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SAA 200088920008
DOCUMENT#

APPENDIX I

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1. The rockets have at present the following characteristics:
 - (a) Standard Navy HVAR Rocket with modified head.
 - (b) Maximum altitude equals 18,500 feet.
 - (c) Rise time to maximum altitude: 31s; fall time 36s.
 - (d) Landing velocity equals 900 fps.
 - (e) Penetration at 900 fps is marginal through 4 ft of sand backed by 18 inches of moderately reinforced concrete.
 - (f) Dispersion: 50% of rockets land in circle of 2500 feet radius about aiming point.

2. Tentative firing schedules for the rockets are:

- (a) Engebi
 - (1) 32 rockets launched from center of Engebi (2500 feet from tower)
 - (2) Launching time: $T_0 - 30$ sec
 - (3) Landing time: $T_0 + 37$ sec
- (b) Acomon
 - (1) 32 rockets launched from approximate center of Acomon (2600 feet from tower)
 - (2) Launching time: $T_0 - 10$ sec
 - (3) Landing time: $T_0 + 37$ sec

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
1ST REVIEW-DATE: 10-22-97	DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: EAOC EAOC EAOD	1. CLASSIFICATION RETAINED
NAME: P. Brown	2. CLASSIFICATION CHANGED TO:
2ND REVIEW-DATE: 10-24-97	3. CONTAINS NO DUE CLASSIFIED INFO
AUTHORITY: ADD	4. COORDINATE WITH:
NAME: R. G. ...	5. CLASSIFICATION CANCELLED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER (SPECIFY):

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APPENDIX II

1. The probability of damage is based on the assumption of a uniform distribution of the rockets within the 50% circle about the aiming point. Since rockets land in a circular gaussian distribution, this assumption understates the probability somewhat for objects located near the aiming point and overstates it for objects far from this point. It should be borne in mind, also, that hits by rockets are mutually exclusive events. Thus the probabilities stated are somewhat higher than is rigorously the case.

- a. The probability of a hit on a particular object is given by:

$$P_{obj} = \frac{\text{Area of object (} 32 \times 0.50 \text{)}}{\text{Area of 50\% circle}}$$
$$(\text{Area of Object}) (8 \times 10^{-7})$$

- b. The probability of hitting any object of a particular group of similar objects is given by:

$$P = \sum P_{obj}$$

- c. The probability of hitting any n of a group of objects is approximately:

$$P_n = P^n$$

- d. The probability of a particular object suffering n hits by rockets is approximately:

$$n P_{obj} = P_{obj}^n$$

2. It should be noted that every part of the top area of an object is not equally important so that damage probability is again overstated. In the discussion in the text of the memorandum, no attempt has been quantitatively made to allow for this factor.

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APPENDIX III A
Engobi

Bldg. No.	Description	Ft. Jn. Center	Type Roof	Vital Area Ft ²	Obj
6a	L'ERL Recording Sta.	1750	Concrete 14"	375	3x10-4
6b	L'ERL Recording Sta.	1850	Concrete 14"	375	3x10-4
8	Limonite Collimator	2000	Limonite 3'	36	3x10-5
9	Limonite Collimator ^d	1050	Limonite 3'	36	3x10-5
10	Limonite Collimator	1500	Limonite 3'	36	3x10-5
11	Limonite Collimator	2000	Limonite 3'	36	3x10-5
12	Limonite Collimator	1100	Limonite 3'	36	3x10-5
14	Limonite Collimator	900	Limonite 3'	36	3x10-5
15	Limonite Collimator	1050	Limonite 3'	36	3x10-5
8,	Limonite Collimator	2100	Limonite 3'	36	3x10-5
9f	Limonite Collimator	650	Limonite 3'	36	3x10-5
10f	Limonite Collimator	1550	Limonite 3'	36	3x10-5
11f	Limonite Collimator	2100	Limonite 3'	36	3x10-5
12f	Limonite Collimator	1000	Limonite 3'	36	3x10-5
14f	Limonite Collimator	600	Limonite 3'	36	3x10-5
15f	Limonite Collimator	650	Limonite 3'	36	3x10-5
19f	Limonite Collimator	1100	Limonite 3'	36	3x10-5
16	Steel cable	700 to 2500	None	4500' long	1.6x10-4
16f	Steel cable	700 to 2500	None	4500' long	1.6x10-4
17	Winch	2200	None	75	6x10-5
17f	Winch	2100	None	75	6x10-5
18	Pump house	2200	Concrete 10"	24	2x10-5
23ab	NOEL Recording station	2200	Concrete 14"	320	2.6x10-4
	NOEL Recording station	2100	Concrete 16"	210	1.7x10-4
27a-d	Ball Crusher gage	Ave. 2800	None	5 each	4x10-6
33a-e	Stake gage mounts	Ave. 2800	None	small	7x10-6
34a-d	Stake gage mounts	Ave. 2800	None	small	7x10-6

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No	Description	Ft. Ya. Center	Type Roof	Vital Area Ft ²	Obj
40	Pressure gage	200	None	50	4x10 ⁻⁵
50a51a	Delayed gamma detector	2000	None	150	1.2x10 ⁻⁴
50b51b	Delayed gamma detector	800	None	150	1.2x10 ⁻⁴
50c51c	Delayed gamma detector	1600	None	150	1.2x10 ⁻⁴
50d51d	Delayed gamma detector	1500	None	150	1.2x10 ⁻⁴
52	Delayed gamma detector	2000	None	1000	8x10 ⁻⁴
53	Delayed gamma detector	800	None	420	3.4x10 ⁻⁴
54	Gamma spectrometer	2000	Part Limestone 4' thick, Part wood	5550	4.4x10 ⁻⁴
55	KRS Recording station	1450	Concrete 15"	325	3.6x10 ⁻⁴
57	Gamma spectrometer	800	Part Limestone 4' thick, Part wood	550	4.4x10 ⁻⁴
6y	Communication & Timing bldg.	2400	Concrete 12"	225	1.8x10 ⁻⁴
70a-x	Mouse house	1200 to 2500	Aluminum 1/2"	8 Each	6.4x10 ⁻⁶
71a-d	Mouse houses	1200 to 2500	Aluminum 1/2"	8 Each	6.4x10 ⁻⁶
72a-h	Pig - Dog houses	1900 to 2700	Aluminum 1/2"	150	1.2x10 ⁻⁴
73a-h	Neutron Hemisphere	1050 Ave.	Lucite 1/2"	5 Each	4x10 ⁻⁶
74a-h	Neutron Hemisphere	1600 to 2500	Lucite 1/2"	5 each	4x10 ⁻⁶
75	Thermal burn pig bldg.	1000	Concrete 12"	100	8x10 ⁻⁵
80b-d	Phantom pig	1600 to 2500	None	40	3.2x10 ⁻⁵
81	Phantom pig	1600 to 2500	Aluminum 1/2"	50	4x10 ⁻⁵
83a-b	Pig - Dog house	1500	Aluminum 1/2"	200 each	1.6x10 ⁻⁴
84a-f	Exposure chamber	1000 - 2500	Concrete 6"	10 each	8x10 ⁻⁶
90a-j	Duck gage	Varies	Steel 2 1/2"	6 each	4.8x10 ⁻⁶
100	Fever house	1200	Concrete 20" Dirt 2'	2150	1.7x10 ⁻³
120a-e	Fireball sample bottle	2700	Steel 4"	30 each	2.4x10 ⁻⁵
121a-e	Fireball sample bottle	2700	Steel 4"	50 each	4x10 ⁻⁵
132 ab	ERL-UCRL Recording Sta.	800	Limestone 19" and Dirt 5'	670	5.4x10 ⁻⁴

Id. No.	Description	Ft. Fr. Center	Type Roof	Vital Area Ft ²	Obj
301a, 31jk	Instrument shelter	Varies	Concrete 16' and Dirt 2'	100 each	8x10-5
302a-d	Camera shelter	Varies	Concrete varies	75 each	6x10-5
311 M	Multi-story bldg	400	Concrete 12"	10,000	8x10-3
313	Bomb shelter	850	Concrete 12" and Dirt 6'	900	7.2x10-4
321a	Navy structure	2500	Concrete, all roof	800	6.4x10-4
321b	Navy structure	2500	Concrete, all roof	800	6.4x10-4
322a	Navy structure	1600	Concrete 1 1/4"	800	6.4x10-4
322b	Navy structure	1500	Concrete 1 1/4"	800	6.4x10-4
327	Navy structure	300	Concrete 10 3/4"	800	6.4x10-4
323b	Navy structure	550	Concrete 10 3/4"	800	6.4x10-4
324a	Navy structure	1400	Concrete 2"	1000	8x10-4
324b	Navy structure	1000	Concrete 2"	1000	8x10-4
325	Navy structure	1500	Concrete 2"	800	6.4x10-4
326	Navy structure	800	Concrete 2" and Dirt 2'	1100	8.8x10-4
327a	Navy structure	1150	Concrete 3"	800	6.4x10-4
335a	Air Force structure	1850	Sheet metal	1460	1.2x10-3
335a-f	Air Force structure	2100 ave.	varies	1900 total	1.5x10-3
321	Anemometer	1100	None	10	8x10-6
323-429	Anemometer	Varies	none	10 each	8x10-6
311-513	Exposure hemisphere	Varies		15 each	1.2x10-5
3141-5142	Exposure hemisphere	Varies		15 each	1.2x10-5
3151-5152	Exposure hemisphere	Varies		15 each	1.2x10-5
3155-5162	Exposure hemisphere	Varies		15 each	1.2x10-5
3163	Exposure hemisphere	Varies		15 each	1.2x10-5
3101-6104	Hole in ground	Varies		15 each	1.2x10-5

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No.	Description	Ft. Pn. Center	Type Roof	Vital Area Ft ²	Obj
621	Test panel	400	None	20	1.6x10-5
622	Test panel	1900	None	20	1.6x10-5
6311, 6312	45 Ton tanks	1350	None	150 each	1.2x10-4
6321, 6322 6323	45 Ton tanks	950	None	150 each	1.2x10-4
6331, 6332	45 Ton tanks	1200	None	150 each	1.2x10-4
6341, 6342	45 Ton tanks	1850	None	150 each	1.2x10-4
6351	45 Ton tanks	2000	None	150 each	1.2x10-4
771	Seismograph	1500	Concrete 12"	120	9.6x10-5
821	Wing sections	1500	None	1000	6x10-4
825	Instrument shelter	1600	Concrete 16"	80	6.4x10-5

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Sta. No.	Description	Ft. From Center	Type Roof	Vital Area Ft ²	Obj
94g	Duck gauge	3300		6	
71f	House house	3300	A1	8	10-6
74h	Neutron hemisphere	3300	Lucite	5	10-6
80d	Pig pen	3000	A1	40	10-6
71g	House house	3500	A1	8	10-6

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