

LOCKHEED-GEORGIA COMPANY

A DIVISION OF LOCKHEED AIRCRAFT CORPORATION

MARIETTA, GEORGIA 30060

LOCKHEED

LGB/301154

29 September 1970

SUBJECT: Report of Facilities Changes for License R-86,  
Docket No. 50-172  
Regulatory File Cy.

TO: United States Atomic Energy Commission  
Division of Reactor Licensing  
Washington, D. C. 20545

REFERENCE: (A) Amendment No. 9 to Facility License  
R-86 dated March 11, 1969

ENCLOSURE: (a) Report of Facilities Changes, August 1, 1969  
through July 31, 1970

1. Enclosure (a) is submitted in compliance with Section 50.59  
(b) of Part 50, Title 10, CFR, and with Paragraph 4.E(4) of Reference (A)  
license.

LOCKHEED-GEORGIA COMPANY

*F. L. Amend*

F. L. Amend, Acting Manager  
Reactor Operations and Nuclear  
Safety Department

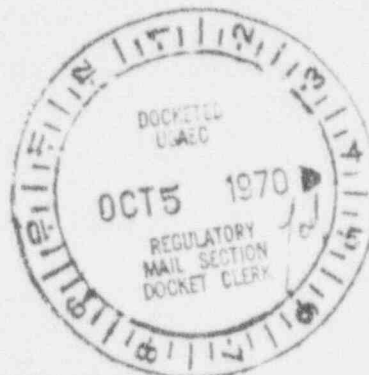
FLA:fc

F. L. Amend, under oath, states that the above and attached statements  
are true to the best of his knowledge and belief.

Subscribed and sworn to before me this 30th day of September, 1970,  
at Dawsonville, Georgia.

*Sybil Westbrook*

NOTARY PUBLIC, GEORGIA STATE AT LARGE  
MY COMMISSION EXPIRES MAY 25, 1972



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REPORT OF FACILITIES

CHANGES

AUGUST 1, 1969, THROUGH JULY 31, 1970

ENCLOSURE (a)

A-28a

# 1. CURRENT STATUS - GNL

Lockheed has recently announced the intention of reducing the level of activity at the Georgia Nuclear Laboratories to caretaker status. The reactor fuel was removed from the RER on July 29, 1970, with no future operation planned.

Although few organizational changes have been announced to date, it is anticipated that many changes will be made in the near future. Lockheed has applied for an amendment to license R-86 to permit ownership but not operation of the RER.

Paragraph 5.0 reports the organizational status on July 31, 1970.

## 2. IRRADIATION EXPERIMENTS

### 2.1 GENERAL

The entire operation of the REF during the period August 1, 1969, through July 31, 1970, is summarized in the table below:

	Startups	Time Operated	MW-Hrs	Unscheduled Shutdowns	
				Scrams	Other
Neutron Radiography	122	67 hrs 26 min	150.15	3	0
Foils	2	3 hrs 27 min	.42	0	0
LMSC-WET	3	1 hr 37 min	.76	0	0
NASA	7	3 hrs 4 min	4.45	0	0
Reactor Checkout	2	1 hr 24 min	3.07	0	0
	136	77 hrs	158.85	0	0

There were no tests involving the use of cryogenic materials or the lithium hydride shield.

### 2.2 NEUTRON RADIOGRAPHY

The beam tube used throughout the reporting period was as described in Paragraph 1.3 of Ref. A. letter. The only change in the test equipment was the addition of a retractable cassette holder which provided a means for changing test specimens without working in close proximity to the beam tube. The cassette holder was provided with an interlock with the reactor lift controls to disable the reactor lift except when the holder is in the fully retracted position.

Lockheed was granted an amendment to license A-86 on April 22, 1970, which permitted personnel access to the reactor building under certain conditions while the reactor was operating. The amendment was sought to facilitate the efficient production of large numbers of neutron radiographs without a reactor shutdown. This type operation has not materialized and there has been no personnel entry to the outside area within the exclusion fence while the reactor was operating.

Approximately 70% of the operation for radiography was a continuation of development work previously described. The remaining 30% was work done under contract to various customers and consisted primarily of radiographing small explosive devices. The aggregate weight of explosives (TNT equivalent) involved in a single exposure has not exceeded 30 grams.

### 2.3 LMSC-WET

One test was conducted for Lockheed Missiles and Space Company and consisted entirely of the irradiation of electronic components.

#### 2.4 NASA

One test was conducted for the purpose of calibrating detectors which were developed at the Georgia Nuclear Laboratories under contract to NASA.

#### 2.5 REACTOR CHECKOUT

The reactor was operated on two occasions to observe reactor systems performance following periods of reactor systems maintenance.

### 3. SCRAMS AND UNSCHEDULED SHUTDOWNS

#### 3.1 SCRAMS

Three scrams occurred during the period August 1, 1969, through July 31, 1970. There were no other unscheduled shutdowns.

<u>Date Scram Occurred</u>	<u>Indication</u>	<u>Cause</u>
February 20 (Three Occurrences)	Relay Scram - Instrument Trouble	Malfunction of #3 Safety Channel Converter result- ing in a shift of the scram set point.

#### 4. REACTOR & AUXILIARY SYSTEMS MAINTENANCE

##### 4.1 REACTOR MAINTENANCE

The reactor was shut down for six work days during the period June 10 through June 17, 1970, to investigate and correct a condition which caused number one control rod to stick in the extreme lowered position. The condition was first observed during the performance of routine rod drop time measurements on June 10. It was necessary to unload the reactor core and disassemble the reactor to the extent that the grid and scram damper were removed from the pressure vessel to perform the necessary maintenance.

The cause of the rod sticking was apparently the presence of a thin deposit of corrosion product in the close tolerance cylindrical section of the scram damper. This section of each of the four dampers was cleaned using a wire brush and cylinder hone. No foreign materials were observed other than particulate matter which formed a white cloud in the pool during the cleaning operation. There was no evidence of damage to the scram damper or the control rod shell.

After the cleaning operation, number one control rod shell was inserted into and withdrawn from number one position of the scram damper through approximately 40 cycles with no sticking.

Rod drop and scram times measured after reactor reassembly were normal.

##### 4.2 EMERGENCY GENERATOR

On March 4, 1970, the automatic start features of the REER emergency diesel generator were functionally checked by simulating a power failure. The diesel engine started but the generator load breaker failed to close to pick up the load. The reactor was not operating at the time. The AEC was advised of this failure by Ref. B. letter.

All other systems maintenance was considered routine.

## 5. CHANGE IN ORGANIZATION

### 5.1 GNL ORGANIZATION

The following title changes within the GNL organization were announced in June, 1970:

<u>From</u>	<u>To</u>
Nuclear Products Manager	Nuclear Laboratory Director
Nuclear Equipment and Laboratory Systems Division	Nuclear Support
Nuclear/Electronic Systems Division	Nuclear Laboratory Operations
Nuclear Aerospace Division	Nuclear Aerospace Engineering

Reactor Operations and Nuclear Safety now report to the Associate Director, Nuclear Support. The changes do not affect the function or the line organization of either of these groups.

All experimental programs are conducted by either Nuclear Laboratory Operations or Nuclear Aerospace Engineering.

The Reactor Operations Group has been reduced to five persons including three licensed Operators and two licensed Senior Operators.

### 5.2 REACTOR SAFETY COMMITTEE

One member of the Safety Committee not in the operating line organization was replaced in May, 1970, due to an organizational change.

Another member has recently left the Company and has been replaced by his Alternate Committee Member.

### 5.3 PLANT PROTECTION AND PLANT ENGINEERING

There have been no changes in the function and activities of these organizations.



## 6. RER OPERATING PROCEDURES

The procedure changes listed have been reviewed and approved by the Reactor Safety Committee:

<u>Procedure</u>	<u>Change</u>
RER 125 - Rod Withdrawal Rates	New procedure - to require that control rod withdrawal rates be measured at least quarterly.
RER 106 - Startup of Reactor Auxiliary Systems	Include check of emergency generator control settings. Incorporate changes permitted by Change No. 7 to Technical Specifications of License R-86.
RER 109 - Shift Supervisors Check Sheet	Incorporate change in key control. Incorporate changes permitted by Change No. 7 to License R-86.
RER 120 - Nuclear Startup	Rewritten to exclude extraneous material and to better define F.C. withdrawal limitations.
RER 300 - Reactor Shutdown	Rewritten to cover In-Pool operation.
RER 514 - Emergency Generator - Functional Check	New Procedure - to require a functional check of the emergency generator automatic start features quarterly.

#### 7. FACILITY CHANGES

There were no changes to the facility other than the addition of the retractable cassette holder discussed in Paragraph 22.

## 8. ENVIRONMENTAL MONITORING

### 8.1 SOIL SAMPLE RESULTS

During the report period surface samples were collected in each of four concentric rings around the Radiation Effects Reactor at distances of 50, 125, 250 and 500 feet. The results shown are an average of the activity in UC/GM for the samples in each ring.

	A. (50 ft)	B. (125 ft)	C. (250 ft)	D. (500 ft)
3rd Quarter - 1969	$19.0 \times 10^{-5}$	$6.4 \times 10^{-5}$	$5.6 \times 10^{-5}$	$4.1 \times 10^{-5}$
4th Quarter - 1969	$26.3 \times 10^{-5}$	$12.2 \times 10^{-5}$	$11.9 \times 10^{-5}$	$9.0 \times 10^{-5}$
1st Quarter - 1970	$21.7 \times 10^{-5}$	$12.6 \times 10^{-5}$	$9.1 \times 10^{-5}$	$6.3 \times 10^{-5}$
2nd Quarter - 1970	$28.6 \times 10^{-5}$	$13.3 \times 10^{-5}$	$8.7 \times 10^{-5}$	$6.8 \times 10^{-5}$

### 8.2 ACTIVATED SOIL TRANSPORT

Primary methods for activated soil transport are by airborne dispersion and water run-off.

#### 8.2.1 Airborne Dispersion

Airborne activity results reflect the average monthly gross activity in particulate air samples taken continuously at the REF approximately 140 feet from the reactor building and at the CEF meteorological tower, which represents the control sample. Results are shown in  $\mu\text{c/cc}$ .

	REF	CEF
August - 1969	$1.25 \times 10^{-12}$	$.97 \times 10^{-12}$
September - 1969	$.69 \times 10^{-12}$	$.44 \times 10^{-12}$
October - 1969	$.99 \times 10^{-12}$	$.50 \times 10^{-12}$
November - 1969	$.72 \times 10^{-12}$	$.38 \times 10^{-12}$
December - 1969	$.77 \times 10^{-12}$	$.38 \times 10^{-12}$
January - 1970	$.64 \times 10^{-12}$	$.35 \times 10^{-12}$
February - 1970	$.94 \times 10^{-12}$	$.52 \times 10^{-12}$
March - 1970	$1.06 \times 10^{-12}$	$.76 \times 10^{-12}$
April - 1970	$2.24 \times 10^{-12}$	$1.18 \times 10^{-12}$
May - 1970	$3.35 \times 10^{-12}$	$2.02 \times 10^{-12}$
June - 1970	$2.80 \times 10^{-12}$	$1.10 \times 10^{-12}$
July - 1970	$1.72 \times 10^{-12}$	$.69 \times 10^{-12}$

#### 8.2.2 Surface Water Transport

The activated soil transport via surface water run-off is determined by continuously sampling the Stowah River water upstream and downstream from the reactor. The monthly averages of the gross activity for these samples are shown in  $\mu\text{c/ML}$ .

For comparison, activity or rain water collected at the CEF is shown.

<u>Period</u>	<u>Upstream</u>	<u>Downstream</u>	<u>CEF, Rain</u>
August - 1969	$3.3 \times 10^{-8}$	$3.5 \times 10^{-8}$	$6.5 \times 10^{-8}$
September - 1969	$3.9 \times 10^{-8}$	$6.0 \times 10^{-8}$	$7.3 \times 10^{-8}$
October - 1969	$3.5 \times 10^{-8}$	$2.9 \times 10^{-8}$	$8.1 \times 10^{-8}$
November - 1969	$2.2 \times 10^{-8}$	$3.2 \times 10^{-8}$	$8.0 \times 10^{-8}$
December - 1969	$2.0 \times 10^{-8}$	$4.2 \times 10^{-8}$	$12.5 \times 10^{-8}$
January - 1970	$3.0 \times 10^{-8}$	$3.0 \times 10^{-8}$	$12.0 \times 10^{-8}$
February - 1970	$2.8 \times 10^{-8}$	$4.1 \times 10^{-8}$	$6.4 \times 10^{-8}$
March - 1970	$2.6 \times 10^{-8}$	$2.7 \times 10^{-8}$	$9.5 \times 10^{-8}$
April - 1970	$2.2 \times 10^{-8}$	$2.2 \times 10^{-8}$	$14.4 \times 10^{-8}$
May - 1970	$3.7 \times 10^{-8}$	$2.9 \times 10^{-8}$	$10.8 \times 10^{-8}$
June - 1970	$1.9 \times 10^{-8}$	$2.2 \times 10^{-8}$	$11.4 \times 10^{-8}$
July - 1970	$2.5 \times 10^{-8}$	$2.2 \times 10^{-8}$	$7.4 \times 10^{-8}$

### 8.3 VEGETATION

Vegetation samples taken quarterly are averaged for the report period and are shown for "on-site" and "off-site" in  $\mu\text{c}/\text{GM}$ .

#### On-Site

$13.2 \times 10^{-5}$

#### Off-Site

$24.4 \times 10^{-5}$

REFERENCES:

- A. LAC, Ga. Co., ltr to AEC, dtd 2 October, 1969,  
Subj.: Report of Facilities Changes for License R-86,  
Docket No. 50-172, LGD/268017
- B. LAC, Ga. Co., ltr to AEC, dtd 12 May, 1970,  
Subj.: Radiation Effects Reactor, Docket No. 50-172.