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 FORCES 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.

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 . 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.

March 31, 1981
(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, 10/13/79); 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 ET-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, 1978, 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.

[AFFIDAVIT TO BE SUBMITTED AT THE TIME OF
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.

[AFFIDAVIT TO BE SUBMITTED AT TIME OF
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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	)	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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