	6	±	1		<	11
10/04/06	59	±	14	2987	±	152		<	3	6	±	1		<	10
Yearly	**54**	**±**	**13**	**2922**	**±**	**184**		**--**		**6**	**±**	**1**		**--**	
05/04/07		<	152	2370	±	123		<	4	4	±	1		<	14
10/18/07	123	±	44	3942	±	200		<	6	14	±	3		<	18
Yearly	**123**	**±**	**44**	**3156**	**±**	**2223**		**--**		**9**	**±**	**14**		**--**	
Overall	**88**	**±**	**97**	**3039**	**±**	**332**		**--**		**8**	**±**	**4**		**--**	
Station PBSFL080 - Peach Bottom Susquehanna Flat Station 8															
05/31/06	158	±	32	12692	±	636		<	8	79	±	4		<	26
10/04/06	252	±	29	5238	±	267		<	5	24	±	2		<	18
Yearly	**205**	**±**	**133**	**8965**	**±**	**10541**		**--**		**51**	**±**	**78**		**--**	
05/04/07	274	±	68	4743	±	242		<	5	19	±	1		<	23
10/18/07		<	97	6789	±	345		<	3	32	±	3		<	7
Yearly	**274**	**±**	**68**	**5766**	**±**	**2892**		**--**		**26**	**±**	**19**		**--**	
Overall	**239**	**±**	**97**	**7366**	**±**	**4524**		**--**		**38**	**±**	**36**		**--**	
Station PBSFL090 - Peach Bottom Susquehanna Flat Station 9															
05/31/06	234	±	38	13159	±	665		<	11	98	±	6		<	33
10/04/06	688	±	62	13618	±	683		<	9	86	±	5		<	32
Yearly	**461**	**±**	**641**	**13389**	**±**	**650**		**--**		**92**	**±**	**17**		**--**	
05/04/07		<	554	15295	±	766	16	±	2	105	±	8		<	45
10/18/07		<	377	15583	±	783		<	15	110	±	9		<	49
Yearly		**--**		**15439**	**±**	**408**	**16**	**±**	**2**	**108**	**±**	**6**		**--**	
Overall	**461**	**±**	**641**	**14414**	**±**	**2900**	**16**	**±**	**2**	**100**	**±**	**22**		**--**	

Table C-3. (Continued)

	Be-7			K-40			Co-60			Cs-137			Zn-65		
DATE	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
Station PBUPB100 - Peach Bottom Upper Bay Station 10															
05/31/06	67	±	22	13488	±	683		<	11	89	±	5		<	34
10/04/06	67	±	38	18049	±	907		<	11		<	11		<	38
Yearly	**66.80**	±	**0.01**	**15769**	±	**6451**		--		**89**	±	**5**		--	
05/04/07		<	412	14170	±	714		<	10	95	±	5		<	45
10/18/07		<	126	12581	±	636		<	4	73	±	5		<	10
Yearly		--		**13376**	±	**2247**		--		**84**	±	**31**		--	
Overall	**66.80**	±	**0.01**	**14572**	±	**3384**		--		**87**	±	**8**		--	

Table C-4. Radionuclide concentrations in finfish (pCi/kg ± 2 sigma error)

SPECIES	TYPE	DATE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR	Zn-65 CONC	Zn-65 ERR
		Station PBLYH010 - Peach Bottom Little Yellow House Station 1										
Cyprinus carpio	flesh	10/06/06		< 484	16459	± 900		< 31		< 29		< 97
Cyprinus carpio	flesh	12/05/06		< 339	13506	± 720		< 22		< 18		< 66
Ictalurus punctatus	flesh	12/05/06		< 304	12423	± 658		< 21	22	± 5		< 55
Ictalurus sp.	flesh	12/05/06		< 354	12915	± 686		< 20	10	± 4		< 61
Lepomis spp.	flesh	06/23/06		< 1057	18111	± 1000		< 46		< 37		< 130
Lepomis spp.	flesh	06/23/06		< 1243	19928	± 1061		< 41	27	± 12		< 125
Mixed freshwater fish	flesh	10/06/06		< 888	22635	± 1225		< 50		< 48		< 136
Porosoma cepedianum	flesh	12/05/06		< 440	15114	± 835		< 36		< 29		< 89
Porosoma cepedianum	flesh	12/05/06		< 724	19968	± 1061		< 41		< 43		< 114
Stizostedion vitreum	flesh	12/05/06		< 302	15797	± 852		< 28		< 25		< 77
	flesh	**Yearly**		**--**	**16686**	**± 6816**		**--**	**20**	**± 17**		**--**
Cyprinus carpio	flesh	04/10/07		< 1746	12442	± 664		< 22		< 18		< 83
Cyprinus carpio	flesh	04/10/07		< 3401	16615	± 861		< 33		< 30		< 129
Ictalurus sp.	flesh	04/10/07		< 1778	11321	± 608		< 21		< 18		< 79
Ictalurus sp.	flesh	04/10/07		< 6140	26309	± 1366		< 51		< 49		< 212
Lepomis spp.	flesh	10/03/07		< 1219	11177	± 695		< 52		< 46		< 144
Lepomis spp.	flesh	11/08/07		< 443	10874	± 611		< 29		< 24		< 81
Lepomis spp.	flesh	11/08/07		< 741	13181	± 703		< 35		< 36		< 101
Micropterus dolomieui	flesh	11/08/07		< 321	10733	± 578		< 19		< 16		< 55
Micropterus dolomieui	flesh	11/08/07		< 940	21270	± 1109		< 43		< 43		< 121
Mixed freshwater fish	flesh	04/10/07		< 3618	15959	± 856		< 12		< 16		< 52
Mixed freshwater fish	flesh	10/03/07		< 1261	19610	± 1029		< 42		< 41		< 130
Mixed freshwater fish	flesh	11/08/07		< 630	18479	± 986		< 30	10	± 6		< 90
Porosoma cepedianum	flesh	11/08/07		< 596	12249	± 678		< 32		< 26		< 80
Porosoma cepedianum	flesh	11/08/07		< 1058	14821	± 788		< 40		< 42		< 117
Porosoma cepedianum	flesh	11/08/07		< 1075	14814	± 778		< 37		< 36		< 109
	flesh	**Yearly**		**--**	**15324**	**± 8999**		**--**	**10**	**± 6**		**--**
	flesh	**Overall**		**--**	**16005**	**± 1926**		**--**	**15**	**± 14**		**--**

Table C-4. (Continued)

SPECIES	TYPE	DATE	Be-7 CONC	Be-7 ERR	K-40 CONC	K-40 ERR	Co-60 CONC	Co-60 ERR	Cs-137 CONC	Cs-137 ERR	Zn-65 CONC	Zn-65 ERR
M. salmoides & M. dolomieui	gut	10/06/06	<	1026	5965	± 500	<	79	<	68	<	187
Cyprinus carpio	gut	10/06/06	<	847	5445	± 441	<	62	<	59	<	154
Cyprinus carpio	gut	12/05/06	<	836	6434	± 490	<	57	<	52	<	149
Ictalurus punctatus	gut	12/05/06	<	1582	6206	± 413	<	56	<	56	<	143
Ictalurus sp.	gut	12/05/06	<	1191	4546	± 384	<	57	<	51	<	150
Ictalurus sp.	gut	12/05/06	<	1534	7438	± 484	<	54	<	62	<	155
Porosoma cepedianum	gut	12/05/06	<	893	5595	± 457	<	65	<	55	<	149
Porosoma cepedianum	gut	12/05/06	<	1459	8852	± 590	<	73	<	83	<	198
Stizostedion vitreum	gut	12/05/06	<	1079	7422	± 496	<	64	<	70	<	161
	gut	**Yearly**	--		**6434**	± **2583**	--		--		--	
Cyprinus carpio	gut	04/10/07	<	4859	5977	± 427	<	51	<	46	<	183
Cyprinus carpio	gut	04/10/07	<	8825	8544	± 547	<	70	<	70	<	254
Cyprinus carpio	gut	10/03/07	<	3200	9300	± 628	<	94	<	101	<	258
Ictalurus punctatus	gut	04/10/07	<	70000	21977	± 1541	<	244	<	261	<	1045
Ictalurus punctatus	gut	10/03/07	<	2080	5875	± 518	145	± 19	<	68	<	222
Ictalurus sp.	gut	04/10/07	<	4938	5017	± 398	<	53	<	44	<	176
Ictalurus sp.	gut	04/10/07	<	14673	8885	± 653	<	103	<	107	<	390
Ictalurus sp.	gut	04/10/07	<	7391	4696	± 364	<	19	<	28	<	95
Micropterus dolomieui	gut	10/03/07	<	2131	6606	± 569	<	80	<	73	<	218
Micropterus dolomieui	gut	11/08/07	<	905	4913	± 392	<	47	<	41	<	129
Micropterus dolomieui	gut	11/08/07	<	1134	5309	± 439	<	63	<	55	<	150
Micropterus salmoides	gut	11/08/07	<	2474	8523	± 630	<	89	<	98	<	251
Pomoxis sp.	gut	11/08/07	<	4387	16232	± 1143	<	173	<	183	<	448
Porosoma cepedianum	gut	04/10/07	<	36087	11187	± 761	<	120	<	125	<	535
Stizostedion vitreum	gut	11/08/07	<	1319	5618	± 464	<	66	<	62	<	184
	gut	**Yearly**	--		**8577**	± **9623**	**145**	± **19**	--		--	
	gut	**Overall**	--		**7505**	± **3032**	**145**	± **19**	--		--	

Table C-5. Radionuclide concentrations in submerged aquatic vegetation (pCi/kg ± 2 sigma error)

		Be-7			K-40			Co-60			Cs-137			I-131		
SPECIES	**DATE**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
Station PBFBT000 - Peach Bottom Fishing Battery Station																
Myriophyllum spicatum	05/31/06	2468	±	221	23958	±	1347		<	63	75	±	18	174	±	33
Myriophyllum spicatum	06/23/06	2725	±	447	23758	±	1364		<	87		<	90		<	8805
Myriophyllum spicatum	10/06/06	2528	±	308	39947	±	2227		<	104		<	104		<	126
Myriophyllum spicatum	**Yearly**	**2574**	±	**269**	**29221**	±	**18578**		**--**		**75**	±	**18**	**174**	±	**33**
Myriophyllum spicatum	08/17/07		<	12000	119635	±	11572		<	1430		<	1580		<	1780
Myriophyllum spicatum	10/03/07	651	±	216	19490	±	1206	414	±	36		<	87	306	±	37
Myriophyllum spicatum	10/03/07		<	989	24499	±	1436		<	115		<	122	385	±	59
Myriophyllum spicatum	10/03/07		<	948	27118	±	1722	154	±	33		<	135	401	±	56
Myriophyllum spicatum	10/18/07		<	988	23519	±	1438		<	124	93	±	17		<	185
Myriophyllum spicatum	**Yearly**	**651**	±	**216**	**42852**	±	**86021**	**284**	±	**367**	**93**	±	**17**	**364**	±	**101**
Myriophyllum spicatum	**Overall**	**1612**	±	**2719**	**36037**	±	**19277**	**284**	±	**367**	**84**	±	**26**	**269**	±	**269**

Table C-6. Radiation Concentrations in Air Particulate and Air (fCi/m3 ± 2 sigma)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
			Calvert Cliffs Long Beach Station								
12/27/2005	1/3/2006	285	0.7	±	0.6	20	±	2		<	37
1/3/2006	1/10/2006	293	1.0	±	0.6	16	±	2		<	16
1/10/2006	1/17/2006	278	0.6	±	0.6	18	±	2		<	35
1/17/2006	1/24/2006	476	0.6	±	0.4	9	±	1		<	10
1/24/2006	1/31/2006	285	0.9	±	0.6	16	±	2		<	16
1/31/2006	2/7/2006	285		<	0.5	18	±	2		<	16
2/7/2006	2/14/2006	285	1.2	±	0.7	19	±	2		<	16
2/14/2006	2/21/2006	286	2.3	±	0.8	27	±	2		<	12
2/21/2006	2/28/2006	285	1.8	±	0.7	25	±	2		<	16
2/28/2006	3/7/2006	285	1.5	±	0.7	20	±	2		<	16
3/7/2006	3/14/2006	285	1.4	±	0.7	23	±	2		<	16
3/14/2006	3/20/2006	245	1.5	±	0.8	16	±	2		<	34
3/20/2006	3/28/2006	326	0.7	±	0.6	10	±	1		<	15
3/28/2006	4/4/2006	287	0.5	±	0.5	22	±	2		<	11
4/4/2006	4/11/2006	256	1.1	±	0.6	21	±	2		<	12
4/11/2006	4/18/2006	286	0.6	±	0.6	20	±	2		<	11
4/18/2006	4/25/2006	285	0.7	±	0.5	10	±	2		<	16
4/25/2006	5/2/2006	286	0.9	±	0.6	16	±	2		<	31
5/2/2006	5/9/2006	285	1.2	±	0.6	19	±	2		<	31
5/9/2006	5/16/2006	286	0.7	±	0.5	14	±	2		<	16
5/16/2006	5/23/2006	285	0.7	±	0.5	12	±	2		<	17
5/23/2006	5/30/2006	114	2.1	±	1.3	12	±	3		<	39
5/30/2006	6/6/2006	283	1.0	±	0.5	19	±	2		<	34
6/6/2006	6/13/2006	284	0.8	±	0.5	16	±	2		<	35
6/13/2006	6/20/2006	286	0.8	±	0.6	21	±	2		<	34
6/20/2006	6/27/2006	280		<	0.6	19	±	2		<	14
6/27/2006	7/5/2006	326	1.2	±	0.5	24	±	2		<	12
7/5/2006	7/11/2006	248		<	0.6	13	±	2		<	20
7/11/2006	7/18/2006	283	0.6	±	0.6	24	±	2		<	18
7/18/2006	7/24/2006	243	0.6	±	0.6	21	±	2		<	18
7/24/2006	8/1/2006	326	1.0	±	0.5	24	±	2		<	15
8/1/2006	8/8/2006	287	0.9	±	0.6	29	±	2		<	33
8/8/2006	8/15/2006	285	0.9	±	0.6	18	±	2		<	18
8/15/2006	8/22/2006	286	0.7	±	0.5	21	±	2		<	13
8/22/2006	8/29/2006	285	1.0	±	0.6	34	±	2		<	13
8/29/2006	9/5/2006	284	0.5	±	0.5	5	±	1		<	37
9/5/2006	9/12/2006	284	1.2	±	0.6	27	±	2		<	11
9/12/2006	9/19/2006	286	0.9	±	0.5	14	±	2		<	18
9/19/2006	9/25/2006	245		<	0.6	17	±	2		<	18
9/25/2006	10/3/2006	325	0.8	±	0.5	15	±	2		<	16
10/3/2006	10/10/2006	286	1.0	±	0.5	19	±	2		<	18

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
10/10/2006	10/17/2006	286		<	0.5	21	±	2		<	17
10/17/2006	10/23/2006	245	1.8	±	0.7	15	±	2		<	18
10/23/2006	10/31/2006	328	1.4	±	0.5	15	±	2		<	15
10/31/2006	11/8/2006	331	1.1	±	0.6	24	±	2		<	15
11/8/2006	11/14/2006	241		<	0.6	16	±	2		<	18
11/14/2006	11/20/2006	248		<	0.6	16	±	2		<	18
11/20/2006	12/12/2006	894	1.1	±	0.3	23	±	1		<	9
12/12/2006	12/19/2006	286	1.0	±	0.6	30	±	2		<	34
12/19/2006	12/26/2006	283		<	0.5	18	±	2		<	17
	Yearly		**1.0**	±	**0.8**	**19**	±	**11**		--	
12/26/2006	1/2/2007	285		<	0.5	17	±	2		<	13
1/2/2007	1/9/2007	286		<	0.5	12	±	2		<	34
1/9/2007	1/16/2007	286	0.7	±	0.5	15	±	2		<	33
1/16/2007	1/23/2007	285		<	0.5	12	±	2		<	16
1/23/2007	1/30/2007	286	0.6	±	0.6	20	±	2		<	16
1/30/2007	2/6/2007	285	1.2	±	0.6	26	±	2		<	16
2/6/2007	2/12/2007	245	0.7	±	0.6	19	±	2		<	39
2/12/2007	2/20/2007	327	0.6	±	0.4	20	±	2		<	13
2/20/2007	2/27/2007	284	1.0	±	0.5	11	±	2		<	16
2/27/2007	3/6/2007	285		<	0.5	13	±	2		<	18
3/6/2007	3/13/2007	285	1.2	±	0.6	22	±	2		<	34
3/13/2007	3/20/2007	285	2.0	±	0.7	19	±	2		<	16
3/20/2007	3/27/2007	285	0.7	±	0.5	19	±	2		<	16
3/27/2007	4/4/2007	326	0.7	±	0.5	17	±	2		<	15
4/4/2007	4/10/2007	238	0.9	±	0.5	14	±	2		<	42
4/10/2007	4/17/2007	286	0.5	±	0.5	9	±	2		<	16
4/17/2007	4/23/2007	285	0.8	±	0.5	12	±	2		<	17
4/23/2007	5/1/2007	285	0.9	±	0.5	17	±	2		<	18
5/1/2007	5/8/2007	286	0.5	±	0.5	9	±	1		<	16
5/8/2007	5/14/2007	245	0.6	±	0.5	7	±	2		<	14
5/14/2007	5/22/2007	326		<	0.4	16	±	2		<	15
5/22/2007	5/29/2007	290	1.0	±	0.6	25	±	2		<	16
5/29/2007	6/4/2007	246	0.8	±	0.7	16	±	2		<	14
6/4/2007	6/12/2007	325	0.6	±	0.4	17	±	2		<	12
6/12/2007	6/19/2007	285		<	0.5	12	±	2		<	13
6/19/2007	6/26/2007	245		<	0.6	21	±	2		<	39
6/26/2007	7/2/2007	243	1.7	±	0.7	21	±	2		<	8
7/2/2007	7/9/2007	285	0.6	±	0.5	19	±	2		<	13
7/9/2007	7/17/2007	326	1.0	±	0.5	22	±	2		<	31
7/17/2007	7/24/2007	203	1.1	±	0.6	14	±	1		<	22
7/24/2007	7/31/2007	246		<	0.6	18	±	2		<	15
7/31/2007	8/7/2007	258	1.5	±	0.6	30	±	2		<	14

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131	
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC	ERR
8/7/2007	8/14/2007	237		<	0.5	26	±	2	<	17
8/14/2007	8/22/2007	326	0.5	±	0.4	18	±	2	<	32
8/22/2007	8/28/2007	209	1.1	±	0.6	15	±	2	<	17
8/28/2007	9/4/2007	285	1.2	±	0.6	26	±	2	<	18
9/4/2007	9/11/2007	287	1.4	±	0.6	28	±	2	<	17
9/11/2007	9/17/2007	244		<	0.5	21	±	2	<	36
9/17/2007	9/24/2007	285		<	0.5	17	±	2	<	30
9/24/2007	10/3/2007	327	1.6	±	0.6	24	±	2	<	26
10/3/2007	10/9/2007	285	0.6	±	0.5	18	±	2	<	16
10/9/2007	10/16/2007	285	1.3	±	0.6	23	±	2	<	18
10/16/2007	10/23/2007	285	1.0	±	0.6	32	±	2	<	16
10/23/2007	10/29/2007	245		<	0.6	12	±	2	<	14
10/29/2007	11/6/2007	328	0.7	±	0.5	22	±	2	<	28
11/6/2007	11/13/2007	286	0.8	±	0.5	19	±	2	<	30
11/13/2007	11/19/2007	245		<	0.6	16	±	2	<	17
11/19/2007	11/27/2007	326	0.8	±	0.5	24	±	2	<	11
11/27/2007	12/3/2007	245	1.6	±	0.7	37	±	3	<	33
12/3/2007	12/12/2007	367	0.8	±	0.5	28	±	2	<	17
12/12/2007	12/17/2007	209		<	0.6	21	±	2	<	39
12/17/2007	12/26/2007	367	1.1	±	0.5	32	±	2	<	13
	Yearly		**1.0**	±	**0.7**	**19**	±	**13**	--	
	Overall		**1.0**	±	**0.1**	**19**	±	**1**	--	
Calvert Cliffs Lusby Station										
12/27/2005	1/3/2006	287	0.6	±	0.5	22	±	2	<	37
1/3/2006	1/10/2006	292	0.6	±	0.5	19	±	2	<	16
1/10/2006	1/17/2006	278	0.9	±	0.6	19	±	2	<	35
1/17/2006	1/24/2006	476	0.7	±	0.4	10	±	1	<	10
1/24/2006	1/31/2006	285	0.9	±	0.6	18	±	2	<	16
1/31/2006	2/7/2006	200	1.9	±	0.9	20	±	2	<	10
2/7/2006	2/14/2006	285	1.8	±	0.7	22	±	2	<	16
2/14/2006	2/21/2006	286	2.2	±	0.8	30	±	2	<	12
2/21/2006	2/28/2006	285	1.3	±	0.6	31	±	2	<	16
2/28/2006	3/7/2006	285	1.5	±	0.7	24	±	2	<	16
3/7/2006	3/14/2006	285	1.6	±	0.7	28	±	2	<	16
3/14/2006	3/20/2006	245	1.6	±	0.8	27	±	2	<	34
3/20/2006	3/28/2006	326	0.9	±	0.6	12	±	1	<	15
3/28/2006	4/4/2006	287	0.9	±	0.6	28	±	2	<	11
4/4/2006	4/11/2006	283	1.3	±	0.6	26	±	2	<	11
4/11/2006	4/18/2006	284	1.2	±	0.7	26	±	2	<	11
4/18/2006	4/25/2006	285	1.0	±	0.6	14	±	2	<	16

Table C-6. (Continued)

SAMPLE DATE			**Gross Alpha**			**Gross Beta**			**I-131**		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
4/25/2006	5/2/2006	286	1.0	±	0.6	21	±	2		<	31
5/2/2006	5/9/2006	285	1.0	±	0.6	22	±	2		<	31
5/9/2006	5/16/2006	286	0.7	±	0.5	17	±	2		<	16
5/16/2006	5/23/2006	285	0.7	±	0.5	14	±	2		<	17
5/23/2006	5/30/2006	289	1.5	±	0.6	28	±	2		<	15
5/30/2006	6/6/2006	279	1.9	±	0.6	21	±	2		<	34
6/6/2006	6/13/2006	284	1.2	±	0.6	16	±	2		<	35
6/13/2006	6/20/2006	286	0.7	±	0.5	24	±	2		<	34
6/20/2006	6/27/2006	286		<	0.5	23	±	2		<	14
6/27/2006	7/5/2006	326	1.8	±	0.6	24	±	2		<	12
7/5/2006	7/11/2006	248		<	0.6	17	±	2		<	20
7/11/2006	7/18/2006	282	0.9	±	0.6	28	±	2		<	18
7/18/2006	7/24/2006	--		--			--			--	
7/24/2006	8/1/2006	325	1.7	±	0.6	43	±	2		<	15
8/1/2006	8/8/2006	287	1.3	±	0.6	27	±	2		<	33
8/8/2006	8/15/2006	285		<	0.5	18	±	2		<	18
8/15/2006	8/22/2006	285	0.6	±	0.5	18	±	2		<	13
8/22/2006	8/29/2006	285	1.0	±	0.6	30	±	2		<	13
8/29/2006	9/5/2006	282	0.7	±	0.5	7	±	1		<	37
9/5/2006	9/12/2006	243	0.6	±	0.6	17	±	2		<	9
9/12/2006	9/19/2006	--		--			--			--	
9/19/2006	9/25/2006	245		<	0.6	15	±	2		<	18
9/25/2006	10/3/2006	327	0.6	±	0.5	17	±	2		<	16
10/3/2006	10/10/2006	285		<	0.4	16	±	2		<	18
10/10/2006	10/17/2006	286		<	0.5	18	±	2		<	17
10/17/2006	10/23/2006	245	1.6	±	0.7	13	±	2		<	18
10/23/2006	10/31/2006	328	1.3	±	0.5	14	±	2		<	15
10/31/2006	11/8/2006	115		<	1.2	24	±	2		<	42
11/8/2006	11/14/2006	241		<	0.6	14	±	2		<	18
11/14/2006	11/20/2006	248		<	0.6	16	±	2		<	18
11/20/2006	12/12/2006	894	0.8	±	0.3	23	±	1		<	9
12/12/2006	12/19/2006	284	1.6	±	0.6	30	±	2		<	34
12/19/2006	12/26/2006	283		<	0.5	18	±	2		<	17
	Yearly		**1.2**	±	**0.9**	**21**	±	**13**		--	
12/26/2006	1/2/2007	287	0.8	±	0.6	18	±	2		<	13
1/2/2007	1/9/2007	284		<	0.5	11	±	2		<	34
1/9/2007	1/16/2007	286		<	0.5	12	±	2		<	33
1/16/2007	1/23/2007	285	1.5	±	0.7	13	±	2		<	16
1/23/2007	1/30/2007	286	1.1	±	0.6	20	±	2		<	16
1/30/2007	2/6/2007	245	1.0	±	0.7	31	±	2		<	19
2/6/2007	2/12/2007	245	1.0	±	0.6	19	±	2		<	39
2/12/2007	2/20/2007	327	1.5	±	0.6	19	±	2		<	13

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
2/20/2007	2/27/2007	284	0.8	±	0.5	13	±	2		<	16
2/27/2007	3/6/2007	285		<	0.5	13	±	2		<	18
3/6/2007	3/13/2007	285	1.5	±	0.6	23	±	2		<	34
3/13/2007	3/20/2007	285	1.8	±	0.7	19	±	2		<	16
3/20/2007	3/27/2007	285	0.8	±	0.6	21	±	2		<	16
3/27/2007	4/4/2007	326	1.1	±	0.5	17	±	2		<	15
4/4/2007	4/10/2007	245	0.7	±	0.5	13	±	2		<	42
4/10/2007	4/17/2007	283	1.0	±	0.6	12	±	2		<	16
4/17/2007	4/23/2007	285	0.7	±	0.7	13	±	2		<	17
4/23/2007	5/1/2007	285		<	0.5	18	±	2		<	18
5/1/2007	5/8/2007	286	0.7	±	0.5	12	±	2		<	16
5/8/2007	5/14/2007	245		<	0.5	12	±	2		<	4
5/14/2007	5/22/2007	326	1.1	±	0.6	18	±	2		<	15
5/22/2007	5/29/2007	290	0.8	±	0.5	30	±	2		<	16
5/29/2007	6/4/2007	246		<	0.5	16	±	2		<	14
6/4/2007	6/12/2007	325	0.6	±	0.4	18	±	2		<	12
6/12/2007	6/19/2007	285	1.8	±	0.7	19	±	2		<	16
6/19/2007	6/26/2007	285	0.8	±	0.6	21	±	2		<	16
6/26/2007	7/2/2007	--		--			--			--	
7/2/2007	7/9/2007	285	1.7	±	0.7	43	±	3		<	13
7/9/2007	7/17/2007	326	0.4	±	0.4	16	±	2		<	31
7/17/2007	7/24/2007	203	3.8	±	3.2	105	±	10		<	22
7/24/2007	7/31/2007	246		<	0.6	18	±	2		<	15
7/31/2007	8/7/2007	258	1.2	±	0.6	33	±	2		<	14
8/7/2007	8/14/2007	237		<	0.5	26	±	2		<	17
8/14/2007	8/22/2007	--		--			--			--	
8/22/2007	8/28/2007	209		<	0.8	5	±	3		<	17
8/28/2007	9/4/2007	285	0.8	±	0.5	34	±	2		<	18
9/4/2007	9/11/2007	287	1.4	±	0.6	34	±	2		<	17
9/11/2007	9/17/2007	244	1.3	±	0.7	27	±	2		<	36
9/17/2007	9/24/2007	285		<	0.5	17	±	2		<	30
9/24/2007	10/3/2007	328	1.2	±	0.6	30	±	2		<	26
10/3/2007	10/9/2007	284	0.6	±	0.5	17	±	2		<	16
10/9/2007	10/16/2007	--		--			--			--	
10/16/2007	10/23/2007	285		<	0.5	30	±	2		<	16
10/23/2007	10/29/2007	245		<	0.6	11	±	2		<	14
10/29/2007	11/6/2007	328	0.9	±	0.5	23	±	2		<	28
11/6/2007	11/13/2007	286	0.9	±	0.6	21	±	2		<	30
11/13/2007	11/19/2007	245		<	0.6	19	±	2		<	17
11/19/2007	11/27/2007	326		<	0.4	14	±	2		<	11
11/27/2007	12/3/2007	245	1.1	±	0.6	21	±	2		<	33
12/3/2007	12/12/2007	367		<	0.4	17	±	2		<	17

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
12/12/2007	12/17/2007	203	0.8	±	0.7	10	±	2		<	39
12/17/2007	12/26/2007	367	0.6	±	0.5	18	±	2		<	13
	Yearly		**1.1**	±	**1.2**	**21**	±	**29**		--	
	Overall		**1.1**	±	**0.1**	**21.1**	±	**0.3**		--	
Calvert Cliffs Cove Point Station											
12/27/2005	1/3/2006	287		<	0.5	18	±	2		<	37
1/3/2006	1/10/2006	291	1.0	±	0.6	17	±	2		<	16
1/10/2006	1/17/2006	278	1.0	±	0.6	12	±	2		<	35
1/17/2006	1/24/2006	476	0.4	±	0.3	8	±	1		<	10
1/24/2006	1/31/2006	285	0.8	±	0.6	16	±	2		<	16
1/31/2006	2/7/2006	285	1.0	±	0.6	18	±	2		<	16
2/7/2006	2/14/2006	285	1.3	±	0.7	20	±	2		<	16
2/14/2006	2/21/2006	286	2.2	±	0.8	24	±	2		<	12
2/21/2006	2/28/2006	285	1.5	±	0.7	26	±	2		<	16
2/28/2006	3/7/2006	285	1.5	±	0.7	17	±	2		<	16
3/7/2006	3/14/2006	285	1.2	±	0.6	21	±	2		<	16
3/14/2006	3/20/2006	245	1.5	±	0.8	18	±	2		<	34
3/20/2006	3/28/2006	326		<	0.5	9	±	1		<	15
3/28/2006	4/4/2006	287	1.1	±	0.6	17	±	2		<	11
4/4/2006	4/11/2006	283	1.1	±	0.6	16	±	2		<	11
4/11/2006	4/18/2006	284		<	0.5	17	±	2		<	11
4/18/2006	4/25/2006	285		<	0.4	10	±	2		<	16
4/25/2006	5/2/2006	286		<	0.5	11	±	2		<	31
5/2/2006	5/9/2006	285	1.0	±	0.6	19	±	2		<	31
5/9/2006	5/16/2006	286	0.6	±	0.5	14	±	2		<	16
5/16/2006	5/23/2006	285	0.9	±	0.6	12	±	2		<	17
5/23/2006	5/30/2006	289	1.4	±	0.6	21	±	2		<	15
5/30/2006	6/6/2006	282	1.2	±	0.5	15	±	2		<	34
6/6/2006	6/13/2006	284	0.7	±	0.5	13	±	2		<	35
6/13/2006	6/20/2006	286	0.9	±	0.6	23	±	2		<	34
6/20/2006	6/27/2006	286		<	0.6	14	±	2		<	14
6/27/2006	7/5/2006	246	1.4	±	0.7	20	±	2		<	15
7/5/2006	7/11/2006	--		--			--			--	
7/11/2006	7/18/2006	--		--			--			--	
7/18/2006	7/24/2006	244	1.0	±	0.6	23	±	2		<	18
7/24/2006	8/1/2006	325	0.8	±	0.5	24	±	2		<	15
8/1/2006	8/8/2006	287	1.1	±	0.6	36	±	2		<	33
8/8/2006	8/15/2006	285		<	0.5	21	±	2		<	18
8/15/2006	8/22/2006	286	1.0	±	0.5	21	±	2		<	13
8/22/2006	8/29/2006	86		<	1.4	23	±	5		<	42
8/29/2006	9/5/2006	--		--			--			--	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131	
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC	ERR
9/5/2006	9/12/2006	--		--			--		--	
9/12/2006	9/19/2006	286	0.6	±	0.5	14	±	2	<	18
9/19/2006	9/25/2006	245	1.3	±	0.7	19	±	2	<	18
9/25/2006	10/3/2006	327		<	0.4	19	±	2	<	16
10/3/2006	10/10/2006	284	0.9	±	0.5	19	±	2	<	18
10/10/2006	10/17/2006	286	1.0	±	0.6	22	±	2	<	17
10/17/2006	10/23/2006	245	1.1	±	0.6	14	±	2	<	18
10/23/2006	10/31/2006	328	2.0	±	0.6	16	±	2	<	15
10/31/2006	11/8/2006	331	1.1	±	0.6	25	±	2	<	15
11/8/2006	11/14/2006	241	0.6	±	0.6	18	±	2	<	18
11/14/2006	11/20/2006	248		<	0.6	19	±	2	<	18
11/20/2006	12/12/2006	894	1.1	±	0.3	24	±	1	<	9
12/12/2006	12/19/2006	286	1.1	±	0.6	31	±	2	<	34
12/19/2006	12/26/2006	284		<	0.5	18	±	2	<	17
	Yearly		**1.1**	±	**0.7**	**19**	±	**11**	--	
12/26/2006	1/2/2007	287	0.7	±	0.5	20	±	2	<	13
1/2/2007	1/9/2007	284		<	0.4	13	±	2	<	34
1/9/2007	1/16/2007	286	0.6	±	0.5	17	±	2	<	33
1/16/2007	1/23/2007	285		<	0.5	13	±	2	<	16
1/23/2007	1/30/2007	286	0.6	±	0.6	21	±	2	<	16
1/30/2007	2/6/2007	286	1.4	±	0.6	27	±	2	<	16
2/6/2007	2/12/2007	245	1.2	±	0.6	20	±	2	<	39
2/12/2007	2/20/2007	327	1.4	±	0.6	23	±	2	<	13
2/20/2007	2/27/2007	284	1.0	±	0.5	12	±	2	<	16
2/27/2007	3/6/2007	285		<	0.5	13	±	2	<	18
3/6/2007	3/13/2007	285	1.4	±	0.6	21	±	2	<	34
3/13/2007	3/20/2007	285	1.0	±	0.5	19	±	2	<	16
3/20/2007	3/27/2007	285	1.3	±	0.6	18	±	2	<	16
3/27/2007	4/4/2007	326	0.5	±	0.4	16	±	2	<	15
4/4/2007	4/10/2007	245	0.5	±	0.5	12	±	2	<	42
4/10/2007	4/17/2007	285		<	0.5	10	±	2	<	16
4/17/2007	4/23/2007	285	0.8	±	0.5	13	±	2	<	17
4/23/2007	5/1/2007	285	1.4	±	0.6	17	±	2	<	18
5/1/2007	5/8/2007	286	0.9	±	0.5	10	±	2	<	16
5/8/2007	5/14/2007	254	0.7	±	0.6	9	±	2	<	14
5/14/2007	5/22/2007	326	0.9	±	0.5	19	±	2	<	15
5/22/2007	5/29/2007	290	1.2	±	0.6	26	±	2	<	16
5/29/2007	6/4/2007	246	0.7	±	0.6	15	±	2	<	14
6/4/2007	6/12/2007	325	1.0	±	0.5	17	±	2	<	12
6/12/2007	6/19/2007	285		<	0.5	14	±	2	<	13
6/19/2007	6/26/2007	285		<	0.5	19	±	2	<	34
6/26/2007	7/2/2007	--		--			--		--	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
7/2/2007	7/9/2007	285	0.8	±	0.5	24	±	2		<	13
7/9/2007	7/17/2007	326	0.7	±	0.5	16	±	2		<	31
7/17/2007	7/24/2007	203		<	0.4	2	±	1		<	22
7/24/2007	7/31/2007	246		<	0.9	15	±	3		<	15
7/31/2007	8/7/2007	258	1.2	±	0.8	42	±	3		<	14
8/7/2007	8/14/2007	237	0.7	±	0.6	25	±	2		<	17
8/14/2007	8/22/2007	326		<	0.4	19	±	2		<	32
8/22/2007	8/28/2007	209		<	0.5	13	±	2		<	17
8/28/2007	9/4/2007	285	0.8	±	0.5	26	±	2		<	18
9/4/2007	9/11/2007	287	0.9	±	0.5	19	±	2		<	17
9/11/2007	9/17/2007	244	0.6	±	0.5	22	±	2		<	36
9/17/2007	9/24/2007	285	0.9	±	0.6	16	±			<	30
9/24/2007	10/3/2007	328	1.3	±	0.6	23	±	2		<	26
10/3/2007	10/9/2007	284	0.6	±	0.5	17	±	2		<	16
10/9/2007	10/16/2007	285	0.9	±	0.5	23	±	2		<	18
10/16/2007	10/23/2007	285	1.4	±	0.7	32	±	2		<	16
10/23/2007	10/29/2007	245	0.9	±	0.7	13	±	2		<	14
10/29/2007	11/6/2007	328	0.9	±	0.5	23	±	2		<	28
11/6/2007	11/13/2007	286	0.7	±	0.5	20	±	2		<	30
11/13/2007	11/19/2007	245	1.3	±	0.7	23	±	2		<	17
11/19/2007	11/27/2007	326	1.1	±	0.6	19	±	2		<	18
11/27/2007	12/3/2007	245	1.4	±	0.7	28	±	2		<	33
12/3/2007	12/12/2007	367	0.5	±	0.4	22	±	2		<	17
12/12/2007	12/17/2007	203		<	0.7	17	±	2		<	39
12/17/2007	12/26/2007	354	0.8	±	0.5	28	±	2		<	13
	Yearly		**0.9**	±	**0.6**	**19**	±	**13**		--	
	Overall		**1.0**	±	**0.2**	**18.7**	±	**0.5**		--	
Baltimore City Station											
12/29/2005	1/5/2006	285	0.8	±	0.6	15	±	2		<	11
1/5/2006	1/12/2006	287	1.0	±	0.6	19	±	2		<	11
1/12/2006	1/19/2006	290	1.0	±	0.6	12	±	2		<	11
1/19/2006	1/26/2006	281	0.6	±	0.5	16	±	2		<	11
1/26/2006	2/2/2006	284	0.8	±	0.6	17	±	2		<	11
2/2/2006	2/9/2006	285	0.9	±	0.6	17	±	2		<	16
2/9/2006	2/16/2006	--		--			--			--	
2/16/2006	2/23/2006	282	1.9	±	0.7	19	±	2		<	16
2/23/2006	3/2/2006	285	1.2	±	0.6	19	±	2		<	12
3/2/2006	3/9/2006	285	0.7	±	0.6	9	±	2		<	16
3/9/2006	3/16/2006	286	1.2	±	0.6	16	±	2		<	11
3/16/2006	3/23/2006	285	0.8	±	0.6	11	±	2		<	11
3/23/2006	3/30/2006	286	0.9	±	0.6	11	±	2		<	30

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
3/30/2006	4/5/2006	243	0.9	±	0.7	17	±	2		<	13
4/5/2006	4/13/2006	325	0.7	±	0.5	16	±	2		<	29
4/13/2006	4/20/2006	285		<	0.5	11	±	2		<	12
4/20/2006	4/27/2006	285	0.6	±	0.5	10	±	2		<	16
4/27/2006	5/4/2006	286	0.7	±	0.6	15	±	2		<	32
5/4/2006	5/11/2006	285	1.3	±	0.6	18	±	2		<	16
5/11/2006	5/18/2006	285	0.5	±	0.5	9	±	2		<	30
5/18/2006	5/25/2006	286	1.0	±	0.6	10	±	2		<	31
5/25/2006	5/31/2006	244	1.3	±	0.6	24	±	2		<	18
5/31/2006	6/8/2006	327	1.1	±	0.5	14	±	2		<	12
6/8/2006	6/15/2006	285	0.9	±	0.5	11	±	2		<	13
6/15/2006	6/22/2006	286	0.5	±	0.5	24	±	2		<	13
6/22/2006	6/29/2006	285		<	0.5	11	±	2		<	13
6/29/2006	7/6/2006	290	1.3	±	0.6	26	±	2		<	13
7/6/2006	7/12/2006	240		<	0.6	18	±	2		<	16
7/12/2006	7/20/2006	326	0.6	±	0.5	23	±	2		<	12
7/20/2006	7/26/2006	248	1.3	±	0.7	21	±	2		<	14
7/26/2006	8/3/2006	322	0.6	±	0.5	34	±	2		<	15
8/3/2006	8/10/2006	287		<	0.5	22	±	2		<	17
8/10/2006	8/17/2006	284		<	0.5	21	±	2		<	16
8/17/2006	8/24/2006	285		<	0.5	20	±	2		<	16
8/24/2006	8/31/2006	286	0.5	±	0.5	25	±	2		<	16
8/31/2006	9/7/2006	289	1.0	±	0.5	12	±	2		<	12
9/7/2006	9/14/2006	281	1.0	±	0.6	25	±	2		<	17
9/14/2006	9/21/2006	286	0.6	±	0.5	13	±	2		<	13
9/21/2006	9/28/2006	285	0.7	±	0.5	24	±	2		<	16
9/28/2006	10/5/2006	278		<	0.5	19	±	2		<	13
10/5/2006	10/11/2006	226	1.0	±	0.6	15	±	2		<	16
10/11/2006	10/19/2006	321		<	0.4	18	±	2		<	12
10/19/2006	10/26/2006	285	1.6	±	0.6	15	±	2		<	13
10/26/2006	11/2/2006	246		<	0.5	2	±	1		<	19
11/2/2006	11/9/2006	248	0.7	±	0.6	16	±	2		<	19
11/9/2006	11/16/2006	286	0.8	±	0.5	17	±	2		<	34
11/16/2006	11/21/2006	204		<	0.7	13	±	2		<	21
11/21/2006	12/15/2006	983	1.0	±	0.3	21	±	1		<	9
12/15/2006	12/21/2006	204	0.7	±	0.7	21	±	2		<	47
12/21/2006	12/27/2006	284		<	0.5	18	±	2		<	17
	Yearly		**0.9**	±	**0.6**	**17**	±	**11**		--	
12/28/2006	1/4/2007	286	0.7	±	0.5	15	±	2		<	17
1/4/2007	1/11/2007	284		<	0.5	11	±	2		<	16
1/11/2007	1/18/2007	285	0.9	±	0.5	11	±	2		<	16
1/18/2007	1/25/2007	285	0.6	±	0.5	10	±	2		<	17

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131	
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC	ERR
1/25/2007	1/31/2007	208		<	0.7	4	±	2	<	17
1/31/2007	2/8/2007	251	1.2	±	0.7	15	±	2	<	16
2/8/2007	2/16/2007	324	0.5	±	0.4	10	±	1	<	12
2/16/2007	2/22/2007	243	1.5	±	0.7	14	±	2	<	19
2/22/2007	3/1/2007	289	0.8	±	0.5	7	±	1	<	16
3/1/2007	3/8/2007	285		<	0.5	12	±	2	<	13
3/8/2007	3/15/2007	283	1.7	±	0.7	18	±	2	<	35
3/15/2007	3/22/2007	285	0.6	±	0.5	11	±	2	<	13
3/22/2007	3/29/2007	286		<	0.5	15	±	2	<	16
3/29/2007	4/5/2007	287	0.6	±	0.5	9	±	1	<	13
4/5/2007	4/12/2007	283	0.6	±	0.4	7	±	1	<	16
4/12/2007	4/19/2007	--		--			--		--	
4/19/2007	4/26/2007	248	1.0	±	0.6	22	±	2	<	17
4/26/2007	5/3/2007	285	0.8	±	0.5	15	±	2	<	16
5/3/2007	5/10/2007	284	0.9	±	0.5	11	±	2	<	18
5/10/2007	5/17/2007	285	1.1	±	0.6	21	±	2	<	16
5/17/2007	5/24/2007	286	0.8	±	0.5	20	±	2	<	16
5/24/2006	5/31/2007	285	2.3	±	0.7	31	±	2	<	17
5/31/2007	6/7/2007	285	0.8	±	0.6	18	±	2	<	16
6/7/2007	6/14/2007	284	0.9	±	0.5	21	±	2	<	13
6/14/2007	6/21/2007	285	1.0	±	0.6	23	±	2	<	13
6/21/2007	6/28/2007	285		<	0.6	27	±	2	<	13
6/28/2007	7/5/2007	285	1.2	±	0.5	18	±	2	<	13
7/5/2007	7/12/2007	285	1.2	±	0.6	30	±	2	<	14
7/12/2007	7/19/2007	285	1.0	±	0.6	30	±	2	<	13
7/19/2007	7/26/2007	224	0.8	±	0.5	21	±	2	<	16
7/26/2007	8/1/2007	246		<	0.6	26	±	2	<	16
8/1/2007	8/9/2007	274	0.8	±	0.5	31	±	2	<	14
8/9/2007	8/16/2007	240	0.6	±	0.5	22	±	2	<	15
8/16/2007	8/23/2007	301	1.0	±	0.5	19	±	2	<	12
8/23/2007	8/30/2007	281	1.0	±	0.5	23	±	2	<	9
8/30/2007	9/6/2007	286	1.4	±	0.6	38	±	2	<	18
9/6/2007	9/13/2007	240	1.2	±	0.6	30	±	2	<	38
9/13/2007	9/20/2007	285	1.3	±	0.6	20	±	2	<	32
9/20/2007	9/28/2007	274	1.3	±	0.6	32	±	2	<	32
9/27/2007	10/4/2007	285	1.0	±	0.6	28	±	2	<	36
10/4/2007	10/11/2007	286	1.2	±	0.6	23	±	2	<	31
10/11/2007	10/18/2007	285	1.7	±	0.7	32	±	2	<	16
10/18/2007	10/25/2007	285	0.7	±	0.6	36	±	2	<	16
10/25/2007	11/1/2007	285	1.5	±	0.7	25	±	2	<	34
11/1/2007	11/9/2007	286	0.9	±	0.6	30	±	2	<	30
11/9/2007	11/15/2007	285	2.2	±	0.7	51	±	3	<	30

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
11/15/2007	11/21/2007	244		<	0.5	15	±	2		<	18
11/21/2007	11/29/2007	326	1.1	±	0.6	32	±	2		<	15
11/29/2007	12/6/2007	287	1.2	±	0.6	28	±	2		<	15
12/6/2007	12/13/2007	285	0.8	±	0.6	31	±	2		<	29
12/13/2007	12/19/2007	283	1.2	±	0.6	27	±	2		<	33
12/19/2007	12/27/2007	287	0.7	±	0.6	34	±	2		<	12
	Yearly		**1.1**	±	**0.8**	**22**	±	**19**		--	
	Overall		**1.0**	±	**0.2**	**19**	±	**7**		--	
Peach Bottom Rising Sun Station											
12/29/2005	1/5/2006	284	0.7	±	0.6	18	±	2		<	11
1/5/2006	1/12/2006	288	0.7	±	0.6	25	±	2		<	11
1/12/2006	1/19/2006	290	1.1	±	0.6	18	±	2		<	11
1/19/2006	1/26/2006	281	1.3	±	0.6	19	±	2		<	11
1/26/2006	2/2/2006	285	0.8	±	0.6	22	±	2		<	11
2/2/2006	2/9/2006	286	1.2	±	0.6	23	±	2		<	16
2/9/2006	2/16/2006	287	1.0	±	0.6	24	±	2		<	23
2/16/2006	2/23/2006	284	2.1	±	0.8	35	±	2		<	16
2/23/2006	3/2/2006	285	1.1	±	0.6	20	±	2		<	12
3/2/2006	3/9/2006	285	2.3	±	0.8	21	±	2		<	16
3/9/2006	3/16/2006	286	1.8	±	0.7	35	±	2		<	11
3/16/2006	3/23/2006	285	1.8	±	0.7	28	±	2		<	11
3/23/2006	3/30/2006	286	2.0	±	0.8	24	±	2		<	30
3/30/2006	4/5/2006	243		<	0.5	15	±	2		<	13
4/5/2006	4/13/2006	326	1.0	±	0.5	19	±	2		<	29
4/13/2006	4/20/2006	--		--			--			--	
4/20/2006	4/27/2006	285		<	0.5	9	±	1		<	16
4/27/2006	5/4/2006	286		<	0.5	14	±	2		<	32
5/4/2006	5/11/2006	285	1.1	±	0.6	15	±	2		<	16
5/11/2006	5/18/2006	285		<	0.4	10	±	2		<	30
5/18/2006	5/25/2006	245		<	0.5	3	±	1		<	36
5/25/2006	5/31/2006	244	1.3	±	0.6	12	±	2		<	18
5/31/2006	6/8/2006	286	1.0	±	0.5	8	±	1		<	14
6/8/2006	6/15/2006	285	0.5	±	0.5	12	±	2		<	13
6/15/2006	6/22/2006	283	1.3	±	0.6	25	±	2		<	13
6/22/2006	6/29/2006	284		<	0.5	12	±	2		<	13
6/29/2006	7/6/2006	291	1.0	±	0.5	18	±	2		<	13
7/6/2006	7/12/2006	240		<	0.6	14	±	2		<	16
7/12/2006	7/20/2006	325	0.8	±	0.5	23	±	2		<	12
7/20/2006	7/26/2006	124		<	1.1	21	±	4		<	28
7/26/2006	8/3/2006	--		--			--			--	
8/3/2006	8/10/2006	--		--			--			--	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
8/10/2006	8/17/2006	283	0.6	±	0.5	13	±	2		<	16
8/17/2006	8/24/2006	286	1.0	±	0.5	18	±	2		<	16
8/24/2006	8/31/2006	285	1.3	±	0.6	24	±	2		<	16
8/31/2006	9/7/2006	289	0.8	±	0.5	11	±	2		<	12
9/7/2006	9/14/2006	279	1.2	±	0.6	26	±	2		<	17
9/14/2006	9/21/2006	284	0.6	±	0.5	11	±	2		<	13
9/21/2006	9/28/2006	286	0.6	±	0.5	22	±	2		<	16
9/28/2006	10/5/2006	285	0.8	±	0.5	20	±	2		<	13
10/5/2006	10/11/2006	250	1.1	±	0.6	17	±	2		<	14
10/11/2006	10/19/2006	321		<	0.5	18	±	2		<	12
10/19/2006	10/26/2006	286	2.1	±	0.7	14	±	2		<	13
10/26/2006	11/2/2006	287	0.8	±	0.5	20	±	2		<	16
11/2/2006	11/9/2006	285		<	0.5	21	±	2		<	16
11/9/2006	11/16/2006	287		<	0.5	17	±	2		<	34
11/16/2006	11/21/2006	203		<	0.7	16	±	2		<	21
11/21/2006	12/15/2006	975	1.4	±	0.3	27	±	1		<	9
12/15/2006	12/21/2006	245	0.8	±	0.6	24	±	2		<	39
12/21/2006	12/28/2006	286		<	0.5	14	±	2		<	17
	Yearly		**1.1**	±	**0.9**	**19**	±	**13**		--	
12/28/2006	1/4/2007	285		<	0.5	17	±	2		<	17
1/4/2007	1/11/2007	285		<	0.4	2	±	1		<	16
1/11/2007	1/18/2007	285	1.0	±	0.6	11	±	2		<	16
1/18/2007	1/25/2007	285	0.8	±	0.6	14	±	2		<	17
1/25/2007	1/31/2007	250	0.7	±	0.7	21	±	2		<	15
1/31/2007	2/8/2007	324	1.0	±	0.5	23	±	2		<	11
2/8/2007	2/16/2007	325	1.3	±	0.5	21	±	2		<	12
2/16/2007	2/22/2007	248	1.2	±	0.7	17	±	2		<	19
2/22/2007	3/1/2007	289		<	0.4	8	±	1		<	16
3/1/2007	3/8/2007	286	0.9	±	0.6	16	±	2		<	13
3/8/2007	3/15/2007	283	1.6	±	0.7	25	±	2		<	35
3/15/2007	3/22/2007	285	0.8	±	0.5	16	±	2		<	13
3/22/2007	3/29/2007	286	0.9	±	0.6	18	±	2		<	16
3/29/2007	4/5/2007	288	0.9	±	0.5	14	±	2		<	13
4/5/2007	4/12/2007	283	1.0	±	0.5	11	±	2		<	16
4/12/2007	4/19/2007	282		<	0.5	4	±	1		<	34
4/19/2007	4/26/2007	285	0.7	±	0.5	16	±	2		<	17
4/26/2007	5/3/2007	286	0.8	±	0.5	11	±	2		<	16
5/3/2007	5/10/2007	284	0.7	±	0.5	8	±	1		<	18
5/10/2007	5/17/2007	286	0.9	±	0.5	16	±	2		<	16
5/17/2007	5/24/2007	286	0.5	±	0.5	14	±	2		<	16
5/24/2007	5/31/2007	283	1.0	±	0.6	23	±	2		<	17
5/31/2007	6/7/2007	285	0.8	±	0.6	18	±	2		<	17

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
6/7/2007	6/14/2007	284	0.6	±	0.5	17	±	2		<	13
6/14/2007	6/21/2007	285	0.5	±	0.5	17	±	2		<	13
6/21/2007	6/28/2007	285		<	0.5	17	±	2		<	13
6/28/2007	7/5/2007	285	0.9	±	0.5	9	±	1		<	13
7/5/2007	7/12/2007	284	1.0	±	0.6	25	±	2		<	14
7/12/2007	7/19/2007	285	1.3	±	0.6	29	±	2		<	14
7/19/2007	7/26/2007	285	1.0	±	0.6	17	±	2		<	13
7/26/2007	8/1/2007	248		<	0.6	21	±	2		<	16
8/1/2007	8/9/2007	274	1.7	±	0.6	38	±	2		<	14
8/9/2007	8/16/2007	240	1.6	±	0.7	22	±	2		<	15
8/16/2007	8/23/2007	301	1.0	±	0.6	17	±	2		<	12
8/23/2007	8/30/2007	281		<	0.4	21	±	2		<	9
8/30/2007	9/6/2007	286	1.6	±	0.6	31	±	2		<	18
9/6/2007	9/13/2007	240	1.2	±	0.6	27	±	2		<	38
9/13/2007	9/20/2007	285	0.8	±	0.5	19	±	2		<	32
9/20/2007	9/28/2007	274	1.3	±	0.6	29	±	2		<	32
9/27/2007	10/4/2007	285	1.4	±	0.7	24	±	2		<	36
10/4/2007	10/11/2007	285	1.5	±	0.6	19	±	2		<	31
10/11/2007	10/18/2007	285	0.6	±	0.5	27	±	2		<	16
10/18/2007	10/25/2007	286	1.1	±	0.6	30	±	2		<	16
10/25/2007	11/1/2007	285	0.6	±	0.6	23	±	2		<	34
11/1/2007	11/8/2007	287	1.1	±	0.6	25	±	2		<	30
11/8/2007	11/15/2007	286	0.7	±	0.5	33	±	2		<	30
11/15/2007	11/21/2007	244	0.8	±	0.6	15	±	2		<	18
11/21/2007	11/29/2007	288		<	0.5	13	±	2		<	15
11/29/2007	12/6/2007	243	1.1	±	0.6	12	±	2		<	15
12/6/2007	12/13/2007	285	0.9	±	0.6	21	±	2		<	29
12/13/2007	12/19/2007	280		<	0.5	20	±	2		<	33
12/20/2007	12/27/2007	285		<	0.6	24	±	2		<	12
	Yearly		**1.0**	±	**0.6**	**19**	±	**14**		--	
	Overall		**1.1**	±	**0.2**	**18.8**	±	**0.5**		--	
Peach Bottom Whiteford Station											
12/29/2005	1/5/2006	284		<	0.5	6	±	1		<	11
1/5/2006	1/12/2006	287	0.8	±	0.6	18	±	2		<	11
1/12/2006	1/19/2006	268		<	0.6	11	±	2		<	11
1/19/2006	1/26/2006	280		<	0.5	8	±	1		<	11
1/26/2006	2/2/2006	285	1.2	±	0.6	17	±	2		<	11
2/2/2006	2/9/2006	286	0.8	±	0.6	12	±	2		<	16
2/9/2006	2/16/2006	287	0.8	±	0.6	17	±	2		<	23
2/16/2006	2/23/2006	284	1.5	±	0.7	18	±	2		<	16
2/23/2006	3/2/2006	286	1.4	±	0.6	17	±	2		<	12

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
3/2/2006	3/9/2006	285	1.0	±	0.6	9	±	2		<	16
3/9/2006	3/16/2006	286	1.0	±	0.6	15	±	2		<	11
3/16/2006	3/23/2006	285	0.6	±	0.5	15	±	2		<	11
3/23/2006	3/30/2006	286	1.3	±	0.7	14	±	2		<	30
3/30/2006	4/5/2006	--		--			--			--	
4/5/2006	4/13/2006	326	1.1	±	0.5	21	±	2		<	29
4/13/2006	4/20/2006	146		<	1	16	±	3		<	22
4/20/2006	4/27/2006	279	0.7	±	0.5	13	±	2		<	16
4/27/2006	5/4/2006	286	0.8	±	0.6	18	±	2		<	32
5/4/2006	5/11/2006	285	0.9	±	0.6	19	±	2		<	16
5/11/2006	5/18/2006	314		<	0.4	9	±	1		<	27
5/18/2006	5/25/2006	286	0.9	±	0.6	12	±	2		<	31
5/25/2006	5/31/2006	244	1.8	±	0.7	29	±	2		<	18
5/31/2006	6/8/2006	327	1.1	±	0.5	15	±	2		<	12
6/8/2006	6/15/2006	285	0.8	±	0.5	11	±	2		<	13
6/15/2006	6/22/2006	286	1.7	±	0.7	27	±	2		<	13
6/22/2006	6/29/2006	273		<	0.6	11	±	2		<	13
6/29/2006	7/6/2006	291	1.4	±	0.6	27	±	2		<	13
7/6/2006	7/12/2006	239		<	0.7	18	±	2		<	16
7/12/2006	7/20/2006	326	1.4	±	0.6	25	±	2		<	12
7/20/2006	7/26/2006	249	0.9	±	0.6	22	±	2		<	14
7/26/2006	8/3/2006	202		<	0.7	12	±	2		<	24
8/3/2006	8/10/2006	--		--			--			--	
8/10/2006	8/17/2006	283	1.2	±	0.6	17	±	2		<	16
8/17/2006	8/24/2006	285	1.0	±	0.5	17	±	2		<	16
8/24/2006	8/31/2006	287	1.0	±	0.6	22	±	2		<	16
8/31/2006	9/7/2006	289		<	0.4	10	±	1		<	12
9/7/2006	9/14/2006	280	0.7	±	0.5	18	±	2		<	17
9/14/2006	9/21/2006	285		<	0.5	9	±	2		<	13
9/21/2006	9/28/2006	286	0.8	±	0.5	19	±	2		<	16
9/28/2006	10/5/2006	285		<	0.4	16	±	2		<	13
10/5/2006	10/11/2006	--		--			--			--	
10/11/2006	10/19/2006	239		<	0.6	5	±	2		<	16
10/19/2006	10/26/2006	286	1.5	±	0.6	19	±	2		<	13
10/26/2006	11/2/2006	287	2.0	±	0.9	27	±	2		<	16
11/2/2006	11/9/2006	285	1.0	±	0.6	30	±	2		<	16
11/9/2006	11/16/2006	286	0.8	±	0.6	25	±	2		<	34
11/16/2006	11/21/2006	204		<	0.7	21	±	2		<	21
11/21/2006	12/15/2006	978	1.7	±	0.3	37	±	1		<	9
12/15/2006	12/21/2006	245	1.0	±	0.6	33	±	2		<	39
12/21/2006	12/28/2006	285	1.5	±	0.7	25	±	2		<	17
	Yearly		**1.1**	±	**0.7**	**18**	±	**14**		--	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
12/28/2006	1/4/2007	285	1.3	±	0.6	26	±	2		<	17
1/4/2007	1/11/2007	286	0.7	±	0.5	18	±	2		<	16
1/11/2007	1/18/2007	285	1.2	±	0.6	22	±	2		<	16
1/18/2007	1/25/2007	282	1.0	±	0.6	14	±	2		<	17
1/25/2007	1/31/2007	250	1.2	±	0.7	31	±	2		<	15
1/31/2007	2/8/2007	324	1.6	±	0.6	35	±	2		<	11
2/8/2007	2/16/2007	325	1.2	±	0.5	29	±	2		<	12
2/16/2007	2/22/2007	242	1.2	±	0.7	29	±	2		<	19
2/22/2007	3/1/2007	289	0.9	±	0.5	12	±	2		<	16
3/1/2007	3/8/2007	286	1.4	±	0.7	24	±	2		<	13
3/8/2007	3/15/2007	283	2.1	±	0.7	33	±	2		<	35
3/15/2007	3/22/2007	285	1.2	±	0.6	21	±	2		<	13
3/22/2007	3/29/2007	286	1.2	±	0.6	23	±	2		<	16
3/29/2007	4/5/2007	288	0.9	±	0.5	21	±	2		<	13
4/5/2007	4/12/2007	282	1.2	±	0.5	8	±	1		<	16
4/12/2007	4/19/2007	--		--			--			--	---
4/19/2007	4/26/2007	--		--			--			--	---
4/26/2007	5/3/2007	285		<	0.4	3	±	1		<	16
5/3/2007	5/10/2007	--		--			--			--	----
5/10/2007	5/17/2007	286	1.0	±	0.5	12	±	2		<	17
5/17/2007	5/24/2007	286	0.7	±	0.5	12	±	2		<	16
5/24/2007	5/31/2007	285	0.8	±	0.5	18	±	2		<	17
5/31/2007	6/7/2007	285	1.1	±	0.6	14	±	2		<	16
6/7/2007	6/14/2007	284	0.9	±	0.5	15	±	2		<	13
6/14/2007	6/21/2007	285	0.7	±	0.5	13	±	2		<	13
6/21/2007	6/28/2007	285		<	0.6	18	±	2		<	13
6/28/2007	7/5/2007	285	0.5	±	0.4	13	±	2		<	13
7/5/2007	7/12/2007	285	1.1	±	0.6	17	±	2		<	14
7/12/2007	7/19/2007	--		--			--			--	
7/19/2007	7/26/2007	224		<	3.3		<	9		<	16
7/26/2007	8/1/2007	217		<	0.7	22	±	2		<	16
8/1/2007	8/9/2007	274		<	1	30	±	2		<	14
8/9/2007	8/16/2007	240		<	1.4	12	±	4		<	15
8/16/2007	8/23/2007	--		--			--			--	
8/23/2007	8/30/2007	281	0.8	±	0.5	16	±	2		<	9
8/30/2007	9/6/2007	286	1.3	±	0.6	24	±	2		<	18
9/6/2007	9/13/2007	240	1.8	±	1.3	27	±	4		<	38
9/13/2007	9/20/2007	285	1.1	±	0.6	14	±	2		<	32
9/20/2007	9/28/2007	274	1.0	±	0.6	19	±	2		<	32
9/27/2007	10/4/2007	120		<	0.8	5	±	3		<	36
10/4/2007	10/11/2007	--		--			--			--	
10/11/2007	10/18/2007	--		--			--			--	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
10/18/2007	10/25/2007	286		<	0.5	27	±	2		<	16
10/25/2007	11/1/2007	285	0.8	±	0.6	19	±	2		<	34
11/1/2007	11/8/2007	287	0.7	±	0.5	19	±	2		<	30
11/8/2007	11/15/2007	286	0.9	±	0.6	16	±	2		<	30
11/15/2007	11/21/2007	244		<	0.5	9	±	2		<	18
11/21/2007	11/29/2007	326	1.0	±	0.5	16	±	2		<	15
11/29/2007	12/6/2007	288	0.7	±	0.5	18	±	2		<	15
12/6/2007	12/13/2007	285	0.9	±	0.6	25	±	2		<	29
12/13/2007	12/19/2007	282	1.2	±	0.6	22	±	2		<	33
12/20/2007	12/27/2007	288	1.2	±	0.6	29	±	2		<	12
	Yearly		**1.1**	±	**0.6**	**19**	±	**15**		--	
	Overall		**1.1**	±	**0.1**	**19**	±	**2**		--	
Calvert Cliffs Horn Point Station											
12/28/2005	1/4/2006	276		<	0.5	15	±	2		<	8
1/4/2006	1/11/2006	285	0.7	±	0.6	18	±	2		<	8
1/11/2006	1/19/2006	326	0.7	±	0.5	9	±	1		<	10
1/19/2006	1/25/2006	245		<	0.6	8	±	2		<	8
1/25/2006	2/1/2006	286		<	0.5	11	±	2		<	21
2/1/2006	2/8/2006	284		<	0.5	13	±	2		<	11
2/8/2006	2/15/2006	286		<	0.5	14	±	2		<	7
2/15/2006	2/22/2006	285	1.5	±	0.7	21	±	2		<	11
2/22/2006	3/1/2006	286	1.2	±	0.6	22	±	2		<	14
3/1/2006	3/8/2006	284	1.4	±	0.7	16	±	2		<	11
3/8/2006	3/15/2006	200	0.8	±	0.8	19	±	2		<	16
3/15/2006	3/22/2006	284	1.0	±	0.6	15	±	2		<	14
3/22/2006	3/29/2006	285		<	0.6	6	±	1		<	11
3/29/2006	4/4/2006	242	0.7	±	0.6	18	±	2		<	13
4/4/2006	4/12/2006	327	0.6	±	0.5	16	±	2		<	7
4/12/2006	4/19/2006	285		<	0.5	13	±	2		<	11
4/19/2006	4/26/2006	167		<	0.6	8	±	2		<	18
4/26/2006	5/3/2006	284	0.7	±	0.6	14	±	2		<	11
5/3/2006	5/10/2006	285	0.6	±	0.5	16	±	2		<	11
5/10/2006	5/17/2006	98		<	1.2	8	±	4		<	62
5/17/2006	5/24/2006	285	0.5	±	0.5	11	±	2		<	15
5/24/2006	5/30/2006	245	1.2	±	0.6	20	±	2		<	17
5/30/2006	6/7/2006	328	1.1	±	0.5	16	±	2		<	7
6/7/2006	6/14/2006	285	1.1	±	0.6	10	±	2		<	18
6/14/2006	6/21/2006	286	0.6	±	0.5	20	±	2		<	7
6/21/2006	6/28/2006	286		<	0.5	11	±	2		<	13
6/28/2006	7/6/2006	326	0.9	±	0.5	22	±	2		<	10
7/6/2006	7/11/2006	257		<	0.6	8	±	2		<	18

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha		Gross Beta		I-131	
START	END	VOLUME	CONC	ERR	CONC	ERR	CONC	ERR
7/11/2006	7/19/2006	327	0.9	± 0.5	21	± 2	< 15	
7/19/2006	7/26/2006	286	< 0.4		16	± 2	< 11	
7/26/2006	8/2/2006	133	< 1		26	± 3	< 39	
8/2/2006	8/9/2006	265	1.0	± 0.6	27	± 2	< 12	
8/9/2006	8/16/2006	286	0.7	± 0.6	18	± 2	< 16	
8/16/2006	8/23/2006	286	0.7	± 0.5	14	± 2	< 18	
8/23/2006	8/30/2006	286	1.0	± 0.6	29	± 2	< 11	
8/30/2006	9/7/2006	326	0.7	± 0.4	7	± 1	< 10	
9/7/2006	9/14/2006	245	1.2	± 0.7	18	± 2	< 8	
9/13/2006	9/20/2006	285	0.6	± 0.5	11	± 2	< 8	
9/20/2006	9/27/2006	286	< 0.5		18	± 2	< 11	
9/27/2006	10/4/2006	286	0.7	± 0.5	18	± 2	< 7	
10/4/2006	10/11/2006	285	1.3	± 0.6	16	± 2	< 17	
10/11/2006	10/18/2006	286	< 0.5		19	± 2	< 16	
10/18/2006	10/25/2006	286	1.0	± 0.5	12	± 2	< 14	
10/25/2006	11/1/2006	286	1.5	± 0.6	14	± 2	< 7	
11/1/2006	11/8/2006	286	1.4	± 0.7	20	± 2	< 7	
11/8/2006	11/15/2006	285	0.7	± 0.5	20	± 2	< 11	
11/15/2006	11/20/2006	203	< 0.7		16	± 2	< 22	
11/20/2006	12/13/2006	940	1.0	± 0.3	22	± 1	< 6	
12/13/2006	12/20/2006	284	0.8	± 0.5	23	± 2	< 18	
12/20/2006	12/27/2006	284	< 0.5		15	± 2	< 16	
	Yearly		**0.9**	**± 0.6**	**16**	**± 11**	--	
12/27/2006	1/3/2007	286	< 0.5		15	± 2	< 17	
1/3/2007	1/10/2007	285	< 0.5		12	± 2	< 11	
1/10/2007	1/17/2007	285	< 0.4		16	± 2	< 18	
1/17/2007	1/24/2007	285	1.7	± 0.7	26	± 2	< 11	
1/24/2007	1/31/2007	286	< 0.5		21	± 2	< 11	
1/31/2007	2/8/2007	324	1.1	± 0.5	24	± 2	< 10	
2/8/2007	2/16/2007	320	0.9	± 0.5	20	± 2	< 11	
2/16/2007	2/21/2007	206	1.7	± 0.8	17	± 2	< 14	
2/21/2007	2/28/2007	285	0.9	± 0.5	10	± 2	< 11	
2/28/2007	3/7/2007	289	< 0.5		14	± 2	< 16	
3/7/2007	3/14/2007	284	1.6	± 0.7	23	± 2	< 18	
3/14/2007	3/21/2007	285	1.3	± 0.6	18	± 2	< 11	
3/21/2007	3/28/2007	286	0.9	± 0.6	20	± 2	< 11	
3/28/2007	4/5/2007	324	< 0.4		15	± 2	< 10	
4/5/2007	4/11/2007	247	1.5	± 0.6	13	± 2	< 38	
4/11/2007	4/18/2007	285	0.5	± 0.5	8	± 1	< 18	
4/18/2007	4/25/2007	286	0.7	± 0.5	12	± 2	< 11	
4/25/2007	5/2/2007	286	0.6	± 0.5	14	± 2	< 16	
5/2/2007	5/9/2007	285	0.7	± 0.5	8	± 1	< 14	

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
5/9/2007	5/16/2007	284	0.6	±	0.5	14	±	2		<	18
5/16/2007	5/23/2007	285	0.6	±	0.5	14	±	2		<	11
5/23/2007	5/29/2007	244	1.5	±	0.7	27	±	2		<	18
5/29/2007	6/5/2007	213	0.8	±	0.7	16	±	2		<	15
6/5/2007	6/13/2007	327	0.8	±	0.5	14	±	2		<	16
6/13/2007	6/20/2007	285		<	0.4	15	±	2		<	18
6/20/2007	6/27/2006	285		<	0.6	15	±	2		<	18
6/27/2007	7/3/2007	245	0.9	±	0.5	15	±	2		<	8
7/3/2007	7/11/2007	321	1.2	±	0.5	20	±	2		<	7
7/11/2007	7/18/2007	286	1.2	±	0.6	22	±	2		<	7
7/18/2007	7/25/2007	285	0.7	±	0.5	13	±	2		<	7
7/25/2007	8/1/2007	203		<	0.8	14	±	2		<	25
8/1/2007	8/8/2007	287	0.8	±	0.5	31	±	2		<	17
8/8/2007	8/14/2007	285	0.5	±	0.5	18	±	2		<	13
8/15/2007	8/22/2007	325	1.0	±	0.5	14	±	2		<	12
8/22/2007	8/29/2007	246		<	0.5	12	±	2		<	20
8/29/2007	9/5/2007	285	1.2	±	0.6	25	±	2		<	17
9/5/2007	9/12/2007	286	0.9	±	0.5	19	±	2		<	16
9/12/2007	9/19/2007	285	0.6	±	0.5	17	±	2		<	20
9/19/2007	9/25/2007	245	1.1	±	0.6	18	±	2		<	24
9/25/2007	10/3/2007	327	1.2	±	0.6	22	±	2		<	20
10/3/2007	10/10/2007	285		<	0.5	13	±	2		<	11
10/10/2007	10/17/2007	286	1.2	±	0.6	24	±	2		<	16
10/17/2007	10/24/2007	286	0.7	±	0.6	30	±	2		<	19
10/24/2007	10/31/2007	285		<	0.5	13	±	2		<	7
10/31/2007	11/7/2007	288	0.8	±	0.5	20	±	2		<	21
11/7/2007	11/14/2007	286	0.5	±	0.5	20	±	2		<	22
11/14/2007	11/20/2007	242		<	0.6	18	±	2		<	13
11/20/2007	11/28/2007	326		<	0.4	21	±	2		<	18
11/28/2007	12/6/2007	288	1.4	±	0.6	25	±	2		<	36
12/6/2007	12/13/2007	285	0.5	±	0.5	22	±	2		<	16
12/13/2007	12/19/2007	246		<	0.5	17	±	2		<	13
12/19/2007	12/27/2007	324		<	0.4	25	±	2		<	7
	Yearly		**1.0**	±	**0.7**	**18**	±	**11**		--	
	Overall		**0.9**	±	**0.1**	**17**	±	**3**		--	
Peach Bottom Dempsey Farm Station											
12/29/2005	1/5/2006	284	0.7	±	0.6	16	±	2		<	11
1/5/2006	1/12/2006	288	1.3	±	0.6	19	±	2		<	11
1/12/2006	1/19/2006	291	0.6	±	0.5	12	±	2		<	11
1/19/2006	1/26/2006	280	0.9	±	0.6	16	±	2		<	11
1/26/2006	2/2/2006	285	1.0	±	0.6	17	±	2		<	11

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
2/2/2006	2/9/2006	286	0.9	±	0.6	17	±	2		<	16
2/9/2006	2/16/2006	287	1.1	±	0.6	21	±	2		<	23
2/16/2006	2/23/2006	284	1.3	±	0.7	25	±	2		<	16
2/23/2006	3/2/2006	285	1.2	±	0.6	22	±	2		<	12
3/2/2006	3/9/2006	285	1.0	±	0.6	13	±	2		<	16
3/9/2006	3/16/2006	286	1.3	±	0.6	20	±	2		<	11
3/16/2006	3/23/2006	285	1.3	±	0.7	14	±	2		<	11
3/23/2006	3/30/2006	286	1.6	±	0.7	12	±	2		<	30
3/30/2006	4/5/2006	243	1.1	±	0.7	17	±	2		<	13
4/5/2006	4/13/2006	326	0.8	±	0.5	18	±	2		<	29
4/13/2006	4/20/2006	285	0.7	±	0.6	14	±	2		<	12
4/20/2006	4/27/2006	285		<	0.5	9	±	1		<	16
4/27/2006	5/4/2006	286	0.8	±	0.6	15	±	2		<	32
5/4/2006	5/11/2006	285	0.8	±	0.5	17	±	2		<	16
5/11/2006	5/18/2006	285		<	0.5	9	±	1		<	30
5/18/2006	5/25/2006	286	0.7	±	0.5	11	±	2		<	31
5/25/2006	5/31/2006	244	1.3	±	0.7	24	±	2		<	18
5/31/2006	6/8/2006	327	0.9	±	0.4	13	±	2		<	12
6/8/2006	6/15/2006	285	0.9	±	0.6	9	±	2		<	13
6/15/2006	6/22/2006	286	0.7	±	0.5	23	±	2		<	13
6/22/2006	6/29/2006	282		<	0.5	26	±	1		<	13
6/29/2006	7/6/2006	291	2.1	±	0.7	25	±	2		<	13
7/6/2006	7/12/2006	239		<	0.7	13	±	2		<	16
7/12/2006	7/20/2006	326	0.9	±	0.5	22	±	2		<	12
7/20/2006	7/26/2006	249	0.9	±	0.6	20	±	2		<	14
7/26/2006	8/3/2006	323	1.0	±	0.5	29	±	2		<	15
8/3/2006	8/10/2006	287	0.7	±	0.5	21	±	2		<	17
8/10/2006	8/17/2006	283	1.2	±	0.6	18	±	2		<	16
8/17/2006	8/24/2006	285	1.5	±	0.6	19	±	2		<	16
8/24/2006	8/31/2006	287	0.7	±	0.5	22	±	2		<	16
8/31/2006	9/7/2006	289	0.8	±	0.5	12	±	2		<	12
9/7/2006	9/14/2006	281	1.1	±	0.6	20	±	2		<	17
9/14/2006	9/21/2006	284	0.8	±	0.5	11	±	2		<	13
9/21/2006	9/28/2006	286	0.7	±	0.5	20	±	2		<	16
9/28/2006	10/5/2006	285	0.5	±	0.5	18	±	2		<	13
10/5/2006	10/11/2006	250	0.7	±	0.5	15	±	2		<	14
10/11/2006	10/19/2006	321	0.6	±	0.5	18	±	2		<	12
10/19/2006	10/26/2006	286	1.2	±	0.6	13	±	2		<	13
10/26/2006	11/2/2006	284	0.7	±	0.5	16	±	2		<	16
11/2/2006	11/9/2006	286		<	0.6	22	±	2		<	16
11/9/2006	11/16/2006	285	0.8	±	0.6	18	±	2		<	34
11/16/2006	11/21/2006	203		<	0.6	15	±	2		<	21

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
11/21/2006	12/15/2006	978	1.0	±	0.3	26	±	1		<	9
12/15/2006	12/21/2006	245	1.1	±	0.6	19	±	2		<	39
12/21/2006	12/28/2006	286		<	0.4	17	±	2		<	17
	Yearly		**1.0**	±	**0.6**	**18**	±	**10**		--	
12/28/2006	1/4/2007	285	0.7	±	0.5	16	±	2		<	17
1/4/2007	1/11/2007	287		<	0.5	12	±	2		<	16
1/11/2007	1/18/2007	285	1.2	±	0.6	16	±	2		<	16
1/18/2007	1/25/2007	285	0.9	±	0.6	17	±	2		<	17
1/25/2007	1/31/2007	250	1.2	±	0.7	20	±	2		<	15
1/31/2007	2/8/2007	324	1.1	±	0.6	26	±	2		<	11
2/8/2007	2/16/2007	325	1.0	±	0.5	21	±	2		<	12
2/16/2007	2/22/2007	242	1.4	±	0.7	19	±	2		<	19
2/22/2007	3/1/2007	289	0.9	±	0.5	9	±	1		<	16
3/1/2007	3/8/2007	286		<	0.5	10	±	2		<	13
3/8/2007	3/15/2007	283	1.3	±	0.6	25	±	2		<	35
3/15/2007	3/22/2007	285	0.6	±	0.5	18	±	2		<	13
3/22/2007	3/29/2007	286	1.3	±	0.6	17	±	2		<	16
3/29/2007	4/5/2007	288	0.5	±	0.5	13	±	2		<	13
4/5/2007	4/12/2007	283	1.0	±	0.5	11	±	2		<	16
4/12/2007	4/19/2007	282	0.8	±	0.5	6	±	1		<	34
4/19/2007	4/26/2007	280	0.6	±	0.5	17	±	2		<	17
4/26/2007	5/3/2007	285	0.8	±	0.5	14	±	2		<	16
5/3/2007	5/10/2007	284	1.0	±	0.6	10	±	2		<	18
5/10/2007	5/17/2007	284		<	0.4	17	±	2		<	16
5/17/2007	5/24/2007	286		<	0.5	15	±	2		<	16
5/24/2007	5/31/2007	285	0.9	±	0.6	23	±	2		<	17
5/31/2007	6/7/2007	285	0.7	±	0.6	18	±	2		<	16
6/7/2007	6/14/2007	284	0.5	±	0.5	17	±	2		<	13
6/14/2007	6/21/2007	285		<	0.5	17	±	2		<	13
6/21/2007	6/28/2007	285	0.6	±	0.6	19	±	2		<	13
6/28/2007	7/5/2007	285	0.9	±	0.5	12	±	2		<	13
7/5/2007	7/12/2007	285	1.0	±	0.5	21	±	2		<	14
7/12/2007	7/19/2007	285	0.7	±	0.5	25	±	2		<	13
7/19/2007	7/26/2007	224	0.8	±	0.5	14	±	2		<	16
7/26/2007	8/1/2007	217		<	0.6	17	±	2		<	16
8/1/2007	8/9/2007	274	1.0	±	0.5	30	±	2		<	14
8/9/2007	8/16/2007	240	1.2	±	0.6	18	±	2		<	15
8/16/2007	8/23/2008	301	0.6	±	0.5	13	±	2		<	12
8/23/2007	8/30/2007	281	0.8	±	0.5	17	±	2		<	9
8/30/2007	9/6/2007	286	0.7	±	0.5	27	±	2		<	18
9/6/2007	9/13/2007	240	1.2	±	0.6	22	±	2		<	38
9/13/2007	9/20/2007	285	1.1	±	0.6	16	±	2		<	32

Table C-6. (Continued)

SAMPLE DATE			Gross Alpha			Gross Beta			I-131		
START	END	VOLUME	CONC		ERR	CONC		ERR	CONC		ERR
9/20/2007	9/28/2007	274	1.5	±	0.6	25	±	2		<	32
9/27/2007	10/4/2007	285	0.9	±	0.6	20	±	2		<	36
10/4/2007	10/11/2007	285	0.6	±	0.5	16	±	2		<	31
10/11/2007	10/18/2007	285	1.1	±	0.6	23	±	2		<	16
10/18/2007	10/25/2007	286		<	0.5	27	±	2		<	16
10/25/2007	11/1/2007	285	0.7	±	0.6	18	±	2		<	34
11/1/2007	11/8/2007	284	1.0	±	0.6	23	±	2		<	30
11/8/2007	11/15/2007	286		<	0.5	25	±	2		<	30
11/15/2007	11/21/2007	244		<	0.6	13	±	2		<	18
11/21/2007	11/29/2007	326	0.8	±	0.5	22	±	2		<	15
11/29/2007	12/6/2007	248		<	0.5	13	±	2		<	15
12/6/2007	12/13/2007	285		<	0.5	21	±	2		<	29
12/13/2007	12/20/2007	282	0.7	±	0.5	14	±	2		<	33
12/19/2007	12/27/2007	288		<	0.5	20	±	2		<	12
	Yearly		**0.9**	±	**0.5**	**18**	±	**10**		--	
	Overall		**0.9**	±	**0.1**	**18**	±	**1**		--	

Table C-7. Radionuclide Concentrations in Monthly Composite Air Particulate (fCi/m3 ± 2 sigma)

SAMPLE DATE			Be-7			Cs-137		
START	**END**	**VOLUME**	**CONC**		**ERR**	**CONC**		**ERR**
			Calvert Cliffs Long Beach Station					
12/27/2005	1/31/2006	1617	90	±	20		<	2
1/31/2006	2/28/2006	1141	140	±	20		<	3
2/28/2006	3/28/2006	1141	130	±	20		<	3
3/28/2006	4/25/2006	1114	130	±	20		<	3
4/25/2006	5/30/2006	1256	180	±	20		<	2
5/30/2006	6/27/2006	1133	180	±	20		<	2
6/27/2006	7/24/2006	1100	160	±	20		<	4
7/24/2006	8/29/2006	1469	180	±	20		<	3
8/29/2006	9/25/2006	1099	100	±	30		<	4
9/26/2006	10/24/2006	1142	110	±	30		<	4
10/23/2006	11/20/2006	1148	80	±	20		<	4
11/20/2006	12/26/2006	1463	130	±	20		<	3
			134	±	**71**		--	
12/26/2006	1/30/2007	1463	130	±	20		<	3
1/30/2007	2/27/2007	1141	110	±	20		<	4
2/27/2007	3/27/2007	1140	130	±	20		<	4
3/27/2007	4/23/2007	1135	140	±	20		<	4
4/23/2007	5/29/2007	1432	190	±	20		<	3
5/29/2007	6/26/2007	1004	150	±	20		<	3
7/2/2007	7/31/2007	1427	120	±	30		<	5
7/31/2007	8/28/2007	1143	130	±	40		<	6
8/28/2007	9/24/2007	1100	170	±	30		<	3
9/24/2007	10/29/2007	1427	140	±	30		<	5
10/29/2007	11/27/2007	1185	100	±	40		<	6
11/27/2007	12/26/2007	1188	160	±	20		<	3
	Yearly		**139**	±	**51**		--	
	Overall		**137**	±	**7**		--	
			Calvert Cliffs Lusby Station					
12/27/2005	1/31/2006	1618	100	±	10		<	2
1/31/2006	2/28/2006	1056	180	±	20		<	3
2/28/2006	3/28/2006	1141	160	±	20		<	3
3/28/2006	4/25/2006	1139	160	±	20		<	3
4/25/2006	5/30/2006	1431	210	±	20		<	2
5/30/2006	6/27/2006	1135	210	±	30		<	4
6/27/2006	7/24/2006	856	210	±	30		<	5
7/24/2006	8/29/2006	1467	170	±	20		<	2
8/29/2006	9/25/2006	770	100	±	20		<	4
9/26/2006	10/24/2006	1143	140	±	30		<	4

Table C-7. (Continued)

SAMPLE DATE			Be-7			Cs-137	
START	END	VOLUME	CONC		ERR	CONC	ERR
10/23/2006	11/20/2006	932	90	±	20	<	3
11/20/2006	12/26/2006	1463	130	±	20	<	2
			155	±	**88**	--	
12/26/2006	1/30/2007	1463	130	±	20	<	2
1/30/2007	2/27/2007	1101	140	±	20	<	3
2/27/2007	3/27/2007	1140	130	±	20	<	2
3/27/2007	4/23/2007	1139	150	±	30	<	3
4/23/2007	5/29/2007	1432	170	±	20	<	2
5/29/2007	6/26/2007	1166	150	±	20	<	2
7/2/2007	7/31/2007	945	200	±	40	<	8
7/31/2007	8/28/2007	566	190	±	80	<	13
8/28/2007	9/24/2007	1101	180	±	40	<	6
9/24/2007	10/29/2007	1142	160	±	20	<	2
10/29/2007	11/27/2007	1183	90	±	30	<	6
11/27/2007	12/26/2007	1182	100	±	20	<	2
	Yearly		**149**	±	**67**	--	
	Overall		**152**	±	**8**	--	
Calvert Cliffs Cove Point Station							
12/27/2005	1/31/2006	1617	80	±	10	<	1
1/31/2006	2/28/2006	1141	140	±	10	<	2
2/28/2006	3/28/2006	1141	120	±	20	<	2
3/28/2006	4/25/2006	1139	130	±	10	<	2
4/25/2006	5/30/2006	1431	170	±	10	<	1
5/30/2006	6/27/2006	1138	160	±	20	<	3
6/27/2006	7/24/2006	490	210	±	60	<	8
7/24/2006	8/29/2006	1269	170	±	20	<	2
8/29/2006	9/25/2006	531	150	±	20	<	4
9/26/2006	10/24/2006	1142	140	±	20	<	2
10/23/2006	11/20/2006	1148	110	±	20	<	2
11/20/2006	12/26/2006	1464	130	±	20	<	2
	Yearly		**143**	±	**67**	--	
12/26/2006	1/30/2007	1464	130	±	10	<	2
1/30/2007	2/27/2007	1142	130	±	30	<	4
2/27/2007	3/27/2007	1140	140	±	10	<	2
3/27/2007	4/23/2007	1141	130	±	10	<	1
4/23/2007	5/29/2007	1132	210	±	20	<	1
5/29/2007	6/26/2007	1129	100	±	20	<	3
7/2/2007	7/31/2007	1056	110	±	20	<	1
7/31/2007	8/28/2007	1059	110	±	20	<	4
8/28/2007	9/24/2007	1101	170	±	20	<	3
9/24/2007	10/29/2007	1426	130	±	20	<	3

Table C-7. (Continued)

SAMPLE DATE			Be-7			Cs-137		
START	END	VOLUME	CONC		ERR	CONC		ERR
10/29/2007	11/27/2007	1185	100	±	10		<	2
11/27/2007	12/26/2007	1169	140	±	10		<	2
	Yearly		**133**	±	**62**		--	
	Overall		**138**	±	**13**		--	
		Baltimore City Station						
12/29/2005	2/2/2006	1427	80	±	10		<	1
2/2/2006	3/2/2006	855	130	±	10		<	2
3/2/2006	3/30/2006	1142	110	±	10		<	2
3/30/2006	4/27/2006	1138	120	±	10		<	2
4/27/2006	5/31/2006	1386	150	±	10		<	1
5/31/2006	6/29/2006	1183	140	±	10		<	1
6/29/2006	7/26/2006	1104	200	±	20		<	2
7/26/2006	8/31/2006	1464	170	±	10		<	1
8/31/2006	9/28/2006	1141	140	±	10		<	1
9/28/2006	10/26/2006	1110	120	±	20		<	4
10/26/2006	11/21/2006	984	80	±	10		<	2
11/21/2006	12/28/2006	1473	100	±	10		<	1
	Yearly		**128**	±	**70**		--	
12/28/2006	1/31/2007	1473	100	±	10		<	1
1/31/2007	3/1/2007	1107	80	±	20		<	3
3/1/2007	3/29/2007	1139	110	±	10		<	2
3/29/2007	4/12/2007	818	140	±	10		<	3
4/26/2007	5/31/2007	1425	220	±	20		<	2
5/31/2007	6/28/2007	1142	180	±	20		<	1
6/28/2007	7/26/2007	1142	180	±	20		<	4
7/31/2007	8/31/2007	1421	160	±	20		<	3
8/30/2007	9/27/2007	1143	160	±	20		<	3
9/27/2007	10/25/2007	1142	200	±	20		<	3
10/25/2007	11/29/2007	1427	190	±	10		<	1
11/29/2007	12/27/2007	1142	160	±	10		<	1
	Yearly		**157**	±	**85**		--	
	Overall		**143**	±	**40**		--	
		Peach Bottom Rising Sun Station						
12/29/2005	2/2/2006	1428	120	±	20		<	2
2/2/2006	3/2/2006	1142	190	±	20		<	2
3/2/2006	3/30/2006	1142	210	±	30		<	3
3/30/2006	4/27/2006	854	110	±	30		<	4
4/27/2006	5/31/2006	1345	120	±	20		<	2
5/31/2006	6/29/2006	1138	140	±	20		<	4
6/29/2006	7/26/2006	981	150	±	30		<	4

Table C-7. (Continued)

SAMPLE DATE			Be-7			Cs-137	
START	END	VOLUME	CONC		ERR	CONC	ERR
7/26/2006	8/31/2006	854	160	±	30	<	3
8/31/2006	9/28/2006	1138	130	±	20	<	3
9/28/2006	10/26/2006	1142	130	±	30	<	2
10/26/2006	11/21/2006	1062	90	±	20	<	3
11/21/2006	12/28/2006	1506	100	±	20	<	2
	Yearly		**138**	±	**71**	--	
12/28/2006	1/31/2007	1506	100	±	20	<	2
1/31/2007	3/1/2007	1176	130	±	20	<	2
3/1/2007	3/29/2007	1140	130	±	20	<	4
3/29/2007	4/12/2007	1138	110	±	20	<	4
4/26/2007	5/31/2007	1425	150	±	20	<	2
5/31/2007	6/28/2007	1141	150	±	20	<	2
6/28/2007	7/26/2007	1140	160	±	20	<	6
7/31/2007	8/31/2007	1427	130	±	30	<	5
8/30/2007	9/27/2007	1143	160	±	30	<	6
9/27/2007	10/25/2007	1141	200	±	40	<	6
10/25/2007	11/29/2007	1390	100	±	20	<	3
11/29/2007	12/27/2007	1093	90	±	30	<	7
	Yearly		**134**	±	**64**	--	
	Overall		**136**	±	**5**	--	
Peach Bottom Whiteford Station							
12/29/2005	2/2/2006	1404	70	±	20	<	3
2/2/2006	3/2/2006	1143	120	±	20	<	3
3/2/2006	3/30/2006	1142	110	±	20	<	3
3/30/2006	4/27/2006	751	120	±	30	<	5
4/27/2006	5/31/2006	1415	170	±	20	<	2
5/31/2006	6/29/2006	1171	150	±	20	<	2
6/29/2006	7/26/2006	1105	210	±	30	<	4
7/26/2006	8/31/2006	1057	160	±	30	<	4
8/31/2006	9/28/2006	1140	120	±	40	<	4
9/28/2006	10/26/2006	810	100	±	40	<	5
10/26/2006	11/21/2006	1062	120	±	30	<	4
11/21/2006	12/28/2006	1508	150	±	20	<	3
	Yearly		**133**	±	**74**	--	
12/28/2006	1/31/2007	1508	150	±	20	<	3
1/31/2007	3/1/2007	1180	180	±	20	<	2
3/1/2007	3/29/2007	1140	170	±	30	<	4
3/29/2007	4/12/2007	570	140	±	40	<	5
4/26/2007	5/31/2007	1142	120	±	20	<	3
5/31/2007	6/28/2007	1137	130	±	20	<	2
6/28/2007	7/26/2007	602	130	±	30	<	5

Table C-7. (Continued)

SAMPLE DATE			Be-7			Cs-137		
START	END	VOLUME	CONC		ERR	CONC		ERR
7/31/2007	8/31/2007	755	90	±	30		<	5
8/30/2007	9/27/2007	914	120	±	30		<	4
9/27/2007	10/25/2007	406	170	±	40		<	6
10/25/2007	11/29/2007	1428	90	±	20		<	3
11/29/2007	12/27/2007	1143	110	±	20		<	3
	Yearly		**133**	±	**60**		--	
	Overall		**133**	±	**0**		--	
			Calvert Cliffs Horn Point Station					
12/28/2005	2/1/2006	1418	60	±	20		<	3
2/1/2006	3/1/2006	1141	110	±	20		<	3
3/1/2006	3/29/2006	1053	120	±	20		<	3
3/29/2006	4/26/2006	1021	130	±	20		<	3
4/26/2006	5/30/2006	1197	160	±	20		<	2
5/30/2006	6/28/2006	1185	150	±	20		<	2
6/28/2006	7/25/2006	1196	150	±	20		<	4
7/26/2006	8/30/2006	1256	150	±	20		<	3
8/30/2006	9/27/2006	1142	100	±	20		<	4
9/27/2006	10/25/2006	1143	105	±	30		<	4
10/25/2006	11/20/2006	1060	90	±	20		<	4
11/20/2006	12/27/2006	1510	110	±	20		<	3
	Yearly		**120**	±	**59**		--	
12/27/2006	1/31/2007	1510	110	±	20		<	3
1/31/2007	2/28/2007	1135	120	±	20		<	4
2/28/2007	3/28/2007	1140	130	±	20		<	2
3/28/2007	4/26/2007	1142	120	±	30		<	6
4/25/2007	5/29/2007	1384	160	±	20		<	2
5/29/2007	6/27/2007	1110	170	±	20		<	3
6/27/2007	7/25/2007	1137	130	±	20		<	3
7/25/2007	8/29/2007	1346	110	±	30		<	3
7/29/2007	9/25/2007	1101	130	±	20		<	4
9/25/2007	10/25/2007	1426	100	±	30		<	5
10/31/2007	11/28/2007	1142	90	±	30		<	3
11/28/2007	12/27/2007	1143	140	±	20		<	3
	Yearly		**126**	±	**46**		--	
	Overall		**123**	±	**9**		--	
			Peach Bottom Dempsey Farm Station					
12/29/2005	2/2/2006	1428	90	±	10		<	2
2/2/2006	3/2/2006	1142	160	±	20		<	2
3/2/2006	3/30/2006	1142	120	±	30		<	3
3/30/2006	4/27/2006	1139	130	±	30		<	3

Table C-7. (Continued)

SAMPLE DATE			Be-7			Cs-137		
START	END	VOLUME	CONC		ERR	CONC		ERR
4/27/2006	5/31/2006	1386	150	±	20		<	2
5/31/2006	6/29/2006	1180	140	±	20		<	4
6/29/2006	7/26/2006	1105	180	±	30		<	1
7/26/2006	8/31/2006	1465	140	±	20		<	2
8/31/2006	9/28/2006	1140	110	±	20		<	2
9/28/2006	10/26/2006	1142	120	±	30		<	3
10/26/2006	11/21/2006	1059	90	±	20		<	3
11/21/2006	12/28/2006	1509	100	±	20		<	2
	Yearly		**128**	±	**56**			
12/28/2006	1/31/2007	1509	100	±	20		<	2
1/31/2007	3/1/2007	1180	120	±	20		<	4
3/1/2007	3/29/2007	1140	110	±	20		<	3
3/29/2007	4/12/2007	1133	120	±	20		<	4
4/26/2007	5/31/2007	1420	150	±	20		<	2
5/31/2007	6/28/2007	1143	150	±	20		<	2
6/28/2007	7/26/2007	1143	140	±	20		<	2
7/31/2007	8/31/2007	1420	130	±	40		<	5
8/30/2007	9/27/2007	1143	130	±	30		<	6
9/27/2007	10/25/2007	1141	160	±	20		<	2
10/25/2007	11/29/2007	1517	160	±	50		<	6
11/29/2007	12/27/2007	1103	80	±	30		<	7
	Yearly		**129**	±	**49**		--	
	Overall		**128**	±	**2**		--	

Table C-8. Radiation Concentrations in Potable Water (pCi/l ± 2 sigma)

	Gross Alpha			Gross Beta			Tritium		
DATE	CONC		ERR	CONC		ERR	CONC		ERR
				Baltimore City Station					
1/5/2006	3	±	1	3	±	2		<	300
2/2/2006		<	1		<	3		<	300
3/1/2006		<	1		<	3		<	300
4/4/2006		<	1		<	3		<	300
5/1/2006	2	±	1	3	±	2		<	300
6/1/2006	1	±	1	3	±	2		<	300
7/6/2006		<	1		<	3		<	300
8/1/2006	1	±	1		<	3		<	300
9/1/2006	2	±	1		<	3		<	300
10/3/2006	1	±	1		<	3		<	300
11/1/2006	1	±	1	4	±	2	300	±	200
12/1/2006		<	1	4	±	2		<	300
Yearly	**2**	±	**2**	**3**	±	**1**	**300**	±	**200**
1/2/2007	2	±	1	3	±	2		<	300
2/1/2007	1	±	1		<	3		<	300
3/1/2007	1	±	1	3	±	2		<	300
4/4/2007	2	±	1	5	±	2		<	300
5/1/2007	1	±	1		<	3		<	300
6/1/2007	2	±	1		<	3		<	300
7/2/2007	1	±	1	5	±	2		<	300
8/1/2007		<	1		<	3		--	
9/5/2007		<	1		<	3		<	300
10/2/2007	1	±	1	3	±	2		<	300
11/1/2007	1	±	1	4	±	2		<	300
12/3/2007	1	±	1	5	±	2		<	300
Yearly	**1**	±	**1**	**4**	±	**2**		--	
Overall	**1.4**	±	**0.4**	**4**	±	**1**	**300**	±	**200**
				Calvert Cliffs Chesapeake Country Club Station					
1/3/2006	1	±	1	4	±	2		<	300
4/11/2006		<	1	5	±	2		<	300
7/24/2006		<	1	6	±	2		<	300
10/3/2006		<	1	5	±	2		<	300
Yearly	**1**	±	**1**	**5**	±	**2**		--	
1/2/2007		<	1	4	±	2		<	300
4/10/2007	1	±	1	6	±	2		<	300
7/2/2007	3	±	1	5	±	2		<	300
10/2/2007		<	1	5	±	2		<	300
Yearly	**2**	±	**3**	**5**	±	**2**		--	
Overall	**2**	±	**1**	**5**	±	**0**		--	

Table C-8. (Continued)

DATE	Gross Alpha CONC		ERR	Gross Beta CONC		ERR	Tritium CONC		ERR
Calvert Cliffs Calvert County Courthouse Station									
1/3/2006		--			--			--	
4/11/2006	1	±	1	11	±	2		<	300
7/24/2006	1	±	1	12	±	2	300	±	200
10/3/2006		<	1	11	±	2		<	300
Yearly	**1**	±	**0**	**11**	±	**1**	**300**	±	**200**
1/2/2007		<	1	11	±	2		<	300
4/10/2007		<	1	10	±	2		<	300
7/2/2007		<	1	12	±	2		<	300
10/2/2007		<	1	12	±	3		<	300
Yearly		--		**11**	±	**2**		--	
Overall	**1**	±	**0**	**11.3**	±	**0.1**	**300**	±	**200**
Calvert Cliffs Appeal Elementary School Station									
1/3/2006	1	±	1	12	±	2		<	300
4/11/2006	1	±	1	15	±	3		<	300
7/24/2006	1	±	1	11	±	2		<	300
10/3/2006		<	1	10	±	2		<	300
Yearly	**1**	±	**0**	**12**	±	**4**		--	
1/2/2007		<	1	10	±	2		<	300
4/10/2007		<	1	11	±	2		<	300
7/2/2007		<	1	10	±	2		<	300
10/2/2007	1	±	1	10	±	2		<	300
Yearly	**1**	±	**1**	**10**	±	**1**		--	
Overall	**1**	±	**0**	**11**	±	**2**		--	
Calvert Cliffs Calvert County Health Department Station									
1/3/2006		<	1	11	±	2		<	300
4/11/2006		<	1	11	±	2		<	300
7/24/2006	1	±	1	11	±	2		<	300
10/3/2006		<	1	13	±	2		<	300
Yearly	**1**	±	**1**	**12**	±	**2**		--	
1/2/2007		<	1	11	±	2		<	300
4/10/2007		<	1	14	±	3		<	300
7/2/2007		<	1	12	±	3		<	300
10/2/2007		<	1	9	±	2		<	300
Yearly		--		**12**	±	**4**		--	
Overall	**1**	±	**1**	**12**	±	**0**		--	

Table C-8. (Continued)

	Gross Alpha			Gross Beta			Tritium		
DATE	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
				Calvert Cliffs Southern Middle School Station					
1/3/2006		<	1	9	±	2		<	300
4/11/2006	1	±	1	7	±	2		<	300
7/24/2006		<	1	10	±	2		<	300
10/3/2006		<	1	9	±	2		<	300
Yearly	**1**	±	**1**	**9**	±	**3**		--	
1/2/2007		<	1	8	±	2		<	300
4/10/2007		<	1	11	±	2		<	300
7/2/2007		<	1	9	±	2		<	300
10/2/2007	1	±	1	8	±	2		<	300
Yearly	**1**	±	**1**	**9**	±	**3**		--	
Overall	**1**	±	**0**	**9**	±	**0**		--	
				Calvert Cliffs Frying Pan Restaurant Station					
1/3/2006	1	±	1	9	±	2		<	300
4/11/2006		<	1	12	±	2		<	300
7/24/2006		<	1	12	±	2	300	±	200
10/3/2006	1	±	1	11	±	2		<	300
Yearly	**1**	±	**0**	**11**	±	**3**	**300**	±	**200**
1/2/2007		<	1	10	±	2		<	300
4/10/2007	1	±	1	10	±	2		<	300
7/2/2007	1	±	1	10	±	2		<	300
10/2/2007	1	±	1	11	±	2		<	300
Yearly	**1**	±	**0**	**10**	±	**1**		--	
Overall	**1**	±	**0**	**11**	±	**1**	**300**	±	**200**

Table C-9. Radiation Concentrations in Precipitation (pCi/l ± 2 sigma)

		Gross Alpha			Gross Beta			Tritium			Be-7		
DATE	**DEPTH**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
					Baltimore City Station								
1/5/2006	0.8		<	0.7	4.3	±	0.5	400	±	200	50	±	10
1/12/2006	0.34	0.8	±	0.2	3.9	±	0.5		<	300	50	±	10
1/19/2006	1.06		<	0.7		<	2.7		<	300	20	±	10
1/26/2006	1		<	0.7		<	2.7		<	300		<	40
2/9/2006	1.83		<	0.7	4.6	±	0.5		<	300	80	±	10
2/16/2006	0.28	0.7	±	0.2	3.8	±	0.5		<	300		<	30
4/5/2006	0.65	2.5	±	0.4	4.5	±	0.6		<	300	60	±	10
4/13/2006	0.96	0.7	±	0.2		<	2.7		<	300	70	±	10
4/27/2006	2.04	1.3	±	0.3	5.1	±	0.6		<	300	80	±	10
5/18/2006	2.33	1.6	±	0.3	3.9	±	0.5		<	300	60	±	10
6/8/2006	0.62	2.2	±	0.4	5.2	±	0.6		<	300	80	±	10
6/15/2006	0.49	1.2	±	0.3	3.4	±	0.5		<	300	100	±	10
6/22/2006	0.29	2.5	±	0.4	8.3	±	0.7		<	300	130	±	10
6/29/2006	7.02		<	0.7		<	2.7		--		40	±	10
7/6/2006	3.68	1.6	±	0.3	3.3	±	0.5		<	300		<	40
7/26/2006	0.645	1.9	±	0.3	4.2	±	0.6		<	300	50	±	20
8/10/2006	0.36	3.6	±	0.6	9.6	±	0.7		<	300	120	±	20
9/7/2007	5.95		<	0.7		<	0.7		<	300		<	30
9/14/2006	0.71		<	0.7	3.8	±	0.5		<	300	60	±	20
9/21/2006	0.67	1.1	±	0.5	2.8	±	0.5		<	300	30	±	10
10/6/2006	0.91	1	±	0.3	3.8	±	0.5		<	300	40	±	10
10/11/2006	2.07	0.5	±	0.2	2.3	±	0.5		<	300	30	±	10
10/19/2006	1.08	1	±	0.3	4.4	±	0.6		<	300	90	±	10
10/26/2006	0.49	1.2	±	0.3	5.4	±	0.6		<	300	60	±	10
11/2/2006	2.27		<	0.7		<	2.7		<	300	50	±	10
11/9/2006	1.58		<	0.7		<	2.7		<	300	60	±	10
11/21/2006	2.56	0.7	±	0.2		<	2.7		<	300	30	±	10
12/15/2006	1.12	1	±	0.3		<	2.7		<	300	40	±	10
12/28/2006	1.835		<	0.7	3.1	±	0.5		<	300	60	±	10
Yearly		**1.4**	±	**1.6**	**4.5**	±	**3.5**	**400**	±	**200**	**62**	±	**55**
1/4/2007	1.02	0.6	±	0.2	2.7	±	0.5		<	300	50	±	10
1/11/2007	1.095		<	0.7		<	2.7		<	300	50	±	10
2/22/2007	0.64	1.28	±	0.3	4.53	±	0.6		<	300	40	±	10
3/1/2007	0.59	0.94	±	0.2	3.74	±	0.5		<	300	60	±	10
3/8/2007	0.98	3.4	±	0.5	9.9	±	0.8		<	300	150	±	20
3/22/2007	2.71		<	0.7		<	2.7		<	300	40	±	10
4/5/2007	1.08	1.2	±	0.3	5.2	±	0.6		<	300	80	±	20
4/12/2007	0.96	1.2	±	0.3	4.3	±	0.5		<	300	60	±	10
4/19/2007	3.05	0.6	±	0.2	2	±	0.4		<	300	40	±	10
5/3/2007	0.42	1.8	±	0.3	4.1	±	0.6		<	300	80	±	10

Table C-9. (Continued)

		Gross Alpha			Gross Beta			Tritium			Be-7		
DATE	**DEPTH**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**	**CONC**		**ERR**
5/17/2007	1.11	2.2	±	0.4	4	±	0.5		<	300	60	±	10
6/7/2007	0.95	1.2	±	0.3	3.7	±	0.5		<	300	70	±	10
7/5/2007	1.76	3.1	±	0.4	7	±	0.7		<	300	80	±	20
8/1/2007	1.12		<	0.7	2.8	±	0.5		<	300	110	±	10
8/16/2007	0.65	3.8	±	0.5	7	±	0.7		<	300	100	±	20
8/24/2007	1.83	1.2	±	0.3	5	±	0.6		<	300	50	±	10
9/13/2007	0.37	2.3	±	0.5	5.2	±	0.6		<	300	70	±	10
10/4/2007	0.55	2.9	±	0.4	4	±	0.5		<	300	60	±	10
10/11/2007	0.6	0.9	±	0.2	5.8	±	0.6		<	300	70	±	20
10/25/2007	1.72		<	0.7		<	1.5		<	300	90	±	10
11/1/2007	4.08	0.7	±	0.2		<	1.5		<	300		<	40
11/15/2007	0.92	2.2	±	0.4	5.5	±	0.6		<	300	70	±	10
11/29/2007	0.35	1.7	±	0.4	4.2	±	0.5		<	300	60	±	10
12/6/2007	0.78	1.4	±	0.3	4.6	±	0.5		<	300	70	±	10
12/13/2007	1.62	2.5	±	0.4	7.5	±	0.6		<	300	90	±	20
12/20/2007	1.45	0.7	±	0.2	2.7	±	0.4		<	300	50	±	20
12/27/2007	0.83	1.9	±	0.4	5	±	0.5		<	300	30	±	20
Yearly		**1.7**	±	**1.9**	**4.8**	±	**3.6**		--		**68**	±	**51**
Overall		**1.6**	±	**0.4**	**4.6**	±	**0.4**	**400**	±	**200**	**65**	±	**10**

Table C-10. Radionuclide Concentrations in Processed Milk (pCi/l ± 2 sigma)

DATE	I-131 CONC	I-131 ERR	Ba-140 CONC	Ba-140 ERR	Cs-137 CONC	Cs-137 ERR	Sr-90 CONC	Sr-90 ERR	Sr-89 CONC	Sr-89 ERR
Maryland Composite Processed Milk										
1/6/2006	<	4	<	13	<	4	<	0.9	1.2 ±	1.2
1/13/2006	<	5	<	18	<	5	--		--	
1/20/2006	<	4	<	13	<	4	--		--	
1/27/2006	<	9	<	30	<	9	--		--	
2/10/2006	<	9	<	30	<	9	--		--	
2/17/2006	<	5	<	17	<	5	--		--	
2/24/2006	<	9	<	30	<	9	--		--	
3/3/2006	<	5	<	17	<	5	--		--	
3/10/2006	<	5	<	17	<	5	--		--	
3/17/2006	<	5	<	17	<	5	--		--	
3/24/2006	<	5	<	17	<	5	--		--	
3/31/2006	<	5	<	16	<	4	--		--	
4/7/2006	<	5	<	17	<	5	--		--	
4/14/2006	<	4	<	13	<	4	--		--	
4/21/2006	<	4	<	13	<	4	--		--	
4/28/2006	<	8	<	29	<	9	--		--	
5/5/2006	<	5	<	17	<	5	--		--	
5/12/2006	<	6	<	20	<	5	--		--	
5/19/2006	<	8	<	29	<	9	--		--	
5/26/2006	<	5	<	17	<	5	<	1.5	1.5 ±	1.1
6/9/2006	<	5	<	17	<	5	--		--	
6/16/2006	<	8	<	29	<	9	--		--	
6/23/2006	<	8	<	29	<	9	--		--	
6/30/2006	<	8	<	29	<	9	--		--	
7/7/2006	<	4	<	13	<	4	--		--	
7/21/2006	<	4	<	13	<	4	--		--	
8/3/2006	<	9	<	31	<	9	--		--	
8/11/2006	<	8	<	29	<	9	--		--	
8/18/2006	<	5	<	17	<	5	--		--	
8/25/2006	<	8	<	29	<	9	--		--	
9/1/2006	<	5	<	17	<	5	--		--	

Table C-10. (Continued)

DATE	I-131 CONC	I-131 ERR	Ba-140 CONC	Ba-140 ERR	Cs-137 CONC	Cs-137 ERR	Sr-90 CONC	Sr-90 ERR	Sr-89 CONC	Sr-89 ERR
9/8/2006	<	8	<	30	<	9	--		--	
9/15/2006	<	8	<	29	<	9	--		--	
9/22/2006	<	5	<	17	<	5	--		--	
10/6/2006	<	5	<	17	<	5	--		--	
10/13/2006	<	8	<	28	<	9	--		--	
10/20/2006	<	5	<	18	<	5	--		--	
10/27/2006	<	4	<	14	<	4	--		--	
11/3/2006	<	5	<	18	<	5	--		--	
11/13/2006	<	7	<	22	<	5	--		--	
11/20/2006	<	11	<	34	<	9	0.7 ±	0.5	<	1.6
12/22/2006	<	5	<	17	<	5	--		--	
12/29/2006	<	5	<	17	<	5	--		--	
Yearly	--		--		--		**0.7 ±**	**0.5**	**1.4 ±**	**0.4**
1/5/2007	<	4	<	13	<	4	--		--	
1/12/2007	<	8	<	29	<	9	--		--	
1/19/2007	<	5	<	17	<	5	<	1.3	<	1.1
1/26/2007	<	5	<	17	<	5	--		--	
2/2/2007	<	5	<	18	<	5	--		--	
2/9/2007	<	8	<	29	<	9	--		--	
2/23/2007	<	5	<	17	<	5	--		--	
3/2/2007	<	5	<	18	<	5	--		--	
3/8/2007	<	5	<	17	<	5	--		--	
3/16/2007	<	5	<	18	<	5	--		--	
3/23/2007	<	5	<	18	<	5	--		--	
4/6/2007	<	5	<	18	<	5	--		--	
4/13/2007	<	5	<	18	<	5	--		--	
4/20/2007	<	5	<	17	<	5	<	1.3	<	1.1
4/27/2007	<	5	<	18	<	5	--		--	
5/4/2007	<	5	<	18	<	5	--		--	
5/11/2007	<	4	<	13	<	4	--		--	
5/18/2007	<	5	<	17	<	5	--		--	
5/25/2007	<	5	<	18	<	5	--		--	

Table C-10. (Continued)

DATE	I-131 CONC		ERR	Ba-140 CONC		ERR	Cs-137 CONC		ERR	Sr-90 CONC		ERR	Sr-89 CONC		ERR
6/1/2007		<	5		<	18		<	5		--			--	
6/8/2007		<	5		<	29		<	6		--			--	
6/15/2007		<	8		<	30		<	9		--			--	
6/23/2007		<	8		<	29		<	9		--			--	
7/6/2007		<	4		<	13		<	4		--			--	
7/13/2007		<	8		<	29		<	9		--			--	
7/20/2007		<	8		<	28		<	9		--			--	
7/27/2007		<	8		<	30		<	9		--			--	
8/3/2007		<	8		<	28		<	9		--			--	
8/10/2007		<	8		<	29		<	9		--			--	
8/17/2007		<	8		<	29		<	9		--			--	
8/24/2007		<	8		<	29		<	9	1.1	±	0.5	1.8	±	0.8
8/31/2007		<	12		<	30		<	5		--			--	
9/7/2007		<	8		<	21		<	5		--			--	
9/14/2007		<	5		<	18		<	5		--			--	
9/21/2007		<	5		<	17		<	5		--			--	
9/28/2007		<	5		<	18		<	5		--			--	
10/5/2007		<	5		<	18		<	5		--			--	
10/12/2007		<	5		<	18		<	5		--			--	
10/19/2007		<	5		<	17		<	5		--			--	
10/26/2007		<	5		<	18		<	5		--			--	
11/2/2007		<	9		<	30		<	10		--			--	
11/9/2007		<	9		<	30		<	9		--			--	
11/16/2007		<	5		<	18		<	5	1.2	±	0.4		<	3.5
11/30/2007		<	5		<	18		<	5		--			--	
12/7/2007		<	9		<	30		<	9		--			--	
12/14/2007		<	9		<	31		<	9		--			--	
12/21/2007		<	9		<	31		<	9		--			--	
12/28/2007		<	5		<	18		<	5		--			--	
Yearly		--			--			--		**1.2**	±	**0.1**	**1.8**	±	**0.8**
Overall		--			--			--		**0.9**	±	**0.6**	**1.6**	±	**0.6**