



47 TRINITY AVENUE, S.W., ATLANTA, GEORGIA 30334

August 14, 1980

Marie Janinek
Office of State Programs
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555 (Mail Stop 7711-MNBB)

Dear Ms. Janinek:

In accordance with the terms of modification no. one to Contract No. NRC-06-78-362, ten copies of the third quarterly progress report are enclosed.

Sincerely,

Willard D. Ingram

Willard D. Ingram
Environmental Radiation Specialist
Radiological/Occupational Health Unit

WDI:ck

Enclosures: as stated

cc: G. Wayne Schumann

8009100.097



GEORGIA INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL RESOURCES CENTER
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MEMORANDUM

TO: Dr. Wayne Schumann, Director Attn: Mr. Willard Ingram
Radiological-Occupational Health Unit, Georgia DHR

FROM: Dr. Bernd Kahn, Director *Bernd Kahn*
Environmental Resources Center

DATE: August 7, 1980

SUBJ: Seventh Quarterly Report of Progress (April 1 - ^{June 30,} ~~July 31,~~ 1980)
of Extended State Transportation Surveillance Program - Radioactive
Materials - under agreement between Georgia Department of Human
Resources and Georgia Institute of Technology

Monitoring of RAM packages and of vehicles transporting RAM continued this quarter, as well as determining the radiation exposures in persons handling RAM at terminals and in the cabs of vehicles. Further data on the magnitude of RAM shipments in Georgia were also collected.

The list of monitored RAM in transit is given in Table 1. Problems with these shipments, including violations, are listed in the "remarks" column, and in Appendix A.

The exposure rates of workers with RAM, including drivers of RAM vehicles and handlers at terminals, that were measured with TLD's for 3-month periods are summarized in Tables 2a to 2i. Typical background exposure rates for 3-month periods are 13 to 26 mR at Atlanta, as determined during the previous year. Some elevated levels are shown in Tables 2e, 2h, and 2i for this quarter. As a check on these values, because there is no assurance that the dosimeters are used appropriately, dosimeters placed at drivers' seats in vehicles and on walls at terminals were also read, with the results shown in Tables 3 to 5. Some elevated exposures were observed at drivers' seats (see Tables 3 and 4) and at terminals (Table 5) during this quarter. These values may exceed exposures to persons because the TLD's were exposed to RAM while no person was nearby, but are indications of high exposure rates in the area.

Vehicle monitoring for RAM is summarized in Tables 6 and 7, and violations are listed in the footnotes to Table 6. Results of analyzing surface smears of RAM vehicles that showed contamination are given in Table 7. All of these are at very low levels. All other smears of packages

and vehicles showed no contamination, either of gross activity or specific radionuclides as determined by gamma-ray spectrometry.

Information obtained from records concerning shipments of RAM through Georgia is compiled in Tables 9 through 22. The RAM listed in Table 16 were reported by NRC inspectors; all other RAM were recorded by the respective carriers.

Several significant changes have occurred in the distribution systems for radiopharmaceutical RAM, which before this quarter had been mainly distributed by Purolator Courier from its Atlanta terminal:

1. New England Nuclear has established a branch office in Atlanta, beginning May 19, 1980. Five shipments per week are received, primarily of Ga-67 and Xe-133, by Airborne Charter Express. A tractor trailer delivers RAM, mainly Mo-99 every Sunday. Outbound RAM from this office is carried by Purolator.
2. Air Lift International ceased operation at Atlanta effective April 15, 1980. Apparently Flying Tiger carries RAM formerly carried by AI.
3. Sagen Air (formerly Golden Eagle) carries RAM produced by New England Nuclear that has been carried by tractor trailer to Atlanta from here to New Orleans, LA, Jackson, MS, and Nashville, TN.
4. RAM produced by Squibb which are carried to Atlanta by Skycab truck every Saturday are transferred in part to vans operated by a local contractor for distribution in Atlanta, to Columbus, GA, and to Alabama (See Tables 10 - 12).

It is noted that New England Nuclear, Skycab, and Associated Courier now operate under an exemption (DOT E-8308) that limits a vehicle to 50 TI except that packages containing Mo-99 (which constitute most of the TI under usual circumstances) shall not be included in the total. The driver is limited to a whole body dose of 1.25 rem per calendar quarter.

Purolator Courier is still auditing its TI totals so as not to exceed 50 TI per vehicle. This pertains at present only to the Macon route and transfer of RAM from the New England Nuclear local office to the Purolator terminal, both on Sunday.

On May 17, 1980, a Federal Highway Administration, US DOT, inspector monitored operations at the Purolator Courier terminal in Atlanta.

During the next quarter, the activities described above will be concluded. A major change is anticipated in handling RAM by passenger airlines when the new terminal is placed into operation on September 21, 1980, hence area radiation measurements at the existing terminal will be ended for this study period early in september. Efforts will be made to monitor and obtain more information on radiography sources.

Table 1

Monitored RAM Packages								
1980 Date and Location	Amount, Ci	Isotopes	Transportation Index	Category				Remarks*
				Ltd	I	II	III	
April 24 Kenworthy AF	0.1	Cs-137	0.4		1			RAM in special form. Ohmart Corp. Cincinnati, OH to Mansanto Co. Decatur, AL (0.2)
April 26 Purulator	1.1	Mo-99	3.6			1		Squibb freight bill to Athens General Hospital was dated April 18. Box was marked "Return to sender-Refused Shipment" Skycab took package on April 26. (0.5)
May 14 Federal Express	0.010 0.050	Cs-137 Am-241/Be	0.1			1		RAM in special form. Brainard Kilman Drill Co Tucker, GA to Coral Gables Fl. Package authorization and type were not visible. (0.2)
	0.0004	U-235	-		1			168 grams DOT 6M Type B container from Oak Ridge, TN to SRP Aiken, SC. Overnite Transportation Co. refused shipment. RAM held pend- ing resolution.
	0.0045	Ra-226	0.5			1		Seaman Nuclear Corp. Atlanta, GA to Pittsburgh, PA. (Density gauge). Ship- per failed to attach package seal after opening box to include papers. Federal Express applied tape for security. (0.5).
May 14 Flying Tiger	228	Ir-192	1.3			1		Type B RAM in special form Technical operations Burlington, MA to Peru. Nails for package seal. Shipping papers were not available. (1.8)
May 14 Delta Cargo	0.49 0.002	Mo-99 I-131	1.0			1		Skycab overpack Newark Airport to Atlanta. Items loose inside box. Staples used for package seal; some staples were loose on top and bottom of overpack (0.8)
	0.0018	I-123	0.1			1		Medi-Physics Overpack. Newark Airport to Brunswick, GA. (0.1)
	0.010 0.020	I-123 Ga-67	0.6			1		Medi-Physics Overpack Newark Airport to Atlanta (0.3)
	0.0048 0.010	I-123 Xe-133	0.3			1		Medi-Physics Overpack Newark to Atlanta (0.1)

Page 4/Table 1

1980 Date and Location	Amount, Ci	Isotopes	Transportation Index	Ltd	I	II	III	Remarks*
Profit By Air *	0.0115	H-3						Overpack From Chicago, IL to Dallas Ft. Worth, TX (0.2)
June 22 Purolator	0.050 (total)	Xe-133 I-123	0.4			1		Medi Physics Overpack From Newark Airport to Atlanta, Ga. (0.1)
June 23 Purolator	0.006	Ga-67 .	0.1			1		NEN From Atlanta, GA to Concord, NC (0.1)
	0.002	Tl-201	-			1		NEN Georgia

*Type A package unless otherwise specified.
 Origin and destination listed unless shipments were exclusively in GA.
 Measured TI shown in parenthesis.
 Pertinent observation noted.

Year Date and Location	Amount, Ci	Isotopes	Transportation Index	Transportation			Remarks*
				Ltd	I	II	
June 19 Flying Tiger	3,460	Ir-192	0.3			1	USA DOT WC type B container from Oak Ridge, TN to Industrial Nuclear Co., Foster City, CA (0.4)
	0.029	Depleted Uranium	0.2			1	Lockheed Georgia Co., Marietta GA to Eastern Airlines, Miami FL. RAM was being held pending disposition. TI was not listed on package labels, labels were not on opposite ends of box, and LSA was not listed on air bill. (0.2)
June 19 Purolator	0.051	I-131	1.5			1	Mallinckrodt, St. Louis, MO to Atlanta, GA (1.5)
	0.001	I-131	0.1			1	Mallinckrodt, St. Louis, MO to Atlanta, GA (0.3)
June 20 Flying Tiger	0.050	Xe-133	-			1	Medi-Physics Overpack, Chicago, IL to Huntsville, TX.
June 20 Kenworthy AF	0.030	I-125	0.4			1	Amersham (Profit By Air) Overpack
	0.10	H-3					Chicago, IL to Atlanta, GA
	0.020	S-35					Staples used as seals. (0.1)
	7 uCi	Co-57					
	0.0012	H-3	-			1	Amersham (Profit By Air) Overpack. Chicago, IL to Dallas/Ft. Worth, TX. Staples used as seals.
	308 uCi	I-125	0.2			1	Amersham (Profit By Air) Chicago, IL to Memphis, TN. Staples used as seals. (0.1)
	0.030	I-125	0.2			1	Amersham (Profit By Air) Overpack-Chicago, IL to Dallas/Ft. Worth, TX. Staples used as seals. (0.1)
	0.0052	H-3					
June 21 Purolator	253	Mo-99	3			1	Squibb bill #31284I to Middle Georgia Hospital, Macon, GA was dated June 16, 1980. Package was consigned to Mediray Inc., Tuckahoe, NY. Package was returned to Purolator to be held for return by Skycab. Paperwork and labels showed Y II, 253 curies with TI of 3; however TI noted was only 0.5. New labels had been placed over original labels.
June 22	0.050	Cr-51	0.2			1	Amersham (Profit By Air)

1980 Date and Location	Amount, Ci	Isotopes	Transportation Index	Ltd	I	II	III	Remarks*
	0.002	P-32	0.1			1		NEN, Boston, MA to Augusta GA. Item loose inside box. Bottom and side of box were wet. Wipes taken showed no contamination. Package contained dry ice. (0.1)
May 17 Purulator	0.010	I-125	0.1			1		Amersham (Profit By Air) Chicago, IL to Augusta, GA Item was loose inside package (0.1)
	0.00077	I-125	0.2			1		Amersham (Profit By Air) Chicago, IL to Ft. Gordon, GA (0.2)
	0.037	I-131	0.7				1	Mallinckrodt overpack arrived in Atlanta on Eastern AB 007 STL 1208-1436, FLT 271/13 as 1 of 4 pieces; however, packages inside were destined for NY. Overpack labels were corrected to show all isotopes and TI. The box was resealed. (0.9)
	(The following packages were found inside subject overpack)							
	1 mCi	Se-75	0.1					
	2 mCi	I-131	0.2					
	12 mCi	I-131	0.3					
	10 mCi	P-32	0.2					
	12 mCi	I-131	0.3					
	unknown	unknown	-	(Ltd)				Associated Courier picked up RAM on May 17, 1980 for return to manufacturer.
June 11 Flying Tiger	0.0004	Depleted Uranium	0.2			1		Lockheed GA. Co. From Marietta, GA to Montreal, Canada (0.1)
	0.080	Po-210	-		4			Minnesota 3 M. Staples used for package seal. From New Brighton, MN to San Juan, Puerto Rico.
	108	Ir-192	1.4			1		NRC USA/9032/B - Type B RAM in special form. Technical Operations, Burlington, MA to Columbia (0.1)
June 11 Delta Cargo	0.046	Ga-67 Xe-133	0.4			1		Diagnostic Isotopes overpack Bloomfield, NJ to Atlanta (0.2)
June 13 NEN	2,500	Xe-133	0.1			1		NEN (0.1)
	2,500	Xe-133	0.1			1		NEN (0.1)
June 13 Airborne Freight	0.010	I-125	0.1			1		Amersham, Chicago, IL to Gainesville, FL. RAM was being held pending proper shipping certificate. Item was loose inside (0.1)
June 16 Flying Tiger	30,000	H-3	-			1		Type USA 5552/B RAM as a gas (3.13 grams) From Oak Ridge, TN to Bucks, England.

Table 2a

Federal Express Personnel Radiation Monitoring with TLDs

TLD #	Position	Exposure rate, mR/period	
		12/13/79 to 3/20/80	3/20/80 to 6/23/80
1 A	Night Ramp Agent	19	NR*

*NR - not recovered

Table 2b

Delta Cargo Terminal Personnel Radiation
Monitoring with TLDs

TLD#	Shift	Position	Exposure rate, mR/period	
			12/13/79 to 3/20/80	3/20/80 to 6/19/80
1	(B)	Clerk (office on 2nd floor) (Control)	25 (21)**	21
3	(C)	CSA Add-to/Spec Ser and In- bound	14	NR
4	(C)	Gate Agent, Main Terminal	NR*	NR
5	(C)	Unloading Aircraft, Main Term.	NR	NR
6	(A)	SCSA	56 (58)	-
6A	(A)	SCSA Spec Ser Agent	14	14
7	(C)	CSA Add-to	16	15
8	(A)	CSA Sorter	15	15
9	(C)	Ticket Counter, Main Terminal	25 (21)	NR
9A	(C)	SCSA Spec Ser Agent	16	15
10	(D)	SCSA Floor	16	17
11	(D)	SCSA Spec Ser Agent	20	17
12A	(D)	SCSA Add-to/outbound	NR	NR
13	(D)	SCSA Sorting Area	NR	25 (27)
16	(C)	Spec Ser Agent	16	18
17	(C)	Spec Ser Agent	17	16
18	(D)	SCSA	NR	25 (27)
19	(D)	SCSA	18	15
20	(E)	Gate Agent, Main Terminal	NR	NR
21	(C)	Senior Ser Agent	NR	30 (27)

Shift: (A) 2315-0700 (B) 0800-1700 (C) 1500-2330 (D) 0700-1515

*NR - not recovered

** - number of weeks other than shown in heading

Table 2c

Eastern Cargo Terminal Personnel Radiation
Monitoring with TLDs

TLD #	Position	Exposure rate, mR/period	
		12/13/79 to 3/20/80	3/20/80 to 6/19/80
1	Ramp Service (1620-0020)	16	16
2	Ramp Service (1620-0020)	14	NR*
3	Ramp Service (0010-0810)	17	12
4	Supervisor (0800-1700)	21	17
5	R/S Front door and belt man (1620-0020)	22	20
6	Lead Ramp Service (0010-0810)	15	NR
7	Ramp Ser Air Express (0900-1730)	19	10
8	Ramp Ser Air Express (0110-0910)	28(21)**	14

* NR-not recovered

** Number of weeks other than shown in heading

Table 2d

Profit By Air Terminal Personnel Radiation
Monitoring with TLDs

<u>TLD #</u>	<u>Position</u>	<u>Exposure rate, mR/period</u>	
		<u>12/13/79</u> to <u>3/20/80</u>	<u>3/20/80</u> to <u>6/20/80</u>
1	Driver, Atlanta area	20	15
2	Driver, Atlanta area	18	14

Table 2e

Purolator Courier Personnel Radiation
Monitoring with TLDs

TLD #	Position (Route)	Exposure rate, mR/period	
		12/13/79 to 3/20/80	3/20/80 to 6/19/80
1	Office Secretary (Control)	14	17
3	Driver (028)	30 (21)+	24
4	Driver (039)	65	42
6	Driver (014)	36	20
7	Weekend Dispatcher (supervisor)	54	28
10	Driver (086)	NR*	70 (67)
11	Driver (037 & 086)	14 (4)	30
12	Driver and Terminal Sorter	52	81
14	Supervisor	19	17
15	Terminal Sorter	NR	-
18B	Driver (002)	22	17
19A	Driver (305)	17	16
36A	Driver/Supervisor	19	16
39	Driver (035)	30 (21)	19
43	Driver (008)	NR	
45	Driver (100)	NR	80 (27)
46	Driver (400)	76	NR
47A	Driver (045)	21	18
48	Driver (001)	14	15
49	Driver (016 & 004)	23	22
53	Driver (103)	NR	50 (27)
56	Sorter, weekends	NR	220 (42)
60	Driver (100 & 108)	NR	NR
63	Driver (011)	19	15
67	Driver (024)	40	33

Table 2e continued.....

68	Driver (051) *	NR	31 (27)
70	Sorter, week nights	74	NR
74	Air Express	NR	NR
75	Driver (400)	NR	NR
76	Driver (005)	22	18
77	Driver (006)	20	19
83	Supervisor, weekend	28	NR
84	Sorter, week nights	22	17
89	Driver (001)	21	18
90	Driver (080)	NR	NR
93	Driver (015)	NR	NR
95	Driver (022)	NR	NR
96	Driver (080)	34	NR
99	Driver (008)	NR	NR
100	Sorter, weekend	53 (4)	NR
103	Driver (008)	-	NR
105	Driver (008)		7 (8)

* NR-not recovered

+ No. of weeks other than shown in heading.

Table 2f
 Associated Courier Personnel Radiation
 Monitoring with TLDs

TLD #	Position	Exposure rate, mR/period	
		12/13/79 to 3/29/80	3/29/80 to 6/21/80
52	Driver	650 (21)+	NR*
73	Driver	900 (22)	NR
104	Driver	-	NR

Note: 1. Route-St. Louis, MO; Memphis, TN; Birmingham, AL; Atlanta, GA; Charlotte, NC, to West Palm Beach, FL.

2. Drivers sometimes switch to a Texas route from St. Louis, MO.

*NR - not recovered

+number of weeks other than shown in heading

Table 29

New England Nuclear Personnel Radiation
Monitoring with TLDs

TLD #	Position	Exposure rate, mR/period	
		12/16/79 to 3/30/80	3/30/80 to 6/22/80
1	Driver	1100 (22)+	NR*
4	Driver	850 (22)	NR
5	Driver	NR	NR
6	Driver	NR	NR

Notes: 1. Route - Billerica, MA; Atlanta, GA; Nashville, TN; Oak Ridge, TN;
to Billerica, MA.

2. Drivers alternate on weekend trips.

*NR - not recovered.

+ number of weeks other than shown in heading.

Table 2h
 Skycab Personnel Radiation
 Monitoring with TLDs

TLD #	Position	Exposure rate, mR/period	
		12/15/79 to 3/22/79	3/22/79 to 6/21/80
50	Driver	NR*	2300 +
59	Driver	1300	NR

Note: 1. Route - New Brunswick, NJ; Richmond, VA; Charlotte, NC; Atlanta, GA; to Orlando, FL. Effective March 29, 1980, Orlando, FL route was dropped. Route now terminates in TN.

* NR - not recovered.

+ Exposed for 34 weeks. In addition, another TLD (#50) issued July 28, 1979 was recovered on June 21, 1980 and had a reading of 1044 mR. However, TLD was not on person but in a box beside driver's seat.

Table 2i

Contractor for Skycab (Atlanta, Georgia): Personnel Radiation
Monitoring with TLDs

TLD #	Position (Route)	Exposure rate, mR/period	
		4/26/80 to 4/28/80	5/2/80 to 6/20/80
1a	Driver (wallet)	29	120
1b	Driver (Shirt pocket)	24	-
2	Driver	-	NR*
3	Driver	30	120
4	Driver	48	NR

* NR-not recovered

Note: 1. Route-East Point, to Columbus, GA and intermediate stops at hospitals enroute to Montgomery and Birmingham, Ala. On April 26, 1980, three drivers were in vehicle to learn route. Drivers are suppose to alternate for weekend runs.

Driver #1 also transports RAM to hospitals in Atlanta area on Saturday evenings.

Table 3

Vehicle Radiation Monitoring with TLDs

TLD #	Vehicle #	Route ID	Exposure rate, mR/period	
			12/13/79 to 3/20/80	3/20/80 to 6/19/80
	<u>Purolator</u>			
20	15180	(015)	NR*	NR
22	15181	(028)	22	20
23	15170	(039)	24	NR
24	15171	(015)	NR	NR
25	15147	(a)	NR	NR
26	15201	(086, 039)	30	Lost
27	15207	(014)	16	18
28	15194	(305)	39 (25)**	NR
29A	15182	(086)	36 (21)	18
30	16144	(028)	NR	NR
32	56078	(b)	NR	NR
33	37064	(018)	NR	18
34	15165	(024, 037, 080, 039)	NR	NR
35A	15174	(081)	22	20
38	16111	(a)	NR	NR
40	15149	(035)	34	28
44	15145	(008)	NR	NR
54	15203	(080)	30	29
57	15208	(100)	NR	NR
61	16725	(400)	NR	NR
62	15205	(008)	85 (38)	40
64	15178	(011)	NR	NR
65	912	(039)	22	18
66	15209	(081)	45	NR
69	15186	(051)	19	NR
72	15192	(081)	21	19

Page 2
Table 3

81	15218	(100)	NR	NR
85	15214	(028)	80	29
86	16724	(400)	580 (26)	200
91	15289	(080)	NR	NR
92	15227	(305)	14	13
94	15223	(015)	47	NR
97	15212	(080)	43	NR
98	15224	(028)	29	23
101	15231	(028)	-	NR
87	<u>Associated Courier</u> P83094	(c)	580 (21)	330
3	<u>New England Nuclear</u> 55	(d)	410	112
88	<u>Skycab</u> XRC92U	(e)	1400	NR
3	<u>Skycab</u> XRC92U	(e)	-	870 (f)

- Notes: (a) Atlanta to Birmingham, AL
 (b) Atlanta To SC
 (c) St. Louis, MO; Memphis, TN; Birmingham, AL; Atlanta, GA; Charlotte, NC to West Palm Beach, FL
 (d) Billerica, MA; Atlanta, GA; Nashville and Oak Ridge, TN;
 (e) New Brunswick, NJ; Richmond, VA; Charlotte, NC; Atlanta, GA; to Orlando, FL
 (f) TLD Skycab 3 was issued on October 25, 1979 and was recovered on June 21, 1980 (34 weeks). However, van was subsequently sold and TLD was carried in other vehicles. Routes and dates associated with subject reading are unknown.

*NR - not recovered.

** Number of weeks other than shown in heading

Table 4

Vehicle Radiation Monitoring with TLD's:
Contractor for Skycab (Atlanta, GA)

TLD #	Vehicle #	Route *	Exposure rate, mR/period	
			4/26/80 to 4/28/80	5/2/80 to 6/20/80
5	TEA 529	(behind driver's seat)	36	360
6	TEA 529	(behind passenger's seat)	-	510
7	TEA 529	(behind rear seat)	250	1560

* East Point, Georgia to Columbus, Georgia with intermediate stops at hospitals to Montgomery and Birmingham, Alabama. Vehicle departs every Saturday night after transferring RAM from Skycab vehicle which started at East Brunswick, NJ.

Table 5

Site Radiation Monitoring With TLD's

TLD Location	8/15/79 to 11/14/79	Quarterly Exposure, mR	
		11/14/79 to 2/13/80	2/13/80 to 5/15/80
Terminal A, Airborne			
1C * Office, under desk	---	15	17
2 RAM Area, south wall	---	33	39
Terminal B, Airlift Intl.			
1C Office, on wall	M+	34	30
2C Breakroom, on wall	M	M	27
3 Left side RAM area, on wall	51	39	44
4 Center RAM area on wall	M	M	40
5 Right side RAM area, on wall	M	46	24
6 Pillar south/east side outbound area	24	20	20
7 Wall, south side Outbound area	45	43	38
8 Pillar, west end Outbound area	M	16	21
9 Pillar, west end Outbound Area	M	18	26
Terminal C, Delta Cargo Terminal			
1C North wall	32	29	32
2C East wall	31	30	30
3 Inbound RAM (Hazardous Holding area)	46	38	47
4 Outbound RAM	19	M	21
5 East wall between doors 6 & 7	26	31	23
6 Pillar, east side opposite doors 6 & 7	32	27	25
Terminal D, Eastern Cargo Terminal			
1 RAM Area, Terminating Bins 3 & 4	66	41	89
2 RAM Area, Terminating Bins 1 & 2	54	52	71
3C Steel pillar, SE end of terminal	16	15	16
4 RAM area, Outbound	22	26	14

5	RAM Area, Inbound on steel pillar	15	14	15
6	RAM Area, Terminating Bins 2 & 3	53	41	71
7	RAM Area, Terminating Bins 4 & 5	52	31	45
8	Left side of pickup door #1	30	22	30

Terminal E, Emery Air Freight

1C	Office, under desk	M	16	15
2	RAM Area on post	32	14	30

Terminal F, Federal Express

1C	Office	M	22 (a)	23
2	End of roller conveyor, east terminal	23	21	30
3	Bin pkg holding area outside office		20	M

Terminal G, Flying Tiger

1C	Office	22	22	23
2	Wall left corner RAM area	36	98	60
3	On pillar center of RAM area	34	88	260

Terminal H, Profit by Air

1C	Office	M	17	M
2	RAM area, east wall	19	18	17
3	RAM area, post to left of east wall	20	20	20

Terminal I, Purolator

1C	Breakroom on water fountain	M	15	16
2	West wall, between door 2 & 3	34	54	80
3	By dispatcher's window inside cabinets	320	290	180
4	North wall, left side men's latrine	72	68	340
5	South wall, between doors 4 & 5	270	200	280
6	South wall, between doors 7 & 8	M	450	530
7	North wall, by door 16	92	62	69
8	South wall, between doors 1 & 2	57	35	52

9	East side between doors A & B	690	560	1000
10	East side between doors B & C	560	440	760

* Denotes Control TLD

+ M: Missing

- Notes: a. F (1C) TLD was attached to file cabinet in office which was subsequently moved out in the terminal area in a fenced storage area.
- b. Terminal B, Airlift International, in Atlanta, Georgia ceased operations effective May 15, 1980.

Table 6

Vehicle Monitoring Results

Date	Location	Vehicle	Route	Radiation Levels (mrem/hr)			Transport Index	Excessive Removable Contamination	Package Placement	Proper Shipping Documents	Placards	Remarks
				Cab	Surface	Six Ft.						
April 1980												
26	Note 1	P83094	A	0.4 0.9 (sleeper)	70	10	185.6	Table 8	Rear	yes	yes	
26		XRC92U	B	0.3 0.8 (Passenger)	30	unknown	unknown	none	Rear	(2)	yes	(3)
26	East Point, GA	TEA529	C	3.2 3.5 (Passenger) 11.0 (rear)	80	7	143.0	unknown	Rear	(2)	yes	(3)
27		NEN55	D	(4)	(4)	(4)	35.4	none on steering wheel, rear bed	Front, rear bed	yes unknown	yes	(3)
27		15213	080	0.8	14	1.7	29.1	unknown	Middle Rear	yes	(5)	(5)
27		15223	028	0.6	55	4.5	43	unknown	Rear	yes	yes	
27		16724	400	0.4	30	3	47.9	unknown	Rear	yes	yes	
27		16738	100	0.8	14	(4)	27.1	unknown	Rear	yes	yes	
27		15180	015	0.7	35	2.5	32.2	unknown	Rear	yes	yes	
27		15205	008	0.8	18	1.9	14.5	unknown	Rear	yes	yes	
May												
17		P83094	A	0.4 0.6 (sleeper)	80	12	227.1	none	Rear	yes	yes	(6)
June												
19	Eastern Cargo	15149	035	0.3	unknown	unknown	2.6	unknown	Front and Rear	yes	yes	

21		P83094	A	0.2	35	7	215.1	Table 8	Rear	yes	yes	(7)
21	Hapeville, GA	XTM792	B	1.2	54	unknown	272.6	Table 8	Front to Middle	(2)	yes	(3)
21	Hapeville, GA	TEA529	C	3.5	70	5.2	135.5	unknown	Rear	(2)	yes	(3)
21	Hapeville, GA	WJ1484	E	0.9	26	1.3	16.0	none	Rear	yes	yes	
22	NEN Atlanta	NEN55	F	0.2 0.4 (sleeper)	15	2.1	192.3	Table 8	Middle	yes	yes	
22		15201	080	0.4	10	1.2	13.4	unknown	Rear	yes	yes	
22		15234	001	0.2	3.2	0.3	2.5	unknown	Rear	yes	yes	
22		15205	008	0.3	15	1.3	11.0	unknown	Rear	yes	yes	
22		15235	015	0.4	15	1.5	31.6	unknown	Rear	yes	yes	
22		16724	400	0.6	20	1.7	45.6	unknown	Middle Rear	yes	yes	(8)
22		15168	100	1.1	20	2	27.3	unknown	Rear	yes	yes	(9)
22		15214	028	0.9	16	unknown	43.3	unknown	Rear	yes	yes	
23		15207	015	0.02	0.05	0.03	0.1	unknown	Rear	yes	yes	
23		15225	089	0.02	0.2	0.03	0.2	unknown	Front	unknown	yes	
23		37064	064	0.02	2.6	0.05	0.4	unknown	Rear	(10)	yes	
29	Charlie Brown Airport, Atlanta	NEN55	F	0.12 0.2 (sleeper)	12	2	261.8	Table 8	Middle	yes	yes	(3)

Notes: A-Associated Courier-St. Louis, MO; Memphis, TN; Birmingham, AL; Atlanta, GA; Charlotte, NC; Athens and Waycross, GA; to West Palm Beach, FL.
 B-Skycab-East Brunswick, NJ; Charlotte, NC; Atlanta, GA and TN.
 C-Skycab (Local Contractor)-Atlanta, GA; Columbus, GA; to Montgomery and Birmingham, AL.
 D-NEN-Billerica, MA; Alexandria, VA; Charlotte, NC; Atlanta, GA; Nashville, TN; to Oak Ridge, TN; and return to Billerica, MA.
 E-Skycab (Local Contractor)-Atlanta Hospitals in Atlanta, GA.

F-NEN (New Route) Billerica, MA; NJ; Alexandria, VA; Charlotte, NC; Atlanta, GA (two locations include Charlie Brown Airport and NEN office) to Orlando, FL; Oak Ridge, TN; and return to Billerica, MA.

1. All locations at Purolator Courier Terminal, Atlanta, GA unless otherwise noted.
2. Driver had only individual freight bills for RAM packages.
3. Company is now operating under exemption DOT E 8308.
4. Readings included contribution from RAM inside building.
5. New driver failed to display placards until advised that placards were required. Reading in cab was 3.0 mR/hr with only 3 1/2 feet separation distance. Driver was advised that RAM was too close to his seat so he repositioned RAM for more distance.
6. Vehicle was also inspected by representative from DOT Federal Highway Administration.
7. Associated Courier is also operating under exemption DOT E 8308, dated May 29, 1980. It was also noted that the trailer has 5000 lbs of steel plating in front and sides of trailer to reduce radiation readings.
8. Alternate driver for route loaded RAM with only 3 feet separation distance. Reading in cab was 1.9 mR/hr. Discussed observations with driver, who repositioned RAM to get separation distance of 7 feet with a cab reading of 0.6 mR/hr.
9. Reading in cab was 1.4 mR/hr with 6 foot separation distance. Discussed observation with driver who replaced a Mo-99 generator, TI of 6.0 with one with a TI of 2.5 in front to reduce reading to 1.1 mR/hr.
10. NEN bill of lading #450658 to Columbia, SC for Ga-67, TI 0.3, Y II did not show label category nor TI.

Table 7

Aircraft Monitoring Results

Sagen Air (formerly Golden Eagle), Manchester, New Hampshire
(Exemption DOT E 7060, Dated January 23, 1980)

<u>1980 Date</u>	<u>Location</u>	<u>Aircraft</u>	<u>Cockpit</u>	<u>Surface</u>	<u>Six Ft</u>	<u>Trans- port Index</u>	<u>Package Place- ment</u>	<u>Proper Shipping Documents</u>
June 29	Charlie Brown Airport, Atlanta	N474SA	3.9	45	4	77.4	Center	yes

- Remarks:
1. NEN delivers RAM by tractor trailer to aircraft Sunday morning. Operation began in June.
 2. Aircraft flies RAM to New Orleans, LA (TI 23.0); Jackson, MS (TI 21.8) to Nashville, TN (TI 32.6) and returns to Manchester, NH empty.
 3. Pilot, co-pilot, and aircraft had film badges.
 4. Separation distance was 53 inches from pilot to RAM. Pilot stated that company has ordered vinyl lead shield to be installed in aircraft.
 5. Personnel were especially helpful and cooperative.
 6. Aircraft #N474SA was a Piper Chieftain.
 7. No removable contamination noted.

Table 8

Surface Contamination Measured By Smears of Vehicles and RAM Packages

<u>Date,</u> <u>1980</u>	<u>Area, cm²</u>	<u>Object Smear</u>	<u>Radionuclide Level, pCi/100 cm²</u>			
			<u>Se-75</u>	<u>Mo-99</u>	<u>I-131</u>	<u>Co-57</u>
April 26	2800	Associated Courier Trailer bed	0.13	0.10	< 0.1	-
June 21	5600	Skycab vehicles-rear bed and steering wheel	<0.05	< 0.05	< 0.05	0.07
June 21	7000	Associated Courier vehicle-steering wheel and rear bed	<0.08	0.05	< 0.08	< 0.04
June 22	7000	New England Nuclear vehicle-steering wheel and rear bed	<0.03	0.05	< 0.03	< 0.02
June 29	1850	New England Nuclear vehicle-rear bed	<0.3	< 0.3	< 0.3	0.34

Table 9

Summary of Weekend RAM Shipments Distribution by Purolator Courier,
Atlanta, Georgia from New England Nuclear (NEN), Mallinckrodt (M) and Squibb (SQ)

1980 Date	Source	Destination	I-131	Mo-99	Misc.	Activity, curie	TI	Category					Unk.	Totals
								Ltd.	I	II	III			
April 27	M	GA	15	23	8	25.1	44.2	0	0	18	28	0	46	
May 18	M	GA	16	23	6	25.4	46.0	2	0	15	28	0	45	
June 22	M	GA	14	23	4	25.9	46.6	0	0	16*	25	0	41	
April 27	NEN	AL	0	12	28	12.4	35.9	3	18	4	15	0	40	
		GA	0	13	18	15.8	49.1	2	13	3	13	0	31	
		FL (1)	-	2	4	3.7	7.1	0	3	1	2	0	6	
June 22	NEN	AL	0	13	16	12.7	38.3	2	8	3	16	0	29	
		GA	0	12	18	14.4	46.5	4	8	5	13	0	30	
		FL (1)	0	2	1	2.7	5.0	0	1	0	2	0	3	
April 27	SQ	GA	3	18	2	25.2	66.2	0	0	5	18	0	23	
		TN	0	6	1	8.1	25.0	1	0	0	6	0	7	
June 22	SQ	GA	1	13	1	15.6	50.9	0	0	1	14	0	15	
		TN	0	4	2	5.7	18.0	0	0	2	4	0	6	

*Mallinckrodt Mo-99 generator #J 99652 B to Cartersville, GA, activity of 0.25 curie, TI 0.8 had yellow II labels on package; however, bill of lading had a correction changing labels from Y II to Y III.

Note 1: RAM destined to Florida is routed thru Montgomery, AL.

Table 10

Summary of Weekend RAM Shipments Distribution by Local Contractor
for Skycab, East Brunswick, New Jersey

1980 Date	Source	Destination	I-131	Mo-99	Misc.	Activity, curie	TI	Category			Unk.	Totals	
								I	II	III			
<u>April</u>													
26	Squibb	Columbus, GA	0	1	0	1.7	5.2	0	0	0	1	0	1
		Birmingham, AL	0	18	1	28.7	74.1	0	0	1	18	0	19
		Montgomery, AL	2	18	0	21.6	63.7	0	0	1	19	0	20
	TOTALS		2	37	1	52.0	143.0	0	0	2	38	0	40
<u>June</u>													
21	Squibb	Columbus, GA	0	1	0	1.7	5.2	0	0	0	1	0	1
		Birmingham, AL	0	17	1	27.0	70.0	0	0	1	17	0	18
		Montgomery, AL*	2	17	0	19.9	60.3	0	0	2	17	0	19
	TOTALS		2	35	1	48.6	135.5	0	0	3	35	0	38

*RAM includes 5 each Mo-99 generators destined for Marianna, Ft. Walton, Graceville, Panama City, and Chipley, FL.

Table 11

Summary of Weekend RAM Shipments Distribution by Local Contractor in
Atlanta, Georgia from Skycab, East Brunswick, New Jersey*

1980 Date	Source	Destination	I-131	Mo-99	Misc.	Activity, curie	TI	Ltd.	Category			Unk.	Totals
									I	II	III		
June 21	Squibb	Atlanta, GA											
		Piedmont Hospital	0	1	0	1.7	5.2	0	0	0	1	0	1
		Emory Hospital	0	1	0	2.8	4.2	0	0	0	1	0	1
		Doctors Hospital	0	1	0	0.6	1.9	0	0	0	1	0	1
		Grady Hospital	1	1	0	2.8	4.7	0	0	1	1	0	2
		TOTALS	1	4	0	7.9	16.0	0	0	1	4	0	5

*Different vehicle from distribution shown in Table 7.

Table 12

Summary of Weekend RAM Shipments Distribution by Skycab, East Brunswick,
New Jersey to or through Atlanta, Georgia per Freight Bills

1980 Date	Source	Destination	I-131	Mo-99	Misc.	Activity, curie	TI	Ltd.	Category			Unk.	Totals
									I	II	III		
June 21	Squibb	Atlanta (Puroiator Courier)	1	17	3	21.3	68.9	0	0	3	18	0	21
		Atlanta Skycab (local)	1	4	0	8.0	16.0	0	0	1	4	0	5
		Atlanta Skycab (local)	2	35	1	48.6	135.5	0	0	3	35	0	38
		TN	0	14	0	19.0	47.0	0	0	0	14	0	14
		Atlanta Airport (Piedmont Air Lines to Myrtle Beach, SC)	0	1	0	1.7	5.2	0	0	0	1	0	1
		TOTALS	4	71	4	98.6	272.6	0	0	7	72	0	79

Table 13

Summary of Weekend RAM Shipments Distribution by Sagen Air
 (formerly Golden Eagle), Manchester, New Hampshire, from
 Atlanta, Georgia (Per Shipping Certificates)

<u>1980</u> <u>Date</u>	<u>Source</u>	<u>Destination</u>	<u>TI</u>
June 22	NEN	New Orleans, LA	22.8
		Jackson, MS	21.2
		Nashville, TN	33.2
		Total	77.2
June 29	NEN	New Orleans, LA	23.0
		Jackson, MS	21.8
		Nashville, TN	32.6
		Total	<u>77.4</u>

Table 14

Summary of Weekend RAM Shipments Distribution by NEN, Billerica, MA
to or through Atlanta, Georgia (Per Shipping Certificates or Bill of Ladings)

<u>1980</u> <u>Date</u>	<u>Source</u>	<u>Destination</u>	<u>TI</u>
June 22	NEN	NEN Atlanta Office	8.0
		NEN Atlanta Office (for Purolator Courier)	89.9
		Charlie Brown Airport Atlanta, GA for Sagen Air	77.2
		Orlando, FL (Miami RAM)	28.2
		Orlando, FL (Tampa RAM)	66.3
		Totals	<hr/> 269.6
		June 29	NEN
		NEN Atlanta, GA Office (for Purolator Courier)	95.4
		Charlie Brown Airport Atlanta, GA for Sagen Air	77.4
		Orlando, FL (Miami RAM)	12.5
		Orlando, FL (Tampa RAM)	66.5
		Totals	<hr/> 261.8

Table 15

Summary of Weekend RAM Shipments Distribution by Associated Courier, St. Louis, Mo.
to or through Atlanta, Georgia per Bill of Lading (Shipping Papers)*

1980 Date	Source	Destination	I-131	Mo-99	Misc.	Activity, curie	TI	Category			Unk.	Totals	
								Ltd. I	II	III			
<u>April</u>													
26	Mallinckrodt	Atlanta, GA (Purolator Courier)	2	23	0	25.2	42.6	0	0	0	25	0	25
		Charlotte, NC	6	42	2	39.2	81.3	0	0	4	46	0	50
		Athens, GA	1	1	1	1.0	1.6	0	0	2	1	0	3
		Waycross, GA	1	1	0	1.0	1.3	0	0	1	1	0	2
		Tampa, FL	2	29	0	47.4	62.2	0	0	1	30	0	31
		Ft Lauderdale, FL	1	18	0	29.1	39.2	0	0	1	18	0	19
		TOTALS	13	114	3	142.9	228.2	0	0	9	121	0	130
<u>May</u>													
17	Mallinckrodt	Atlanta, GA (Purolator Courier)	1	23	5	25.4	43.0	5	0	0	24	0	29
		Charlotte, NC	7	42	8	39.2	74.7	7	0	6	44	0	57
		Athens, GA	1	1	0	1.0	1.3	0	0	1	1	0	2
		Waycross, GA	1	1	1	1.0	1.2	1	0	1	1	0	3
		Tampa, FL	4	31	5	50.8	67.5	5	0	2	33	0	40
		Ft Lauderdale, FL	0	17	7	31.0	39.3	5	0	1	18	0	24
		TOTALS	14	115	26	148.4	227.0	23	0	11	121	0	155

June

21	Mallinckrodt	Atlanta, GA (Purolator Courier)	2	23	0	22.9	43.6	0 0	2	23	0	25
		Charlotte, NC	8	44	1	40.1	81.4	0 0	6	47	0	53
		Athens, GA	1	1	0	1.0	1.4	0 0	1	1	0	2
		Waycross, GA	1	1	0	1.0	1.3	0 0	1	1	0	2
		Tampa, FL	2	27	0	47.5	50.7	0 0	0	29	0	29
		Ft Lauderdale, FL	1	17	2	29.2	36.7	0 0	3	17	0	20
		TOTALS	15	113	3	141.7	215.1	0 0	13	118	0	131

*Company picks up Skycab (Squibb) RAM at Charlotte, NC destined for Orlando, FL. Data not available.

Table 16

Shipments of Radioactive Waste Transported Through Georgia and Inspected at Barnwell, South Carolina by Nuclear Regulatory Commission*

<u>Date, 1980</u>	<u>SSR No.</u>	<u>Licensee/Shipper</u>	<u>Carrier</u>	<u>Trailer no.</u>
Feb. 27-29	018949	Toledo Edison Co. Davis-Besse Power Sta Oak Harbor, OH	Home Trans Co.+	330039
	018955	Arkansas Power & Light Co. Arkansas N-1 Russelville, AR	McCormack	72234
	018960	Florida Power Crystal River Plant Crystal River, Florida	Chem-Nuclear	046
	018970	TVA, Browns Ferry Nuclear Plant Decatur, AL	Tri-State	TVA-83
	018979	Iowa Electric Light & Power Co. Duane Arnold Energy Center Cedar Rapids, IA	Hittman**	72235
Mar. 13-14	010116	Neoplastic Diseases Orlando, FL	Home Trans Co.	018
	019118	Commonwealth Edison Co. Dresden Plant Morris, IL	Hittman	72230
	019105	Commonwealth Edison Co./Quad-Cities Plant Chicago, IL	Hittman	72484
March 19	019169	Commonwealth Edison	Hittman	72230
	019173	Dresden Plant	Hittman	72229
	019180	Chicago, IL	Hittman	72235
	019170	TVA	Tri-State	4572
	019176	Chattanooga, TN	Tri-State	TV-83

*NRC letters RII:WWP 15000039/80-03 dated March 20, 1980;

Notes continued

Page 2

Table # 16

RII:RAB 1500039, dated April 7, 1980; and
RII:RLW 15000039/80-05, dated April 14, 1980.

No items of noncompliance were found.

+ This shipment probably came through Georgia;
however Home Transportation Company is now by-passing Georgia from
subject location by using alternate routes.

**Hittman has 27-28 shipments per month through Georgia. It
was also reported that permits for compliance with Rules of the State
Department of Transportation, Chapter 672-10, Transportation of
Hazardous Materials have been submitted.

Table 17

Monthly Summary of RAM Shipments, Delta Cargo Terminal,
Atlanta, Outbound*

1980 Date	Origin	Destination	Isotope	Curie	TI	Category				Remarks
						Ltd	I	II	III	
May										
9	Atlanta	Lexington	Xe-133	0.010	-		1			NEN RAM
10	Atlanta	Lexington	Tl-201	0.004	-		1			NEN RAM
10	Atlanta	Lexington	Xe-133	0.100	-		1			NEN RAM
15	Atlanta	TYS	I-131	0.001	0.1			1		Mallinckrodt RAM
15	Atlanta	TYS	I-131	0.001	0.1			1		Mallinckrodt RAM
15	ORD	BNA	P-32	0.001	-	1				Amersham
15	ORD	BNA	H-3	0.101	-		1			Amersham
16	Atlanta	TYS	I-131	0.001	0.1			1		Mallinckrodt RAM
16	Atlanta	TYS	I-131	0.001	0.1			1		Mallinckrodt RAM
20	Atlanta	TYS	I-131	0.009	0.4			1		Mallinckrodt RAM
24	Atlanta	MCO	Tl-201	0.002	-		1			NEN RAM
24	Atlanta	MCO	Tl-201	0.002	-		1			NEN RAM
24	Atlanta	MCO	Xe-133	0.040	-		1			NEN RAM
24	Atlanta	MCO	Tl-201	0.006	-		1			NEN RAM
28	Atlanta	MCO	Xe-133	0.060	-		1			NEN RAM
28	Atlanta	MCO	Tl-201	0.002	-		1			NEN RAM
28	Atlanta	MCO	Tl-201	0.002	-		1			NEN RAM
28	Atlanta	MIA	Tl-201	0.006	-		1			NEN RAM
28	Atlanta	MIA	Tl-201	0.008	-		1			NEN RAM
28	Atlanta	MIA	Xe-133	0.080	-		1			NEN RAM
TOTAL					0.8	1	14	5	0	

*Data were obtained from Delta Restricted Articles to Pilot Notification forms.

Table 18

Monthly Summary of RAM Shipments, Eastern Cargo Terminal,
Atlanta, Outbound *

1980 Date	Origin	Destination	Isotope	Curie	TI	Category			
						Ltd	I	II	III
May									
1	Atlanta	MSY	H-3	0.015	-		1		
1	EWR	MSY	I-131	0.014	2.1				1
1	ORD	AGS	Fe-59	0.001	0.2			1	
1	Atlanta	JFK	Y-90	0.46	1.5				1
1	Atlanta	ORD	Y-90	0.36	1.5				1
5	ORD	BHM	Ga-67	0.013	0.5			1	
6	Atlanta	MGM	Mo-99	0.45	2.0				1
6	ORD	CHA	Ga- 67	0.012	0.4			1	
6	ORD	CHA	I-123	0.002	0.1			1	
6	Atlanta	CHA	Tl-201	0.004	-		1		
7	Atlanta	LEX	Tl-201	0.004	-		1		
7	Atlanta	CHA	Tl-201	0.006	-		1		
7	TLH	PHL	I-125	768 uCi	-		1		
7	Atlanta	BHM	Se-75	0.001	0.2				1
7	DFW	MLU	Ga-67	0.003	0.1				1
7	ATL	MSY	H-3	0.025	-		1		
7	ATL	CHS	Se-75	0.001	0.2				1
8	ATL	CHA	I-123	0.004	0.1				1
8	ATL	PNS	I-125	10 uCi	-		1		

Page 2
Table # 18

8	ATL	MEM	Tl-201	0.012	-	1	
8	ATL	LEX	Tl-201	0.004	-	1	
8	ATL	CHA	Tl-201	0.004	-	1	
8	ATL	CHA	Tl-201	0.002	-	1	
8	ATL	CHA	Tl-201	0.002	-	1	
13	ATL	MGM	I-131	0.450	2.0		1
13	ATL	CHA	Tl-201	0.004	-	1	
14	Unknown	GNV	Unknown (Solution Sodium Iodine)	0.010	Unknown		1
15	EWR	MSY	I-131	0.014	3.0		1
17	DTW	AGS	I-131	0.013	0.6		1
22	ATL	TPA	I-131	0.008	1.1		1
22	ATL	CHA	Co-57	2.6 uCi	0.1		1
23	Unknown	MSY	In-125	< 0.001	-	1	
23	Unknown	MSY	I-131	0.014	3.0		1
25	LAC	MIA	C-14	0.002	-	1	
26	LAX	BHM	I-125	0.002	-	1	
27	ATL	MIA	Tl-201	0.002	-	1	
27	ORD	CHA	I-123	0.003	0.1		1
28	Unknown	MSY	I-125	0.001	-	1	
Totals				1.9	18.8	2	16 12 8

Note: Data were obtained from Eastern Restricted Articles forms.

Table 19

Monthly Summary of RAM Shipments at Eastern Cargo Terminal,
Atlanta, Terminating*

1980 Date	Origin	Isotope	Curie	Category					Remarks**
				II	Ltd	I	II	III	
May									
1	STL	I-131	0.011	0.4			1		
5	EWR	I-125	< 0.001	-	1				Picked up by Sonic Deliv.
5	STL	Cr-51	0.001	0.1			1		
5	EWR	Mo-99	2.3	1.6				1	
5	EWR	Mo-99	2.3	1.6				1	
5	EWR	Mo-99	1.411	1.3				1	
6	STL	Mo-99	5.0	3.8				2	
7	STL	I-131	0.099	1.8				2	
11	LGA	I-123	0.0003	0.1			1		
12	STL	I-131	0.060	1.5				1	
12	LGA	I-123	0.0003	0.1			1		
13	LGA	I-123	0.0003	0.1			1		
13	STL	I-131	0.056	1.0				1	
13	STL	I-125	0.0002	-	1				
13	STL	I-125	0.0002	-	1				
13	EWR	Mo-99	Unknown	5.5				4	
13	EWR	I-125	< 0.001	-	1				Picked up by Sonic Deliv.
13	EWR	Cr-51	0.0014	0.1			1		" "
13	EWR	Co-57	2.8 uCi	0.1			1		" "
13	STL	Mo-99	5.0	3.8				2	
14	BUF	I-131	0.037	0.7				1	
14	LGA	I-123	0.0003	0.1			1		
14	STI	Cr-51	0.001	0.1			1		
15	EWR	Cr-51	0.0069	0.6			1		Picked up by Sonic Deliv.
15	EWR	Co-57	2.8 uCi	0.2			1		" "

Page 2
Table # 19

18	LGA	I-123	0.0003	0.1	1	
19	STL	I-131	0.036	1.2		1
19	LGA	I-123	0.0084	0.4	1	
19	LGA	Ga-67 Xe-133 I-123	0.010 0.010 0.009	0.7	1	Overpack
19	AUS	Cd-109	0.005	-	1	Deliv. Co unkn
19	AUS	Fe-55	0.045	(Exempt)		Deliv. Co unkn
20	STL	Mo-99	5.0	3.8		2
20	LGA	I-123 Ga-67	0.0084 0.024	0.5	1	Overpack
20	EWR	Mo-99	1.4	1.3		1
20	EWR	Mo-99	2.3	1.6		1
20	EWR	Mo-99	2.3	1.6		1
20	STL	I-125	0.001	0.1	1	
21	STL	I-131	0.19	1.6		1
21	STL	I-131	0.081	1.2		1
22	EWR	I-125	< 0.001	-	1	Picked up by Sonic Deliv.
22	STL	I-131	0.005	0.2	1	
22	STL	Ga-67	0.020	0.5	1	
26	EWR	Mo-99	2.3	1.9		1
26	EWR	Mo-99	2.3	1.9		1
26	EWR	Mo-99	1.1	1.6		1
26	EWR	Mo-99	0.56	1.0		1
26	LGA	I-123	0.0048	0.2	1	
26	LGA	Xe-133	0.020	-	1	
26	LGA	Xe-133 I-123 Ga-67	0.040 0.012 0.040	0.7	1	Overpack
27	LGA	Co-60	2 uCi	0.1	1	Picked up by Sonic Deliv.
27	STL	I-131	0.056	1.3	3	
27	LGA	I-123	0.0018	0.1	1	
27	LGA	Xe-133 Ga-67 I-123	0.030 0.024 0.0096	0.6	1	Overpack

Page 3
Table #19

27	STL	Mo-99	5.0	3.8				2
28	STL	I-125	0.0002	-	1			
28	STL	I-131	0.053	0.7			1	
29	STL	I-131	0.033	0.7			1	
29	STL	Ga-67	0.028	0.1			1	
29	EWR	I-131	0.012	0.3			1	(1)
TOTALS			39.2	54.4	7	1	30	30

*Data were obtained from airbills, shipping certificates and restricted articles forms.

**RAM picked up by Purolator Courier unless otherwise indicated.

NOTE: 1. Picked up by Sonic Delivery. Air bill showed five pieces at 86 lbs; however, it is unknown if other 4 pieces were RAM. Only shipper's certificate, (Atlanta 1/5) was present, which agreed with air bill.

Table 20

Monthly Summary of RAM Shipments: Emery Air Freight, Atlanta

<u>Date, 1980</u>	<u>Origin</u>	<u>Destination</u>	<u>Isotope</u>	<u>Curie</u>	<u>Category</u>					<u>Remarks</u>
					<u>II</u>	<u>Ltd</u>	<u>I</u>	<u>II</u>	<u>III</u>	
May										
1	Atlanta, GA	Chicago, IL	Yttrium	Unknown	unk				1	Via Delta AB006 ATL- 1878-8965
2	Oak Ridge, TN	Gamma Industries Baton Rouge, LA	Ir-192	7,801	1.4				1	
			Ir-192	7,585	1.3				1	
7	Atlanta, GA	Dallas/Ft Worth, TX	Kr-35	unknown	unk		unknown			Air bill cross referenced to RAM on Flying Tiger shipments on May 7, 1980. RAM come from GA Tech.
28	Oak Ridge, TN	Baton Rouge, LA	Ir-192	8,363	1.5				1	
30	Oak Ridge, TN	Baton Rouge, LA	Ir-192	7,938	1.6				1	
unknown	Oak Ridge, TN	New Orleans, LA	Ir-192	5,945	0.7				1	
			Totals	37,632	6.5				6	

Note: Data obtained from inbound/outbound air bills.

Table 21

Monthly Summary of RAM Shipments: Flying Tiger, Atlanta*

<u>Date, 1980</u>	<u>Origin</u>	<u>Destination</u>	<u>Isotope</u>	<u>Curie</u>	<u>TI</u>	<u>Category</u>				<u>Remarks</u>	
						<u>Ltd</u>	<u>I</u>	<u>II</u>	<u>III</u>		
May											
7	Oak Ridge, TN (BNA Airport)	San Francisco, CA	Kr-85	30	0.3			1		Emery Air Freight to Atlanta	
7	GA Tech Atlanta, GA	Dallas, TX	Kr-85 H-3	1.8 0.53	1.5				1	Emery Air Freight	
16	Knoxville, TN	San Francisco, CA	H-3	2,382	-			1		Airborne (Cape Air Freight)	
22	Oak Ridge, TN	Industrial Nuclear Co San Francisco, CA	Ir-192	3,688	0.8				1		
27	3 M St Paul, MN	3 M Caroline, Puerto Rico	Po-210 Po-210 Po-210	0.1 0.4 0.85	- - -			1 1 5		Bonded in ceramic, solids	
				(total)							
31	Oak Ridge, TN	Industrial Nuclear Co Foster City, CA	Ir-192	3,612	0.4				1		
				<u>Totals</u>	<u>9,716</u>	<u>3.0</u>	<u>0</u>	<u>8</u>	<u>3</u>	<u>1</u>	

*Data were obtained from air bills, air way bills and shipper's certificates.

Table 22

Monthly Summary of RAM Shipments, Republic (formerly Southern) Airlines,
Atlanta, Outbound*

<u>Date, 1980</u>	<u>Origin</u>	<u>Destination</u>	<u>Isotope</u>	<u>Curie</u>	<u>TI</u>	<u>Category</u>				<u>Remarks</u>
						<u>Ltd</u>	<u>I</u>	<u>II</u>	<u>III</u>	
<u>May 1980</u>										
12	Orangeburg, NY	New Orleans, LA	I-125	3.5 uCi	-	1				Profit by Air shipper
13	Orangeburg, NY	New Orleans, LA	I-125 Co-57	3.0 uCi 1.5 uCi	-	1				Overpack Profit by Air shipper
14	Unknown	Memphis, TN	Unknown	unknown						Ab 032 ATL 5720- 8126 did not reflect RAM: however, Restriction Articles Pilot Notification indicated RAM NOS.
16	Orangeburg, NY	New Orleans, LA	Co-57	3.0 uCi	-	1				Profit by Air shipper
20	Skycab East Brunswick, NJ	Panama City, FL	Mo-99	unknown	1.6				1	
31	St. Louis, MO.	Sioux City, IA	Mo-99	1.5	1.7				1	Restricted Articles Pilot Notification listed radionuclide as Ga-67.
31	St. Louis, MO.	Bemidji, MN	Mo-99	3.0	2.5				1	Restricted Articles Pilot Notification listed radionuclide as Ga-67.
<u>Totals</u>				4.5	5.8	3	0	0	3	

*Data were obtained from air bills and shipper's certificates or Pilot Notification forms.
There was no record of any RAM terminating in Atlanta, Georgia during this period.

Appendix A

Observations

1. Observations of possible violations for monitored RAM packages and vehicle monitoring results are now listed in the applicable tables.
2. On May 17, 1980, at Purolator terminal, the driver of vehicle 15213 did not have shipping papers available for two boxes of I-125 with yellow II labels. Driver's manifest furnished by Profit By Air reflected medical test kits for subject RAM. Shipping certificates were available in sealed envelopes attached to the boxes. Vehicle was not monitored.
3. On May 22, 1980, Georgia EPD-DNR staff responded to a request from Eastern Airlines, Hartsfield Airport, Atlanta to assist in evaluating a potential radiological problem with some medical isotopes being shipped. Purolator Courier representative originally notified Eastern Airlines that one inner box of an overpack was broken open and contents were missing. Subsequent investigation and contact with the shipper, Medi-Physics, Inc. in New Jersey, indicated that the suspect box with missing contents was really just an empty box used to fill empty space left in the overpack. The overpacks were surveyed and smeared for removable contamination. No contamination was found. The aircraft was checked for contamination upon arrival in Miami and no gamma-ray contaminants were found.
4. On June 13, 1980, it was learned that a RAM package had been run over by a forklift at Delta Cargo, Hartsfield Airport, Atlanta on June 3, 1980. New England Nuclear recovered the damaged package of I-125, 15 mCi. Damage was restricted to external box and no damage to vials. It was reported that there was no release and no contamination from package.
5. On June 13, 1980, an Ir-192 package, type B container dropped from the loading belt while loading a Flying Tiger Aircraft. Package was visually checked and reloaded. Package was subsequently checked at Miami, Florida and it was reported to be undamaged.
6. On June 27, 1980, Georgia EPD-DNR staff received a call from EPA that U.S. Customs had been concerned about leak test requirements on an empty radioactive material container from Germany going to Oak Ridge National Laboratory. Oak Ridge advised that cask must be certified and tested prior to shipment. Courier and U.S. Customs were advised of this.