NUCLEAR REGULATORY COMMISSION

DEPARTMENT OF THE INTERIOR

Geological Survey

[Docket No. 50–274]

United States Geological Survey Triga Reactor Environmental Assessment and Finding of No Significant Impact

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Facility License No. R–113, issued to the Department of the Interior, United States Geological Survey (the licensee), which authorizes operation of the United States Geological Survey TRIGA Reactor (GSTR), in Lakewood, Colorado. Therefore, as required by 10 CFR 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 revise Facility License No. R–113 to change the license expiration date from October 10, 2007, to February 24, 2009, to recapture the construction time between the issuance date of Construction Permit No. CPRR–102 (October 10, 1967) and issuance date of Facility Operating License No. R–113 (February 24, 1969) to allow a 40-year operating license term.

The GSTR is located in a building on the grounds of the Denver Federal Center, a complex of U.S. Government offices and laboratories owned by the U.S. Government about 7 miles (11.3 km) southwest of the central Denver, Colorado, business area. The reactor is a General Atomics TRIGA-Mark I design with a maximum steady state power level of 1 megawatt thermal power (MW(t)). The reactor can be operated in a pulse mode with reactivity insertions not to exceed 2.1% delta k/k. The reactor core is at the bottom of an open pool with about 20 ft (6 m) of water above the core for radiation shielding. The fuel moderator elements consist of a homogeneous mixture of uranium-zirconium hydride. The elements are rods about 28 inches (71 cm) long with a diameter of about 1.5 inch (4 cm). The fuel elements are clad in stainless steel. The reactor pool is surrounded by a biological shield. The reactor is inside a confinement building.

The construction permit for the facility (CPRR–102) was issued to the licensee on October 10, 1967. On February 24, 1969, Facility Operating License No. R–113 was issued to the licensee. The facility normally operates during the day shift from Monday to Friday.

The proposed action is in accordance with the licensee's application for amendment dated April 30, 2002, as supplemented by letters dated March 11 and 24, 2005.

The Need for the Proposed Action

The proposed action is needed to recapture the time spent constructing the plant. The amendment will allow operation of the GSTR reactor for a term of 40 years from the date of issuance of the facility license.

Environmental Impacts of the Proposed Action

The NRC has completed its safety evaluation of the proposed amendment to change the expiration date of the facility license to recapture time between construction and operation to allow a 40-year operating license term and concludes there is reasonable assurance that the GSTR will continue to operate safely for the additional period of time authorized by the amendment.

The licensee has not requested any changes to the facility design or operating conditions as part of this amendment request. Data from the last 5 years of operation was assessed to determine the radiological impact of the facility on the environment.

The licensee does environmental surveys by measuring the exposure at five outdoor environmental stations near the GSTR facility with thermoluminescent dosimeters (TLDs). The results from the TLD with the maximum exposure (with background subtracted) were as follows:

Year	Maximum (rad/yr) (except 2000, which is in rem/yr)
2004	0.0226
2003	0.0157
2002	0.0233
2001	0.0427
2000	0.0974

These doses are within the regulatory limits of 0.1 rem per year total effective dose equivalent for doses to members of the public given in 10 CFR 20.1301.

In addition, the licensee has calculated the dose to the individual member of the public likely to receive the highest dose from air emission of radioactive material to the environment to demonstrate compliance with 10 CFR 20.1101(d). This regulation provides for an as low as is reasonably achievable criteria for air emissions as a result of which an individual member of the public receives a total effective dose equivalent (TEDE) of less than 10 mrem per year.

The results of calculations for the years 2000–2004, are as follows:

Year	Dose (mrem/yr)
2004	0.1
2003	0.1
2002	0.2
2001	0.3
2000	0.2

These doses are within the 10 mrem per year TEDE constraint on air emissions given in 10 CFR 20.1101(d).

The airborne effluent releases are as follows:

Year	Curies released (argon–41)	Curies released (total)
2004	1.718	1.719
2003	2.289	2.290
2002	2.442	2.443
2001	4.868	4.869
2000	2.910	2.912

Airborne effluent releases from the facility consist primarily of argon-41. This is characteristic for research reactors. The releases from the facility were below the average concentration requirements of the facility technical specifications.

The licensee has not released liquid effluent to the sanitary sewer or the environment since 1990. The small amounts of liquid waste generated by reactor operations are evaporated or are solidified for disposal.

Shipments of solid radioactive waste off site for disposal at approved sites were as follows (note that these numbers also include some solid waste from other U.S. Geological Survey activities and therefore are bounding for the reactor facility):

Year	Volume (cubic feet)	Activity (mCi)
2004	0	0
2003	7.5	10
2002	7.5	5
2001	7.5	194
2000	7.5	106

The NRC inspection program confirmed that the waste shipments met the requirements of the regulations in 10 CFR Part 20 for waste disposal. The principal radioactive waste generated at the GSTR is demineralizer resin. The licensee did not ship radioactive waste off site in 2004.

The licensee collects groundwater samples from a monitoring well down gradient from the GSTR. These samples were analyzed for tritium, which is the only significant reactor-produced radionuclide in the primary coolant. Tritium is also soluble in water, which makes it a sensitive indicator of the reactor's impact, if any, on groundwater. Between 2000 and 2004, except for one sample, the results have been below the licensee's lower limit of measuring detection. The sample that showed a positive result was slightly above the licensee's lower limit of measuring detection and significantly below regulatory limits.

The radiological releases from the facility and the associated doses to the public are within regulatory limits or facility technical specifications and do not have a significant impact on human health or the environment. The licensee's environmental radiation monitoring includes soil and water sampling and direct radiation readings. The results of the monitoring program indicate that the facility does not have a significant impact on human health or the environment. Releases of radioactive material from the facility to the environment for the proposed construction permit recapture period are estimated to continue at levels similar to previous levels, which were within regulatory limits.

Occupational doses to GSTR staff and users meet the regulatory requirements in 10 CFR part 20, subpart C, and are as low as is reasonably achievable. No changes in reactor operation that would lead to an increase in occupational dose are expected as a result of the proposed action.

The proposed action will not increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released off site, and there is no significant increase in occupational or public radiation exposure. Therefore, no significant radiological environmental impacts are associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action does not have a potential to impact historic properties.

No chemicals which are discharged to the environment are used for activities under the reactor license.

The facility uses approximately 600,000 gallons of water annually. The water is supplied by a utility, Denver Water, which is able to supply 745 million gallons of potable water a day. Most of the water is used in the cooling tower and the water is lost to the atmosphere as water vapor or discharged to the sanitary sewer as bleedoff water. Wastewater from the facility discharges to the Denver Wastewater Management Division system.

The site for the reactor facility is several rooms in a building at the Denver Federal Center. No Federal- or State-listed plants or animals are known to be found on the GSTR site.

The GSTR uses a minimal amount of water for reactor operation, has no major refurbishment or construction activities planned, and will have no significant change in the types or amounts of effluents leaving the facility as a result of construction permit recapture. Therefore, the proposed action is not expected to affect aquatic and terrestrial biota. The staff concludes there are no significant nonradiological environmental impacts associated with the proposed action.

Accordingly, the NRC concludes that no significant environmental impacts are associated with the proposed action.

Environmental Impacts of the Alternatives to the Proposed Action

As an alternative to the proposed action, the staff considered denial of the proposed action (*i.e.*, the no-action alternative). Denial of the proposed action will result in expiration of the current license in October 2007, and the commencement of decommissioning if an application for license renewal is not made. If the application is denied, the licensee is expected to apply for renewal of the license. Whether the reactor is operating under the proposed action or a renewed license or during the evaluation of a timely renewal application, the environmental impacts of the proposed action and the alternative are similar.

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 the proposed action and this alternative action are similar. In addition, the benefits of research conducted by the facility would be lost.

Alternative Use of Resources

This action does not involve the use of any resources not previously considered in the Hazards Summary Report dated December 1966 prepared for initial licensing of the facility.

Agencies and Persons Consulted

In accordance with the agency's stated policy, on March 18 and 21, and April 7, 2005, the staff consulted with the Colorado State official, Mr. Steve Tarlton, Unit Leader, Radiation Protection Program, Hazardous Materials and Waste Management Division, Colorado Department of Public Health and Environment, regarding the environmental impact of the proposed action. The State official discussed the fact that groundwater-monitoring wells existed at the Denver Federal Center. The State official was not aware if any groundwater samples were analyzed for radionuclides. However, if data existed, it would contribute to the discussion of the environmental impact of the GSTR. This issue was discussed with the licensee, who confirmed that samples from a groundwater-monitoring well down gradient from the GSTR were routinely collected and analyzed. This data has been added to the environmental assessment.

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 letter dated April 30, 2002, as supplemented by letters dated March 11 and 24, 2005. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR) at One White Flint North, Public File Area O–1–F–21, 11555 Rockville Pike (first 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 Internet at 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 by telephone at 1–800–397–4209 or 301–415–4737 or by e-mail to *pdr@nrc.gov*.

Dated at Rockville, Maryland, this 23rd day of May 2005.

For the Nuclear Regulatory Commission.

Patrick M. Madden,

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[FR Doc. E5–2849 Filed 6–2–05; 8:45 am]

BILLING CODE 7590–01–P