

NOTE: All areas indicated in field notes are not required to be addressed during each inspection.

APPENDIX E

INDUSTRIAL/ACADEMIC INSPECTION FIELD NOTES
Region I

Inspection Report No. 93-001 License No. ^{8URB-831} 37-02006-09
Licensee (name and address) (KOP) Docket No. 040-07344
^{martin marietta corp}
^{philadelphia, PA} 030-12894
Licensee Contact: John Andrews Telephone No. (215) 354-3840
Last Amendment No. Date of Amendment:
Priority: 3 03520
Program Code(s): 11300
Date of Last Inspection: 1/17+14/91
Date of This Inspection: 12/8/93
Type of Inspection: () Announced () Unannounced
() Routine () Special
() Initial () Reinspection
Next Inspection Date: () Normal () Reduced () Extended

Summary of Findings and Action:

- () No violations, Clear 591 or letter issued
- () Violations, 591 or letter issued
- () Action on Previous Violations

Inspector: Judith A. Guster Date 12/8/93
(Signature)

Approved: Elizabeth Ullrich Date 12/9/93
(Signature)

F-58

Storage cabinet in irradiation room
locked & contains parts from a
neutron activation off site.

*Indicates presence at exit meeting

- d. Briefly describe scope, including types of use involving byproduct material, frequency of use, staff size, etc.: ~ 6 users of source material
2 labs, waste storage, mgt. storage
mgt. is not maintained at ~~the~~ business facility

4. INTERNAL AUDITS OR INSPECTIONS

~ 10 users for irradiation systems
only 2 people actually use it.

- a. Audits are required by license condition Y N
- b. Audits or inspections are conducted Y N

- (1) Audits conducted by: RSO
- (2) Frequency: monthly calendar see attached c/o area audited
- c. Records maintained. yes. Y N

Remarks:

5. TRAINING, RETRAINING, AND INSTRUCTIONS TO WORKERS

- a. Instructions to workers per [10 CFR 19.12] Y N

Remarks:

- b. Training program required [L/C] Y N

- (1) If so, briefly describe training program:
initial and annual training in Rad safety, new Part 20
etc.
- (2) Training program implemented Y N
- (3) Retraining program required Y N
- (4) Retraining program implemented Y N
- (5) Records maintained Y N

Remarks:

6. FACILITIES AND EQUIPMENT

- a. Facilities as described in license application
[L/C] mgt. storage is in secure
posted trailer on property Y N

Remarks:
area monitor is placed in irradiation facility
~~set~~ set point 5mc/hr.

- b. Areas for storage and use of RAM
- (1) Adequate method used to prevent an unauthorized individual from entering restricted area Y N
- (2) RAM is secured to prevent unauthorized removal from an unrestricted area [20.207] Y N

Remarks:

- c. Survey instruments () N/A
- (1) Appropriate operable survey instruments possessed Y () N
 - (2) Calibration performed as required Y () N
 - (3) Records maintained Y () N

Remarks: E-120, E-520, Ludlum 14, Victoreen 471
Victoreen entire pile

7. RADIOLOGICAL PROTECTION PROCEDURES

- a. Radioactive materials used in accordance with current procedures [L/C] Y () N
- b. Individuals understanding of current procedures is adequate [L/C]
- (1) in general rules for safe use of RAM Y () N
 - (2) in emergency procedures Y () N

Remarks:

8. MATERIALS

- a. Isotope, chemical form, quantity and use as authorized [L/C] Y () N
see attached inventory

Remarks:

- b. Leak tests and Inventory
- (1) Leak tests of sealed sources performed as required [L/C] Y () N
 - (2) Inventory of RAM performed as required [L/C] Y () N
 - (3) Records maintained Y () N

Remarks: Co-60 irradiator leak tested 8/17/92, 3/92, 4/93, 7/93 and will be doing again this month.

9. RECEIPT AND TRANSFER OF RADIOACTIVE MATERIAL

- a. Describe how packages are received and by whom: () N/A
Receiving notes for RGD via survey & weights records are maintained
- b. Opening procedures established and followed *yes.*

- [20.205(d)]
- c. Incoming packages wiped per [20.205(b)] Y () N
 - d. Incoming packages surveyed per [20.205(c)] Y () N
 - e. Transfer(s) performed per [30.41] *no recent transfers* () Y () N
 - f. Records of surveys and receipt/transfer maintained per [20.401(b) and 30.51] Y () N

Remarks:

10. AREA SURVEYS N/A

Briefly describe area survey requirements and licensee's implementation [L/C]: *monthly low risk (storage)*

11. PERSONNEL RADIATION PROTECTION - EXTERNAL

- a. Film or TLD supplier: *Landauer* Frequency: *Quarterly TLD*
- b. Supplier is NVLAP - approved Y () N
- c. Reports reviewed by: *RSS* Frequency: *quarterly*
- d. NRC inspector reviewed personnel monitoring records for period from *1st 1991* to *3rd qtr 93*
- e. NRC forms or equivalent

(1) NRC-4: Y () N Complete: Y () N () N/A
 (2) NRC-5: Y () N Complete: Y () N () N/A
 [20.401(a)]

- f. List maximum exposures (millirem):

*30 mrem exposure to personnel
area monitors are used with higher reading*

Remarks:

12. PERSONNEL RADIATION PROTECTION - INTERNAL N/A

- a. Potential for exposure of individuals to airborne RAM exists () Y () N
- b. Monitoring for airborne radioactivity conducted [20.201(b) to meet 20.103] () Y () N
- c. Records maintained [20.401 and L/C] () Y () N
- d. Briefly describe licensee's monitoring system for airborne radioactivity [L\C]:
- e. Bioassay program implemented as described in correspondence with NRC () Y () N

Remarks:

13. RADIOACTIVE EFFLUENT AND WASTE DISPOSAL

- a. RAM in effluents to unrestricted areas () Y () N
- b. Release in accordance with regulatory limits [20.106(a)] () Y () N

Remarks:

- c. Describe waste disposal method(s) - solid and liquid:
held till vendor or other licensed entity can take possession only one shipment in 1993
- d. If LLW is stored because access to a burial site has been denied, answer (1), (2), and (3) below: *no* *limited quantity*
- (1) Adequate control of waste in storage is maintained () Y () N
- (2) Package is labeled and package integrity is adequately maintained () Y () N
- (3) Adequate records of surveys and material accountability are maintained () Y () N
- e. Disposal of waste in accordance with regulatory requirements [20.301] () Y () N
- f. Records maintained [20.401(b)] *transfer to vendor* () Y () N

Remarks:

14. NOTIFICATION AND REPORTS

- a. Licensee in compliance with [19.13] (reports to individuals) () Y () N () N/A
- b. Licensee in compliance with [20.402] (theft or loss) () Y () N () None
- c. Licensee in compliance with [20.403] (incidents) () Y () N () None
- d. Licensee in compliance with [20.405] (overexposures) () Y () N () None

Remarks:

15. POSTING AND LABELING

- a. NRC-3 "Notice to Workers" is posted [19.11] () Y () N
- b. Parts 19, 20, and 21, and license are posted or a notice indicating where documents can be examined is posted [19.11, 21.6] () Y () N
- c. Other posting and labeling per [20.203] () Y () N

Remarks:

16. ENVIRONMENTAL MONITORING PROGRAM

- a. Licensee has implemented an environmental monitoring program [L/C] N/A () Y () N
b. Records maintained () Y () N

Remarks:

- c. Briefly describe the licensee's environmental monitoring program:

17. TRANSPORTATION (10 CFR 71.5(a) and 49 CFR 171-189)

- a. Licensee makes shipments of RAM () Y () N
b. Shipments are:
 delivered to common carriers
 transported in licensee's own private vehicle
 both
 no shipments since last inspection

Remarks: *all limited quantity RAM c packing slip containing all required info.*

Complete only if shipments made since last inspection:

c. Shipments

- (1) Authorized packages used [173.415,416] () Y () N () N/A
(2) Package type used:
(3) For DOT-7A packages, performance test record on file [173.415(a)] () Y () N () N/A
(4) For DOT-55 packages, use is approved by NRC [173.416(a)] () Y () N () N/A
(5) Other Type B packages used are approved [173.416(a)] () Y () N () N/A
(6) Licensee has COCs on file with NRC [71.12(c)(1)] () Y () N () N/A
(7) Licensee has a QA program approved by NRC [71.12(b)] () Y () N () N/A
(8) For special form sources, performance test record on file [173.476(a)] () Y () N () N/A
(9) Packages properly labeled [172.403, 173.441] () Y () N () N/A
(10) Packages properly marked [173.200] () Y () N () N/A
(11) Proper shipping papers prepared and used [172.200-204] () Y () N () N/A

- (12) Shipping papers readily accessible during transport [177.817(e)] () Y () N (✓) N/A
- (13) Vehicles placarded as necessary [172.500, 504] () Y () N (✓) N/A
- (14) Cargo blocked and braced [177.842(d)] () Y () N (✓) N/A
- (15) Any incidents reported to DOT [171.15-16] () Y () N (✓) None

Remarks:

18. RECORDKEEPING FOR DECOMMISSIONING

() N/A

- a. Records of information important to the safe and effective decommissioning of the facility maintained in an independent and identifiable location until license termination [30.35(g)]
- b. Records include all information outlined in [30.35(g)]

N/I

() Y () N

() Y () N

Remarks:

19. INDEPENDENT MEASUREMENTS

- a. Survey instrument used: *Radline MC*
- b. NRC Serial No.:
- c. Last date of calibration:
- d. Inspector's measurements were compared to licensee's *around simple chamber of Co-60* ^{*in radionuclide*}
- e. Describe the type and results of measurements:

(✓) Y () N

20. BULLETINS AND INFORMATION NOTICES

- a. Bulletins, Information Notices, etc., received by the licensee
- b. Licensee took appropriate action in response to Bulletins, INs, etc.

() Y () N

() Y () N

N/I

Remarks:

21. CONTINUATION OF REPORT ITEMS - USE BACK OF PAGE IF NECESSARY

22. LIST OF VIOLATIONS

NONE

23. PERFORMANCE EVALUATION FACTORS

Licensee: *menton marieetta Corp* Inspector: *J. A. Johnston*

Inspection Date:

- | | | | |
|----|---|-------|---|
| a. | Lack of senior management involvement with the radiation safety program and/or Radiation Safety Officer (RSO) oversight | () Y | (<input checked="" type="checkbox"/>) N |
| b. | RSO too busy with other assignments | () Y | (<input checked="" type="checkbox"/>) N |
| c. | Insufficient staffing | () Y | (<input checked="" type="checkbox"/>) N |
| d. | Radiation Safety Committee fails to meet or functions inadequately | () Y | (<input checked="" type="checkbox"/>) N |
| e. | Inadequate consulting services or inadequate audits | () Y | (<input checked="" type="checkbox"/>) N |

Remarks (consider above assessment and/or other pertinent PEFs):

Regional follow-up on above PEFs citations:

Martin Marietta Astro Space

EHS COMPLIANCE CALENDAR RADIATION SAFETY OFFICERS

Revised: 083093

CURRENT MONTH/YEAR: Yearly
 FISCAL WEEKS: All
 BUILDING: 100 & B
 Valley Forge, PA

USE A STANDARD (NOT FISCAL) CALENDAR WHEN COMPLETING THIS DOCUMENT.
 ANNOTATE ALL OF LAST MONTH'S "IP" AND "NA" ACTIVITIES AT THE END.
 IF THE ACTIVITY REQUIRES A REPORT, PLEASE MAKE SURE IT IS ON FILE.
 IF YOU HAVE ANY ADDITIONS/DELETIONS/CORRECTIONS, CALL D. ERB 354-6250

CHG	DUE DATE	YEAR	FREQ	REPORT (Y/N)	ACTIVITY	STATUS (C,IP,NA)	COMPLETION DATE(S)	INITIALS	COMMENTS
	MONTH		MONTH	N	RADIATION AREA SURVEY-- RADIATION EFFECTS LAB				
	MONTH		MONTH	N	RADIATION AREA SURVEY--PARTS LAB				
	MONTH		MONTH	N	RADIATION AREA SURVEY--VAULT				
	MONTH		MONTH	N	RADIATION AREA SURVEY--BLDG. 800				
	MONTH		MONTH	N	RADIATION AREA SURVEY-BLDG. B LAB				
	JAN	93	QUAR	Y	LTD RAD BADGES--DISTRIBUTE TO EMPLOYEES (RAD)				
	JAN	93	QUAR	Y	LTD RAD BADGES--RETURN TO LANDAUER				
	JAN	93	QUAR	Y	STATE QUARTERLY RAD WASTE REPORT				DUE BY THE 15th
	JAN	93	QUAR	Y	RADIATION SWIPES--RADIATION EFFECTS LAB				
	JAN	93	QUAR	Y	RADIATION SWIPES--BLDG. B LAB				
	JAN	93	QUAR	Y	RADIATION SWIPES--PARTS LAB (KRYPTON 85)				
	JAN	93	QUAR	Y	RADIATION SWIPES--RADIATION SOURCE SURVEY				
	JAN	93	ANNUAL	Y	RADIATION LICENSE FEES--X RAY SURVEY				THEY WILL SEND US A STATEMENT DURING THE FIRST QUARTER; LICENSED IS GOVERNED BY RADIATION LICENSE--PA #202
	JAN	93	QUAR	N	REVIEW DOSIMETRY LAB EXPOSURE REPORTS				

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CHG	DUE DATE	YEAR	FREQ	REPORT (Y/N)	ACTIVITY	STATUS (C,IP,NA)	COMPLETION DATE(S)	INITIALS	COMMENTS
	FEB	93	QUAR	N	IRAG COMMITTEE MEETING				
	MAR	93	ANNUAL	Y	RADIATION MONITORING REPORT (RMR)				
	MAR	93	ANNUAL	Y	SEND EMPLOYEES MEMO W/EXPOSURE RESULTS				
	MAR	94	ANNUAL	Y	RADIATION LICENSE FEES--PA #0202				SUBMITTED TO REQUIRED AGENCY 30 DAYS BEFORE EXPIRATION; THIS LICENSE IS THE BASIS OR SOURCE DOCUMENT FOR THE YEARLY X-RAY AND
	APR	93	QUAR	Y	LTD RAD BADGES--DISTRIBUTE TO EMPLOYEES (RAD)				
	APR	93	QUAR	Y	LTD RAD BADGES--RETURN TO LANDAUER				
	APR	93	QUAR	Y	STATE QUARTERLY RAD WASTE REPORT				DUE BY THE 15th
	APR	93	QUAR	Y	RADIATION SWIPES--RADIATION EFFECTS LAB				
	APR	93	QUAR	Y	RADIATION SWIPES--BLDG. B LAB				
	APR	93	QUAR	Y	RADIATION SWIPES--PARTS LAB (KRYPTON 85)				
	APR	93	QUAR	Y	RADIATION SWIPES--RADIATION SOURCE SURVEY				
	APR	93	QUAR	N	REVIEW DOSIMETRY LAB EXPOSURE REPORTS				
	APR	93	ANNUAL	Y	VAULT INVENTORY				

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CHG	DUE DATE	YEAR	FREQ	REPORT (Y/N)	ACTIVITY	STATUS (C,IP,NA)	COMPLETION DATE(S)	INITIALS	COMMENTS
	MAY	93	QUAR	N	IRAG COMMITTEE MEETING				
	MAY	93	ANNUAL	Y	INVENTORY ALL RADIOACTIVE MATERIAL				
	JUL	93	QUAR	Y	LTD RAD BADGES--DISTRIBUTE TO EMPLOYEES (RAD)				
	JUL	93	QUAR	Y	LTD RAD BADGES--RETURN TO LANDAUER				
	JUL	93	QUAR	Y	STATE QUARTERLY RAD WASTE REPORT				DUE BY THE 15th
	JUL	93	QUAR	Y	RADIATION SWIPES--RADIATION EFFECTS LAB				
	JUL	93	QUAR	Y	RADIATION SWIPES--BLDG. B LAB				
	JUL	93	QUAR	Y	RADIATION SWIPES--PARTS LAB (KRYPTON 85)				
	JUL	93	QUAR	Y	RADIATION SWIPES--RADIATION SOURCE SURVEY				
	JUL	93	QUAR	N	REVIEW DOSIMETRY LAB EXPOSURE REPORTS				
	AUG	93	ANNUAL	Y	MONITORING EQUIPMENT CALIBRATION				SEND OUT ALL RADIATION MONITORING EQUIPMENT FOR CALIBRATION
	AUG	93	QUAR	N	IRAG COMMITTEE MEETING				
	SEP	93	ANNUAL	Y	REVIEW IONIZING RADIATION POLICY				UPDATE IF NEEDED
	SEP	95	QUAR	Y	RADIATION LICENSE FEES--SUB #B31 (THORIUM/URANIUM)				THEY WILL SEND US A STATEMENT, LICENSE EXPIRES 10/31/95, RENEWAL MUST BE SUBMITTED 30 DAYS BEFORE EXPIRATION TO THE REQUIRED AGENCY. PERMIT IS FOR THORIUM/IRANIUM

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CHG	DUE DATE	YEAR	FREQ	REPORT (Y/N)	ACTIVITY	STATUS (C,IP,NA)	COMPLETION DATE(S)	INITIALS	COMMENTS
	OCT	93	QUAR	Y	LTD RAD BADGES--DISTRIBUTE TO EMPLOYEES (RAD)				
	OCT	93	QUAR	Y	LTD RAD BADGES--RETURN TO LANDAUER				
	OCT	93	QUAR	Y	STATE QUARTERLY RAD WASTE REPORT				DUE BY THE 15th
	OCT	93	QUAR	Y	RADIATION SWIPES--RADIATION EFFECTS LAB				
	OCT	93	QUAR	Y	RADIATION SWIPES--BLDG. B LAB				
	OCT	93	QUAR	Y	RADIATION SWIPES--PARTS LAB (KRYPTON 85)				
	OCT	93	QUAR	Y	RADIATION SWIPES--RADIATION SOURCE SURVEY				
	OCT	93	QUAR	N	REVIEW DOSIMETRY LAB EXPOSURE REPORTS				
	OCT	93	ANNUAL	Y	RADIATION LICENSE FEES--NRC #37-02006-09				THEY WILL SEND US A STATEMENT; DUE 30 DAYS BEFORE CURRENT EXPIRATION OF 11/30/97; PERMIT IS FOR Co-60 GAMMA CELLS
	NOV	93	QUAR	N	IRAG COMMITTEE MEETING				
	NOV	93	ANNUAL	Y	X-RAY MEASUREMENT MONITORING				
	NOV	94	ANNUAL	Y	RADIATION LICENSE FEES--NRC #37-02006-05				APPLICATION MUST BE SUBMITTED TO THE REQUIRED AGENCY 30 DAYS BEFORE EXPIRATION; PERMIT IS A BROAD SCOPE BY PRODUCT LICENSE
	DEC	93	ANNUAL	N	ANNUAL RAD LIBRARY REQUIREMENT REVIEW				ASSURE NEW/UPDATED REGULATIONS, RECOMMENDED STDS, MFG'S DATA & BOOKS ON HAND. ORDER ANY IF NEEDED.

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CHG	DUE DATE	YEAR	FREQ	REPORT (Y/N)	ACTIVITY	STATUS (C,IP,NA)	COMPLETION DATE(S)	INITIALS	COMMENTS
		93	SEMI A	Y	SEALED SOURCES TEST				PA-0202 CONDITION 13A; NRC COBALT CONDITION 13A; BROAD SCOPE CONDITION 13A
		93	SEMI A	Y	SEALED SOURCES TEST				PA-0202 CONDITION 13A; NRC COBALT CONDITION 13A; BROAD SCOPE CONDITION 13A
		93	SEMI A	Y	PHYSICAL RAD INVENTORY				BORAD SCOPE CONDITION17
		93	SEMI A	Y	PHYSICAL RAD INVENTORY				BORAD SCOPE CONDITION17
		93	ANNUAL	Y	CALIBRATION OF METERS				
	WEEK								
	WEEK								
	WEEK								

LAST MONTH'S ACTIVITIES STATED AS "IP" AND/OR "NA"

RADIOACTIVE MATERIAL VAULT INVENTORY 9/93

return pellets - to N.C. ... measure 2-5 mCi ...

Old Inventory #	Case File Number	Isotope	Original Source Strength	Activity Date, T1/2	Current Activity	Package Description
1	RadHS042	Unknown Enriched Uranium			same	3/4" pellets in pail (UO ₂) < 50 mCi
2	RadHS002	Sr-90	100 mCi	6/75		7" lead pig
3	RadHS003	Sr-90	10 mCi	4/66		large 6" capped pipe
4	RadHS004	Am-241	1 Ci	T1/2 = 433		3" steel pig
5	RadHS005	Pu-239	5 uCi		same	1.5" pipe
6	RadHS006	Pu-238	90 mCi			3 small plugs in lead foil
none	RadHS039	MgTh <i>scrap machine</i>	<i>Can't identify</i>	<i>2 Tins = 3 mCi plus in other a few oz.</i>	same	2 bags of scrap machining
8	RadHS008	U-238	< 1 mCi		same	2 jars 50% DU in urethane resin
none	RadHS040	Po-210	4 1	9/90 70% T1/2 = 4 2/80: <i>(u)</i> T1/2 = 1		5 Static Master brushes
none	RadHS041	H3	20 Ci	1/86		3 exit signs
	RadHS043	UO₂ ?		4/75		bag in pail
16	RadHS016	Co-60	81.8 mCi	11/81		4" lead pig within lead bricks

pail tag in error; not U²³⁵

from contact sheet to file in 1971

return to vendor w/str. incl.

1 RadHS093 *depleted 38.9 lbs 4/75* same Granules pail tag
uranium (110 mCi)
pail marked DU also from comp. process uranium ore
 sealed source RadHS044 U238 ~0.04 Ci same W87 simulator B400
 sealed source RadHS045 U238 ~0.04 Ci same W78 simulator B400

J. Andrews, R50

MgTh Inventory

03/92

186.8 kg x 0.029 x 9

9 plates --- 2% Th --- 84.25" x 56.25" x 1.35" --- 412lbs./plate
186.8kg/plate

1 plate --- 4% Th --- 90.0" x 48.0" x 1.88" --- 480lbs = 217.73kg

1 plate --- 2% Th --- machined MgTh panel --- ? lbs = ??? kg

Assuming the specific activity for the thorium is:

1% = 5.5×10^{-8} Curies/gram

2% = 1.1×10^{-7} Ci/g

4% = 2.2×10^{-7} Ci/g

1 plate --- 2% Th --- 186.8 kg --- Th = 3.74 kg (0.02 x 186.8)
= 3740 grams

$3740 \text{ g} \times 1.1 \times 10^{-7} \text{ Ci/g} = 4.11 \times 10^{-4} \text{ Ci} = 411 \text{ uCi/ plate}$

$411 \text{ uCi/ plate} \times 9 = 3699 \text{ uCi} = 3.6 \text{ mCi total activity for 2% MgTh plates.}$

1 plate --- 4% Th --- 217.73 kg --- Th = 8.71 kg = 8710 grams

$8710 \text{ g} \times 2.2 \times 10^{-7} \text{ Ci/g} = 1.92 \times 10^{-3} \text{ Ci} = 1920 \text{ uCi/ plate.}$

Total Activity for all MgTh plates [(9) 2% & (1) 4%]

$3699 \text{ uCi} + 1920 \text{ uCi} = 5619 \text{ uCi} = 5.62 \text{ mCi}$

plus 1 panel = ??? activity

Radioactive Material Inventory
Active Sources

~~03/92~~ 1/93

Item #	Isotope	Original Activity		Current Activity	User/ Location	Radiation
		Source Strength	Date			
16	Co-60	81.8mCi	11/81		P. Bollinger Room T9278	11/11/93
17	Co-60	(b)(4)	5/77		J. Greenwald Bldg B (b)(4)	γ
18	Co-60	(b)(4)	9/89		" "	γ
19	Sr-90 sn 19233	<25 uCi			Dominic Centurioni Robert Snow Room M4239 Bldg B	
20	Tl-204 sn 77546	100 uCi			" "	
21	Pm-147 sn 75771	<75 uCi			" "	
22	Sr-90 sn 49107	<25 uCi			" "	
23	Tl-204 sn 36653	100 uCi			" "	
24	Pm-147 SIN	90 μCi 85373			" "	
25	Kr-85	1.14 Ci	6/90	(Trio-Tech)	W. Dyreka U 8301 8/93 moved to trailer	
26	Th (2-4g in Mg)	6.03 mCi			Bldg 800 (6/93)	
27	Starsat (mainly (S-137))			~ 3 μCi	J. Klish near Bldg 300	
28	Be10? Mg-Th				J. D'Andrea S705S III S/C 777m in clean Rm orbit	