50-396

UNIVERSITY OF VIRGINIA

SCHOOL OF ENGINEERING AND APPLIED SCIENCE
CHARLOTTESVILLE 22901

DEPARTMENT OF NUCLEAR ENGINEERING
REACTOR FACILITY

TELEPHONE 804-924-7136

June 11, 1975

RECEIVED JUN 20 1975

Mr. Norman C. Moseley, Director
Nuclear Regulatory Commission
Region II
230 Peachtree Street, N.W., Suite 818
Atlanta, Georgia 30303

Dear Mr. Moseley,

We hereby submit, as required by Section 6.7.E of our Technical Specifications our report on the first 6 months of operation of the CAVALIER reactor, License R-123, Docket No. 50-396. This report includes operations from initial criticality on October 21, 1974 through April 30, 1975 except that the information supplied in our 60 day report submitted on January 3, 1975 is not duplicated here.

1.0 During this period the reactor was operated for ∿ 110 hours. Most of this time was devoted to training fourth year undergraduate and graduate students in reactor operations. Several foil activations were also performed as an experiment in fast neutron flux measurement for third year undergraduate students.

2.0 Abnormal Occurrences

a) An abnormal occurrence was experienced on February 6, 1975 when it was discovered during testing of the rod control system that the magnet release times for rods #2 and #4 exceeded the 100 msec time required by Section 3.6 of the Technical Specifications. The Reactor Safety Committee and the Region II Regulatory Operations Office were notified and reactor operations were suspended for corrective action and review. The support arm bolts for rods #2 and #4 were found to be loose causing a slight misalignment of the rod with the drive system. After realignment and testing of the control rods the reactor was placed back in service on February 26, 1975. Rod drop tests were conducted every two weeks for the next two months and the support arm mounting bolts were checked daily. No further problems with rod drop times have occurred. Rod drop times measured during this period are given below.

6092

8204290112

Date	Rod	Magnet Release (msec)	Free Drop (msec)	Total Drop Time (msec)
2-6-75	1	60	505	565
	2	120	500	620
	3	80	500	580
	4	120	520	640
2-25-75	1	62	525	587
	2	68	497	565
	3	83	499	582
	4	52	527	579
3-4-75	1	40	552	592
	2	80	488	568
	3	82	514	596
	4	72	501	573
3-18-75	1	57	520	577
	2	89	502	591
	3	70	516	586
	4	92	524	616
4-1-75	1	54	515	569
	2	93	497	590
	3	98	519	617
	4	62	546	608
4-15-75	1	57	504	561
	2	79	550	629
	3	96	520	616
	4	86	547	633

b) A second abnormal occurrence was experienced on April 1, 1975 when the Log G instrument failed to indicate upscale as the reactor was brought to a power level of ∿ 20 watts. Investigation revealed that the signal lead had not been properly connected after maintenance was performed on-the previous day. The Reactor Safety Committee and the Region II Regulatory Operations Office were notified.

Since this particular instrument does not come on scale until the reactor is super-critical we have made the following change to our operating procedures. When the Log G channel is removed for maintenance, in addition to checking the calibration of the channel, a portable source will be used to check the response of the system from the detectors to the Log G drawer. This change has been made in our procedures and approved by the Reactor Safety Committee.

3.0 The reactor was operated during this report period for ∿ 110 hours with an integrated power of ∿ 477 watt hours.

4.0 The following is a list of unplanned shutdowns during this report period.

10-22-74	2 scrams while leveling power at 1 watt due to noise spikes from operation of rod control relays.
11-1-74	Scram due to instrument noise.
11-8-74	Period scram - occurred while adjusting Log G detectors after power calibration.
11-8-74	Period scram due to instrument noise.
11-11-74	Period scram due to instrument noise.
4-4-75	Scram - due to building power failure.
4-4-75	Scram - due to building power failure.
4-26-75	Period scram due to instrument noise.
4-29-75	Period scram due to instrument noise.

5.0 Maintenance

Two major maintenance operations were undertaken during the reporting period. New magnetic clutches and motor couplings were installed in the rod drive mechanisms. A series resistance was added to each magnet clutch circuit to allow operation with reduced clutch voltage. These items were discussed in the 60 day operating report, Section 7.A.

The Alternate Reactivity Insertion System Tank was repaired after detecting several pinhole leaks in the tank seam welds. This item was reported in the 60 day operating report, Section 7.B.

6.0 Environmental Monitoring

During this report period the health physicist took air and water samples both at the facility and outside the site boundary. The following table lists these locations and the specific activities obtained from these samples.

Location	Sample	Specific Activity Average of 8 Samples
Reactor Site	Water	2.31×10^{-9} µci/ml
	Air	2.63×10^{-12} µci/cc
Filter Plant	Water	1.12×10^{-9} µci/ml
	Air	1.5×10^{-12} µci/cc
Barracks Road	Water	2.95×10^{-9} µci/ml
	Air	1.99×10^{-12} µci/cc

7-0 Personnel Monitoring

During this report period approximately 128 personnel including faculty, staff, and students were monitored by film badges supplied by the R. S. Landauer Co. The highest exposures were by two staff members who are directly associated with the operation of the facility and the handling of samples in activation analysis work. The exposures are from operation of the UVAR reactor.

	Exposure
Individual A	220 mrem
Individual B	60 mrem

During this period the facility had approximately 1089 visitors. These visitors were monitored with direct and indirect reading dosimeters and received no significant exposure.

Sincerely,

J. P. Farrar
Operations Supervisor

JPF:ec

cc NRC-Washington
Reactor Safety Committee
Senior Operators

EMPLOYER (LICENSE No.)	REPORTED WITH	PROGM CODE	TOTAL	KEY	<M	M<.1	<.25	<.50	<.75	<1.	<2.	<3.	<4.	<5.	<6.	<7.	<8.	<9.	<10.	<11.	<12.
			42110.	42120.	42130.	42140.	42150.	42160.	42200.	42300.	42400										
CX-17	SNM-0021	42160	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DR-10	SNM-0960	42140	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-101		42150	25	R	21	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-102		42150	55	P	23	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-103	24-00513-32	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-106	R-51	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-107	43-09234-16	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-108		42150	6	P	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-110		42150	3	R	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-111	03-01399-08	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-112		42150	28	R	19	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-114		42150	184	P	141	35	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0
R-115	12-00330-05	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-116		42150	54	P	48	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-117	12-00330-05	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-118	SNM-0021	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-119		42150	90	P	71	17	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
R-120	R-63	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-123	45-00034-26	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-124		42150	78	P	37	18	16	4	3	0	0	0	0	0	0	0	0	0	0	0	0
R-125		42150	9	R	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
R-126	43-01884-15	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-127		42150	36	P	26	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-23		42150	142	R	134	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-25	43-01884-15	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-28	21-00215-04	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-31	08-02075-03	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-33	SNM-0960	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-37	20-01537-02	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-4		42150	0	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-40	SNM-0021	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-47		42150	248	P	49	140	19	12	5	6	13	4	0	0	0	0	0	0	0	0	0
*R-51		42150	115	P	92	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-52		42150	123	R	121	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-53		42150	21	R	14	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-56		42150	25	P	16	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-57	26-00138-01	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-58		42150	0	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-61	20-03680-01	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-62	45-09475-30	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-63		42150	190	P	58	105	23	4	0	0	0	0	0	0	0	0	0	0	0	0	0
R-65	20-01010-04	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-66	45-00034-26	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-67	SNM-0696	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-71		42150	16	P	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-73		42150	26	R	16	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-75	34-00293-02	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-76		42150	11	R	0	4	2	1	0	0	1	0	3	0	0	0	0	0	0	0	0
R-78		42150	13	P	3	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-79	24-00513-32	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-81		42150	21	R	2	2	1	1	1	1	4	6	3	0	0	0	0	0	0	0	0
R-83		42150	38	R	24	8	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0
R-84	19-08330-02	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-87	13-02812-04	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-88		42150	82	R	59	22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

An * by a license # means that this report was for more than one license #, and that the people + doses were included in this group
+ A "0" with an "X" in the 'total' and 'key' columns means that this report was for more than one license no. + that the people + doses were included in the group having the license + shown in the "reported with" column.

EMPLOYER	REPORTED WITH	PRCGM	TOTAL	KEY	<M	M<.1	<.25	<.50	<.75	<1.	<2.	<3.	<4.	<5.	<6.	<7.	<8.	<9.	<10.	<11.	<12.	>
*R-92		42150	39	P	35	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-93	34-06706-03	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-95	38-09982-01	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-97		42150	956	P	750	189	13	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0
R-98		42150	10	P	1	2	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0
TR-1	SNM-0960	42140	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-3	34-06706-03	42140	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-5	08-00566-05	42140	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CATEGORY: TEST REACTORS 42100, 42120, 42130, 42140, 42150, 42160, 42200, 42300, 42400

EMPLOYER	REPORTED WITH PROGRAM		TOTAL	KEY	<M	M<.1	<.25	<.50	<.75	<1.	<2.	<3.	<4.	<5.	<6.	<7.	<8.	<9.	<10.	<11.	<12.	>
CA-17	SNM-0021	42160	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*CA-22		42160	34	P	12	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DR-10	SNM-0900	42140	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-101		42150	28	R	13	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-103	24-00513-32	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-106	R-51	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-105		42150	6	P	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-107		42150	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-110		42150	4	R	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-111	R-97	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-112		42150	10	R	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-113	05-01332-08	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-114	21-00021-29	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-115	12-00330-05	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-116		42150	75	P	72	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-117	12-00330-05	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-118	SNM-0021	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-119		42150	221	P	197	21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-120	R-53	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-121		42150	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-122		42150	6	P	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-123	45-00334-26	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-124		42150	79	P	59	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-125		42150	6	R	2	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
R-126	45-01884-15	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-127		42150	72	P	63	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-2	37-00165-04	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-23		42150	166	R	24	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-25	45-01884-15	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-26	21-00215-04	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-31	08-02075-03	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-33	SNM-0903	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-37	20-01537-02	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-38	SNM-0696	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-4		42150	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-40	SNM-0021	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-51		42150	176	P	166	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-52		42150	153	R	149	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-5.	35-07466-05	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-56		42150	19	P	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-57	20-00138-16	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-58	47-01103-24	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-59	14-00019-06	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-61	20-03080-01	42150	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-62	45-09475-30	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-63		42150	242	P	46	168	23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-65	20-01010-04	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-66	45-00034-26	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-67	SNM-0696	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-70		42150	170	R	75	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-71		42150	18	R	13	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-73		42150	26	R	17	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-74	45-09843-29	42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-75	34-00293-02	42150	6	A	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-76		42150	10	R	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

EMPLOYER	REPORTED WITH PROGRAM	TOTAL		Y <M	M<.1	<.25	<.50	<.75	<1.	<2.	<3.	<4.	<5.	<6.	<7.	<8.	<9.	<10.	<11.	<12.	>
*R-77	42150	122	P	88	15	8	5	1	2	3	0	0	0	0	0	0	0	0	0	0	0
R-78	42150	12	P	1	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-79	24-00313-32 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-81	42150	54	R	0	3	4	8	7	4	19	8	1	0	0	0	0	0	0	0	0	0
R-83	42150	30	R	9	30	4	2	4	0	1	0	0	0	0	0	0	0	0	0	0	0
R-84	19-08330-02 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-87	13-02812-04 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-88	42150	55	R	47	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-90	42150	8	P	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
*R-92	42150	56	P	49	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-93	34-08760-03 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R-95	38-09902-01 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*R-97	42150	1169	P	975	173	12	8	1	1	1	0	0	0	0	0	0	0	0	0	0	0
R-98	42150	11	P	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
TR-1	344-0700 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-3	34-06760-03 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-5	03-00500-05 42150	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

04/14/81

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE	)	Docket No. 50-170
	)	
	)	(Renewal of Facility
(TRIGA-Type Research Reactor)	)	License No. R-84)

NRC STAFF'S STATEMENT OF POSITION
ON UNSTIPULATED CONTENTIONS OF PETITIONER
CITIZENS FOR NUCLEAR REACTOR SAFETY, INC

Pursuant to the Stipulation dated March 30, 1981 and signed by the Staff, the Armed Forces Radiobiology Research Institute (AFRRI or Licensee) and Citizens for Nuclear Reactor Safety, Inc. (Petitioner) on March 31, 1981, the Staff herein sets forth its statements of position regarding those contentions of the Petitioner which were not stipulated to, and which were submitted with the Stipulation as Attachment B.

BACKGROUND

On December 9, 1980, Petitioner filed a Petition for Leave to Intervene in this proceeding. On December 24, 1980, the Staff and the Licensee filed responses to the Petition, opposing the Petition on the issues of interest and standing. The Petitioner then filed an Amendment to Petition for Leave to Intervene on January 16, 1981. The Staff responded to the Amendment on January 26, 1981, and concluded that the Petitioner had cured the defects of interest and standing in the original Petition. In the Staff's Response,

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it was noted that the Staff intended to meet with the Petitioner and the Licensee to attempt to stipulate admissible contentions.

Following a number of meetings, on March 27, 1981, the Staff, Petitioner and Licensee met, and as a result were able to stipulate as to the admissibility of six of Petitioner's proposed contentions. Agreement was not reached on seven additional contentions. Both sets of contentions were filed with the Board in the Stipulation signed by the parties and the Petitioner on March 31, 1981. As a consequence of these efforts and the parties' and Petitioner's agreement upon a stipulation of contentions, the Licensing Board now has before it the tasks of (a) ruling on Petitioner's "Amendment to Petition for Leave to Intervene", dated January 16, 1981; (b) approving the Stipulation dated March 31, 1981; (c) ruling on the admissibility of the nonstipulated contentions advanced by the Petitioner. In the balance of this pleading, the Staff submits its position concerning the nonstipulated contentions as set forth in Attachment B to the Stipulation.

DISCUSSION

As a general matter, for the contentions proposed to be admissible, they must ~~fall within the scope of the issues set forth in the Federal Register Notice in this proceeding~~ [1/] and comply with the requirements of

---

1/ A Notice of Hearing has not yet been issued in this proceeding, since the Licensing Board has not yet ruled upon any request for hearing and/or petition for leave to intervene. See 10 CFR § 2.105(e). Notice of opportunity to request a hearing, which identifies to some extent the subject of the proceeding, has been published in the Federal Register. See "Armed Forces Radiobiology Research Institute (AFFRI); Consideration of Application for Renewal of Amended Facility License", 45 Fed. Reg. 78314 (November 25, 1980).

10 CFR 2.714(b) and applicable Commission case law. See, e.g., Northern States Power Co. (Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2), ALAB-197, 6 AEC 188, 194 (1973), aff'd, BPI v. Atomic Energy Commission, 502 F.2d 424, 429 (D.C. Cir. 1974); Duquesne Light Co. (Beaver Valley Power Station, Unit No. 1), ALAB-109, 6 AEC 243, 245 (1973); 10 CFR § 2.714(h).

10 CFR § 2.714(b) requires that contentions which intervenors seek to have litigated be filed along with the basis for those contentions set forth with reasonable specificity. A contention must be rejected where:

> (a) it constitutes an attack on applicable statutory requirements;
>
> (b) it challenges the basic structure of the Commission's regulatory process or is an attack on the regulations;
>
> (c) it is nothing more than a generalization regarding the intervenor's views of what applicable policies ought to be;
>
> (d) it seeks to raise an issue which is not proper for adjudication in the proceeding or does not apply to the facility in question; or
>
> (e) it seeks to raise an issue which is not concrete or litigable.

Philadelphia Electric Co. (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974).

The purpose of the bases requirement of 10 CFR § 2.714 is to assure that the contention in question does not suffer from any of the infirmities listed above, to establish sufficient foundation for the contention to warrant further inquiry of the subject matter in the proceeding, and to put the other parties sufficiently on notice "so that they will know at least generally what they will have to defend against or oppose". Peach Bottom

supra at 20. From the standpoint of bases, it is unnecessary for the petition "to detail the evidence which will be offered in support of each contention". Mississippi Power & Light Co. (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423, 426 (1973). Furthermore, in examining the contentions and bases therefore, a licensing board is not to reach the merits of the contentions. Duke Power Company (Amendment to Materials License SNM-01773 -Transportation of Spent Fuel from Oconee Nuclear Station for Storage at McGuire Nuclear Station), ALAB-528, 9 NRC 146, 151 (1979); Peach Bottom, supra at 20; Grant Gulf, supra at 426. This principle was recently reaffirmed in Houston Lighting And Power Company (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 548 (1980) where the Appeal Board pointed out that, with regard to basis, all that is required at the petition stage is that the petitioner state the reasons for its contention.

In sum, at the petition stage, although a petitioner need not establish the validity of its contentions and the bases therefor, it is incumbent upon the petitioner to set forth contentions and the bases therefor which are sufficiently detailed and specific to demonstrate that the issues raised are admissible and that further inquiry is warranted, and to put the other parties on notice as to what they will have to defend against or oppose. This is particularly true where, as here, a hearing is not mandatory, in order to assure that an asserted contention raises an issue clearly open to adjudication. Cincinnati Gas & Electric Company, et al. (William H. Zimmer Power Station), ALAB-305, 3 NRC 8, 12 (1976); Gulf States Utilities Company (River Bend Station, Units 1 and 2), ALAB-183, 7 AEC 222, 226 at n.10 (1974).

Based on the foregoing, and as set forth below, the Staff believes Petitioner's contentions which were submitted with the Stipulation as Attachment B fail to meet the requirements of 10 CFR § 2.714(b) and accordingly should not be admitted as issues controversy in this proceeding. For the convenience of the Licensing Board and the parties, each unstipulated contention is reproduced below, followed by the Staff's statement of position.

Contention 1

Accidents I

The analysis of the loss of coolant accident (LOCA) and the two design basis accidents (DBAs) within Applicant's Hazard Summary Report (HSR) is faulty in that:

1) It erroneously concludes that in event of an accident described therein as "Loss of Shielding and Cooling Water", air convection cooling would be sufficient to prevent cladding failure and significant fission product release.

Petitioner contends that in the event of a rapid loss of coolant while the reactor core is in the pulse mode, there could be a sudden temperature elevation sufficient to cause multiple cladding failures and fission product releases in excess of the limits provided in 10 CFR Part 20;

2) Both of the DBA analyses in the HSR ("Fuel Element Drop Accident" and "Fuel Element Clad Failure Accident") erroneously consider only those radiation doses to humans that would result from submersion exposure to the noble gases released.

Petitioner contends that if such accidents were to occur, individuals would receive additional exposure due to internal emissions of the noble gases, sustaining injuries far greater than those predicted in the HSR.

Staff Position

The Staff opposes admission of part 1 of this contention on the grounds that it lacks adequate basis and fails to alert the parties as to

the matters sought to be litigated. The Petitioner does not indicate the mechanism by which the reactor could achieve pulse mode without the water moderator. The present wording of the contention states a physical impossibility, since the coolant is required to maintain criticality, and without criticality it is not possible to pulse the reactor. The Staff is aware of no scenario in which the reactor would not shut down upon loss of coolant, and the Petitioner has done nothing more than assert, without basis, that these events could occur.

Based on the foregoing, the Staff opposes admission of part 1 of this contention.

The Staff opposes admission of part 2 of this contention on the grounds that it lacks adequate basis and constitutes an indirect challenge to the Commission's regulations. 10 CFR Part 20 quite clearly bases the allowable concentrations of the noble gases, Argon, Krypton and Xenon, on submersion exposures (see 10 CFR Part 20, Appendix B, n.2). The Petitioner has set forth no "special circumstances" pursuant to 10 CFR 2.758 to demonstrate why the basis for Part 20 limits, submersion exposure, should not be applied in this case. Based on the foregoing, the Staff opposes admission of part 2 of this contention.

Contention 2

Accidents II

Accidents can be expected to occur at the AFRRI reactor of a different kind and greater severity than those described in the HSR. Such accidents would result in significant offsite releases and include:

1) Failure of the N-16 diffuser system. Petitioner contends that in the event of such failure, N-16 bubbles would accumulate along the surface of the fuel element cladding causing: a) insulation of the fuel elements from the water coolant resulting in rapid temperature elevation of the elements and possible multiple clad failures, and loss of water shielding; and b) production and release of the gaseous radionuclide N-16 with its powerful gamma ray.

2) Two maximum credible accidents (MCAs) beyond the design basis of the reactor (Class 9 accidents): a) power excursion accident (PEA) resulting in multiple cladding failures at an elevated temperature with reduction in the thermalizing effect of hydrogen, followed by an explosive zirconium-steam interaction; and b) LOCA resulting in multiple cladding failures at an elevated temperature, followed by an explosive zirconium-air interaction.

Staff Position

The Staff opposes admission of part 1 of this contention on the grounds that it lacks basis and seeks to raise an issue which is not litigable. Petitioner has misunderstood the purpose of the N-16 diffuser system. The system was never intended to prevent the accumulation of nitrogen bubbles on the fuel cladding. On the contrary, the system retards the rise of dissolved nitrogen to permit the decay of N-16, which has a half-life of 5.7 seconds. The Staff could not litigate the effects of the failure of a system, where that system, when operable, performs an entirely different function from that described by the Petitioner.

The Staff opposes the admission of part 2 of this contention on the grounds that it lacks an adequate basis and raises an issue which is neither concrete nor litigable. The Petitioner has not described in any way the mechanism by which a power excursion accident or a LOCA could occur. More importantly, it is a scientific fact that the Zirconium hydride used in the fuel has a very low reactivity to both air and water.

It is simply physically impossible to have an "explosive Zirconium-steam interaction" or an "explosive Zirconium-air interaction".

Contention 3

Testing Facility

Petitioner contends that the AFRRI facility is a testing facility within the meaning of § 31.a(3) and § 104(c) of the Atomic Energy Act of 1954, as amended, and § 50.21(c) and § 50.2(r) of 10 CFR Part 50.

[AFFIDAVIT TO BE SUBMITTED AT THE TIME OF FILING OF STATEMENTS OF POSITION]

Staff Position

The Staff maintains that the AFRRI reactor is not a testing facility within the meaning of 10 CFR 50.2(r).

In The Trustees of Columbia University, ALAB-3, 4 AEC 349 (1970) the Atomic Safety and licensing Appeal Board reviewed the certified question of whether a TRIGA reactor was a "testing facility" according to the definition of 10 CFR 50.2(r)(1). The Appeal Board decided, based on the potential for releases of radioactivity, that it was not a "testing facility". Id. at 350, 351. The Staff follows the long-standing precedent of Columbia University and opposes the admission of this contention.

Contention 4

Siting

Applicant has failed to demonstrate that the AFRRI facility satisfies the siting criteria set forth at 10 CFR Part 100.

Petitioner contends the AFRRI reactor falls within the scope of Part 100 siting criteria either as a testing reactor or a research reactor and cites for the latter case the Memorandum from Vollmer (Director, Division of Engineering, NRR), to Eisenhut (Director, Division of Licensing, NRR).

Petitioner contends that because of the density and residential nature of the population in the plume exposure EPZ, the inadequacy and inaccessibility of highways, the inadequacy of Applicant's Emergency Plan, and meteorological, geological and hydrological conditions of the area surrounding the facility, Applicant cannot provide reasonable assurance that Part 100 offsite dose limits would not be exceeded in the event of a maximum credible accident.

Staff Position

The Staff opposes the admission of this contention on the grounds that it seeks to raise an issue which does not apply to the facility in question and therefore is beyond the scope of this proceeding. The scope of 10 CFR Part 100 is set forth in 10 CFR § 100.2(a) which states:

> This part applies to applications filed under Part 50 of this chapter for stationary power and testing reactors.

Since the AFRRI reactor is a research reactor, and not a power or testing reactor (See Staff Position on Contention 3, supra), the site criteria of Part 100 clearly do not apply. In the event the Petitioner seeks an exemption from the regulation, the "special circumstances" of 10 CFR § 2.758 must be addressed. Petitioner has failed to do so.

Contention 5

Routine Emissions I

Applicant has not demonstrated that airborne and waterborne radioactive emissions from routine operations and disposal of solid wastes will be maintained within the limits of 10 CFR Part 20 in that actual and probable violations of these regulatory limits have taken place on the occasions listed below and Applicant's radiation monitoring methods and corrective actions are inadequate to detect and prevent their recurrence.

1) The data cited in 4) of the stipulated contention (Routine Emissions I) and Applicant's written response to Petitioner's question submitted in the winter of 1979, "[w]hat is the highest total exposure measures over the year at any one of the reactor environmental monitoring stations, for the [years 1975-1979]", demonstrate that releases measured at these stations from 1962 through 1965, 1978 and 1979 resulted in average annual whole body doses to members of the public in excess of EPA's limit of 25 mrem.

2) Applicant's incineration at NNMC of 160 boxes of contaminated solid waste, cited in NRC Inspection Reports for 1975-1976, Docket No. 50-170, resulted in the release of radioactive gases and particulates in excess of the limits set forth at 10 CFR Part 20, Appendix C.

3) Since Applicant's Environmental Impact Appraisal (EIA), submitted in conjunction with its license renewal application, admits that the highest average unrestricted area exposure rate from airborne releases (set forth in the EIA) extends to residential areas, it is highly probable that such exposures have resulted and continue to result in doses to the public in excess of 0.5 rem and, violate the principle that emissions from Applicant's operation be kept as low as is reasonably achievable (the ALARA principle).

4) Applicant's Environmental Release Report, issued 12/14/71, indicate that between 1/1/70 and 7/1/71 exposure rates in several unrestricted areas were as high as 1-5 mRad/hr. At this rate, any person who lived or worked in these areas 500 hours in a year, or about 10 hours a week, would receive an annual whole body dose in excess of the NRC's limit of 0.5 rem/yr. Since 50-60% of the area within a one mile radius of the AFRRI stack is residential, it is highly probable that the population dose limit was exceeded during this period. This is a violation of the ALARA principle.

Staff Position

The Staff opposes admission of part 1 of this contention on the grounds that it is an attack on the Commission's regulations. In the case of research reactors, the NRC does not apply exposure standards set by EPA. The applicable NRC regulation is 10 CFR Part 20, which has an annual limit for whole body doses in unrestricted areas of 500 mrem (10 CFR § 20.105). The Petitioner has not demonstrated "special circumstances" pursuant to 10 CFR § 2.758 to show why Part 20 should not be applicable.

The Staff opposes admission of part 2 of this contention on the grounds that it fails to put the other parties on notice as to what they will have to defend against or oppose. Neither the Staff nor the Licensee have any record of the reports Petitioner refers to. The Staff is not aware of any incineration performed under this particular license and has been informed by AFRRI that all wastes are shipped off site. Unless the Petitioner is able to be specific enough to enable the reports to be identified, the Staff opposes this contention.

The Staff opposes admission of part 3 of this contention on the grounds that it lacks adequate basis and fails to alert the parties as to the matters sought to be litigated. The fact that an unrestricted area exposure rate extends to residential areas does not raise a litigable issue since, by definition, an unrestricted area can be a residential area (10 CFR § 20.3(a)(17)). The test is whether the emissions result in doses to the general public in excess of .5 rem per year. Petitioner has stated no basis for contending that it is "highly probable" that doses to the general public in excess of .5 rem per year have occurred.

The Staff opposes part 4 of this contention on the grounds that it lacks adequate basis and seeks to raise an issue beyond the scope of the proceeding. The Petitioner has misstated the facts in the Environmental Release Report. The Report states quite clearly that a direct radiation exposure rate of 5.0 mR/hr was produced at the Maxitron 250, an x-ray facility located in a building not part of the AFRRI complex. Since this Board is considering the license renewal of the AFRRI reactor, part 4 is beyond the scope of the proceeding.

Contention 6

Routine Emissions II

10 CFR Part 20 limits are inadequate to protect the health and safety of the population in the vicinity of the AFRRI reactor.

This proceeding presents "special circumstances" within the meaning of 10 CFR § 2.758 that warrant the Board's consideration of whether the offsite air- and waterborne release limits set forth at 10 CFR Part 20 and Appendices B and C thereto are adequate to protect the public health and safety.

[AFFIDAVIT TO BE SUBMITTED AT TIME OF FILING OF STATEMENT OF POSITION]

Staff Position

The Staff opposes the admission of this contention on the grounds that it is an attack on the Commission's regulations, and that it is so vague it fails to put the other parties sufficiently on notice as to what Petitioner seeks to litigate. The Petitioner states no basis whatsoever for its bare

claim that 10 CFR Part 20 limits are inadequate to protect the health and safety of the population in the vicinity of the AFRRI reactor.

Contention 7

Security

Neither the Physical Security Plan for the facility nor Applicant's history of security violations and substandard management and operating procedures demonstrate that the controlled access areas can be protected from sabotage or diversion of special nuclear material according to the standards set forth at 10 CFR Part 73.

The Draft Audit Report of the AFRRI facility prepared by the Defense Audit Service in 1979 cites frequent instances of security and management violations, including:

1) Eighteen activations of the facility alarm system during a 34-day period, caused by personnel leaving work after normal duty hours from unauthorized exits. Auditors were told by AFRRI security personnel and other AFRRI officials that investigations were not made of the activations and that not enough security people were on duty to investigate each time the alarm went off;

2) unauthorized people entering the facility by following employees in who used their magnetic cards to unlock the door;

3) failure to escort visitors attending weekly seminars and provide them with dosimeters;

4) failure of employees entering and exiting the building after hours to sign a log showing their time of arrival and departure;

5) violations of Applicant's accounting and dispensing procedures for controlled substances such as narcotics.

Staff Position

The Staff opposes admission of this contention on the grounds that it lacks adequate bases and appears to raise issues which do not apply to the

facility involved in this proceeding. The AFRRI reactor facility possesses special nuclear material of low strategic significance. As such, only § 73.67 of 10 CFR Part 73 applies. 10 CFR § 73.67(a)(2) requires that the physical protection system shall provide:

> (i) Early detection and assessment of unauthorized access or activities by an external adversary within the controlled access area containing special nuclear material;
>
> (ii) Early detection of removal of special nuclear material by an external adversary from a controlled access area;
>
> (iii) Assure proper placement and transfer of custody of special nuclear material; and
>
> (iv) Respond to indications of an unauthorized removal of special nuclear material and then notify the appropriate response forces of its removal in order to facilitate its recovery.

None of the instances cited by the Petitioner appear to demonstrate a lack of compliance with 10 CFR 73.67, especially in that there is no showing early detection would not be accomplished. In addition, the Petitioner fails to indicate the connection between the violations and the controlled access area. No allegation has been made that any of the violations resulted in unauthorized access to the controlled access area without detection.

CONCLUSION

For the reasons stated above, the Staff urges that the Licensing Board (a) approve the Stipulation submitted by the Staff, AFRRI and Petitioner

and (b) deny admission of all other contentions advanced by Petitioner at this time.

Respectfully submitted,

Richard G. Bachmann
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 14th day of April, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-170
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE	)	
	)	(Renewal of Facility License No. R-84)
(TRIGA-Type Research Reactor)	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S STATEMENT OF POSITION ON UNSTIPULATED CONTENTIONS OF PETITIONER CITIZENS FOR NUCLEAR REACTOR SAFETY, INC." in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 14th day of April, 1981:

Louis J. Carter, Esq., Chairman
Administrative Judge
Atomic Safety and Licensing Board
23 Wiltshire Road
Philadelphia, PA 19151

Mr. Ernest E. Hill
Administrative Judge
Lawrence Livermore Laboratory
University of California
P.O. Box 808, L-123
Livermore, CA 94550

Dr. David R. Schink
Administrative Judge
Department of Oceanography
Texas A&M University
College Station, TX 77840

Mr. Robert L. Brittigan, Esq.
General Counsel
Defense Nuclear Agency
Washington, DC 20305

Ms. Elizabeth B. Entwisle
8118 Hartford Avenue
Silver Spring, MD 20910

Atomic Safety and Licensing Board Panel*
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Atomic Safety and Licensing Appeal Panel (5)*
U.S. Nuclear Regulatory Commission
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Docketing and Service Section (7)*
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Richard G. Bachmann
Counsel for NRC Staff

03/30/81

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-170
ARMED FORCED RADIOBIOLOGY RESEARCH INSTITUTE	)	
	)	(Renewal of Facility License No. R-84)
(TRIGA-Type Research Reactor)	)	

STIPULATION

The NRC Staff (Staff), Armed Forces Radiobiology Research Institute (AFRRI or Licensee), and Citizens for Nuclear Reactor Safety, Inc. (CNRS or Petitioner), by their respective attorneys or authorized representatives, hereby stipulate and agree as follows:

1. Discussions having been held between the Staff, Licensee and Petitioner pursuant to the Letter from Staff Counsel to Administrative Judge Carter dated January 16, 1981, the Petitioner agrees that the sole contentions it is asserting in this proceeding are those set forth in Attachment A (Stipulated Contentions) and Attachment B (Unstipulated Contentions), subject to the reservation set forth in paragraph 6 below. The renumbering and wording of the contentions set forth in Attachments A and B supersede that set forth in all filings by the Petitioner prior to this date.

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2. Except as set forth in Attachments A and B, the Petitioner hereby withdraws all other contentions submitted by it in all of its previous petitions and filings.

3. The parties to this Stipulation agree that the contentions set forth in Attachment A meet the requirements of 10 CFR § 2.714 as to specificity and basis, raise appropriate issues for determination in this proceeding, and thus constitute admissible contentions herein.

4. The Petitioner asserts that the unstipulated contentions set forth in Attachment B are also proper contentions which should be admitted as matters in controversy and will file by April 14, 1981, or such other date as is set by the Licensing Board, such statement of position as it deems necessary and appropriate with respect to these contentions.

5. The Staff and/or the Licensee do not agree that the contentions set forth in Attachment B are proper contentions to be admitted as matters in controversy. The Staff and/or the Licensee Applicant will file statements of position with respect to these contentions by April 14, 1981, or such other date as is set by the Licensing Board.

6. Nothing in this Stipulation shall be deemed to prevent the Petitioner from filing new or amended contentions upon a showing of good cause as required by 10 CFR § 2.714 of the Commission's regulations.

7. Nothing contained in this Stipulation:

(a) shall be deemed an admission by the Staff or the Licensee of the merits of any contention or the validity of any allegation of fact or law stated in any contention; nor,

(b) shall be construed as a waiver by any party to this stipulation of any rights with respect to the admissibility of evidence pursuant to 10 CFR § 2.743 of the Commission's regulations.

8. Each party to this Stipulation expressly reserves any right to move for summary disposition pursuant to 10 CFR § 2.749 of the Commission's regulations in regard to any contention advanced by the Petitioner and admitted by the Licensing Board.

(date)

Elizabeth B. Entwisle, Esq.
Counsel for Citizens for Nuclear Reactor Safety, Inc.

March 31, 1981
(date)

Richard G. Bachmann, Esq.
Counsel for NRC Staff

March 31, 1981
(date)

Robert L. Brittigan, Esq.
Counsel for Armed Forces Radiobiology Research Institute

ATTACHMENT A

STIPULATED CONTENTIONS

1. Accidents I

The analysis of the "Fuel Element Clad Failure Accident", one of the two design basis accidents (DBAs) within Applicant's Hazard Summary Report (HSR) is faulty in that:

The analysis of the "Fuel Element Clad Failure Accident" erroneously assumes that cladding failure during a pulse operation or inadvertant transient would occur at a peak fuel element temperature of less than 100°C.

Petitioner contends that such cladding failure would be much more likely to occur at elevated fuel temperatures (in excess of 400°C), resulting in far greater gap activity and fission product releases than the HSR postulates.

2. Accidents II

Accidents can be expected to occur at the AFRRI reactor of a different kind and greater severity than those described in the HSR. Such accidents should be more properly designated DBA's to ensure that such accidents would not result in releases in excess of regulatory limits.

1) Fuel element storage rack failure. The HSR does not provide reasonable assurance that such an accident cannot occur in that: a) it fails to publish the calculations from which it concludes that a contact configuration of the twelve elements stored in Applicant's pool would not

result in a critical mass; b) it does not cite the source for its statement that experience shows it takes approximately 67 closely packed fuel elements to achieve criticality.

2) Failure of an experiment. Applicant has failed to show that several instances of malfunctions of confinement safeguards at AFRRI could not recur during an experiment failure, resulting in the release of radiation in excess of occupational and offsite limits. Such malfunctions include: a) a breach of containment caused by missing rubber gasket sealing material on the double doors to the corridor behind the reactor control room, in violation of Applicant's Technical Specification, § I.A.4. (See, Notice of Violation, App. A, NRC Inspection Report Docket No. 50-170, 10/13/78); b) failure of the reactor room ventilation dampers to close on August 26, 1975 when the Continuous Air Monitor was alarmed (see, DNA Abnormal Occurrence Report to Directorate of Reactor Licensing, dated September 3, 1975, Docket No. 50-170, 9/10/75.); c) failure of the lead shielding doors to stop opening at the fully opened position (see DNA Abnormal Occurrence Report, dated July 27, 1976, Docket No. 50-170, 8/16/76); d) reactor core position safety interlock malfunction on February 1, 1973 (not recorded in Docket No. 50-170).

Petitioner contends that human error coupled with failure of built-in safeguards could lead to a series of events resulting in releases of radioactivity in excess of regulatory limits and cites the following past malfunctions at AFRRI as evidence that such failures could occur there in the future: a) malfunction of Safety Channel One on March 15, 1980. An NRC inspection on March 17, 1980 "revealed that Safety Channel One would

not initiate a scram in accordance with [Applicant's] Technical Specifications"; b) reactor exhaust system malfunction on August 9, 1979 caused by an electrical fire in the EF-1 cubicle of the motor control center, in turn caused by a power surge due to a faulty transformer; c) malfunction of the fuel element temperature sensing circuit caused by a "floating signal ground", reported by DNA on August 1, 1979; d) malfunction of the pool water level sensing float switch caused by wear on the jacketing around the wires leading to the switch, reported by DNA on July 31, 1979; e) malfunction of Radiation Monitoring System caused by two loose wires in the control box and resulting in a failure of the reactor room ventilation dampers to close (on August 26, 1975 (referred to in Contention 2b), Accidents II, supra); f) malfunction of the Fuel Temperature - Automatic Scram System on January 29, 1974, caused by a build-up of high resistance material on the mechanical contacts of the TZ output meter; g) malfunction of the Reactor Core Position Safety Interlock System on February 1, 1973, caused by a faulty de-energizing relay (referred to in Contention 2d), Accidents II, supra).

Applicant has not shown that the TRIGA reactor's negative temperature coefficient will automatically shut down the reactor in accident situations with damaged fuel elements, where the moderating effect of the hydrogen nuclei in the U-Zr-Hx alloy may be significantly reduced and the value of the negative temperature coefficient is changed.

4) Multiple fuel element cladding failure accidents have not been considered in the HSR. Such accidents could result from: a) defects in the material integrity of the fuel elements themselves; b) an uncontrolled

power excursion in the reactor core; c) LOCA; d) sabotage, aircraft collision or natural ("act of God") accident.

3. Emergency Plan

The Emergency Plan prepared by Applicant in conjunction with its license renewal application does not comply with the standards set forth at 10 CFR Part 50, Appendix E, in that it fails to provide reasonable assurance that appropriate measures will be taken to protect the public health and safety in the event of offsite releases following a major accident such as those described in Accidents I and II, supra. The following elements required by Appendix E are missing from the Plan:

A. Organization

1) Description of the normal plant operating organization.

2) Detailed discussion of plant staff emergency assignments and duties of an onsite emergency coordinator in charge of exchanging information with offsite emergency authorities.

3) Description of Applicant's headquarters personnel who will be sent to the plant to augment the onsite emergency organization.

4) Identification of and methods used by Applicant's personnel responsible for making offsite dose projections and transmitting the results to State and local authorities, NRC and other appropriate governmental entities.

5) Identification of Applicant's employees and consultants with special qualifications for coping with emergency conditions.

6) Description of local offsite emergency support services.

7) Identification of, and assistance expected from State, local and Federal agencies with emergency responsibilities.

8) Identification of State and local officials responsible for planning protective actions, including evacuations.

B. Assessment Actions

1) Description of offsite monitoring methods for determining the magnitude and continually assessing the impact of radioactive releases.

C. Activation of Emergency Organization

1) Description of emergency action levels for notifying offsite agencies and notation that a message authentication scheme exists for such agencies.

D. Notification Procedures

1) Description of means for notifying and agreements reached with local, State and Federal officials and agencies for the prompt notification and evacuation of, and other protective measures for, the public.

2) Identification of the State and local government agencies within Applicant's Emergency Planning Zone (EPZ).

3) Description of provisions for yearly dissemination to the public within the plume pathway EPZ of information on emergency planning, nature and effects of radiation, and a listing of local broadcast stations.

4) Demonstration that the State/local officials can make a public notification decision promptly on being informed of an emergency.

E. Emergency Facilities and Equipment

1) Description of arrangements for transporting contaminated individuals to identified treatment facilities outside the site boundary (i.e., facilities other than the National Naval Medical Center).

2) Description of arrangements for treatment of said individuals at said facilities.

3) Description of a near-site emergency operations facility and offsite communications systems with a backup power source.

F. Training

1) Description of provisions for conducting a radiological orientation training program for local Civil Defense, law enforcement, and news media personnel.

G. Recovery

1) Description of criteria for determining when Applicant's facility may be re-entered or its operation may be resumed.

4. Routine Emissions I

Applicant has not demonstrated that airborne and waterborne radioactive emissions from routine operations and disposal of solid wastes will be maintained within the limits of 10 CFR Part 20 in that actual and probable violations of these regulatory limits have taken place on the occasions listed below and Applicant's radiation monitoring methods and corrective actions are inadequate to detect and prevent their recurrence.

1) Applicant's equipment, methods, and reporting system for measuring releases into the Montgomery County sanitary sewerage system and at its perimeter and offsite monitoring stations do not provide reasonable assurance that violations of regulatory limits have in all instances been or will be detected.

Environmental monitoring is inadequate to determine radiation doses to the public due to inhalation or ingestion because:

a) film dosimetry detects only external gamma radiation.

b) the particulate radioactivity monitor for airborne effluents (i.e. a pancake-probe C-M counter) is not isokinetic, and therefore cannot be used for meaningful evaluations. Applicant's only other stack effluent monitoring system, the radioactive gas monitor, is likewise not reliable for particulate sampling. (See, Environmental Release Report issued 12/14/71, covering period 1/1/70 - 9/30/71, and Inspection Report No. 50-170/77-01-03.)

c) Applicant was cited by the NRC for a violation of environmental sampling and analysis procedures. The Violation Notice of Gross Beta Effluent Analysis, based on an NRC Inspection conducted January 12-14, 1977, cited Applicant for calculational omissions, methods for preparing and analyzing samples, and instrumentation used. The gross beta measurements were made without the use of a beta self-absorption correction in the presence of significant amounts of suspended solid material. (see NRC Inspection Reports No. 50-170/77-01-02 and 50-170/77-01-03.) Moreover, Applicant's "Environmental Sampling and Analysis" program does not provide adequate information on how quarterly environmental samples of water, soil

and vegetation are prepared and analyzed, nor does it provide the raw data collected over the past ten years.

d) The "concentric cylinder set model" used by Applicant to derive its dose assessments to the environment, and from which it concludes its effluents are within regulatory limits, is an unrealistic model.

2) An NRC inspection conducted January 10-12, 1979 revealed that, contrary to Applicant's Technical Specifications governing discharge of airborne radionuclides, Argon-41 and other radionuclides were discharged at ground level outside the reactor building for several months through a leak in the ventilation exhaust stack drain line (see NRC Inspection Report No. 50-170/79-01). It is highly probable that this resulted in releases in excess of the maximum permissible concentrations set forth at 10 CFR Part 20, Appendix B.

3) Applicant's Airborne Release Reports for 1962, 1963, and 1964 and AEC Inspection Reports for the same years (Docket No. 50-170) reveal that releases of Argon-41 from Applicant's stack exceeded the maximum permissible concentration for unrestricted areas listed at 10 CFR Part 20, Appendix B, during those years. (Also see letter from AEC to National Naval Medical Center (NNMC) dated October 6, 1961, Docket No. 50-170).

4) Applicant's Environmental Release Data and Perimeter Monitoring Reports, Docket No. 50-170 (5/27/66 report and 9/20/66 report), show that emissions from the AFRRI facility in 1962 and 1963 resulted in annual whole body doses in unrestricted areas in excess of the NRC's regulatory limit of 0.5 rem.

5. NEPA I

The NRC Staff has not prepared an environmental impact statement (EIS) addressing the proposed licensing action.

In view of the foregoing contentions which, in their sum, establish that emissions from routine operations and postulated accidents at the AFRRI facility present a significant threat to the public health and safety, Petitioner contends that the proposed licensing action is a major Federal action with significant environmental effects. As such, NEPA requires preparation of a site-specific EIS.

6. NEPA II

The NRC Staff's environmental impact appraisal does not adequately consider the impacts associated with operating the AFRRI facility for another twenty years, nor does it adequately consider alternatives to re-licensing the facility, including the no-action alternative, relocating the reactor, or doing the research at other reactors as required by 10 CFR Part 51.

ATTACHMENT B

UNSTIPULATED CONTENTIONS

1. Accidents I

The analysis of the loss of coolant accident (LOCA) and the two design basis accidents (DBAs) within Applicant's Hazard Summary Report (HSR) is faulty in that:

1) It erroneously concludes that in event of an accident described therein as "Loss of Shielding and Cooling Water", air convection cooling would be sufficient to prevent cladding failure and significant fission product release.

Petitioner contends that in the event of a rapid loss of coolant while the reactor core is in the pulse mode, there could be a sudden temperature elevation sufficient to cause multiple cladding failures and fission product releases in excess of the limits provided in 10 CFR Part 20;

2) Both of the DBA analyses in the HSR ("Fuel Element Drop Accident" and "Fuel Element Clad Failure Accident") erroneously consider only those radiation doses to humans that would result from submersion exposure to the noble gases released.

Petitioner contends that if such accidents were to occur, indivudals would receive additional exposure due to internal emissions of the noble gases, sustaining injuries far greater than those predicted in the HSR;

2. Accidents II

Accidents can be expected to occur at the AFRRI reactor of a different kind and greater severity than those described in the HSR. Such accidents would result in significant offsite releases and include:

1) Failure of the N-16 diffuser system. Petitioner contends that in the event of such failure, N-16 bubbles would accumulate along the surface of the fuel element cladding causing: a) insulation of the fuel elements from the water coolant resulting in rapid temperature elevation of the elements and possible multiple clad failures, and loss of water shielding; and b) production and release of the gaseous radionuclide N-16 with its powerful gamma ray.

2) Two maximum credible accidents (MCAs) beyond the design basis of the reactor (Class 9 accidents): a) power excursion accident (PEA) resulting in multiple cladding failures at an elevated temperature with reduction in the thermalizing effect of hydrogen, followed by an explosive zirconium-steam interaction; and b) LOCA resulting in multiple cladding failures at an elevated temperature, followed by an explosive zirconium-air interaction.

3. Testing Facility

Petitioner contends that the AFRRI facility is a testing facility within the meaning of § 31.a(3) and § 104(c) of the Atomic Energy Act of 1954, as amended, and § 50.21(c) and § 50.2(r) of 10 CFR Part 50.

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FILING OF STATEMENTS OF POSITION]

4. Siting

Applicant has failed to demonstrate that the AFRRI facility satisfies the siting criteria set forth at 10 CFR Part 100.

Petitioner contends the AFRRI reactor falls within the scope of Part 100 siting criteria either as a testing reactor or a research reactor and cites for the latter case the Memorandum from Vollmer (Director, Division of Engineering, NRR), to Eisenhut (Director, Division of Licensing, NRR).

Petitioner contends that because of the density and residential nature of the population in the plume exposure EPZ, the inadequacy and inaccessibility of highways, the inadequacy of Applicant's Emergency Plan, and meteorological, geological and hydrological conditions of the area surrounding the facility, Applicant cannot provide reasonable assurance that Part 100 offsite dose limits would not be exceeded in the event of a maximum credible accident.

5. Routine Emissions I

Applicant has not demonstrated that airborne and waterborne radioactive emissions from routine operations and disposal of solid wastes will be maintained within the limits of 10 CFR Part 20 in that actual and probable violations of these regulatory limits have taken place on the occasions listed below and Applicant's radiation monitoring methods and corrective actions are inadequate to detect and prevent their recurrence.

1) The data cited in 4) of the stipulated contention (Routine Emissions I) and Applicant's written response to Petitioner's question submitted in the winter of 1979, "[w]hat is the highest total exposure measures over

the year at any one of the reactor environmental monitoring stations, for the [years 1975-1979]", demonstrate that releases measured at these stations from 1962 through 1965, 1978 and 1979 resulted in average annual whole body doses to members of the public in excess of EPA's limit of 25 mrem.

2) Applicant's incineration at NNMC of 160 boxes of contaminated solid waste, cited in NRC Inspection Reports for 1975-1976, Docket No. 50-170, resulted in the release of radioactive gases and particulates in excess of the limits set forth at 10 CFR Part 20, Appendix C.

3) Since Applicant's Environmental Impact Appraisal (EIA), submitted in conjunction with its license renewal application, admits that the highest average unrestricted area exposure rate from airborne releases (set forth in the EIA) extends to residential areas, it is highly probable that such exposures have resulted and continue to result in doses to the public in excess of 0.5 rem and, violate the principle that emissions from Applicant's operation be kept as low as is reasonably achievable (the ALARA principle).

4) Applicant's Environmental Release Report, issued 12/14/71, indicate that between 1/1/70 and 7/1/71 exposure rates in several unrestricted areas were as high as 1-5 mRad/hr. At this rate, any person who lived or worked in these areas 500 hours in a year, or about 10 hours a week, would receive an annual whole body dose in excess of the NRC's limit of 0.5 rem/yr. Since 50-60% of the area within a one mile radius of the AFRRI stack is residential, it is highly probable that the population dose limit was exceeded during this period. This is a violation of the ALARA principle.

6. Routine Emissions II

10 CFR Part 20 limits are inadequate to protect the health and safety of the population in the vicinity of the AFRRI reactor.

This proceeding presents "special circumstances" within the meaning of 10 CFR § 2.758 that warrant the Board's consideration of whether the offsite air- and waterborne release limits set forth at 10 CFR Part 20 and Appendices B and C thereto are adequate to protect the public health and safety.

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FILING OF STATEMENT OF POSITION]

7. Security

Neither the Physical Security Plan for the facility nor Applicant's history of security violations and substandard management and operating procedures demonstrate that the controlled access areas can be protected from sabotage or diversion of special nuclear material according to the standards set forth at 10 CFR Part 73.

The Draft Audit Report of the AFRRI facility prepared by the Defense Audit Service in 1979 cites frequent instances of security and management violations, including:

1) Eighteen activations of the facility alarm system during a 34-day period, caused by personnel leaving work after normal duty hours from unauthorized exits. Auditors were told by AFRRI security personnel and other AFRRI officials that investigations were not made of the activations

and that not enough security people were on duty to investigate each time the alarm went off;

2) unauthorized people entering the facility by following employees in who used their magnetic cards to unlock the door;

3) failure to escort visitors attending weekly seminars and provide them with dosimeters;

4) failure of employees entering and exiting the building after hours to sign a log showing their time of arrival and departure;

5) violations of Applicant's accounting and dispensing procedures for controlled substances such as narcotics.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-170
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE	)	
	)	(Renewal of Facility License No. R-84)
(TRIGA-Type Research Reactor)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "STIPULATION" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 1st day of April, 1981:

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