

UNCLASSIFIED

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
1 <sup>st</sup> Review Date: 5/22/98	Determination (Circle Number):
Authority: ADD	1. Classification Retained: U
Name: [Signature]	2. Classification Changed to:
2 <sup>nd</sup> Review Date: 5-26-98	3. Contains No DOE Classified Information
Authority: ADD	4. Contains WFO:
Name: WC [Signature]	5. Contains UCAF:
	6. Contains:
	DECLASSIFY

JUN 6 1961  
 File No: Z-49, 3.2  
 T-17238  
 Project No. 13.784.10  
 RS 7321/9777

INVENTORIED  
 SEP 14 '65

TO: DISTRIBUTION

Re: Joint Qualification Fungus Test of W-49-4, Unit "Z", in Mk 3 R/V (Srd)

Summary of Test

A fungus test of 28 days duration (Nov. 10-December, 8, 1960) was performed on W-49-4, Unit "Z", assembled as a part of the General Electric Mk 3 Re-entry Vehicle. The test was one of a series of Joint Qualification tests conducted jointly by Sandia Corporation and General Electric. The object of the test was to demonstrate the ability of the assembled R/V to withstand high humidity fungus-nutrient conditions without incurring damage or showing evidence of fungus growth.

Throughout the test, the chamber in which the R/V was placed was maintained at a nominal dry bulb temperature of 86°F (variations from 84°F to 91°F) with average relative humidity of 85% (fluctuations between 80% and 96%).

There was no evidence of fungus growth on the R/V as a result of the test, and post-mortem visual examination of the R/V, with nose cap removed, disclosed no damage. The contact fuzing circuits within the nose possessed proper continuity and resistance to ground. No evidence of ablative sleeve growth was noted.

Procedure

Prior to the test, careful measurements of the warhead ablative sleeve dimensions were made. These values are recorded in Table I.

The assembled R/V, with spacer attached, was located (as shown in Fig. 1) in the humidity chamber (Hiatt No. 3). The aft end of the spacer, which adjoins the R/V to the missile, was covered with a plastic liner carefully taped around the edges. Internal warhead pressure, at laboratory temperature (about 75°F) was 12.25 psig at beginning of the test.

The complete outer surface of the R/V was sprayed by F. McCullough, Div. 1112, with a composite spore suspension consisting of five bacteria types; *Aspergillus niger*, *Chaetomium globosum*, *Mormoniella echinata*, *Aspergillus terreus*, and

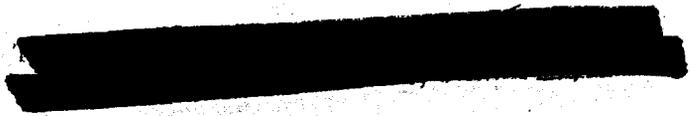
INVENTORIED

RECEIVED

JUN - 6 1961

RECORDED FILE

MK-493-2



UNCLASSIFIED PERSON IS PROHIBITED.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U	AUTHORITY: WC [Signature]
Emelda Selch 5/22/98	
PERSON CHANGING MARKING & DATE	RECORD ID: 985N2128

UNCLASSIFIED

1226

**UNCLASSIFIED**

and *Penicillium citrinum*. These are the bacteria types specified in MIL-E-8272-A.

Two fungus-nutrient control samples (on 3 inch diameter glass saucers) were also sprayed with the spore suspension and placed beside the R/V throughout the test (Fig. 1). Purpose of these samples was to demonstrate positively that the environment would support fungus growth.

Instrumentation monitored continuously during the test, on a Brown Mod. 153R60P16-31A recorder, was as follows:

- Thermocouple T-1; on the aft end of Test Wt. No. 2 in the warhead
- Thermocouple T-2; at 0° on the equatorial axis of Test Wt. No. 1 in the warhead
- Thermocouple T-3; chamber temperature beside the R/V (Fig. 1)

In addition, wet and dry bulb temperatures controlling the Heatt 3 chamber conditions were recorded by the chamber recording system. Relative humidity was calculated from these values.

Warhead pressure was monitored, and ablative sleeve measurements were taken after stabilization of the R/V at laboratory temperature following the test.

#### Results

At termination of the test, visual inspection of the R/V with a magnifying glass disclosed no evidence of fungus growth. Both control samples showed pronounced growth.

Table I lists measurements of the ablative sleeve following the tests. No evidence of growth or significant change in the sleeve gap dimensions was noted.

Warhead pressure, monitored after stabilization of the R/V at laboratory temperature following the test, was 9.75 psig, indicating a drop of approximately 2.50 psig during the test period.

The contact fuzing circuits within the nose cap were inspected and "megged". All circuits possessed proper continuity and resistance to ground.

Chamber relative humidity, calculated from the recorded wet and dry bulb chamber temperatures, remained between 86% and 98%, with an average value of 85%.

With the exception of the first 2-½ days of test operation, during which the chamber control was inadvertently allowed to maintain a dry bulb

**UNCLASSIFIED**

[REDACTED]

UNCLASSIFIED

To: Distribution

- 3 -

RS 7321/9777  
T-17238

temperature of 91°F, dry bulb temperature (monitored by T-3 near the R/V) was maintained at 86° ± 2°F. During this 3-½ day period the internal warhead temperatures (T-1 and T-2) had stabilized at 90° ± 2°F. After proper adjustment of the chamber temperature control, the internal warhead temperature stabilized to 86° ± 2°F (five days after beginning of test) and remained within this range throughout the remaining portion of the test.

*G. Willson*  
G. WILLSON - 7321-5

*R. S. Hooper*  
R. S. HOOPER - 7321-5

GW:hw

Distribution

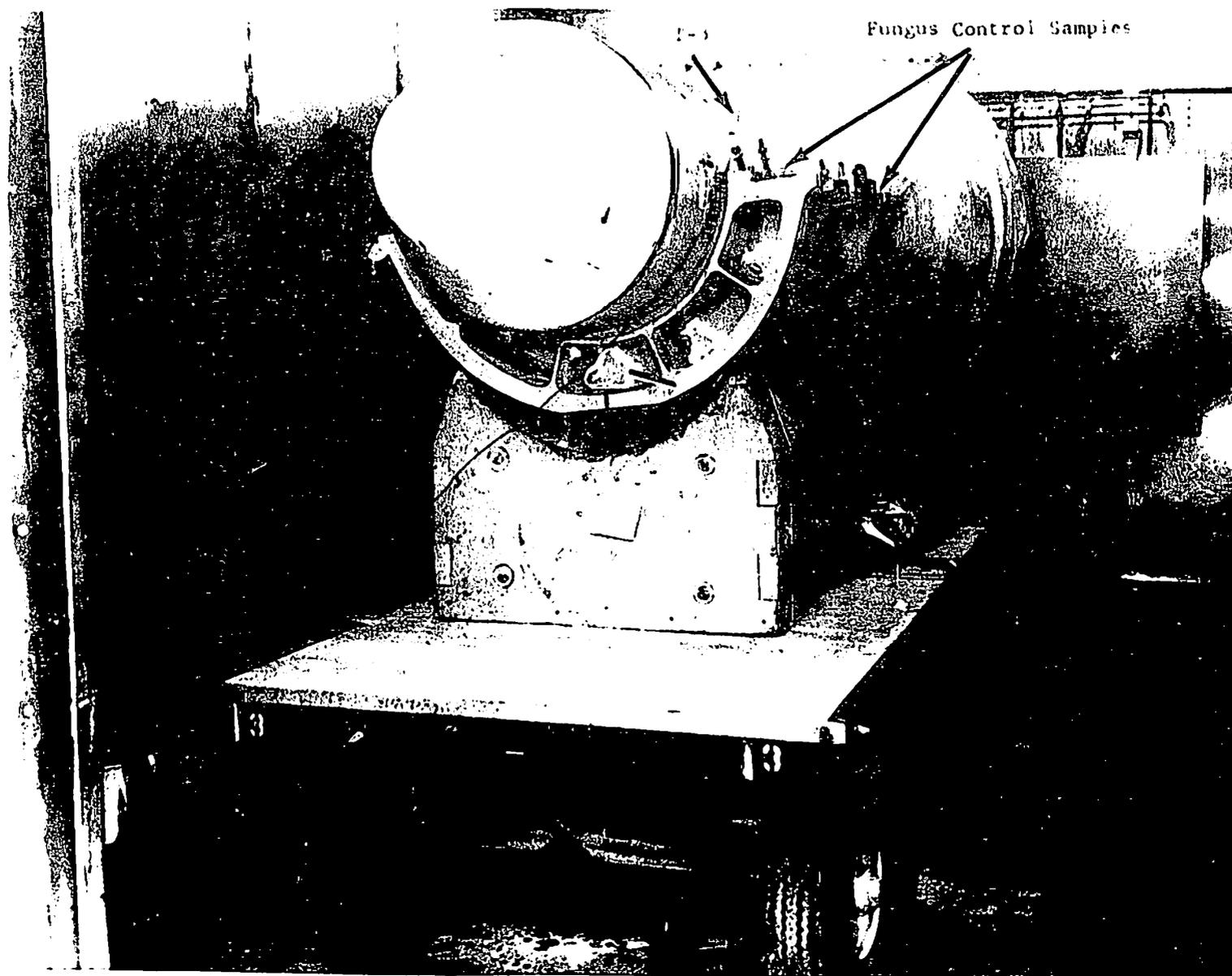
1/3A - J. J. Kane, 7145  
2/3A - E. H. Copeland, 7321  
3/3A - R.K. Smeltzer, 3421-3

UNCLASSIFIED

[REDACTED]

228

UNCLASSIFIED



Fungus Control Samples

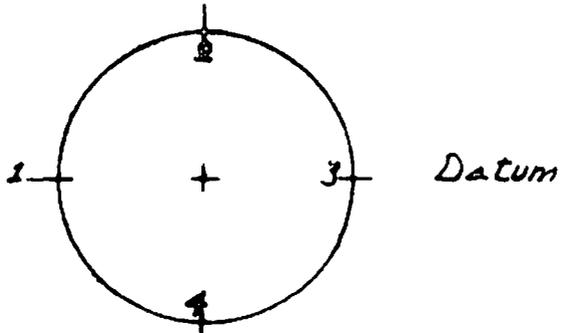
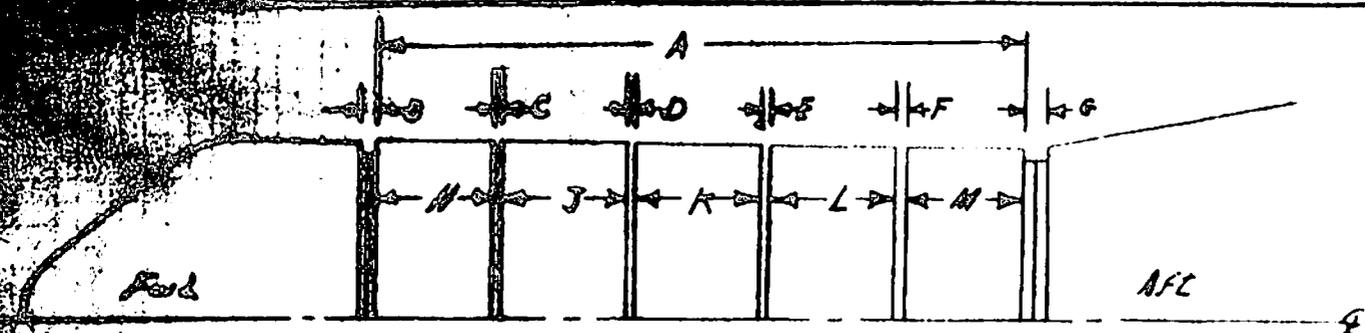
UNCLASSIFIED

D 1-5601

FIGURE 1 -- RE-ENTRY VEHICLE LOCATED IN HEATT 3 CHAMBER FOR FUNGUS TEST.

RS 7321/9777

T-17238



Warhead Section - Looking AFC

Measurements Before Test (Nov 8, 1960), at Stabilized Temp of 75°F

	A	B	C	D	E	F	G	H	J	K	L	M
1	0.062	0.040	0.050	0.051	0.048	0.090	8.963	8.951	7.957	7.954	8.790	
2	0.070	0.040	0.050	0.053	0.056	0.060	8.955	8.947	7.953	7.953	8.776	
3	0.070	0.049	0.045	0.056	0.057	0.060	8.951	8.940	7.952	7.949	8.779	
4	0.062	-	-	-	-	0.067	-	-	-	-	-	

Measurements After Test (Dec 9, 1960), at Stabilized Temp of 80°F

	A	B	C	D	E	F	G	H	J	K	L	M
1	-	0.061	0.040	0.047	0.051	0.048	0.050	8.960	8.956	7.959	7.960	8.823
2	-	0.065	0.041	0.050	0.054	0.054	0.040	8.969	8.948	7.950	7.952	8.803
3	-	0.061	0.047	0.045	0.056	0.051	0.040	8.963	8.948	7.956	7.952	8.805
4	-	0.053	-	-	-	-	0.051	-	-	-	-	-

Measurements of Ablative Sleeve

RS 7321/9777

Proj. No. T-1723B

UNCLASSIFIED

UNCLASSIFIED



DATE:	PROJECT NO.:
REPORT NO.:	MODEL NO.: