[redacted]

UNCLASSIFIED

2315

September 4, 1963

File: N57-1, 3-2
T-25597
Test Completed 8/2/63
Ref. Sym: 7332/1

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 9/23/98
Authority: ☐ ADC ☒ ADD
Name: W Layne
2nd Review Date: 9/23/98
Authority: ADD
Name: R B Craner
Determination (Circle Numbers):
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCAIT: No
6. Comments: OK for Openmet

RECEIVED
SEP 5 1963
CENTRAL RECORD FILE

MR. P. J. KOMEN - 1422
Attn: C. E. Johnston, Jr.

Re: Nuclear Radiation Test of Four Single-Channel Radars from N57-1 Radar Sets, Serial No. 8 and 9 (U)

ENTERED FILE
BB
FILE NO. Mk 57
3-2

PROGRAM 0 5 7 8 0
CATEGORY 3 0 6 2 3
ORG. 2 1 0
DATE 6 3 6 4

Object of Test

The object of this test was to determine the tolerance of the N57-1 to nuclear radiation.

INVENTORIED
SEP 14 '65
3428-3

Authorization for Test

This test was requested by Division 1422 in a Work Order Authorization received January 4, 1963. Mr. C. E. Johnston, Jr. was the consultant. The material for test was received July 23, 1963.

Summary

Four N57-1 single-channel radars were exposed to nuclear radiation. Based on average values of NVT from the detectors located nearest to the unit's critical elements, the units became inoperable after the following accumulated NVT ($E > 0.01$ Mev):

One unit	1.03×10^{13}
Two units	1.99×10^{13}
One unit	2.22×10^{13}

INVENTORIED
AUG 6 1964
3427-1

Functional Measurements and Methods

All functional measurements on these units following each radiation exposure were made by Organization 4631 personnel. No functional data are included in this report.

The nuclear source was the Sandia Pulse Reactor (SPR) located in Area V. Dosimetry was made with sulphur detectors.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
AUTHORITY: R.B Craner
Emelda Selph 9/28/98
PERSON CHANGING MARKING & DATE
RECORD ID: 98SN4406
W Layne 9/28/98
PERSON VERIFYING MARKING & DATE
DATED: 9/23/98

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[redacted]

30-146

Procedure and Results

Two N57-1 Radar Sets, divided into their four individual single-channel radars, were to be exposed to several planned nuclear radiation levels to determine the radiation level to which the units could be exposed before significant degradation occurred. It was determined, in meetings attended by S. C. Rogers, 5321, W. G. Sullivan, 5321, C. E. Johnston, 1422 and A. G. Bytheway, 7332, that the exposure levels should be approximately 6×10^{12}, 6×10^{12}, 1.2×10^{13} and 1.2×10^{13} NVT ($E > 0.1$ Mev) respectively.

The units were placed upright, on their bases, with their flat faces facing the SPR at a distance of 14-3/4 inches from the SPR centerline with one exception. The one unit which survived the third exposure was mounted, in error, with its conical surface facing the SPR for the fourth exposure. Three sulphur detectors were mounted on each unit. Location of the detectors and the geometry of the setup are sketched in Figure 1.

Each channel from a unit was arbitrarily identified as unit A or unit B.

The exposure levels as determined by the sulphur detectors were as follows:

Unit	Date	Detector No.	Exposure	NVT During This Exposure $E > 0.01$ Mev	Accumulated NVT On Test Units $E > 0.01$ Me
8A	7/23/63	1	1	2.14×10^{12}	2.14×10^{12}
		2		4.76×10^{12}	4.76×10^{12}
		3		2.57×10^{12}	2.57×10^{12}
	7/25/63	1	2	2.39×10^{12}	4.53×10^{12}
		2		4.95×10^{12}	9.71×10^{12}
		3		2.55×10^{12}	5.12×10^{12}
	7/31/63	1	3	4.78×10^{12}	9.31×10^{12}
		2		9.77×10^{12}	1.95×10^{13}
		3		4.76×10^{12}	9.88×10^{12}
8B	7/23/63	1	1	1.93×10^{12}	1.93×10^{12}
		2		4.14×10^{12}	4.14×10^{12}
		3		2.39×10^{12}	2.39×10^{12}
	7/25/63	1	2	1.99×10^{12}	3.92×10^{12}
		2		4.50×10^{12}	8.64×10^{12}
		3		2.29×10^{12}	4.68×10^{12}
9A	7/23/63	1	1	2.64×10^{12}	2.64×10^{12}
		2		5.36×10^{12}	5.36×10^{12}
		3		2.67×10^{12}	2.67×10^{12}
	7/25/63	1	2	2.52×10^{12}	5.16×10^{12}
		2		5.77×10^{12}	1.11×10^{13}
		3		2.83×10^{12}	5.50×10^{12}

Unit	Date	Detector No.	Exposure	NVT During This Exposure E > 0.01 Mev	Accumulated NVT On Test Units E > 0.01 Mev
9A	7/31/63	1	3	3.76×10^{12}	8.92×10^{12}
		2		7.88×10^{12}	1.90×10^{13}
		3		4.26×10^{12}	9.76×10^{12}
9B	7/23/63	1	1	2.37×10^{12}	2.37×10^{12}
		2		5.07×10^{12}	5.07×10^{12}
		3		2.27×10^{12}	2.27×10^{12}
	7/25/63	1	2	2.80×10^{12}	5.17×10^{12}
		2		6.78×10^{12}	1.18×10^{13}
		3		3.52×10^{12}	5.79×10^{12}
	7/31/63	1	3	4.21×10^{12}	9.38×10^{12}
		2		9.24×10^{12}	2.11×10^{13}
		3		6.58×10^{12}	1.04×10^{13}
	8/2/63	1	4	5.71×10^{12}	1.51×10^{13}
		2		2.27×10^{12}	2.34×10^{13}
		3		6.60×10^{12}	1.70×10^{13}

NOTE: Although the request was in terms of E > 0.1 Mev and the exposures are reported in terms of E > 0.01 Mev, this represents an approximate one percent difference.

Functional tests performed by Organization 4631 personnel following each exposure showed that unit 8B became essentially inoperable after the second exposure, units 8B and 9A after the third and unit 9B after the fifth.

Complete functional test results were made available directly to the consultant by 4631 personnel. Results are not contained in this report.

B. L. SCHMEDEMAN - 7332-3

C. G. SAIN - 7332-1

CGS:7332-1:kv

Distribution:
1/7A - P. J. Komen, 1422
2/7A - C. S. Williams, Jr., 1442
3/7A - D. S. Bliss, 2344
4/7A - S. C. Rogers, 5321
5/7A - C. L. Johnson, 7523
6/7A - E. H. Copeland, 7331
7/7A - Central Record File, 3421-3

FIGURE 1

[redacted]

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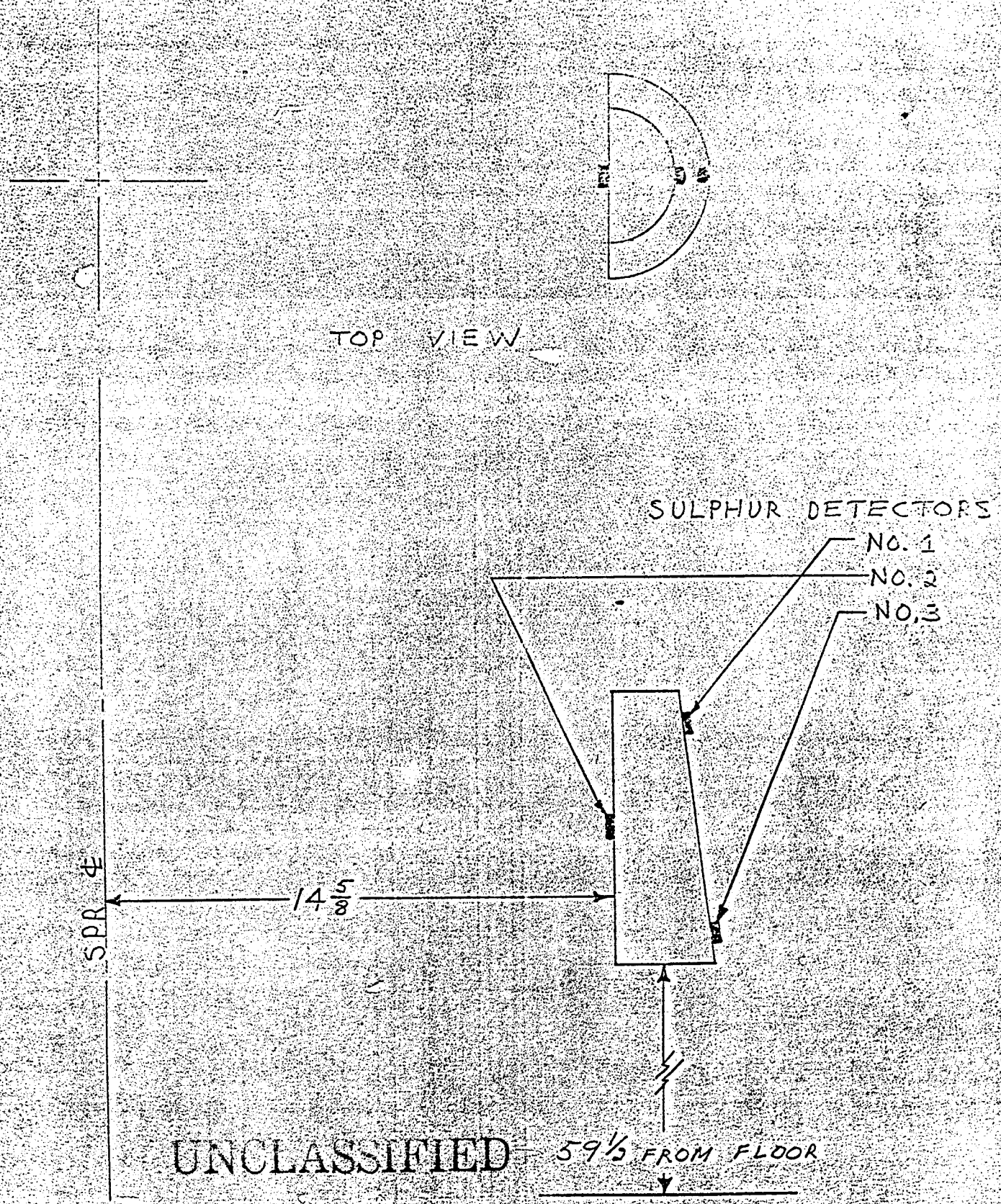

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