



**ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE**

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6055.85  
28 February 2000

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

SUBJECT: Request for modification of License R-84

Dear Sirs/Mmes:

AFRRI requests that the license expiration date (Item 3) of operating license R-84 be revised. The current wording, which stems from Amendment 18 issued August 1, 1984, states that the license expires on November 8, 2000. AFRRI petitions that the wording be revised to reflect an expiration date 20 years from the date of issuance. This would make the license expiration date August 1, 2004.

Specifically, the wording of Item 3 of the license should be changed from:

*This amended license is effective as of the date of issuance and shall expire at midnight November 8, 2000.*

To read:

*This license is effective as of the date of issuance. This license shall expire 20 years from August 1, 1984, the date of issuance of the Amendment 18 license renewal.*

The original operating license expired on November 8, 1980. A license renewal application was submitted in October 1980. The license went into a state of "timely renewal" until August 1, 1984 when Amendment 18 was issued renewing the license. This requested change grants a 20-year license period from the date of issuance. AFRRI believes it was an oversight that the expiration date was assigned as November 8, 2000, instead of 20 years from the date of issuance.

AFRRI believes that the requested change is fair and reasonable. A review of the sixty-five NRC-regulated non-power reactors shows that granting a license for 20 years from the date of issuance is common and has never led to a safety problem. Also, a request similar to ours from the University of Missouri-Rolla (License R-79) was approved in 1999.

AD20

The requested change will remove a premature heavy burden. AFRRI believes an undue hardship is imposed by requiring the time-consuming and labor-intensive license renewal process only 16 years after the previous license renewal.

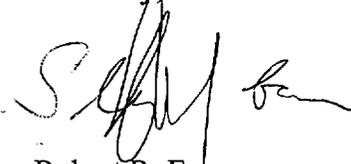
There are no safety considerations dependent on the duration of operations at our facility. Because of the moderate licensed power (1 MW) and operating history of the facility, there are no fuel burn-up or material damage issues to be considered. The facility has operated less than 500 MW-hrs since the last license renewal was issued. Granting the proposed license revision will not endanger the health and safety of the public and will have no environmental impact. The attached Environmental Report addresses this in greater detail.

In the 1988 to 1994 time frame, new Technical Specifications, license amendments, Emergency Plans, and Safety Analysis Reports were submitted to the NRC for review and approval. These were submitted in conjunction with the installation of the fuel-follower control rods and new microprocessor-based control console. Therefore, our documents have undergone recent NRC review and approval.

AFRRI solicits your response as soon as possible since preparation of the license renewal package is a major burden on our current resources. Thank you in advance for your consideration of this very important matter.

Attachment:  
as stated

Sincerely,



Robert R. Eng  
COL, MS, USA  
Director

Cy Furn:  
U.S. Nuclear Regulatory Commission  
ATTN: Mr. Marvin Mendonca, Mail Stop 11D19  
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U.S. Nuclear Regulatory Commission, Region I  
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## **Environmental Report**

### **1.0 Proposed Action**

The Armed Forces Radiobiology Research Institute (AFRRI) proposes to have the wording of our current operating license changed to make the license effective for a period of twenty years from the date it was issued (August 1, 1984). Therefore, if the proposed action were implemented, the current license would be effective until August 1, 2004. The current wording of the license specifies that the license expires on November 8, 2000.

There are no safety considerations dependent on the duration of operations at our facility. Because of the moderate licensed power (1 MW) and operating history of the facility, there are no fuel burn-up or material damage issues to be considered. The facility has operated less than 500 MW-hrs since the last license renewal was issued.

The Armed Forces Radiobiology Research Institute will apply for a license renewal within 30 days prior to the license expiration date. If the proposed action is denied, the license renewal application will be prepared and submitted prior to October 8, 2000. If the proposed action is approved, the license renewal application will not be due until July 1, 2004.

### **2.0 Background**

The Armed Forces Radiobiology Research Institute reactor is a pool-type reactor operating with standard TRIGA stainless steel-clad fuel elements and fuel-follower control rods. The fuel is enriched to just under 20% in U-235. The maximum licensed operating power is 1.0 MW. The AFRRI reactor is licensed by the U.S. Nuclear Regulatory Commission, pursuant to 10CFR50, as a research reactor. The facility operating license number is R-84 (Docket No. 50-170).

The reactor is housed in a concrete and steel building located on the grounds of the National Naval Medical Center in Bethesda, Maryland as shown in Figure 2-1 (Site Plan), extracted from the reactor Safety Analysis Report.

The principal activities conducted with the reactor are radiobiology research, activation analysis, and training. Typical experimental activities include studying the response of biological samples to various neutron-gamma fields, development of military radioprotectants, neutron activation analysis, electronics degradation studies, reactor flux field studies, and operator training.

The movable reactor core sits near the bottom of an open 15,000-gallon aluminum pool. The reactor is cooled by natural convection flow of the pool water, supplemented by a secondary cooling system including a 1.5 MW heat exchanger and cooling tower.

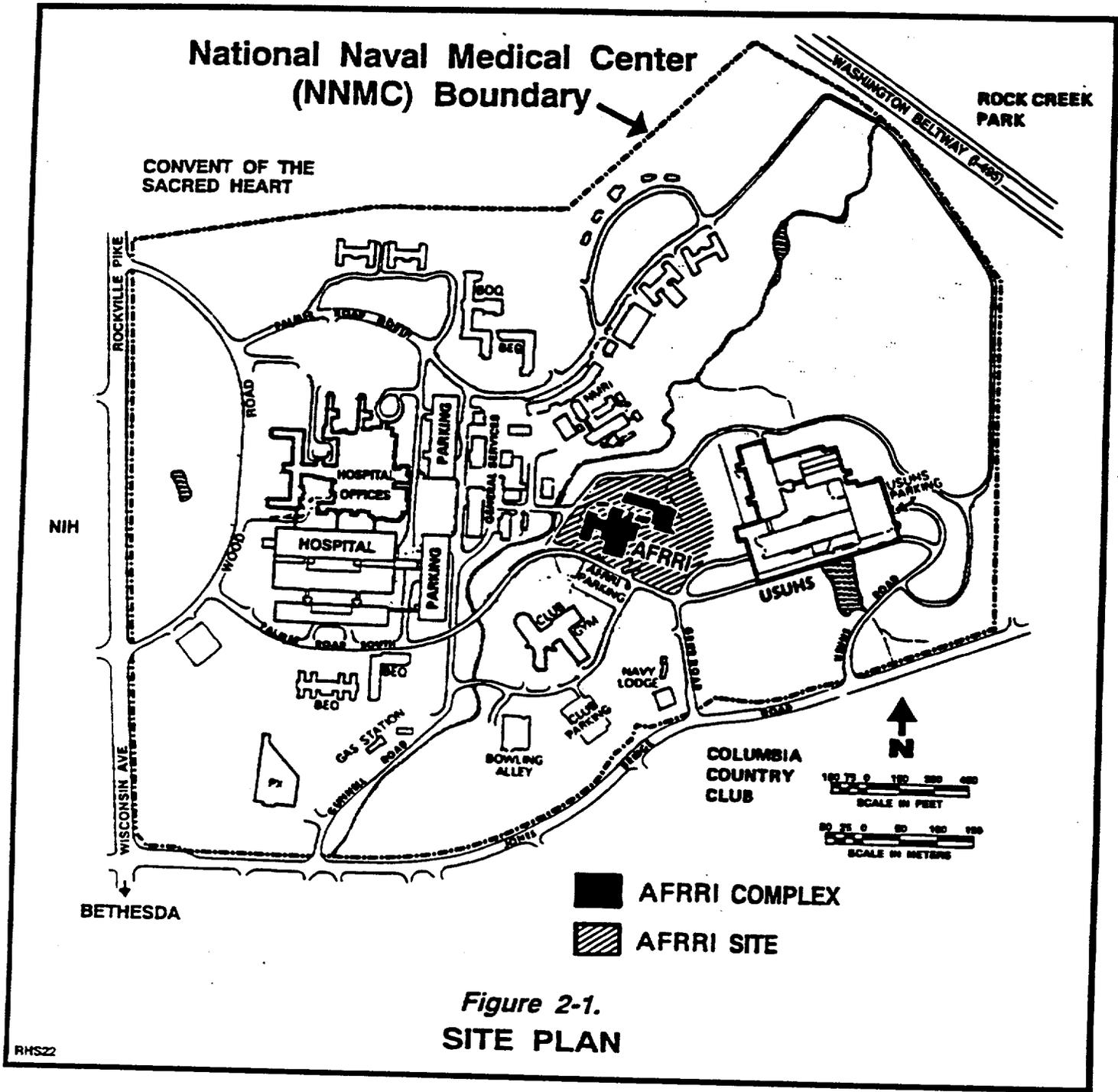


Figure 2-1.  
SITE PLAN

RHS22

The AFRRI reactor is typically operated during normal daytime hours. Table 1 presents the annual operating history in MW-hrs since 1981. On average, the reactor is operated about 28.8 MW-hrs per year. Future operations are expected to follow the historical pattern.

Table 1 Annual Operating History	
YEAR	MW-HRS
1981	22.1
1982	8.7
1983	7.8
1984	40.2
1985	62.8
1986	11.0
1987	37.6
1988	32.0
1989	36.0
1990	36.4
1991	32.1
1992	44.5
1993	32.1
1994	44.6
1995	18.3
1996	21.1
1997	22.4
1998	28.2
1999	10.4
AVERAGE	28.8

The facility is equipped with a ventilation system that exhausts air from the reactor room and all experimental facilities through a series of roughing filters, prefilters, and absolute filters. After passing through the filters, the air is monitored and released through the AFRRI stack to the environment. The reactor room and all experimental facilities are held at a negative pressure with respect to the rest of the institute.

The only gaseous effluent released to the environment during normal operations is Ar-41. Air contains a small amount of Ar-40. Ar-41 is produced when dissolved air in the pool water passes through the reactor core and becomes activated. Ar-41 is also produced from air in the two dry exposure rooms. In order to minimize Ar-41 production, the walls of the exposure rooms are coated with special gadolinium paint to absorb thermal neutrons. Annual Ar-41 releases to the environment are minimal. Historical Ar-41 releases since 1981 are presented in Table 2. The table shows that the average annual Ar-41 release is only 8747 millicuries (8.7 Ci) at the top of

the stack. Diffusion calculations and on-the-ground sampling show that, even for the largest release in 1985 (22.3 Ci), the total annual dose in any unrestricted area was less than two millirem. This is a factor of 50 below the limits of 10CFR20. Future releases are expected to be similar to the historical releases.

YEAR	ACTIVITY (mCi)
1981	1231
1982	1865
1983	1729
1984	13921
1985	22260
1986	4990
1987	16820
1988	9145
1989	4622
1990	6747
1991	13488
1992	4431
1993	14110
1994	7400
1995	7900
1996	5200
1997	9100
1998	17800
1999	3440
AVERAGE	8747

The AFRRI reactor facility produced no liquid radioactive waste during the years 1981-1999. We expect no liquid radioactive waste in the future.

Solid radioactive waste generated during normal reactor operations typically includes ion exchange resins, water filters, gloves, paper, and low-activity samples from experiments. All solid waste is transferred to the AFRRI byproduct license for decay in the AFRRI waste storage facility and ultimate shipment to a disposal site. No solid waste was disposed of under the reactor license during the years 1981-1999 and this procedure is expected to continue in the future.

### **3.0 Impact of the Proposed Action on the Environment**

There will be absolutely no impact on the environment resulting from the proposed action. The proposed action simply changes the effective expiration date of the license from November 8, 2000 to August 1, 2004.

If the proposed action is denied, a license renewal application will be made in a timely fashion and the license will go into a status of timely renewal. It is anticipated that the license will most likely be in a status of timely renewal for several years before the license is reissued. We are confident that the relicensing process will be successful and that a new license will be issued. Therefore, normal reactor operations are expected to continue during this time frame (2000 to 2004) regardless of whether or not the proposed action is approved. Therefore, the impact on the environment will be unchanged.

The environmental impacts of normal reactor operations have been addressed above and have been shown to be insignificant.

### **4.0 Alternatives to the Proposed Action**

The alternative to the proposed action, which simply extends the license expiration date to August 1, 2004, is to not extend the expiration date. In such an instance, the facility administration would submit a license renewal application in the fall of 2000. As such, the reactor facility would go into timely renewal and the facility would continue to operate in the same manner as it has over the past many years. Therefore, the environmental impacts of the facility are the same regardless of whether or not the proposed action is implemented.

If the proposed action is denied, an undue hardship will be imposed upon both the AFRRRI and NRC staffs by requiring us to go through the time-consuming and human resource-intensive process of license renewal only 16 years after the previous license renewal. Because the license renewal process is very resource intensive, we believe that the process should not be initiated any more frequently than necessary. Also, new avenues of research may be undertaken at AFRRRI in the future that would require significant license modifications. A final DoD decision on whether to proceed with this research may not come before the current license expires in November 2000. The proposed action would allow those modifications to be included in the full relicensing submittal, rather than as a separate time-consuming amendment. The proposed action seeks to establish a time period of 20 years from the date of the last license renewal as a reasonable time before reinstating the license renewal process.

### **5.0 Conclusion**

There will be no significant environmental impacts associated with granting of the proposed action. The benefits will be significant in that the undue burden and use of resources for the

license renewal process will be minimized. If the proposed action is granted, facility resources can be used towards radiobiology research and radioprotectant development instead of on relicensing activities. This is a crucial period for the AFRRI reactor facility. In view of the shrinking federal nuclear research budget, it is imperative that we show strong utilization in research and development over the next few years. Granting of the proposed action will free up our resources for use in effective research without adversely affecting the environment.