



OFFICE OF ENVIRONMENTAL PROGRAMS
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

201 WEST PRESTON STREET • BALTIMORE, MARYLAND 21201 • Area Code 301 • 3833125

Harry Hughes, Governor

Charles R. Buck, Jr., Sc.D. Secretary

May 18, 1981

Ms. Marie Janinek
State Relations Officer
Office of State Programs
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: 3rd Quarterly Report
Contract No. NRC 06-80-679


Dear Ms. Janinek:

Please find attached the 3rd quarterly activities report prepared under the contract between the State of Maryland, the U. S. Department of Transportation, and the U. S. Nuclear Regulatory Commission. This report covers the activities conducted between December 7, 1980 and March 6, 1981.

During this period, actual field inspections were conducted under phase two (roadside vehicle inspections) and phase four (facilities monitoring) of the contract. Some planning functions and equipment purchases were also performed during the quarter for upcoming phase three activities that will be conducted during the fourth quarter.

I trust that this report will satisfactorily meet the requirements of the contract. However, should there be any questions or comments regarding the contents of the report, please contact Mr. George Harman of my office.

Sincerely,


John E. McQuade, Jr., Chief
Toxic Substances Control Program
Scientific and Health Advisory Group

JEMcQ:ib
Attachment

cc: Dr. Max Eisenberg
Mr. David Resh

8105280029

DISTRIBUTION LIST

Dr. Max Eisenberg	Maryland Department of Health and Mental Hygiene - OEP
Mr. Jon Crosby	" " " " " " " "
Mr. Ronald Nelson	" " " " " " " "
Mr. David Resh	" " " " " " " "
Mr. Robert Corcoran	" " " " " " " "
Mr. James J. O'Donnell	Maryland Department of Transportation
Mr. Bernard T. Stewart	" " " " " " " "
Mr. Thomas W. Powers	Occupational Safety and Health Administration
Mr. E. Donald Reilly	Maryland Toll Facilities
Mr. Thomas S. Smith	Maryland State Police
Major T. S. Moyer	" " " " " " " "
Mr. Vernon Goodwin	Maryland State Highway Administration
Mr. Rodney Davis	NUS, Inc.
Members of the Council on Toxic Substances	

STATE OF MARYLAND
RADIOACTIVE MATERIALS TRANSPORTATION SURVEILLANCE PROGRAM

Contract No. NRC 06-80-679
Third Quarterly Progress Report
December 7, 1980 - March 6, 1981

INTRODUCTION

Maryland's Office of Environmental Programs (OEP) of the Department of Health and Mental Hygiene conducted a variety of activities under the Radioactive Materials Transportation Surveillance Program contract during the third quarter of the contract period. The period covered by the following report began on December 7, 1980 and ended on March 6, 1981.

During this quarter, work was performed in Phases 2, 3 and 4 of the contract. Only work in phase 1, which was completed during the first quarter, was not performed during this quarter. Phase 2 activities included the presentation of a training program for staff personnel and roadside inspections of vehicles. Phase 3 work consisted of planning activities and the ordering of radiation detection equipment for the State Police cruisers and the fixed site highway monitoring locations. OEP's Division of Radiation Control continued its phase 4 activities of inspecting and monitoring shippers and users of radioactive materials.

The specific activities performed under phases 2 and 4 during the third quarter are presented in the following pages:

PHASE 2 ACTIVITIES

Scope of Work

Phase 2 activities conducted during the third quarter of the contract period consisted of the presentation of a training course and field inspections of vehicles.

Training Program

The training course was designed to acquaint the staff of the Scientific and Health Advisory Group of OEP with monitoring procedures and regulations pertaining to the inspection of vehicles carrying radioactive materials. Topics covered during the training session included basics of atomic structure and radiation, instrumentation, general safety procedures, plus labeling and packaging requirements. Elements of the training session were presented by the staff personnel, the Nuclear Regulatory Commission, and the Federal Department of Transportation.

Highway Inspections

The second activity conducted as part of phase 2 was the highway surveillance of vehicles. Prior to the actual efforts on the highways, data from phase 1 (first quarter) and phase 3 (second quarter) was reviewed to assess any patterns in the movement of radioactive materials. It was determined from that data that most of the shipments of radioactive materials on interstate or major highways in Maryland occurred during daylight hours. Therefore, a surveillance program was developed to inspect vehicles during daylight hours (see Table 2 for schedule).

Two additional steps that were taken before the field work began included the calibration of the monitoring instruments and the procurement of film badges for the inspectors.

Methods

Highway inspection activities consisted of the stopping of selected vehicles, an examination of their shipping papers, and a check for radiation levels. Radiation levels were measured with an Eberline E-520 Monitor attached to either an Eberline HP-270 or HP-190 probe. Background levels ranged between zero and 0.05 mR/hr. On vehicles carrying radioactive materials, radiation levels at the surface, at 6 feet distant from the trailer, and in the cab were checked. Where no radiation was detected on the surface of the trailer, no readings were made at 6 feet or in the cab.

To insure that our selection of vehicles did not overlook unmarked or improperly placarded shipments of radioactive materials, a sodium iodide (NaI) crystal detector was placed in a police car located between 1/4 and 1/2 of a mile ahead of the inspection site. The detector unit, an Eberline PRM-6, was used in conjunction with a PG-2 probe. The sodium iodide crystal in that probe measures 2 mm by 2 inches. Except for the placarded shipments of radioactive materials, no measurements above background were detected by the NaI detector. On four dates, however, the detector was not used (Jan. 27 and 28, and Feb. 3 and 27). On these dates, the necessary vehicles and/or police manpower were unavailable.

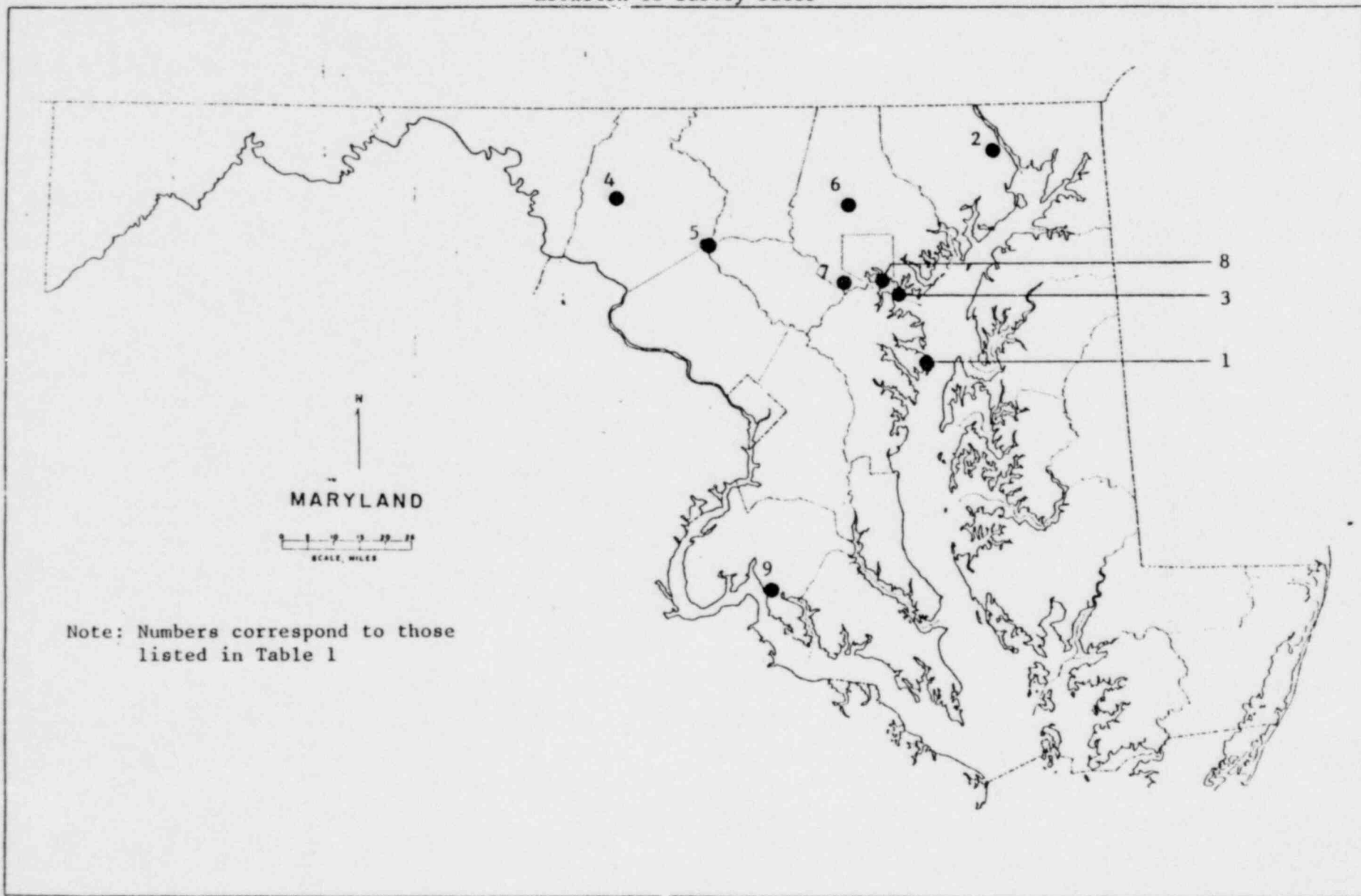
Inspections/^{were}conducted at the nine locations listed in Table 1 and depicted in Figure 1. The actual schedule is contained in Table 2.

INSPECTION LOCATIONS (Table 1)

<u>Location</u>	<u>Traffic Direction</u>	<u>(No. of Days)</u>
1. Chesapeake Bay Bridge	Westbound	(4)
2. John F. Kennedy Highway (I-95) at Susquehanna River Bridge	Southbound	(4)
3. Francis Scott Key Bridge (Md. 695 - outer Harbor crossing) ,	Northbound	(1)
	Southbound	(3)
4. Interstate Highway 70 at Catoclin Mountain	Eastbound	(1)
5. Interstate Highway 70 at Mt. Airy	Eastbound	(1)
6. Interstate Highway 83 at Shawan Road (near Cockeysville)	Northbound	(1)
	Southbound	(1)
7. Interstate Highway 95 at Md. Rt. 166 (south of Baltimore)	Southbound	(2)
8. Baltimore Harbor Tunnel	Southbound	(4)
9. U. S. Route 301 at Potomac River (Nice Memorial Bridge)	Southbound	(2)

Figure 1

Location Of Survey Sites



LOCATIONS AND TIMES OF VEHICLE SURVEYS (Table 2)

	<u>Highway Location</u>	<u>Direction</u>	<u>Day</u>	<u>Date</u>	<u>Times</u>
1.	Chesapeake Bay Bridge	Westbound	Mon.	1/12/81	8:45-3:00
2.	John F. Kennedy Highway at Susquehanna River	Southbound	Tue.	1/13/81	8:45-3:00
3.	(same as above)	Southbound	Wed.	1/14/81	8:30-2:50
4.	Francis Scott Key Bridge	Northbound	Fri.	1/16/81	9:30-2:30
5.	John F. Kennedy Highway	Southbound	Sat.	1/17/81	10:30-4:35
6.	I-70 at Catoclin Mountain	Eastbound	Mon.	1/19/81	9:00-2:20
7.	I-83 at Shawan Road	Southbound	Tue.	1/20/81	9:15-2:10
8.	John F. Kennedy Highway	Southbound	Wed.	1/21/81	8:45-2:30
9.	Chesapeake Bay Bridge	Westbound	Thur.	1/22/81	9:00-3:00
10.	Francis Scott Key Bridge	Southbound	Fri.	1/23/81	8:30-2:20
11.	Chesapeake Bay Bridge	Westbound	Mon.	1/26/81	10:00-1:55
12.	I-95 at Md. Rt. 166	Southbound	Tue.	1/27/81	8:30-2:16
13.	(same as above)	Southbound	Wed.	1/28/81	8:25-2:30
14.	Chesapeake Bay Bridge	Westbound	Thur.	1/29/81	8:30-2:00
15.	Francis Scott Key Bridge	Southbound	Sun.	2/1/81	8:30-3:00
16.	I-83 at Shawan Road	Northbound	Tue.	2/3/81	10:30-2:10
17.	Baltimore Harbor Tunnel	Southbound	Wed.	2/4/81	8:50-2:40
18.	(same as above)	Southbound	Thur.	2/5/81	8:55-2:35
19.	Francis Scott Key Bridge	Southbound	Fri.	2/6/81	8:50-2:30
20.	Baltimore Harbor Tunnel	Southbound	Mon.	2/7/81	8:45-2:45
21.	(same as above)	Southbound	Tue.	2/10/81	8:45-2:10
22.	Nice Memorial Bridge	Southbound	Wed.	2/25/81	8:20-3:15
23.	(same as above)	Southbound	Thur.	2/26/81	8:25-3:15
24.	I-70 at Mt. Airy, Md.	Eastbound	Fri.	2/27/81	8:20-2:40

The following specific information was sought on all stopped vehicles.

1. Day, date and time of inspection.
2. Field observers.
3. Specific location and direction.
4. Carrier's name.
5. Shipper's name.
6. Type of cargo.
7. Trailer tag number.
8. Presence or absence of placards (4 sides).
9. Radiation levels (surface, 6 feet, cab).
10. Transport Index and/or Total Activity.

Results

A summary of the overall survey results are listed below in Table 3 with the daily results for each sampling site presented graphically in Figure 2:

SUMMARY OF SURVEY RESULTS (Table 3)

Vehicles inspected	1,263
Placarded vehicles	75
Placard violations	36
Radioactive materials (RAM) Placarded Vehicles	18
RAM Placard violations	3
RAM I and II cargo	0
Number of sole use vehicles.	16

In all, during the twenty-four days spent in the field, a total of 1,263 vehicles inspections were conducted. Of that number, 75 were placarded and of those 18 were placarded for radioactive materials. The total number, as well as the number of placarded vehicles is not, however, representative of the overall highway traffic. To the extent possible only placarded vehicles (excluding petroleum tank trucks and bottled gas haulers) and haulers carrying unspecified shipments were stopped. Specific vehicles types that were not stopped included beverage haulers, grocery store deliveries, bakery trucks, livestock carriers, and other carriers hauling known materials. Therefore, the reported numbers are representative of a select group of vehicles that had the highest likelihood of being transporters of hazardous and radioactive materials.

Figure 2

Number of Vehicle Inspections at Survey Sites
for Phase II of the
Radioactive Materials Transportation Surveillance Program

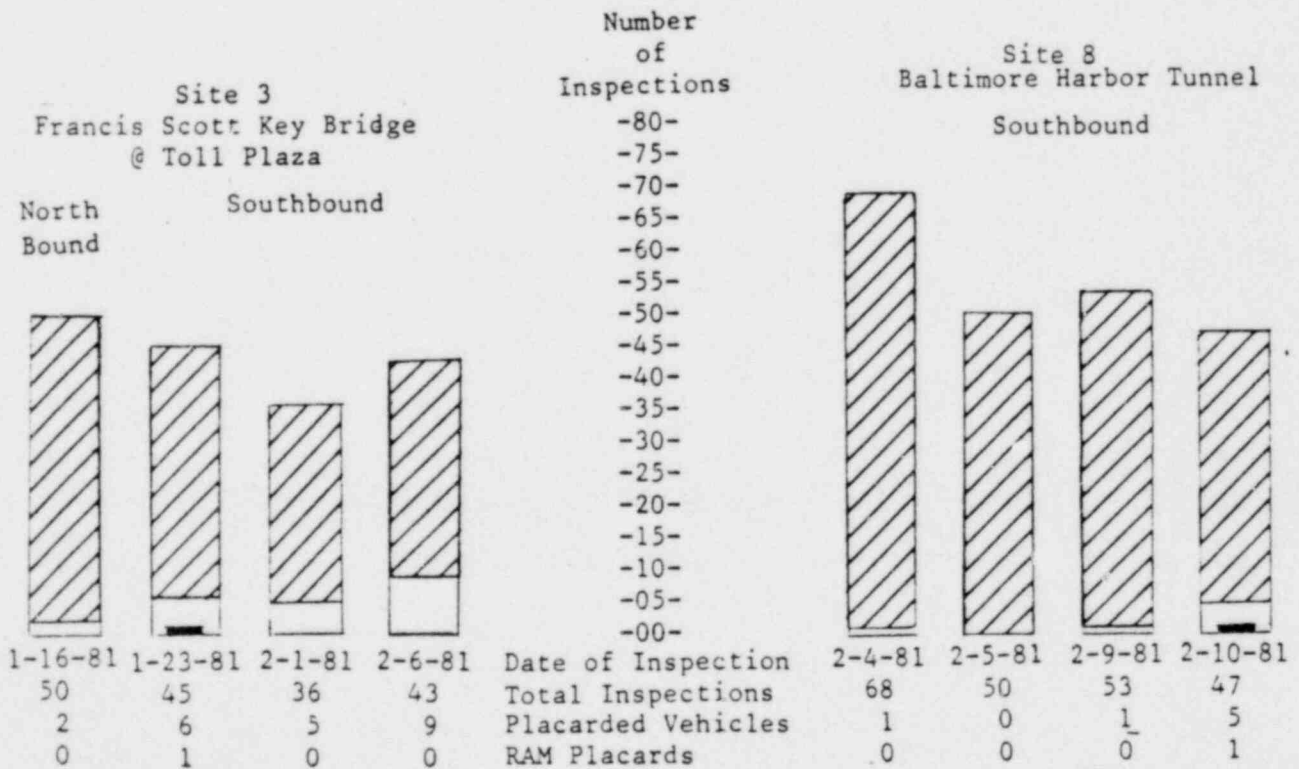
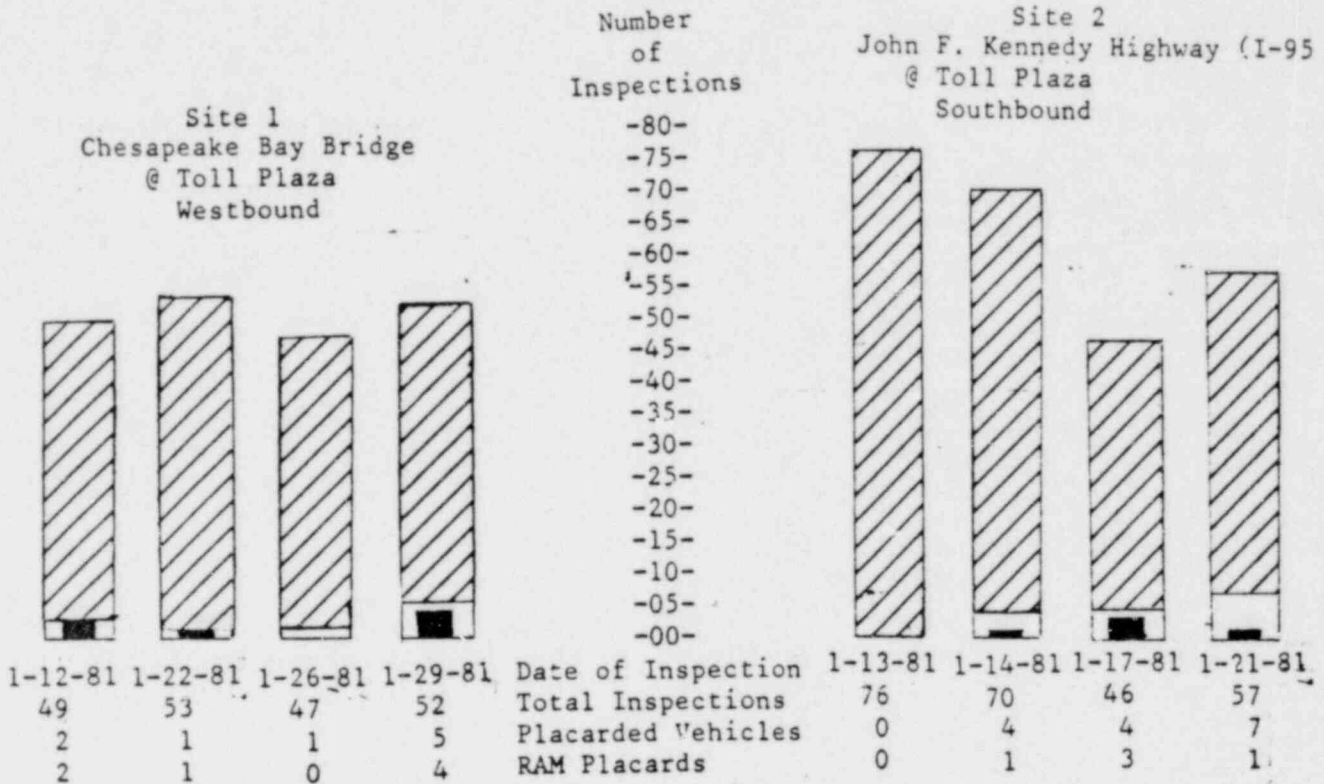
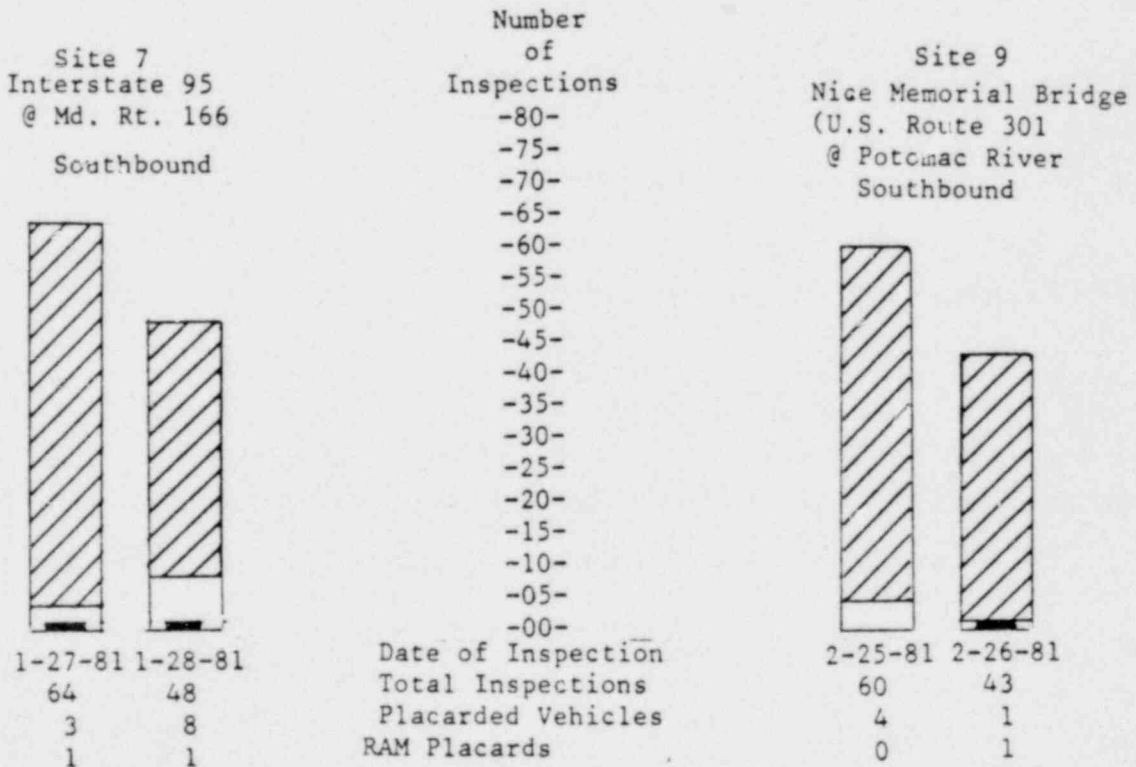
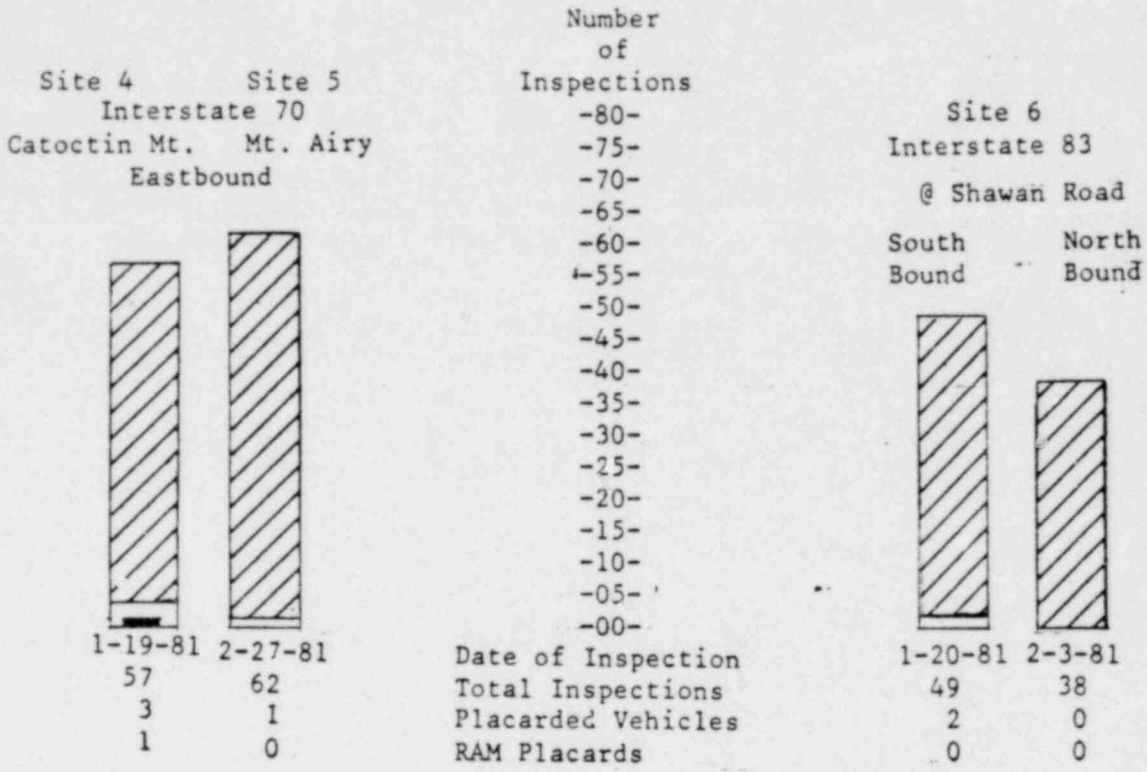


Figure 2 (cont.)



Violations of Federal Regulations (49 CFR) that were noted during the highway inspection activities (Phase 2) of the Radioactive Materials Transportation Surveillance Program are summarized in Table 4. Of the thirty-six noted violations, two were for having radioactive materials (RAM) placards displayed when not needed, one Cesium (Cs-137) shipment had a RAM placard missing, and one radioactive shipment did not have shipping papers. These were the only violations of radioactive materials transportation regulations that were noted. All of the other violations were for improper or incomplete placarding of other hazardous materials.

VIOLATIONS NOTED DURING THE HIGHWAY INSPECTION ACTIVITIES
OF THE RADIOACTIVE MATERIALS TRANSPORTATION SURVEILLANCE PROGRAM
(Table 4)

<u>Date</u>	<u>Site</u>	<u>Carrier</u>	<u>Cargo</u>	<u>Violations</u>
1/14/81	JFK Highway (I-95)	Callahan	Acids	No corrosive placards
1/14/81	" " "	J.B. Williams	Corrosives	One placard missing
1/14/81	" " "	Torber Truck	PCB	Front flammable placard displayed
1/14/81	" " "	Johnson Bros.	Cleaning Compounds	Two corrosive placards displayed
1/14/81	" " "	Unknown	Toxaphene, etc.	Only three sides placarded
1/16/81	F.S. Key Bridge	Preston	Tires	One RAM placard displayed
1/17/81	JFK Highway	Hemingway	Not dangerous	Dangerous placards displayed
1/17/81	" "	Tri State	Unknown Rad. material	No shipping papers
1/19/81	I-70	Ohio Frt.	Steel	Torn placards displayed
1/20/81	I-83	Bev. Trans. Inc.	Matches (44,000 lbs.)	No placards displayed
1/20/81	"	UPS	Non-Flammable gas corrosive	Flammable solid placard displayed
1/21/81	JFK Highway	Hood	Soup	Flammable gas placard exhibited
1/21/81	" "	Maislin	6,000 lbs. of dangerous & corrosive materials	One dangerous placard missing, no corrosive placards
1/21/81	" "	Oliver Brown	Drums of flammable materials	No placards
1/21/81	" "	Barnes	Coffee	Flammable placards exhibited

Table 4 (Continued)

<u>Date</u>	<u>Site</u>	<u>Carrier</u>	<u>Cargo</u>	<u>Violations</u>
1/21/81	JFK Highway	Am. Farm Line	Rocket motor	Front explosive B placard missing
1/22/81	Ches. Bay Br.	PPG	lacquer thinner more than 1,000 lbs.	No flammable placards
1/23/81	F.S.Key Br.	Maislin	Cs-137	No front RAM placard
1/23/81	" "	Textile Chem	Chromic acid & acetones 4,500 lbs.	Right dangerous placard missing
1/23/81	" "	Kirson Medical	5 tanks of oxygen	Placards missing.
1/28/81	I-95 at Rt. 166	Smith's	Paint, matches	No flammable placards
1/28/81	" " "	Inland Leidy	Anhydrous ammonia, isopropyl alcohol	Incorrect and incomplete placarding
1/28/81	" " "	Lenmar	Flammable paint	Rear placard missing
1/28/81	" " "	Yale	Batteries (wet cell) 1,811 lbs.	No placards
1/29/81	Ches. Bay Br.	Thurston	Toilet paper	Dangerous placards exhibited
2/11/81	F.S. Key Br.	Mobile Chem.	paint, phosphoric acid (7,000 lbs)	Placards incomplete and incorrect
2/4/81	Balto. Harbor Tunnel	Sea Wheels Carlisle	Empty	Oxidizer placard on front
2/6/81	F.S. Key Br.	General Products	Paint thinner	Rear flammable placard missing
2/6/81	" " "	Murray Int.	Inflammable paint	Flammable placards exhibited
2/9/81	Balto. Harbor Tunnel	Cooper	Solvents, flammable paint, more than 1,000 lbs.	No placards
2/9/81	"	Delco Batteries	Forty Bat. 1,600 lbs.	Front corrosive placard missing
2/10/81	"	Hemingway	Phosphoric, chromic and formic acids	No corrosive placards

Table 4 (Continued)

<u>Date</u>	<u>Site</u>	<u>Carrier</u>	<u>Cargo</u>	<u>Violations</u>
2/10/81	Balto Harbor Tunnel	Malone	Copper and aluminum cable	Radioactive placards exhibited
2/10/81	"	Refrigerated Transport	Coffee	Corrosive placards exhibited
2/25/81	Rt. 301	Del's Leasing	Flammable paint 39,141 lbs.	No flammable placards
2/27/81	I-70 at Mt. Airy	Crete Carrier	Fire Ext. 19,000 lbs. LPG 3,500 lbs.	No placards

The information obtained from the eighteen observed shipments of radioactive materials are summarized in Table 5. As previously noted, only two shipments violated Federal Regulations. One lacked shipping papers and the other was missing a vehicle placard. The maximum detected radiation level observed (55 mR/hr) was measured at the surface of a Chem Nuclear shipment from the Connecticut Yankee facility. This level was well below the allowable level of 200 mR/hr as was the six feet reading of (7.0 mR/hr) which was below the limit of 10 mR/hr. All readings taken from the truck cabs were well below the maximum allowable limit of 2 mR/hr.

None of the film badges worn by the field inspectors during this activity produced any measurable values. Therefore, by using the basic safety precautions of maintaining maximum distance, keeping inspection times to a minimum, and taking advantage of shielding, exposure risks were kept to a minimum.

RADIOACTIVE MATERIALS SHIPMENTS INSPECTED UNDER PHASE II
OF THE RADIOACTIVE MATERIALS TRANSPORTATION SURVEILLANCE PROGRAM
(Table 5)

<u>Date</u>	<u>Site</u>	<u>Carrier</u>	<u>Shipper</u>	<u>Cargo</u>	<u>Surface</u>	<u>6 Feet</u>	<u>Cab</u>	<u>Comments</u>
1/12/81	Chesapeake Bay Br.	Chem. Nuclear	Indian Point	LSA	4.0	1.3	0.1	No violations
1/12/81	" " "	" "	Oyster Creek	LSA	3.0	0.7	---	" "
1/13/81	JFK Highway (I-95)	ATC	-----	NOS	---	---	---	" "
1/14/81	" " "	Nuclear Diagnostics	-----	Waste	3.0	0.2	0.2	" "
1/17/81	" " "	Tri State	Teledyne	LSA	0.11	< 0.1	< 0.1	" "
1/17/81	" " "	" "	Smith and King Labs	LSA	0.6	< 0.6	< 0.6	" "
1/17/81	" " "	" "	HNDC	Unknown Rad. Mat.	15.0	---	---	No Shipping Papers
1/19/81	I-70 at Catoclin Mountain	Chem Nuclear	-----	?	----	---	---	Vehicle travelling in opposite direction - not stopped
1/21/81	JFK Highway (I-95)	Tri State	Salem, N.J.	LSA	2.5	0.4	0.07	No Violations
1/22/81	Chesapeake Bay Br.	Chem. Nuclear	Syracuse, New York	LSA	5.0	0.8	0.05	" "
1/23/81	F.S. Key Bridge	Maislin	Atomic Energy of Canada	Cs-137	0.08	< 0.08	< 0.08	Front Placard Missing
1/27/81	I-95 at Rt. 166	Hittman	Phila. Elec.	LSA	6.0	1.4	0.2	No Violations
1/28/81	" " "	" "	" "	LSA	4.0	1.0	0.1	" "
1/29/81	Chesapeake Bay Br.	Chem. Nuclear	-----	LSA	30.0	3.0	0.2	" "
1/29/81	" " "	" "	Conn. Yankee	LSA	55.0	7.0	0.2	" "
1/29/81	" " "	" "	Boston Edison	LSA	2.0	0.4	0.1	" "
1/29/81	" " "	" "	Oyster Cr.	LSA	1.0	0.5	0.1	" "
2/26/81	Rt. 301 at Nice Memorial Br.	Tri State	Jersey Central Power & Light	LSA	50.0	2.0	0.2	" "

PHASE 4 ACTIVITIES

The Office of Environmental Programs' Division of Radiation Control continued its facilities monitoring activities during the 3rd quarter of the contract period. During this quarter, a total of six inspections were conducted. Those inspections are discussed below and summarized in Table 6.

- (1) 12/10/80 - A survey of the Calvert Cliffs Nuclear Power Plant was conducted to examine some radioactive wastes that were being processed for transfer to Barnwell,, South Carolina. No deficiencies were noted in their operations.
- (2) 12/10/80 - On the same date an inspection of the Federal Express Courier Corporation's facility at the Baltimore-Washington International Airport was conducted. The only deficiencies noted in the single shipment examined was an overstatement of the transport index value.
- (3) 1/23/81 - A survey of the cargo aboard the Japanese ship "Ming Star" at the Dundalk Marine Terminal revealed one unlabeled containerized shipment of radioactive materials. The material within the container consisted of eight 6m drums of plutonium sulfate tetrahydrate. The total weight of the radioactive material equalled six grams of unirradiated U-235. Radiation levels outside the container were approximately 0.15 mR/hr. This shipment, enroute from Keelung, Taiwan to Wilmington, North Carolina, was not labeled except for normal numerical shipping identification. Shipping documents were not available during the visit.
- (4) 1/27/81 - On this date, the Division of Radiation Control was notified of a potential problem at the Governor Nice Memorial Bridge (U.S. Route 301 at the Potomac River). A tractor trailer hauling radioactive wastes from Yankee Atomic Electric Company at Rowe, Massachusetts to Barnwell, South Carolina was observed to have a liquid leaking from it. Local fire, state and Federal personnel responded to the incident. It was determined that the leaking liquid was snow melting atop the cargo in the trailer. The shipment was returned to the utility for complete repackaging the next day after being examined by company radiation safety personnel.

- (5) 2/27/81 - A shipment of 4,540 curies of a cobalt-60 teletherapy source being sent to Puerto Rico was surveyed at the Dundalk Marine Terminal.
- (6) 2/27/81 - Also on this date at the same terminal, a returning shipment of a teletherapy source containing 669 curies of cobalt-60 was examined. No deficiencies were noted for either shipment.

None of the thermoluminescent dosimeter badges used during this quarter of the contract period indicated any radiation exposures greater than the limits of detection.

Facilities surveys will be continued during the fourth quarter by the Division of Radiation Control.

SUMMARY OF THE FACILITIES MONITORING ACTIVITIES
 CONDUCTED BY THE DIVISION OF RADIATION CONTROL
 Between 12/7/80 and 3/6/81
 (Table 6)

Facility	Date	Type Package	Radioactive Materials	Destination	In Compliance	Area or Personnel Monitoring	Deficiencies Noted	Remarks
Calvert Cliffs Nuclear Power Plant	12/10/80	17 H	Dry radioactive wastes 0.03825 Ci	Barnwell, South Carolina	Yes	Yes	None	Type A quantity 80 55-gallon barrels
Federal Express Baltimore-Washington Airport	12/10/80	7 A's	H-3 Sn-117 Sr-82 & 85 Pt-145	Baltimore	Yes	Yes	Transport Index	T.I. listed as 0.6 - actual measured was 0.2
Dundalk Marine Terminal Baltimore	1/23/81	6 m	U-235	Wilmington, North Carolina	Yes	No	"Container" not Labeled	Package Containerized on Board Ship "Ming-Star"
Governor Nice Bridge Charles Co., Md.	1/27/81	17 H, Strong tight boxes	Dry Rad Wastes	Barnwell, South Carolina	Yes	Yes	None	Liquid noted leaking from truck (water not contaminated)
Dundalk Marine Terminal Baltimore	2/27/81	Source Shipping Container	Co-60 4540 Curies	Puerto Rico San Juan	Yes	No	None	Teletherapy Source shipped to hospital from Md. Source Mfr.
Dundalk Marine Terminal Baltimore	2/27/81	Source Shipping Container	Co-60 669 Curies	-----	Yes	No	None	None