

1. LICENSEE Lockheed Martin Corp. Communication Power Center 100 Campus Drive Newtown PA 18940 REPORT NUMBER(S) 2000-001	2. REGIONAL OFFICE REGION I US NUCLEAR REGULATORY COMMISSION 475 ALLENDALE ROAD KING OF PRUSSIA PA 19406-1415	
3. DOCKET NUMBER(S) 030-12894	4. LICENSE NUMBER(S) 37-02006-09	5. DATE(S) OF INSPECTION 12/14/00

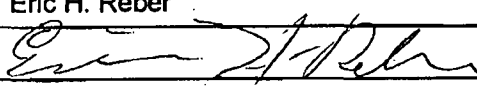
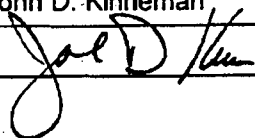
The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

- ☒ 1. Based on the inspection findings, no violations were identified.
- ☐ 2. The violation(s), specifically described to you by the Inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, NUREG-1600, to exercise discretion, were satisfied. _____ non-cited violation(s) were discussed involving the following requirement(s): _____
- ☐ 3. During this inspection certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited. This form is a NOTICE OF VIOLATION, which is required to be posted in accordance with 10 CFR 19.11.

I hereby state that, within 30 days, the actions described by me to the Inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested.

TITLE	PRINTED NAME	SIGNATURE	DATE
LICENSEE			
NRC INSPECTOR	Eric H. Reber	<i>Eric H. Reber</i>	12/14/00

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APPENDIX A MATERIALS PROCESSOR/MANUFACTURER INSPECTION RECORD (IP 87111)									
REGION I									
Insp. Report #	00-001	License #	37-02006-09	Docket #	030-12894				
Licensee Name	Lockheed Martin Corporation, Communications and Power Center								
Street Address	100 Campus Drive								
City, State, Zip	Newtown, Pennsylvania 18940								
Location (Authorized Site) Being Inspected	100 Campus Drive, Newtown, PA and 230 Mall Boulevard, King of Prussia, PA								
Licensee Contact Name	Jeffrey N. Evans, RSO			Phone #	215-4971312				
Priority	3	Program Code	3520	Description	Self-Shielded Irradiator (b)(2)High				
Date of Last Inspection:		October 11, 1997		Date of This Inspection		Dec 14, 2000			
Type of Insp.	Announced		Routine	x	Initial				
	Unannounced	x	Special						
Next Insp. Date	12/2005	Normal		Reduced		Extended	x		
Justification for change in normal inspection frequency:			No violations for the past three inspections (94-001, 97-001, and 2000-001)						
Summary of Findings and Actions									
No violations, Clear 591 or letter issued			x	Non-cited violations					
Violation(s), 591 issued		Violation(s), letter issued							
Follow up on previous violations:			N/A						
Inspector - Printed Name		Eric H. Reber							
- Signature						Date		12/15/00	
Approved - Printed Name		John D. Kinneman							
- Signature						Date		12/18/2000	

EX2

PART I-LICENSE, INSPECTION, INCIDENT/EVENT, AND ENFORCEMENT HISTORY		
1.	AMENDMENTS AND PROGRAM CHANGES	
License amendments issued since last inspection, or program changes noted in the license.		
Amendment No.	Date	Subject
13	9/13/99	Consolidation of licenses
12	5/21/98	Management Change/RSO Change
2.	INSPECTION AND ENFORCEMENT HISTORY	
Unresolved issues; previous and repeat violations; Confirmatory Action Letters; and orders.		
None		
3.	INCIDENT/EVENT HISTORY	
List any incidents or events reported to NRC since the last inspection. Citing "None" indicates that regional event logs, event files, and the licensing file have no evidence of any incidents or events since the last inspection.		
None		
PART II - INSPECTION DOCUMENTATION		
NOTE: References that correspond to each inspection documentation topic are in Inspection Procedure 87111, Appendix B, "Materials Processor/Manufacturer Inspection References."		
The inspection documentation part is to be used by the inspector to assist with the performance of the inspection. Note that not all areas indicated in this part are required to be addressed during each inspection. However, for those areas not covered during the inspection, a notation ("Not Reviewed" or "Not Applicable") should be made in each section, where applicable. All areas covered during the inspection should be documented in sufficient detail to describe what activities and procedures were observed and/or demonstrated. In addition, the types of records that were reviewed and the time periods covered by those records should be noted. If the licensee demonstrated any practices at your request, describe those demonstrations. The observations and demonstrations you describe in this report, along with measurements and some records review, should substantiate your inspection findings. Attach copies of all licensee documents and records needed to support violations.		

1.	ORGANIZATION AND SCOPE OF PROGRAM
Management organizational structure; authorized locations of use, including field offices and temporary job sites; type, quantity, and frequency of material use.	
Jeff Evans, RSO maintains his office at the Newtown facility. He is also a Staff Safety & Health Engineer. Todd Williams is the assistant RSO who is stationed in King of Prussia. Newtown Facility: 4' x 7' MgTh panels (2% Th) that will be installed in spacecrafts are assembled/manufactured at the Product Team Bldg. at their Newtown facility. Currently the licensee has one panel in their possession. The licensee's production of MgTh and their use of other licensed materials is sporadic based on contracts that they are awarded. The licensee has been producing panels of essentially the same design since the 1970's. King of Prussia Facility: Two Gammacell 220's with Co-60 and irradiated electronics components are used/manipulated in the Radiation Effects Laboratory (b)(2)High. The Gammacell's are generally used on a daily basis, and the electronic components are handled more sporadically. Approximately 75 electronic components were received for testing in 2000.	
2.	MANAGEMENT OVERSIGHT
Management support to radiation safety; Radiation Safety Committee; Radiation Safety Officer; program audits, including annual reviews; as low as is reasonably achievable (ALARA) reviews; control and supervision by authorized users.	
Steve Walker, VP of Lockheed Commercial Space Systems in Newtown John Zedro, Dir. Of Operations and Quality Clare LumKong, Environmental Safety and Health Lead Jeff Evans, RSO and Staff Safety & Health Engineer Todd Williams, Asst. RSO in Valley Forge The licensee also maintains a RSC that meets annually. The RSC reviews the radiation safety program annually. Records of RSC minutes were reviewed for meetings on August 16, 1999 and August 21, 2000. The meeting minutes reflected that the committee discussed appropriate issues related to the implementation of the radiation safety program and approved authorized users.	
3.	FACILITIES
Facilities as described; uses; control of access; engineering controls; calibration facilities; shielding; air flow:	

Ex 2

The licensee's Radiation Effects Lab in KOP has a combination lock on the door and only those with training are allowed access to the facility. Within the lab, the gammacells are located in a locked, shielded room. Irradiated electronic components are stored in a locked cabinet in the room where the gammacells are located when tests are not being performed.

The MgTh panels are classified spacecraft components and are kept very secure within the Product Team Building at the Newtown facility. Occasionally, machining of these parts are performed. The last time that drilling was performed, the licensee's consultant, Syd Porter, evaluated the resultant airborne radiation levels and surface contamination and found that engineering controls in place are sufficient to maintain radiation levels within NRC requirements.

4. EQUIPMENT AND INSTRUMENTATION

Operable survey instruments; procedures; 10 CFR Part 21 procedures; process and storage systems.

The licensee has several operable and calibrated survey instruments on hand at both their Newtown and King of Prussia facilities. Applied HP calibrates their survey instruments every six months. The inspector reviewed records of calibration and found them to be appropriate. At their Newtown facility, the inspector observed two G-M survey meters, an Eberline E120 and a Victoreen Model 190 and a Ludlum Model 18 equipped with an alpha probe. At their King of Prussia facility, the inspector observed a calibrated Eberline Geiger Counter, as well as a calibrated Eberline SRM-100 (area radiation monitor) that was installed to monitor radiation levels in the room where the gammacells were located.

5. MATERIAL USE, CONTROL, AND TRANSFER

Materials and uses authorized; security and control of licensed materials; and procedures for receipt and transfer of licensed material.

The licensee makes surveys of, and maintains records of, incoming packages of radioactive material that are labeled, and non-labeled. The inspector reviewed receipt records that included radiation survey information for several shipments of irradiated electronic components.

The licensee's Radiation Effects Lab in KOP has a combination lock on the door and only those with training are allowed access to the facility. Within the lab, the gammacells are located in a locked, shielded room. Irradiated electronic components are stored in this room in a locked cabinet when tests are not being performed on the components.

The MgTh panels are classified spacecraft components and are kept very secure within the Product Team Building at the Newtown facility.

Gammacell 220 S/N PM7157 (b)(2)High on 5/77
Gammacell 220 S/N 186 (b)(2)High on Sept 1989

Ex2

6.	AREA RADIATION SURVEYS AND CONTAMINATION CONTROL
	Radiological surveys; air sampling; leak tests; inventories; handling of radioactive materials; contamination controls; records; and public doses.
	The last time that drilling was performed on MgTh panels, the licensee's consultant, Syd Porter, evaluated the resultant airborne radiation levels and surface contamination and found that engineering controls in place are sufficient to maintain radiation levels within NRC requirements. Leak tests are performed on the Gammacells @ six month intervals. Records for the last three years were reviewed by the inspector. Irradiated electrical components are wipe tested when they are received. No removable contamination has ever been detected. Typically, measured dose rates are less than 0.5 mR/hr @ contact with the external surfaces of electronic components.
7.	TRAINING AND INSTRUCTIONS TO WORKERS
	Training and retraining requirements and documentation; interviews and observations of routine work; staff knowledge of all routine activities; 10 CFR Parts 19 and 20 requirements; emergency situations; and supervision by authorized users.
	All employees that work in the vicinity of radioactive materials receive at least one hour of radiation safety training. Authorized users of MgTh, irradiated electronic components, and the Gammacells have all received at least 8 hours of radiation safety training which included specialized training that addressed the specific hazards of the use of these types of radioactive materials. Authorized users are then approved by the RSC - records of these approvals were reviewed by the inspector. Annual retraining is also performed - records reviewed by the inspector.
8.	RADIATION PROTECTION
	Radiation protection program with ALARA provisions; external and internal dosimetry; exposure evaluations; dose and survey records and reports; annual notifications to workers; bulletins and other generic communications.

Visitors, people who work with MgTh and users of the Gammacells and irradiated electronic components wear OSL's. Records of the analysis of these badges were reviewed by the inspector for 1999 and 2000. Most exposures were less than 10 mR/quarter. Employees are notified at least annually of their dose. High badge readings, including a 1 R reading that was measured from a badge worn by an individual working with MgTh were investigated by the licensee. The analysis that was performed by the licensee's consultant, Sydney Porter, indicated that the reading of 1 R was not valid. A maximum reading of 0.2 mR/hr was measured by the consultant @ 8" from the MgTh panel which would exclude the possibility of a legitimate 1 R reading.

The inspector observed an authorized user of the Gammacells irradiate an electronic component. The authorized user limited his time in the room where the irradiators were located to maintain doses ALARA.

9.	RADIOACTIVE WASTE MANAGEMENT
	Disposal; effluent pathways and control; storage areas; transfer; packaging, control, and tracking procedures; equipment; incinerators, hoods, vents and compactors; license conditions for special disposal method.
	Irradiated electronic components are held for decay-in-storage. The last disposal was on June 17, 1999. The components were surveyed prior to disposal by the licensee's consultant, Sydney Porter to assure that all radiation had decayed to below detectable limits before the components are disposed of in the regular trash.

10.	DECOMMISSIONING
	Records relevant to decommissioning; decommissioning plan/schedule; notification requirements; cost estimates; funding methods; financial assurance; and Timeliness Rule requirements; changes in radiological conditions since decommissioning plan was submitted.
	The inspector reviewed Letter of Credit No. LC870-072320 for \$226,000 from Wachovia Bank of Georgia, N.A. which the RSO indicated is still valid. The licensee maintains records of restricted areas, surveys and leak tests.
11.	TRANSPORTATION
	Quantities and types of licensed material shipped; packaging design requirements; shipping papers; hazardous materials (HAZMAT) communication procedures; return of sources; procedures for monitoring radiation and contamination levels of packages; HAZMAT training; and records and reports.
	The only items shipped from the facility are completed MgTh panels which are shipped as excepted material - Instruments and Articles, UN2910. When they are shipped, the inner packaged is labeled "Radioactive"

12.	NOTIFICATIONS AND REPORTS
Reporting and followup of theft; loss; incidents; overexposures; change in RSO; authorized user; and radiation exposure reports to individuals.	
Workers are notified of their dosimetry readings. The RSO stated that they have had no thefts, losses, incidents, or overexposures since the last NRC inspection.	
13.	POSTING AND LABELING
Notices; license documents; regulations; bulletins and generic information; posting of radiation areas; and labeling of containers of licenses material.	
Form NRC-3's were posted in work areas. Irradiated electronic components are labeled. The room in which the Gammacells and irradiated electronic components were located was labeled with a radioactive material caution sign.	
14.	INDEPENDENT AND CONFIRMATORY MEASUREMENTS
Areas surveyed and measurements made; comparison of data with licensee's results and regulations; and instrument type and calibration date.	
The inspector measured 0.75 mR/hr @ one foot from the side of the Gammacell that contained (b)(2)High of Co-60 on Sept. '89. The inspector also measured 5 mR/hr at the top of the elevator or the top of this irradiator. A calibrated Ludlum Model 14C with a pancake probe (S/N 33506) was used to make these measurements.	
15.	VIOLATIONS, NON-CITED VIOLATIONS (NCVs), AND OTHER SAFETY ISSUES
State requirement and how and when licensee violated the requirement. For NCVs, indicate why the violation was not cited. Attach copies of all licensee documents needed to support violations. ☐	
None	
16.	SOURCE OR DEVICE REVIEW
Device registration documents; changes; quality assurance/quality control program. Contact Material Safety Branch (NMSS/IMNS) and supervisor if unregistered equipment is identified.	
None	

Ex2

17.	PERSONNEL CONTACTED			
Identify licensee personnel contacted during the inspection (including those individuals contacted by telephone). Use # to indicate individual present at entrance meeting. Use * to indicate individual present at exit meeting.				
Name		Title	Phone No.	In Person or By phone
Jeffrey Evans #*		RSO	215-497-1312	In person
Todd Williams *		Associate RSO		In person
Jeff Auletto *		Acting V-P of Newtown Facility		By phone
Robert Gigliuto *		Staff Survivability Engineer		In person
Larry Bruccoliere		Test Specialist		In person
18.	PERFORMANCE EVALUATION FACTORS			
A.	Lack of senior management involvement with the radiation safety program and/or RSO oversight.			Y ☐ N ☒
B.	RSO too busy with other assignments.			Y ☐ N ☒
C.	Insufficient staffing.			Y ☐ N ☒
D.	RSC fails to meet or functions inadequately.	N/A	Y ☐ N ☒	
E.	Inadequate consulting services or inadequate audits conducted.	N/A	Y ☐ N ☒	
REMARKS : (Consider the above assessment and/or other pertinent Performance Evaluation Factors (PEFs) with regard to the licensee's oversight of the radiation safety program)				
19.	SPECIAL CONDITIONS OR ISSUES			
NONE	☒	Special license conditions		
PART III - POST- INSPECTION ACTIVITIES				
1.	REGIONAL FOLLOWUP ON PEFs			
None				
2.	DEBRIEF WITH REGIONAL STAFF			
Post-inspection communication with supervisor, regional licensing staff, Agreement State Officer, and/or State Liaison Officer.				

Paperwork to supervisor.								
APPENDIX A - ATTACHMENT A								
RADIOACTIVE DRUG DISTRIBUTORS								
Licensee:					Date of Inspection:			
1.	Indicate type of operation:							
	A.	Registered or licensed with U.S. Food and Drug Administration as a drug manufacturer:	Y		N			
	B.	Registered or licensed with State Agency as a Drug Manufacturer:	Y		N			
2.	Licensee distributes:							
		• Sealed Sources	Y		N			
		• Alpha and beta emitters	Y		N			
		• Generators	Y		N			
		• Photon emitters	Y		N			
Basis for Findings:								
3.	Licensee periodically reviews work of supervised individuals preparing drugs, and records kept to reflect work. [License condition(L/C)]							
			Y		N			
Basis for findings:								
4.	Radioactive drugs are measured (assayed) by direct measurement or combination of measurement and calculation before commercial distribution. [10 CFR 32.72(c)]							
			Y		N			
Basis for findings:								
5.	Instrumentation Used to measure Radioactivity of Drugs							
	A.	List type of equipment used to assay alpha and beta particles:						
	B.	Procedures for instrument use developed and implemented. [10CFR 32.72(c)]	Y		N			
	C.	Calibration tests performed before initial use, periodically, and following repair for accuracy, linearity, and geometry dependence, as appropriate for use of the instrument. [10 CFR 32.72(c)(1); L/C]						
			Y		N			

D.	Adjustment to instrumentation made when necessary. [10CFR 32.72(c)(1); L/C]	Y		N	
E.	Instruments are checked for constancy and proper operation at the beginning of each day of use. [10 CFR 32.72(c)(2); L/C]	Y		N	

Basis for findings:

6.	Transport radiation shield (on transfers for distribution) labeled with radiation symbol, "CAUTION [or DANGER] RADIOACTIVE MATERIAL", name, and quantity at specified date and time*: [10 CFR 32.72(a)(4)(i); L/C] *Time may be omitted for drugs with a half-life > 100 days.				
		Y		N	

Basis for findings:

7.	Syringes, vials, or other containers labeled with radiation symbol, "CAUTION [or DANGER] RADIOACTIVE MATERIAL," and an identifier to correlate with the information on the transport radiation shield label: [10 CFR 32.72(a)(4)(ii); L/C]				
		Y		N	

Basis for findings:

TO ADVANCE TO NEXT SECTION OF FORM - PRESS PAGE DOWN KEY

APPENDIX A - ATTACHMENT B DECOMMISSIONING TIMELINESS INSPECTION ATTACHMENT									
Licensee:						Date of Inspection:			
1. COMPLIANCE WITH DECOMMISSIONING TIMELINESS RULE									
(NOTE: Repeat the answers given in Section 12 of the main body of the inspection record. The issues in subsequent sections are dependent on the answers to these questions.)									
A.		License to conduct a <i>principal activity</i> <u>has</u> expired or been revoked:				Y		N	
B.		Licensee <u>has</u> made a decision to permanently cease <i>principal activities</i> at the entire site, or any separate buildings, or any outdoor areas, including inactive burial grounds:				Y		N	
C.		A 24-month duration has passed in which no <i>principal activities</i> have been conducted under the license at the site, or at any separate buildings, or any outdoor areas, including inactive burial grounds:				Y		N	
D.		If "Yes" to either A or B or C above:							
		(1) Identify Site/Bldg./Area:							
		(2) Date of occurrence of A, B, or C:							
2. NOTIFICATION REQUIREMENTS									
A.		Licensee has provided written notification to U.S. NRC within 60 days of the occurrence of 1.A., 1.B., or 1.C. above.				Y		N	
		If "Yes," date of notification:							
B.		If the licensee is requesting to delay initiation of the decommissioning process, the licensee <u>has</u> provided written notification to NRC within 30 days of occurrence of 1.A., 1.B., or 1.C. above:				N/A		Y	N
		If "Yes," date of notification:							
Basis for Findings:									
3. DECOMMISSIONING PLAN/SCHEDULE REQUIREMENTS									
A.		Licensee is required to submit a decommissioning plan per 10 CFR 30.36(g), 40.42(g), 70.38(g), or 10 CFR Part 72?				N/A		Y	N
		If "No" to 3.A., answer the following items B - F:							

B.	The decommissioning work scope is covered by current license conditions.	Y		N	
C.	Decommissioning has been initiated within 60 days of notification to NRC, or NRC has granted a delay.	Y		N	
D.	If licensee has initiated decommissioning, give date the decommissioning was initiated:				
E.	If decommissioning has been completed, it was completed within 24 months of notification to NRC.	N/A	Y	N	
F.	If decommissioning is still scheduled to be completed, it is on schedule to be completed within 24 months of notification to NRC.	N/A	Y	N	
Basis for Findings:					
If "Yes" to 3.A., answer the following items G - J:					
G.	The decommissioning plan has been submitted to NRC within 12 months of notification.	Y		N	
If "Yes," date of submittal:					
If NRC approved, date of NRC approval:					
H.	Has the licensee submitted an alternative schedule request?	Y		N	
If "Yes," date of submittal:					
I.	If decommissioning has been completed, it was completed within 24 months after approval of the decommissioning plan.	N/A	Y	N	
J.	If decommissioning is still scheduled to be completed, it is on schedule to be completed within 24 months after approval of the decommissioning plan.	N/A	Y	N	
Basis for Findings:					
Violations identified, if any: ☐					

END

G (1 year)
OK 5/25/00

[illegible]

ESH TRAINING ATTENDANCE LOG

1 year
014 5/24/00

COURSE NAME: <u>Radiation Safety (EHS-17)</u>			DATE <u>5/23/00</u>				
INSTRUCTOR'S NAME: <u>Jeff Evans</u>			INSTRUCTOR'S AFFILIATION <u>ESH</u>				
TRAINING MATERIAL USED: <u>Overhead</u>			TEST GIVEN: <u>N</u>				
NAME (PRINT)	PAY #	JOB TITLE	PRODUCT TEAM	ORG. #	PHONE	INITIALS	P/F
✓ George Pigage	J20287	Manager, I & T	Gov Programs	KFOB	2486	GP	
✓ Julio C. SANCHEZ	J21012	ENG. I & T	Gov. Programs	KFOB	2089	JS	
✓ William Tindall	J20657	I & T	Gov Programs	KFOB	2832	WT	
✓ David Smernoff	J20134	Sr. Design Engineer	RF Prod	KJ2B	1196	D.S.	
✓ PAUL SWARTER	J20980	Sr. Des Eng	SE I & T	KFOZ	2087	PS	
✓ MARCUS THOMAS	J20387	DESIGN ENG.	S I & T	KFOB	2448	MT	
✓ EDWARD RODRIGUEZ	J20981 J20387	Tech	I & T	KFOB	2348	ER	
✓ GARY COOK	J20459	Mission Assurance	Quality	QDA2	2852	GC	
✓ KENNETH L. VAUGHN	J20686	MSIPA Qual Eng	MS + PA	Q212	2117	KLV	
✓ MICHAEL FERRANTE	J20112	ENG.	I & T	KFOB	2115	MF	
✓ Jeff Evans	J21100	ESH	ESH	KNDT	1312	JNE	

entered 10/25
JNE

[illegible]



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Environmental Services*

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FAX (610)642-7804

PCI-TR-447

**Measurement and Clearance of Neutron Activated
Electronic Components at Lockheed Martin, Valley Forge Operation**

June 17, 1999

Prepared for:

**Todd Williams
Assistant RSO
of
Lockheed Martin
Valley Forge Operation**

Prepared by:

S. W. Porter, JR., CHP



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PCI- TR-447
June 17, 1999

**Measurement and Clearance of Neutron Activated
Electronic components at Lockheed Martin, Valley Forge Operation**

A. INTRODUCTION

After the request of Mr. Todd Williams, Assistant RSO, at the Valley Forge Operation, Mr. S. W. Porter performed a series of measurements on approximately 150 lots of neutron activated electronic components.

The objective of these measurements was to ensure that they no longer contained levels of radioactive material (fix and removable contamination) above unrestricted release limits. Measurements were performed with instrumentation measuring alpha, beta and gamma.

B. METHOD OF SURVEY

1. The gamma survey was performed on contact with a Ludlum model 19 micro-R meter, serial # 77635, calibrated January 15, 1999.
2. The Beta Survey was performed with a shielded pancake GM detector connected to a Eberline E-120, Serial #10443, Calibrated September 9, 1998.
3. The smears were taken over a 100 cm² area, and then frisked for β - γ activity. The frisking was performed utilizing an Eberline Model E-120, Serial # 10443, Calibrated September 9, 1998; and connected to a shielded pancake tube, Eberline model HP-210T, Serial # 81506. If no activity above background was measured with a quick "frisk" then the samples were counted for first alpha then beta, with a laboratory counting system described below. The ten minute count was performed on an Eberline Stabilized Assay Meter, model SAM-2, serial #s 569 and 312. The alpha detector is a Johnson Zinc Sulfide Model ASP-2A, Serial # 973. The beta detector is a shielded thin and window GM Tube, Johnson Model GP-200, Serial # 658 with a 1 mg/cm² window



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PCI- TR-447
June 17, 1999

Measurement and Clearance of Neutron Activated
Electronic components at Lockheed Martin, Valley Forge Operation

C. RESULTS

1. General - With the exception of one lot of electronic components, all of the electronic components measured were "clean", and maybe released from radioactive material storage and accountability. The radioactive material labels have been removed from all components.
2. Lot Number H9097 - Containing neutron activated products. This was the only Lot that could not be release with no restrictions. The Beta Gamma Contact Survey was 3800 d/m/100 sq.cm. above background. This component was also read 9 μ R/hr gamma above background. This components contained no significant removable alpha or beta contamination.
3. Specific Results (except for #2 above)
 - a. Contact Gamma Surveys; All gamma surveys were indistinguishable from ambient gamma background for μ R/hr. (refer to Attachment 1)
 - b. Contact Beta Surveys; All lots were indistinguishable from the normal instrument background of approximately 20 counts per minutes (refer to Attachment 1)
 - c. Removable Contamination Survey for Alpha Activity; All alpha smears were well below cleanup criteria of 100 d/m/ 100 sq.cm. The maximum net alpha 3 d/m 100 sq.cm. (refer to Attachment 2)
 - d. Removable Contamination Survey for Beta Activity; All beta activity was well below the cleanup criteria of 1000 d/m 100 sq.cm. the max removable beta activity was 22 d/m 100 sq.cm. (refer Attachment 2)

D. INTERPRETATION OF RESULTS

1. Lot H 9097 - This lot needs to be disposed via a licensed Rad-Waste broker. There may be sufficient activity to perform a rough gamma spec survey for identification purposes.
2. All Lots other than H 9097 - No contact survey for beta or gamma showed any results significantly above natural background. The unrestricted release criteria have been met for even the most restrictive radionuclide. (referred to references 1 and 2)



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June 17, 1999

Measurement and Clearance of Neutron Activated
Electronic components at Lockheed Martin, Valley Forge Operation

E. REFERENCES

1. U.S. Nuclear Commission Regulatory Guide 1.86 entitled: Guidelines for Decontamination of Facilities and Equipment prior to release for Unrestricted use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material.
2. A Summary of NRC's Interim Radiological Cleanup Criteria and Current Dose Bases; Decommissioning and Regulatory Issues Branch, US Nuclear Regulatory Commission, November 1992)
3. Porter Consultants, Inc., Standard Operating Procedure #10 Radiological Surveys dated August 13, 1992
4. Porter Consultants, Inc., Standard Operating Procedure #51 Calibration of Eberline Instruments Corp. SAM-2 Dual Single Channel Analyzer with the Wm. B. Johnson & Associates, Inc. ASP-2A Alpha Detector
5. Porter Consultants, Inc., Standard Operating Procedure #79 Radiation Dose Rate Surveys dated January 27, 1992
(Also LRRP-RSO-SOP-11)
6. Porter Consultants, Inc., Standard Operating Procedure #80 Surface Contamination Surveys dated January 27, 1992
(Also LRRP-RSO-SOP-12)
7. Porter Consultants, Inc., Standard Operating Procedure #82 Counting and Reporting Smear Data dated March 4, 1992
(Also LRRP-RSO-SOP-18)

Sgt. Porter, J. Measurements on 4/23/99 + 4/26/99

Note: 15 not found.

in activated Parts Storage

3X $\text{lbpr} \approx 700/m$ $\text{lbpr} = 4 \mu R/h$

Similar

LOT NO.	PART TYPE	PROGRAM	DATE	< 200/m	4 $\mu R/h$
D9098	CA32909	SUR.SER.	6/13/88		
D9106	SP10957	HAC	6/13/88		
D9114	UA139	SUR.SER.	6/13/88		
D9116	SP10956	HAC	6/13/88		
D9128	ADC87-12	SUR.SER.	6/13/88		#17
D9131	CT3232	SUR.SER.	6/13/88		
E0195	MN5210	DSCS	6/13/88		
E3021	SMP10A	MDAC	6/13/88		
E3022	SMP10A	MDAC	6/13/88		
E9008	CTS0021ZB	SUR.SER.	6/13/88		
E9019	HAI-5320-2	SUR.SER.	6/13/88		#16
E9022	63105	SUR.SER.	6/13/88		
E9027	AD585SQ	SUR.SER.	6/13/88		
F1100	2N3467	MILSTAR	6/13/88		
F6000	9N13	HAC	6/13/88		#4
F9066	CT3231-M	STAR	6/13/88		
F9067	VH025-01	HVIC	6/13/88		
F9067	LM107	SAIC	6/13/88		
F9068	MOTOR DR.	HVIC	6/13/88		
F9069	55115	SAIC	6/13/88		
F9070	OP27	BAT	6/13/88		
F9072	1N829	BAT	6/13/88		
F9080	78C20	SAIC	6/13/88		#9
F9081	AH0015	SAIC	6/13/88		
F9082	6600	SAIC	6/13/88		
F9083	UCS4801	SAIC	6/13/88		#8
F9084	AM2966	SAIC	6/13/88		
F9085	ULS2803	SAIC	6/13/88		
F9087	55461	SAIC	6/13/88		
F9088	IRF9112	SAIC	6/13/88		
F9089	IRF151	SAIC	6/13/88		
F9091	VN0340N2	SAIC	6/13/88		
F9092	OP27	BAT	6/13/88		#6
F9095	55471	SAIC	6/13/88		
F9096	2N6193	ACSD	6/13/88		
F9098	2N6688	ACSD	6/13/88		
F9100	4N22	ACSD	6/13/88		
H1062	OP15	MILSTAR	9/27/92		
H9018	S555	BAT	6/13/88		
H9019	2N3811	BAT	6/13/88		

F1240

Parts Storage

P J Y sma
 $\Delta \log_1 = 20 \text{ c/m}$ $\Delta \log_1 = 4 \mu R/h$

H9020	SCA15264	ACSD	6/13/88
H9064	VOLT. REG	STAR	6/13/88
H9065	REF05	STAR	6/13/88
H9068			6/13/88
H9079	REF02	STAR	6/13/88
H9080	QDM	ACSD	6/13/88
H9086	MN5123	SAIC	6/13/88
H9091	DAC08Q/883	STAR	11/10/88
H9092	UC1834J/883	STAR	11/10/88
H9096	MCM990	ACSD	6/13/88
H9097	35788-1	ACSD	6/13/88
H9100	OP27	BAT	6/13/88
H9102	HV-TEG	HVIC	6/13/88
H9103	IN829	BAT	6/13/88
H9104	BUP-T REC.	ACSD	6/13/88
H9105	PWR. SWITCH	ACSD	6/13/88
H9106	PWR. SWITCH	ACSD	6/13/88
H9107	PRI. CONTROL	ACSD	6/13/88
H9108	SEC. CONTROL	ACSD	6/13/88
H9109	IN. MONITOR	ACSD	6/13/88
H9117	LM136	STAR	6/13/88
H9119	LVDT	ACSD	6/13/88
H9120		ACSD	6/13/88
H9122	MCM991	ACSD	6/13/88
H9127	OP02AZ	STAR	6/13/88
H9129	OP20GZ	STAR	6/13/88
H9130	REF02HZ	STAR	12/13/88
H9131	DAC08	STAR	11/10/88
H9132	OP15FZ	STAR	6/13/88
H9144	CD40193	SPAR	6/13/88
H9145	CD4050	SPAR	6/13/88
H9148	CMP-05C2	STAR	6/13/88
H9160	BOOST HYB.	ACSD	6/13/88
H9172	LM135AH	ACSD	6/13/88
H9173	AD390TD	ACSD	6/13/88
H9177	OP27	BAT	6/13/88
H9179			6/13/88
H9197			7/7/89
H9201	TRANSDUCER 3 boards		11/10/88
J9001	IRF250	STAR	11/28/88
J9013	AM686	STAR	11/28/88
J9016	4N55	SLI	6/13/88

< 20 c/m

4

#13

#12

400 c/m

13 $\mu R/h$

#18

#5

#11

#10

#7

#25

Most activity in Top layer of 6.

SMP

5

PCI-TR-447 attachment 1

pg 2 of 4

Parts Storage

BY
 $lbp > 70 \text{ y/m}$ $lbp = 4 \mu R/Lr.$ *smear*

J9050	HPND4005	STAR	10/14/88
J9069	SG1503T	STAR	12/13/88
J9086	TEG-4	DH3	12/6/88
J9108	4N55	SLI	11/1/88
J9149	HCPL-5730	STAR	12/9/88
J9164			1/30/89
J9168	MA4GP030	STAR	11/4/89
J9196	2N3019	BABCOCK	3/30/89
J9199	2N2222A	BABCOCK	3/30/89
J9202	2N2907A	BABCOCK	3/30/89
K3115C			1/3/90
K3126			9/12/89
K9005			2/20/89
K9020	UC1846J	BABCOCK	3/30/89
K9057	UC1707	BABCOCK	3/30/89
K9142	1N4106	MSC	4/4/90
K9167	2N2222A	BABCOCK	12/7/89
K9170	2N2907A	BABCOCK	12/7/89
K9173	2N3019	BABCOCK	12/7/89
K9178	2N6351	BABCOCK	12/7/89
K9190	LM139	BABCOCK	12/7/89
L3009			4/4/90
L9099	1N4150-1	GCSD	12/2/90
L9137	2N2222A	GCSD	12/2/90
L9138	1N4148-1	GCSD	12/2/90
L9179	4N55	SLI	6/10/91
L9191	2N2222A	GCSD	12/2/90
L9192	2N6353	GCSD	12/2/90
L9203	1N4469	DSCS	12/2/90
L9216	OP215GBC	SLI	6/10/91
L9217	OP215	SLI	6/10/91
L9218	OP15	SLI	6/10/91
M0017	SP8740A	DSCS	8/9/94
M0017	SP8740A	DSCS	8/9/94
M3069	2N5160	MDAC	9/27/92
M3073	RM4156D	MDAC	12/2/91
M3074	RM4156D	MDAC	12/2/91
M3079	RC4156	MDAC	12/4/91
M9142	UZ2455	UNITRODE	12/2/91
M9143	29653	GCSD	9/27/92
N9088	SG1524	FEI	9/27/92
N9118	LM139	FEI	9/27/92

#15

#21

#19

#20

#24

#23

#22

Sup

Parts Storage

lbg=200/m lbg=400/m

BT T 17/h similar

D0002	SG1846J	BABCOCK	5/16/95	< 200/m	4	
S0001	1N4478	DSCS	4/18/97			
S1003	1N4461	MILSTAR	6/25/96			
S1003	2N3507	MILSTAR	9/9/96			
S1003	6N134	MILSTAR	9/27/96			
S1003	1N4148	FEI	8/18/96			
S9108	LM117H	BABCOCK	10/15/96	< 200/m	4	#1
S9117	LM139	BABCOCK	10/15/96			
S9137	1N6642	DSCS	8/14/96			
S9142	86-884	MSC	7/26/96			
S9145	2N3501L	BABCOCK	10/15/96			
S9204	DAC-100	TIROS	8/14/96			
S9204	LM117K	BABCOCK	10/15/96			
S9251	2N2907A	BABCOCK	10/15/96	< 200/m	4	#2
S9253	2N3019	BABCOCK	12/11/96			
S9297	2N3637	BABCOCK	10/15/96			
S9297	1N5811	DSCS	5/14/98			
T9036	2N2907A	BABCOCK	4/1/97			
T9037	2N2222A	BABCOCK	4/1/97			
T9087	86-884	MSC	4/9/97			
Line Driver Switching Box						#3
Wafers						
ACS						
RTR# F018						
RTR# F023						
RTR# F011						
HS-31C55RH						
59AC244/374						
H 9168						#14
+ 9001						
(10) ADC-87-12 + SUR SER						

Sup

PCI Form 15
Updated 4.9.99



Porter Consultants, Inc.
125 Argyle Road
Ardmore, PA 19003-3201
Phone (610) 896-5353
FAX (610) 642-7804

Customer: Lockheed Martin

Site: K. J. P. Green, PA

Sinus samples taken on 4/23/99
and on 4/26/99.

Smear Location: Elmhurst X-Ray Facility.

Smear Location: Irradiated Parts

[illegible]

Cleanups Criteria

Tech Signature

SmrCULog 4.21

4/26 & 5/2 & 5/4/99
Date

attachment 2