[redacted]

UNCLASSIFIED

October 31, 1962

NOV 5 1962

TO	ORG.	CODE
	7111	hard copies
	7112	
	7113	
	7110	
	TIE	Aero-Eng
	RET.	7110

MR. A. J. CLARK, JR. - 7110

Re: Trip Report -- October 15-19, 1962

October 16, 1962 - Martin Marietta Company

Personnel contacted:

Mr. T. Dobry
Mr. W. Hagis

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
AUTHORITY: W. C Layne
PERSON CHANGING MARKING & DATE: Emelda Selph 11/03/97
RECORD ID: 98SN0383
PERSON VERIFYING MARKING & DATE: W. LAWRENCE 11/04/97
DATED: 10/22/97

SNAP 9A

The SNAP 9A Thermoelectric Generator Final Safety Report was discussed with particular emphasis being placed on the fuel capsule and the testing of this capsule.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
Determination (Circle Number(s)):
1. Classification Retained
2. Classification Changed to: UNCL
3. Contains No DOE Classified Information
4. Classified Info Bracketed
5. Contains UCNI
6. Comments:
1st Review Date: 10/15/97
Authority: ☐ ADC ☒ ADD
Name: W. H. LAWRENCE
2nd Review Date: 10-31-97
Authority: ADD
Name:
Unclassified

Capsule Testing - The Martin Company uses a modified Bazooka for the launch vehicle and attaches the fuel rod to the bazooka rocket. The rocket and holding fixture are stopped allowing free flight impact of the fuel rod. This system allows only end impact - no side impact tests have been run. Martin Company has calculated the stress caused by side impact or corner impact and in all cases feel that the stress is below the structural strength of the material. The impact loads for end impact are channeled through the parent material by a step on which the end cap seats. I believe a side impact will place a shear stress on the end cap welds and therefore tests should be run to determine if the 50 to 60% efficient weld will withstand the shear loading. Martin calculations indicate this is not necessary because at a constant velocity at impact, there will be a constant kinetic energy and their tests have shown the capsule can withstand this condition. This is only true for the parent metal and not the weld material. Also, this is only true for static conditions - dynamic conditions will give different results.

Further discussion of burnup brought out that Martin's calculations for satellite burnup are probably conservative as their calculation concentrated full satellite weight in the skin. This is not true and the inner structure of the satellite is so light that it will disintegrate rather than burn.

The additional studies which Martin is presently running on the SNAP 9A are required because of new trajectory information on the Scout vehicle and the addition of Thor Able Star as a launch vehicle.

UNCLASSIFIED

"Th[redacted]
Nat[redacted]
mea[redacted]
Soci[redacted]
of wh[redacted]
is prohibited by law."

COPIED/DOE
SANDIA RC

UNCLASSIFIED

SNAP 11

The present requirements for SNAP 11 is a 90 day mission, 30 day hold period, and 10 day shipping time. This 130 day mission requirement is supported with about 100% excess fuel (1000 watts thermal) to assure proper operation for the full 90 day lunar mission.

Drawings of the SNAP 11 generator assembly will be sent to Sandia in the near future. Drawings for the fuel capsule are not available at this time but general information about the capsule was obtained. The fuel will be encapsulated in molybdenum (welded assembly), placed in a platinum sphere (4" dia. welded assembly), inserted in a graphite cylinder (about 1-1/2" wall thickness-screw assembly), encased in a beryllium cylinder (about 1/4" wall thickness-screw assembly), and finally placed in a stainless steel cylinder (welded assembly). The outside dimensions of the fuel capsule will have an L/D ratio of approximately 1.0. This package is being designed to provide a proper temperature source for the thermoelectric elements, provide the necessary radiation shielding, provide corrosion protection, and finally to provide impact characteristics which will withstand a lunar impact of 9000 feet per second.

One-half scale impact tests of the fuel capsule will be performed at Aberdeen Proving Ground in December 1962, and simulated re-entry heating tests will be performed at Malta in January 1963.

The SNAP 11 will be launched on an Atlas-Centaur vehicle. This launch will be dependent on the Apollo program. If Apollo is launched first, the SNAP 11-Surveyor probably will not be launched.

October 17, 1962 - Johns Hopkins University, Applied Physics Laboratory

Personnel contacted (Howard County Lab):

Mr. T. Wyatt	776-7100	Ext. 391, 392
Mr. F. Esch	776-7100	Ext. 2167, 2168

After some trouble obtaining entrance to the laboratory (clearance request denied - "no need to know"), I was given an excellent description and guided tour of the facilities.

The Transit 5A system will use existing hardware and solar cells. The Transit 5 BN will have the SNAP 9A mounted and will be launched from PMR using a Thor Able Star vehicle.

COPIED/DOE
SANDIA RC

UNCLASSIFIED

The Transit 5A uses fibreglas outer skin covers, but Transit 5 BN will use beryllium for the skin material. The satellite designers want to conduct 100 watts thermal energy down the sides of the satellite for dissipation to the atmosphere.

The inner structural members of the satellite are fabricated from .015 to .025 aluminum sheet and molded fibreglas. All electrical components are fabricated into modules (books) which are encapsulated with filled epoxy (90% glass spheres and 10% epoxy). These "books" are 7" x 7" x 1" and the satellite carries 12 full books and 5 half books. These books are held in place with number 10 aluminum (7075) bolts.

The stabilization boom for the Transit satellite consists of two booms. The first section is a copper-beryllium 2" tape (.002-.003" thick) deployed from a reel such that a .5" diameter cylinder is formed. The second section is a helical spring (.010" wire) deployed slowly by the sublimation of biphenal. The helical spring is also copper-beryllium but has been cadnium plated and silver plated to prevent corrosion. Mounted on the end of the second boom, which extends from the end of the first boom, is a solar cell flash element.

Drawings of the inner structure subassembly internal component mounting, the second section of the boom, and a weight breakdown for the Transit 5A satellite were obtained.

October 18, 1962 - Wallops Island -- NASA Launch Facility

Personnel contacted:

Phone - Valley 4-3411, Temperanceville, Virginia

S. Diamond
L. Early, Instrumentation
F. Karik, Supervisor, Spin Balance & MI, Ext. 663
Ed Weatherman, Spin Balance
Dale Fielder, MI

MI Facility

The Wallops Island Facility for obtaining moments of inertia has about 15 feet between "A" frame legs, about 10 feet from beam support to wall, and about 15 feet from the floor to the bottom of the support beam. The fixture for obtaining MI is gimbal mounted and MI's can be measured for all three axes. I obtained drawings of the gimbal device and made sketches of the necessary hardware that Sandia must furnish to enable swinging for MI determination. Any MI's measured at Sandia must have an accuracy of ± .1 slug feet squared.

COPIED/DOE
SANDIA RC

UNCLASSIFIED

The Scout Office (Wallops) will accept Sandia measured MI's on the R/V and calculate the R/V plus 4th stage motor MI's. But Payload Coordinators (Langley) may require measured MI's of the assembly. Payload (Langley) was not definite when contacted; therefore, I recommend that Sandia fabricate the necessary fixtures for measuring MI's at Wallops.

Spin Balance

Horizontal Spin Balance Facility

35 feet long
8 feet diameter
5000 pounds maximum
0-1000 RPM (speed uniformly variable)

Items can be balanced to within a few grams at speeds of 100RPM to 1000 RPM. Speeds below 100 RPM have reduced accuracy because of machine characteristics.

The horizontal facility is optically aligned in the vertical plane, rigidly mounted longitudinally and free to swing laterally.

Future Facility - About 1 yr.

40 feet long
110 inches diameter
35000 pounds maximum

Vertical Spin Balance Facility

15 feet high
45 inches diameter
0-1000 RPM (speeds uniformly variable)

Items can also be balanced to within a few grams on this machine. A fixture must be available for rotating and suspending the vehicle in a vertical position. The test vehicle is lowered through a 48 inch diameter hole in the roof onto the spin balance machine.

Future Facility - About 1 yr.

20 feet high
Diameter unlimited
6000 pounds maximum

COPIED/DOE
SANDIA RC

UNCLASSIFIED

General

I received a very nice guided tour of the Wallops Island Launch Complex and a general description of the facilities and capabilities of this range. These people seem to be quite capable and interested in passing on information to range users, and interested in doing a good job for Scout vehicle users.

October 19, 1962 - NASA Langley Field

Personnel contacted:

W. Lovelace	Payload Coordinator Office
C. A. Sandahl	Payload Coordinator Office
L. Forrest	Scout Office
C. Robins	Scout Office
R. Latter	Scout Details

Mr. A. Churgin was contacted by telephone to arrange this meeting and was to alert Mr. A. Swanson of Sandia's visit. Mr. Swanson was on vacation and Mr. Churgin was in Dallas, Texas.

Mr. Lovelace, Mr. Sandahl, and Mr. Robins were not familiar with the Five Pound "Piggyback" Experiment. Therefore, considerable time was consumed briefing these people.

After attaining a common ground for discussion purposes, no real decisions could be made. The personnel at NASA promised an investigation and a forthcoming answer. This answer was received on October 23, 1962, by telephone. Due to possible interference with intended optical coverage and reduction in velocity profile, the "Piggyback" experiment would not be flown by NASA.

R. E. BERRY - 7112

REB:7112:fg

Copy to:
W. E. Blake, 7110
H. E. Hansen, 7111
A. E. Bantz, 7113

COPIED/DOE
SANDIA RC