

NUCLEAR REGULATORY COMMISSION

UNIVERSITY OF NEW MEXICO

DOCKET NO. 50-252

UNIVERSITY OF NEW MEXICO AGN-201M REACTOR

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

[NRC-2009-0557]

The U.S. Nuclear Regulatory Commission (NRC or the Commission) is considering issuance of a renewed Facility Operating License No. R-102, to the University of New Mexico (the licensee), which would authorize continued operation of the University of New Mexico AGN-201M reactor, located in Albuquerque, Bernalillo County, New Mexico. Therefore, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 51.21, the NRC is issuing this Environmental Assessment and Finding of No Significant Impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would renew Facility Operating License No. R-102 for a period of twenty years from the date of issuance of the renewed license. The proposed action is in accordance with the licensee's application dated February 21, 2007, as supplemented by letter dated November 9, 2009. In accordance with 10 CFR 2.109, the existing license remains in effect until the NRC takes final action on the renewal application.

Need for the Proposed Action:

The proposed action is needed to allow the continued operation of the AGN-201M reactor to routinely provide teaching, research, and services to numerous institutions for a period of twenty years.

Environmental Impacts of the Proposed Action:

The NRC has completed its safety evaluation of the proposed action to issue a renewed Facility Operating License No. R-102 to allow continued operation of the AGN-201M reactor and concludes there is reasonable assurance that the AGN-201M reactor will continue to operate safely for the additional period of time. The details of the NRC staff's safety evaluation will be provided with the renewed license that will be issued as part of the letter to the licensee approving its license renewal application. This document contains the environmental assessment of the proposed action.

The University of New Mexico is located in Albuquerque, New Mexico. The AGN-201M reactor is housed in the Nuclear Energy Laboratory (NEL) located near the southwest corner of the University campus. The NEL is primarily surrounded by residential areas to the west and south and the University campus to the east and north. According to the 2000 census, the population density within a radial distance of one mile from the NEL is 5352.9 persons per square mile. The nearest permanent residence is 160 (174 yards) meters from the site and the nearest dormitory is 724 meters (792 yards).

The NEL is a one-story concrete structure with six feet of earth between one foot thick concrete walls on the south and west sides. The north and east walls are poured concrete approximately one foot thick. The roof of the building is three feet of earth between five-inch thick concrete slabs. A portion of the roof is five feet of earth between five-inch thick concrete slabs. The only outside windows in the building are located in the entrance doors.

The AGN-201M reactor is a solid, homogeneous thermal reactor, used for teaching and training of students. The reactor is operated in a sealed container at a maximum licensed power of 5.0 watts. The reactor core uses graphite-coated uranium microspheres enriched in uranium-235, dispersed in a polyethylene matrix. The reactor core consists of nine fuel discs

that are separated at the mid-plane by a thin aluminum baffle. Because of the small fissile material content and low operation power level, the fission product inventory in the core is negligible. The core is contained in a gas-tight aluminum cylindrical tank. The AGN-201M reactor has two safety rods, one coarse control rod, and one fine control rod. The two safety rods and the coarse control rod are fuel-loaded while the loading of the fine control rod depends on the standard loading in use at the time. In all cases, inserting a rod adds reactivity to the system.

The licensee has not requested any changes to the facility design or operating conditions as part of this renewal request. Therefore, the proposed action should not increase the probability or consequences of accidents. No changes are being made in the types of effluents that may be released off site. There should be no increase in occupational or public radiation exposure. Therefore, license renewal should not change the environmental impact of facility operation. Data from the last five years of operation was assessed to determine the projected radiological impact of the facility on the environment during the period of the renewed license. Based on this evaluation, the NRC staff concluded that continued operation of the reactor should not have a significant environmental impact.

#### I. Radiological Impact

No environmental effects should result from use of this reactor. The AGN-201M reactor has a dry core of uranium-impregnated polyethylene, sealed in an aluminum tank. Because of the form of the fuel and the lack of fission product inventory, failure of equipment or release of the fuel to the outside environment will not directly or indirectly endanger the public health and safety. A probabilistic risk assessment review of the reactor (ANS Transactions, Vol.65, p. 132-133, 1992) indicated that "in the unlikely event of release to the environment, a total whole body dose rate of  $1.61 \times 10^{-5}$  mrem/sec in the form of a radioactive plume has been calculated

for persons located in the vicinity." This indicates that even the maximum hypothetical release accident does not endanger the public health and safety.

The core is surrounded by a 20 cm thick high density (1.75 gram/cm<sup>3</sup>) graphite reflector followed by a 10 cm thick lead gamma shield. The core and part of the graphite reflector are sealed in a fluid-tight aluminum core tank designed to contain any fission gases that might leak from the core. A review of the licensee's annual reports from 2000-2007, excluding the report for the period July 2002 through June 2003 which was not available, reveals that there was no liquid radioactive waste released from the facility nor was there any solid waste released. In addition, no environmental radiation surveys were required to be performed outside of the facility.

Personnel exposures received during the same time period were below 50 mrem per person with the majority of the personnel receiving below 5 mrem. No changes in reactor operation that would lead to an increase in occupational dose are expected as a result of license renewal.

Radiation monitoring instrumentation available to the reactor operators includes console-mounted meters and a portable survey meter. There are remote area monitors with automatic alarms installed to monitor gamma levels at the reactor console, checkpoint three (the south side of the reactor), reactor top, and in the general lab area (near the east door). All of the detectors are energy-compensated Geiger Mueller tubes. There will be no changes to the licensed program that would affect off-site radiation and contamination levels.

## II. Non-Radiological Impact

The AGN-201M reactor is conductively cooled and requires no liquid or auxiliary cooling system. The removable thermal column tank permits access to the core tank. The thermal column tank is normally filled with water to provide shielding. The tank can be filled with graphite

if a thermal column is desired. The steel thermal column tank acts as secondary containment for the core tank and is fluid tight. The water tank is the third and outermost of the fluid tight containers. It is 198 cm in diameter and made of steel. It holds 1000 gallons of water and forms the fast neutron shield. The water in the tank contains chromium. To date, the water has never been removed from the tank and there are no plans to do so. The water will be drained in the event the reactor is decommissioned and removal of the water will be handled by University of New Mexico Radiation Safety. Finally, there is a 60 cm concrete block shield on the front of the reactor tank and 40 cm concrete block shields on the sides and back. There is no shielding on the top of the reactor tank.

Release of thermal effluents from the AGN-201M reactor will not have a significant effect on the environment.

#### Environmental Effects of Accidents:

Accident scenarios are discussed in Appendix A of the University of New Mexico's Safety Analysis Report. The maximum hypothetical accident is a nuclear excursion resulting from a 2% instantaneous increase of reactivity. The total radiation dose to a person next to the reactor would be approximately one rem; therefore, the worst-case occupational doses resulting from this accident would be below the limit of 5 rem or 0.05 Sieverts (Sv) specified in 10 CFR 20.1201. Worst-case doses to members of the general public would be below the limit of 0.1 rem (1 mSv) specified in 10 CFR 20.1301. The proposed action will not increase the probability or consequences of accidents.

#### National Environmental Policy Act (NEPA) Considerations:

##### I. Endangered Species Act (ESA)

The site occupied by the AGN-201M reactor does not contain any Federally- or State-protected fauna or flora, nor do the AGN-201M reactor effluents impact the habitats of any

such fauna or flora.

II. Costal Zone Management Act (CZMA)

The site occupied by the AGN-201M reactor is not located within any managed coastal zones, nor do the AGN-201M reactor effluents impact any managed costal zones.

III. National Historical Preservation Act (NHPA)

The NHPA requires Federal agencies to consider the effects of their undertakings on historic properties. The National Register of Historic Places (NRHP) lists several historical sites near the AGN-201M reactor site. The nearest historical site is Cottage Bakery, located approximately 0.1 miles from the AGN-201M reactor site boundary. Given the distance between the facility and Cottage Bakery, continued operation of the AGN-201M reactor will not impact this historical site.

IV. Fish and Wildlife Coordination Act (FWCA)

The licensee is not planning any water resource development projects, including any of the modifications relating to impounding a body of water, damming, diverting a stream or river, deepening a channel, irrigation, or altering a body of water for navigation or drainage.

V. Executive Order 12898 - Environmental Justice

The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from the relicensing and the continued operation of the AGN-201M reactor. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant and exceeds the risk or exposure rate for the general population or for another appropriate comparison group. Disproportionately high environmental effects are impacts or risk of impacts on the natural or physical environment in a minority or low-income community that are significant

and appreciably exceed the environmental impact on the larger community. Such effects may include ecological, cultural, economic, or social impacts. Minority and low-income populations are subsets of the general public residing in the vicinity of the AGN-201M reactor, and all are exposed to the same health and environmental effects generated from activities at the AGN-201M reactor.

Minority Populations in the Vicinity of the AGN-201M reactor — According to 2000 census data, 51.9 percent of the population (approximately 748,000 individuals) residing within a 50-mile radius of the AGN-201M reactor identified themselves as minority individuals. The largest minority group was Hispanic or Latino (310,000 persons or 41.4 percent), followed by “Some other race” (141,500 or about 18.9 percent). According to the U.S. Census Bureau, about 51.7 percent of the Bernalillo County population identified themselves as minorities, with persons of Hispanic or Latino origin comprising the largest minority group (42.0 percent). According to census data 3-year average estimates for 2005-2007, the minority population of Bernalillo County, as a percent of total population, had increased to 55.6 percent.

Low-Income Populations in the Vicinity of the AGN-201M reactor — According to 2000 census data, approximately 19,900 families and 100,800 individuals (approximately 10.4 and 13.5 percent, respectively) residing within a 50-mile radius of the AGN-201M reactor were identified as living below the Federal poverty threshold in 1999. The 1999 Federal poverty threshold was \$17,029 for a family of four.

According to Census data in the 2005–2007 American Community Survey 3–Year Estimates, the median household income for New Mexico was \$41,042, while 18.4 percent of the state population and 14.2 percent of families were determined to be living below the Federal poverty threshold. Bernalillo County had a higher median household income average (\$45,022)

and lower percentages (14.9 percent) of individuals and families (11.1 percent) living below the poverty level, respectively.

Impact Analysis—Potential impacts to minority and low-income populations would mostly consist of radiological effects; however, radiation doses from continued operations associated with the license renewal are expected to continue at current levels and would be well below regulatory limits.

Based on this information and the analysis of human health and environmental impacts presented in this environmental assessment, the proposed relicensing would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations residing in the vicinity of the AGN-201M reactor.

Environmental Impacts of the Alternatives to the Proposed Action:

As an alternative to license renewal, the staff considered denial of the proposed action. If the Commission denied the application for license renewal, facility operations would end and decommissioning would be required with no significant impact on the environment. The environmental impacts of license renewal and this alternative action are similar. In addition, the benefits of teaching, research, and services provided by facility operation would be lost.

Alternative Use of Resources:

The proposed action does not involve the use of any different resources or significant quantities of resources beyond those previously considered in the issuance of the original Facility Operating License R-102 for the University of New Mexico AGN-201M dated September, 1966; and the issuance of Amendment No. 10 to R-102, which authorized the power uprate to 5.0 W(t) dated January 18, 1973.

Agencies and Persons Consulted:

In accordance with the Commission's stated policy, on November 25, 2009, the staff

consulted with the State of New Mexico's State Liaison Officer, regarding the environmental impact of the proposed action. A copy of the draft environmental assessment was provided to the State Liaison Officer for review. In a memorandum dated December 22, 2009, the Director of the Environmental Health Division of the State's Department of the Environment responded, expressing the State's support for the continued operation of the facility.

Finding of No Significant Impact:

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's application dated February 21, 2007 [ML092170540], as supplemented by the letter dated November 9, 2009 [ML093410385]. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (1<sup>st</sup> Floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the NRC Web site <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or send an e-mail to [pdr@nrc.gov](mailto:pdr@nrc.gov).

Dated at Rockville, Maryland, this 5<sup>th</sup> day of May, 2010.

FOR THE NUCLEAR REGULATORY COMMISSION

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