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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 29 1981

MEMORANDUM FOR: Kenneth L. Pierson, FHWA-DOT
Arthur Warren, FAA-DOT
James Shuler, MTB-DOE
James C. Malaro, RES-NRC
Charles E. MacDonald, NMSS-NRC
A. W. Grella, IE-NRC

FROM: Marie Janinek, State Relations Officer
Office of State Programs

SUBJECT: THIRD QUARTERLY REPORT (FOURTH YEAR) FROM MICHIGAN ON TRANSPORTATION SURVEILLANCE PROGRAM

Enclosed is the third quarterly progress report (fourth year) submitted by Michigan on its transportation surveillance program under contract with NRC and DOT. The report covers the period March 1 to May 31, 1981.

Any comments you might have on the report would be appreciated.

for Frank A. Young
Marie Janinek
State Relations Officer
Office of State Programs

Enclosure:
Report fm T. R. Ervin
dtd 7/7/81

Distribution List for Third Quarterly Report (Fourth Year) submitted by Michigan on Transportation Surveillance Program.

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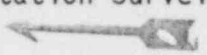
PDR: Michigan 

RADIOACTIVE MATERIAL TRANSPORTATION SURVEILLANCE

CONTRACT #NRC-06-77-051

Third Quarterly Progress Report
(March 1, 1981 - May 31, 1981)

Fourth Contract Year

Introduction

The companies under investigation this quarter were:

American Airlines Freight System

Emery Air Freight

Federal Express

Flying Tigers

Northwest Orient Airlines

Republic Airlines

Sajen Air

Zantop International Airlines, Inc.

Casperson, Inc.

Purolator Courier, Inc.

Pharmatopes, Inc.

Donald C. Cook Nuclear Power Plant

Palisades Nuclear Power Plant

Big Rock Point Nuclear Power Plant

Elliot Lake Freight Lines

Table I shows the number of field investigations made at various locations this quarter. Package surveys are summarized in Tables II and III. Vehicle surveys are listed in Tables IV and V. Tables VI, VII, and VIII summarize the actual direct radiation exposure measurements from thermoluminescent dosimeters (TLDs) and project the exposures for a 92-day quarter. Tables IX, X, and XI list the radioactive material shipments reported through the Michigan State Police to the Division of Radiological Health. This quarter there is no table of shipments from Canadian uranium mines since no shipments were made.

Most wipe tests indicated contamination levels at the lower limit of detectability. No wipes exceeded the contamination limits set in 49 CFR.

Airlines and Airfreight at Detrcit Metropolitan Airport (Metro)

American Airlines carries Mediphysics and Mallinckrodt radiopharmaceuticals aboard regularly scheduled passenger flights. As shown in Table VI, area monitors indicate the presence of radioactive material (RAM), but the exposure to freight handlers is negligible. In addition to the one handler already badged, TLDs were issued to two more employees. The foreman and one handler declined the offer and remain unmonitored. These two, however, have less contact with RAM. Most packages surveyed were in compliance with packaging and labeling requirements. One Mallinckrodt package monitored March 17, 1981 read 1.6 mR/hr at 3 feet, twice the label T.I. of 0.8. This is the first package to greatly exceed the label T.I. for some months, reflecting an improvement due to the surveillance program.

Emery Air Freight has not carried any RAM all quarter. Some contact will be maintained to see if RAM shipments resume.

Federal Express continues to carry an assortment of medical and industrial packages. Unfortunately, none were available for examination on the particular days field investigations were performed. According to discussions with employees, most RAM is now received at the new airport terminal, rather than the older one nearby. This change is reflected in the Table VII TLD area monitor readings. Although not at background level, these readings are much lower than pervious data. With the prospect of a phase out of the old terminal over the next year, the TLDs were removed from it, and one area monitor was placed in the new terminal. Personnel monitors still show negligible exposure.

Flying Tigers has not had any RAM packages available for examination. A few are carried by the airline, but may only pass through on a plane without off-loading in Michigan. The emergency phone number for the Division was added to the board of emergency numbers in the freight terminal office. Periodic contact is maintained due to the possibility of encountering RAM packages.

Northwest Orient Airlines carries Squibb products shipped by Skycab. All packages were in compliance with 49 CFR regarding labeling, packaging, and, in particular, shipping papers, which indicates an improvement over previous quarters when shipper certifications were frequently omitted.

Republic Airlines was carrying New England Nuclear radiopharmaceuticals once each week. Now an additional charter flight has been scheduled for the same night. The employees report and shipping papers confirm that no RAM has passed through recently. Contact will be continued.

Sajen Air continues to make charter flights of New England Nuclear products but has been joined by Air Charter Services, Inc. Some loads are carried part way by Air Charter and then are transferred

to Sajen. One day each week Air Charter, itself, may fly into Metro, but no such shipments have yet been confirmed. Surveys of Sajen aircraft have shown that exposure rates at the fuel ports are occasionally in excess of the 2 mrem/hr limit set by air-carrier exemption DOT-E 7060 for exposure to the general public. None of the observed flights loaded fuel at Metro, so none of the Metro refuelers was exposed.

United Airlines continues to carry Union Carbide technetium-99m generators. Of the five examined this quarter, three were slightly below the label T.I. of 2.0. The other two, both examined on March 18, 1981, were over the listed T.I. At 3 feet, one read 2.2 mR/hr and the other 3.0 mR/hr. One of these two had the "DOT 7A Type A" designation covered by a United Airlines shipping label. All shipping papers were in proper order.

Airfreight at Willow Run Airport

A major reorganization of Zantop International Airlines took place this quarter. The number of hub terminals for the transfer of freight was reduced to one, that one being the Willow Run facility. This means that each night all Zantop freight is flown or trucked in for sorting and reloading. In addition to the outbound bromine-82 labeled motor oil from the University of Michigan, other RAM is handled. Some problems have occurred with the bromine-82 shipments and also a technetium-99m generator. On March 23, 1981 two bromine-82 packages were surveyed. Usually, the exposure rate at 3 feet for these packages is below the labeled T.I. On this occasion one package measured slightly above the label T.I., and the other was only about half of the label T.I. The labels for the packages had apparently been interchanged. The Zantop manager refused to continue carrying the two packages when he was informed that one exceeded the label T.I. Phoenix Memorial Laboratory, the shipper, was called and sent a technician with a survey instrument to relabel the packages. On May 4, 1981 two more bromine-82 packages were monitored. They were labeled 6 T.I. and 7 T.I., but both measured 7.0 mR/hr at 3 feet. Again Phoenix was called. After some discussion between a Phoenix employee and an FAA officer regarding the accuracy of survey instruments, no further action was taken on that particular shipment. Instead, an examination of the bromine-82 labeled motor oil production and packaging at Phoenix has been scheduled. In attendance at this evaluation will be representatives from the Federal Aviation Administration and the U. S. DOT Office of Motor Carrier Safety.

A transportation incident involving the skewering of a technetium-99m generator with a fork lift occurred at Zantop May 5, 1981. A Division physicist living in the area was dispatched to the scene. He found no release of radioactive material, only of sterile saline solution from vials packed with the generator. A similar generator examined later that month was labeled 1.2 T.I. and read 20 mR/hr at the surface and 0.6 mR/hr at 3 feet.

First Flight Freight Service is the trucking company that carries the bromine-82 packages from Phoenix Lab to Willow Run. Due to a lack of blocking and bracing, the packages can shift forward in the

trucks during normal transit. As shown by a comparison of the measurements for the two trucks in Table V, improper loading or load shifting can result in a factor of 10 increase in driver exposure. Maintenance of the proper separation distance as in 49 CFR 177.848 is apparently less restrictive than the exclusive use vehicle condition of 2 mrem/hr in the driver's seat, not applicable in this case. One truck had the required 4 feet separation distance but exceeded 3 mR/hr in the driver's seat. This same truck was also missing the front placard. Rather than tape a placard to the front of the truck box, one was leaned against the inside of the windshield. Besides being a visual obstruction, it had fallen down. Taping a placard on the box was recommended for future pick-ups. The lack of blocking and bracing was called to the attention of the company office. A solution will be found, according to the company. The method for rectification of this deficiency will be observed in the future.

Courier Companies

After a series of meetings with Division staff, Purolator Courier Corporation has agreed to allow the reinstitution of the surveillance program. Preparations are underway for area and personnel monitoring. Mutually acceptable ground rules for unannounced entry of facilities and for direct employee contact have been worked out. Next quarter there should be actual data from Purolator. From general observations of Purolator vehicles at Metro airport it appears that compliance is generally good with respect to placarding, carrying shipping papers, and staying under 50 T.I. per vehicle. One regular airport driver has been using a PDV (a van chassis with a larger box for cargo) with adequate room to meet separation distance requirements. The other driver generally uses a van and occasionally has difficulty maintaining separation distances. Contact with Purolator management is planned on the topic of driver training and the necessity for maintaining the prescribed separation distances.

Casperson, Inc. drivers continue to wear TLD dosimeters issued by the Division. Since May 12, 1981 the company has become a party to exemption DOT-E 8308. To fulfill one of the conditions of this exemption the drivers now also wear company TLDs to collect data for quarterly reports to the U. S. DOT. As shown in Table VIII, three of the eight drivers have been projected to receive more than 125 mR this quarter after subtraction of background. It is possible that at this rate these three may receive more than 500 mrem in a year, which is the dose limit for a member of the general public. According to one of the drivers, vehicles are now surveyed upon loading at Toledo, Ohio, a requirement of the exemption.

Some improvements have been observed in the exposures, even though several are still too high. By decreasing the loads carried and by the use of shielding in some trucks, Drivers 1 and 2 have had less exposure than in past quarters. However, they still nearly exceed the annual limit in a quarter. Driver 5 has been using her privately owned vehicle to drive her route. With the purchase of a larger

vehicle her exposure has dropped to one fourth of the exposure two quarters ago. Last quarter's badge was lost in the postal service.

Investigation of Casperson, Inc. operations now has become an evaluation of compliance with the exemption and an evaluation of how well the exemption conditions reduce the drivers' exposures. Division TLD monitoring will be continued to see if a significant decrease in exposure occurs. Also, data from the company-issued TLDs will be requested for comparison purposes, and vehicle surveys will be conducted.

Pharmatopes, Inc. is a nuclear pharmacy that operates its own courier delivery system. All employees wear film badges from a commercial supplier. A review of dosimetry reports showed that exposures are low for employees that deal with the transportation part of the business. An occasional badge may indicate 10 to 25 mrem received in a month, but most are reported as zero exposure. Dispatchers, who load briefcases with the unit doses, may receive 30 to 50 mrem per month on their ring badges, the highest dose for transportation workers at Pharmatopes. However, the 10 CFR Part 20 limit for dose to the hands is 18,750 mrem per quarter for the occupationally exposed.

Some minor problems have been observed with Pharmatopes' pick-up of technetium generators. There has been a tendency to place the generators at less than the maximum separation distance. A vehicle with a removable rear seat has been used to pick up two or three generator shipments. When the seat is removed, it is possible to load the generators at less than the required separation distance. The problem was discussed with the company president, who was to instruct the drivers to place the generators against the tailgate, at the maximum separation distance possible. The lead shield previously reported is still in use. When combined with the proper loading of the vehicle, it is effective in reducing driver exposure. Use of the shield is an excellent precaution since the current DOT-required separation distances do not necessarily guarantee that the exposure rate in the driver's seat will be below the 2 mrem/hr usually considered acceptable. If properly installed while carrying generators, the rear seat could be considered bracing for the load.

Nuclear Power Plant Shipments

Consumers Power Company nuclear power plants, Big Rock Point and Palisades, had been expected to use up a stock of ion exchange resin liners before the Barnwell, South Carolina burial site imposed new restrictions. New limits are to go into effect July 1, 1981 on the amount of water allowed in resin shipments. One gallon or 0.5% water will be allowed, whichever is less. Although the manufacturer will not certify the liners to meet the new standard, Consumers Power Company testing indicates that the old liners can meet the new requirements with extended dewatering time. For this reason there is now no reason to use the liners before the end of June. As shown in Tables IX and X there has been no marked increase in shipments from Consumers' plants. Big Rock Point made four shipments, and Palisades made five. None of the Big Rock Point shipments were examined this quarter, but two Palisades shipments were

checked, neither of which exceeded the DOT limits for contamination or for radiation levels. On the second truck examined, a last minute check by Palisades staff on a wooden box of non-compactible trash indicated excessive contamination. The box was set aside for decontamination, and another was substituted into the shipment. The highest level wipe taken at random on the waste containers to double check Consumers' wipe tests indicated 144±7pCi/100cm^2. Analysis was performed in the Division's Nuclear Counting Facility. This level is negligible compared to the limit of 10,000 pCi/100cm^2.

Of the 27 waste shipments from the D. C. Cook Nuclear Power Plant as noted in Table XI, two were checked. No problems were observed with either shipment. All radiation levels and contamination readings were within applicable limits. The most contaminated wipe from the Cook shipments monitored was 11±2pCi/100cm^2.

Yellowcake Shipments

No yellowcake shipments passed through the State this quarter. In previous shipment notifications, the data received from the shipper were not actual survey data but appeared to be worst-case data. Letters were written to the two Canadian mines that have shipped yellowcake into the U. S. instructing them to provide actual data. Both have agreed to provide actual data for each shipment regarding the curies carried and the radiation reading at 6 feet from the truck, and also stated that they had no immediate plans to ship into the U. S.

TABLE I

FIELD INVESTIGATIONS

Radioactive Material Transporter	Number of Investigations
American Airlines	4
Emery Air Freight	3
Federal Express	8
Flying Tigers	2
Northwest Orient Airlines	4
Republic Airlines	1
Sajen Air	4
United Airlines	2
Zantop International Airlines, Inc.	3
Pharmatopes, Inc.	3
Purolator Courier Corporation	4
Casperson, Inc.	1
First Flight Freight Service	3
Donald C. Cook Nuclear Power Plant	2
Palisades Nuclear Power Plant	2

TABLE II

Package Surveys

Label	Number	Label T.I.			mR/hr @ Surface			mR/hr @ 3 ft.		
		Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
I	0	-	-	-	-	-	-	-	-	-
II	0	-	-	-	-	-	-	-	-	-
III	10	1.2	3.8	8.0	38.0	78.3	138.	0.6	3.6	7.0

TABLE III

Overpack Surveys

Label	Number	Label T.I.			mR/hr @ Surface			mR/hr @ 3 ft.		
		Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
I	0	-	-	-	-	-	-	-	-	-
II	14	0.2	0.4	0.8	1.3	10.6	47.	0.1	0.4	1.6
III	3	0.9	1.4	2.0	30.	43.	62.	0.9	1.4	1.7

TABLE IV

Sajen Air Airplane Surveys

Date	T.I. Carried*	mR/hr* in Cockpit	mR/hr* at Fuel Ports
3/17/81	20.4	0.5	0.4
3/24/81	71.4(8.4)	4.0(0.1)	2.1
5/4/81	>65.6	3.0(0.1)	2.2
5/28/81	0.3	0.1	N.M.

* Numbers in parentheses are after unloading at Metro
N.M. - Not Measured

TABLE V

Truck Surveys

First Flight Freight Service

Date	T.I. Carried	mR/hr in Cab	Approximate Separation Distance
3/23/81	14.	0.3	13 ft.
5/4/81	13.	3.1	4 ft.

TABLE VI

DIRECT RADIATION EXPOSURE MEASUREMENTS
USING LiF THERMOLUMINESCENT DOSIMETERS

Station, Location, & Monitoring Period		Monitoring Days	Total mR for Period	Gross mR Per Day	*Net mR Per Day	mR Per Quarter
American Airlines						
Detroit Metropolitan						
Airport - Romulus						
Area Monitors Over RAM Carts Feb. 23, 1981 - May 28, 1981	#1	94	42.70	0.45	0.32	30
	#2	94	44.85	0.48	0.35	32
Area Monitors Near Men's Room Feb. 23, 1981 - May 28, 1981	#3	94	22.36	0.24	0.11	10
	#4	94	25.35	0.27	0.14	13
Handler 1 Feb. 23, 1981 - May 28, 1981		94	11.89	0.13	0.00	0
Handler 2 Feb. 23, 1981 - May 28, 1981		94	14.35	0.15	0.02	2
Handler 3 Feb. 23, 1981 - May 28, 1981	(1)	94[106]	12.77	-	0.00	0

*Background = 0.13 mR/day

(1) Badge returned late. Reading corrected for total days between readings, in brackets.

TABLE VII

DIRECT RADIATION EXPOSURE MEASUREMENTS
USING LiF THERMOLUMINESCENT DOSIMETERS

Station, Location, & Monitoring Period		Monitoring Days	Total mR for Period	Gross mR Per Day	*Net mR Per Day	mR Per Quarter
Federal Express						
Romulus						
Area Monitors Beside Phone March 17, 1981 - May 28, 1981	#1	72	14.43	0.20	0.07	6
	#2	72	10.66	0.15	0.02	2
Area Monitors Under Rollers March 17, 1981 - May 28, 1981	#3	72	12.35	0.17	0.04	4
	#4	72	13.63	0.19	0.05	5
Area Monitors On Wall March 17, 1981 - May 28, 1981	#5	72	9.174	0.13	0.00	0
	#6	72	9.177	0.13	0.00	0
Area Monitors In Van One March 17, 1981 - May 28, 1981	#7	72	10.61	0.15	0.02	2
	#8	72	9.430	0.13	0.00	0
Handler/Driver 1 Dec. 12, 1980(1)(2) - Feb. 23, 1981		77[175]	21.28	-	0.00	0
Feb. 23, 1981(1) - May 28, 1981		94[105]	15.39	-	0.02	2
Handler/Driver 2 March 17, 1981 - May 28, 1981		72	11.69	0.16	0.03	3
Handler/Driver 3 Feb. 23, 1981(1) - May 28, 1981		94[105]	14.48	-	0.01	1

*Background = 0.13 mR/day

(1)Badge returned late. Reading corrected for total days between readings, in brackets.
(2)Data is from previous quarter.

TABLE VIII

DIRECT RADIATION EXPOSURE MEASUREMENTS
USING LiF THERMOLUMINESCENT DOSIMETERS

Station, Location, & Monitoring Period	Monitoring Days	Total mR For Period	Gross mR Per Day	*Net mR Per Day	mR Per Quarter
Casperson, Inc.					
Feb. 26, 1981 - May 28, 1981					
Driver 1	91	488.3	5.37	5.25	483
Driver 2	91	451.0	4.96	4.84	445
Driver 3	91	171.3	1.88	1.76	162
Driver 4	91	32.58	0.36	0.24	22
Driver 5	91	88.07	0.97	0.85	78
Feb. 26, 1981 - May 27, 1981					
Driver 6	90	28.19	0.31	0.17	16
Driver 7	90	67.75	0.75	0.61	56
Driver 8	90	12.32	0.14	0.00	0

*Background = 0.12 for Drivers 1-5; = 0.14 for Drivers 6-8

TABLE IX

REPORTED RADIOACTIVE MATERIAL SHIPMENTS

to and from

Big Rock Point Nuclear Power Plant

Consumers Power Company

Charlevoix, Michigan

Date Time	Description of Shipment	Curies	mR/hr at 6 ft.	Destination
4/21/81 4:40 P.M.	Solid Waste	2.8	5.0	Barnwell, SC
5/18/81 9:00 A.M.	Dewatered Resin	120.0	7.0	Barnwell, SC
5/21/81 1:00 P.M.	Dewatered Resin	20.4	5.0	Barnwell, SC
5/27/81 7:00 P.M.	Filters, Insulation, Plastic, & Absorbant	8.0	4.0	Barnwell, SC
	Total	151.2		

TABLE X

REPORTED RADIOACTIVE MATERIAL SHIPMENTS

to and from

Palisades Nuclear Power Plant

Consumers Power Company

Covert, Michigan

Date Time	Description of Shipment	Curies	mR/hr at 6 ft.	Destination
3/25/81 10:30 A.M.	Non-compacted Trash	0.341	5.0	Richland, WA
4/8/81 1:30 P.M.	Non-compacted and Compacted Trash	0.577	2.0	Richland, WA
4/28/81 2:30 P.M.	Filter Cartridges	1.085	5.0	Barnwell, SC
5/15/81 2:30 P.M.	Non-compacted and Compacted Trash	1.59	8.0	Richland, WA
5/29/81 12:00 Noon	Non-compacted and Compacted Trash Dewatered Resin	1.005	2.0	Richland, WA
	Total	4.598		

TABLE XI

REPORTED RADIOACTIVE MATERIAL SHIPMENTS

to and from

Donald C. Cook Nuclear Power Plants

Indiana & Michigan Electric Company

Bridgman, Michigan

Date Time	Description of Shipment	Curies	mR/hr. at 6 ft.	Destination
3/4/81 11:15 A.M.	Solidified Evaporator Concentrates	0.029	0.8	Barnwell, SC
3/6/81 5:45 P.M.	Filter Cartridges	31.	1.5	Barnwell, SC
3/14/81 1:05 A.M.	Dewatered Resin	140.7	1.5	Barnwell, SC
3/16/81 5:20 P.M.	Filter Cartridges & Crystaline Boric Acid	7.7	1.5	Barnwell, SC
3/26/81 1:35 P.M.	Solidified Evaporator Concentrates	0.045	1.0	Barnwell, SC
3/27/81 4:45 P.M.	Solidified Evaporator Concentrates	0.045	0.9	Barnwell, SC
3/28/81 6:00 P.M.	Dry Solid Trash	0.0412	3.5	Barnwell, SC
3/30/81 11:00 A.M.	Solidified Evaporator Concentrates	0.397	1.2	Barnwell, SC
4/2/81 6:00 P.M.	Solidified Evaporator Concentrates	0.450	4.5	Barnwell, SC
4/3/81 6:00 A.M.	Solidified Evaporator	0.309	<0.2	Barnwell, SC
12:30 P.M.	Concentrates	0.179	2.8	Barnwell, SC
4/4/81 11:20 A.M.	Solidified Evaporator Concentrates	1.15	0.3	Barnwell, SC
4/6/81 12:20 P.M.	Filter Cartridges & Trash	4.075	0.8	Barnwell, SC
4/7/81 3:35 P.M.	Solidified Evaporator Concentrates	0.137	2.0	Barnwell, SC

TABLE XI cont.

REPORTED RADIOACTIVE MATERIAL SHIPMENTS

to and from

Donald C. Cook Nuclear Power Plants

Indiana & Michigan Electric Company

Bridgman, Michigan

Date Time	Description of Shipment	Curies	mR/hr. at 6 ft.	Destination
4/20/81 12:00 Noon	Dewatered Resin	135.72	2.8	Barnwell, SC
4/27/81 4:00 P.M.	Metal Parts	0.438	1.8	Madison, PA
4/27/81 5:59 P.M.	Contaminated Camera & Video Equipment	0.0009	0.1	Windsor, CT
4/28/81 12:25 P.M.	Solidified Evaporator Concentrates	0.038	0.7	Barnwell, SC
4/30/81 6:00 P.M.	Dry Compacted Waste	0.342	7.0	Richland, WA
5/1/81 12:00 Noon	Solidified Evaporator	0.061	0.8	Barnwell, SC
4:00 P.M.	Concentrates	0.063	1.5	Barnwell, SC
5/2/81 11:30 A.M.	Solidified Evaporator Concentrates	0.28	0.4	Barnwell, SC
5/5/81 10:15 A.M.	Dewatered Resin	171.41	1.7	Barnwell, SC
5/11/81 4:45 P.M.	Solidified Evaporator Concentrates	1.15	<0.2	Barnwell, SC
5/21/81 2:00 P.M.	Dry Solid Trash	0.0296	1.8	Richland, WA
5/27/81 10:30 A.M.	Dry Solid Trash	0.2168	3.0	Richland, WA
5/28/81 10:10 A.M.	Solidified Evaporator Concentrates	0.088616	1.2	Barnwell, SC
	Total	496.		