SAFSTOR

For the
University of Illinois
Nuclear Reactor Laboratory

(10/98)

Table of Contents

Chapter 1: Introduction and Summary

1.1 Facility Status

On July 1, 1998 the University of Illinois Nuclear Reactor Laboratory filed for permanent cessation of operations with the U. S. Nuclear Regulatory Commission (NRC) effective at midnight, August 9, 1998. On October 5, 1998 technical specifications in support of SAFSTOR for the UIUC Nuclear Reactor Laboratory were submitted for review and approval by the NRC.

The facility is currently in the process of preparing for SAFSTOR (details in Chapter 2) and expects to have all preparations complete by January 1, 1999.

1.2 Why SAFSTOR

Title 10 Code of Federal Regulations part 50.82 (b) (4) (i) states that the proposed decommissioning plan for a non-power reactor must include *"The choice of the alternative for decommissioning with a description of activities involved. An alternative is acceptable if it provides for completion of decommissioning without significant delay. Consideration will be given to an alternative which provides for delayed completion of decommissioning only when necessary to protect the public health and safety. Factors to be considered in evaluating an alternative which provides for delayed completion of decommissioning include unavailability of waste disposal capacity and other site-specific factors affecting the licensee's capability to carry out decommissioning, including the presence of other nuclear facilities at the site."* The University of Illinois is placing the facility in a SAFSTOR status based on an estimated shipping date for the TRIGA fuel of 2010 at the earliest (see attached letter from INEEL Spent Fuel Program). The University of Illinois Nuclear Reactor Laboratory is a stand alone facility and cannot commence decommissioning until the fuel is shipped offsite. This situation forces the facility into a SAFSTOR decommissioning option.

Chapter 2: Details of Preparation for SAFSTOR

2.1 Fuel Movement and Storage

In order to better facilitate future fuel inspections with minimal fuel movement the fuel will be moved to the Bulk Shielding Facility. This action will minimize the potential for damage to a fuel element since this is greatest when an element is being moved. This will also reduce the amount of time and effort required to inspect the fuel by placing the elements in racks that allow for visual inspection without having to move the fuel element. New fuel storage racks for the Bulk Shielding Facility (BSF) have been manufactured based on the approved Safety Analysis P port design. These racks were then installed in the BSF through a 50.59 approved by the Nuclear Reactor Committee (see Figures 1 and 2):.

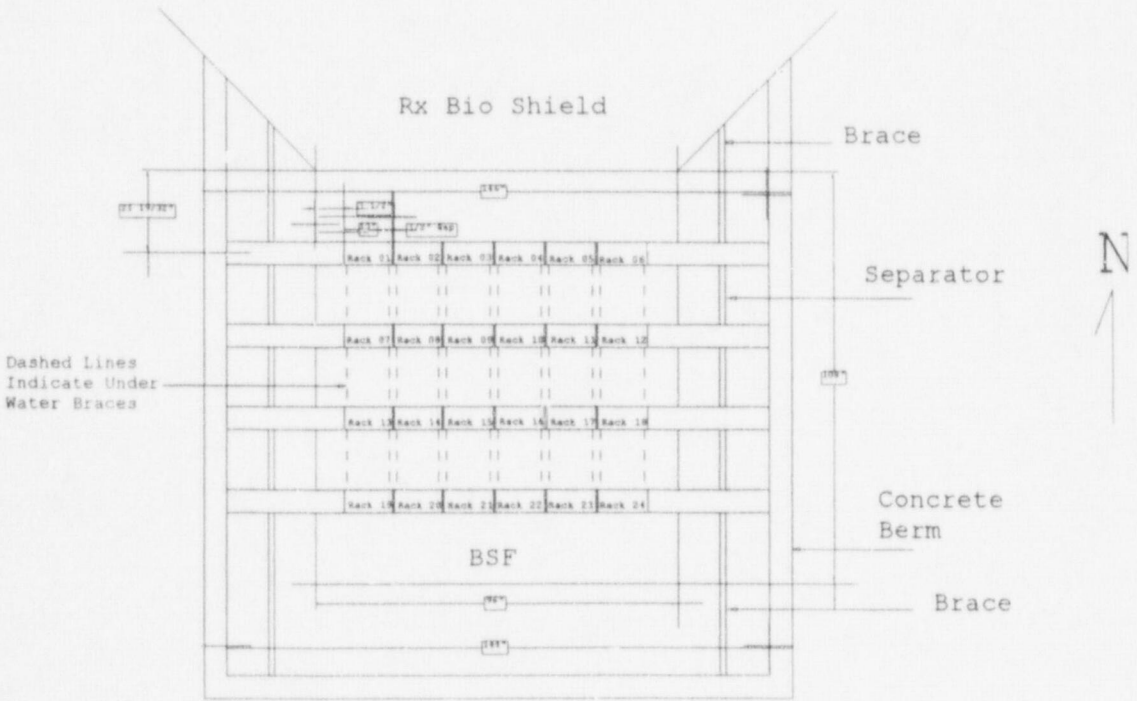

Figure 1

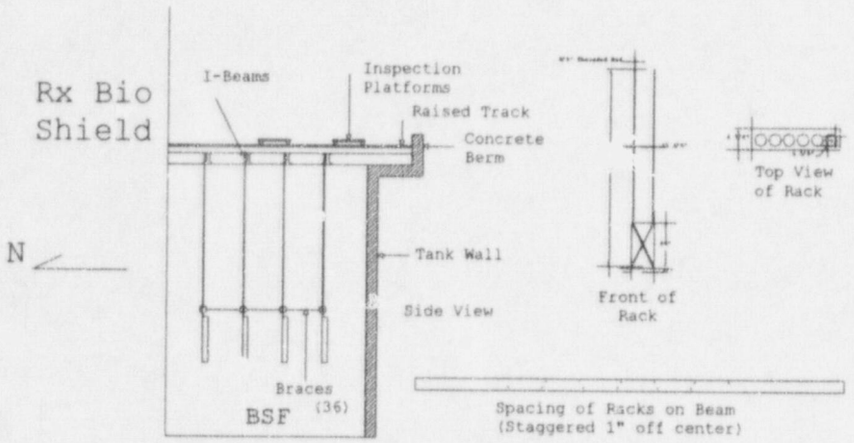

Figure 2

All fuel elements will be visually verified for their serial number and measured for length and bend prior to being placed in long term storage in the BSF.

2.2 Monitoring Systems

During the SAFSTOR period the Reactor Administrator and Reactor Health Physicist will have other duties and responsibilities elsewhere on the UIUC campus. In order to better monitor all parameters within the building a computerized monitoring system will be installed to allow remote monitoring of the reactor building. This system will take inputs from sensors and display them on a computer screen. This computer will be accessible through a network to the reactor staff anywhere on campus through a secure password access. In this way the staff may monitor the building critical parameters without necessarilly having to enter the building daily. The facility will be verified by a physical check at least weekly. At a minimum the following parameters will be input to the computer monitoring system:

- TRIGA pool level
- TRIGA pool temperature
- TRIGA pool conductivity
- BSF pool level
- BSF pool temperature
- BSF pool conductivity
- Area Radiation Monitors
- Continous air monitor
- Tunnel sump alarm
- Vault sump alarm

- Building temperature
- Building humidity
- Security system status

2.3 Surveillances

A surveillance schedule has been developed to ensure that the fuel and support systems are monitored appropriately. An example of the schedule can be seen in Figure 3. An example of the weekly and quarterly surveillance sheets may be seen in Figures 4 and 5 respectively. These schedules are examples and subject to change.

2.4 Facility Staffing

The University of Illinois has made a commitment to maintain a minimum of two individuals on approximately a 25% time basis for the facility. This commitment is specified in Technical Specification 6.1.2 to be the Reactor Administrator and the Reactor Health Physicist. Qualification requirements for these individuals are also listed:

6.1.2 Staffing

a. The minimum staffing at the Nuclear Reactor Laboratory shall be:

1. Reactor Administrator. This individual shall meet the requirements of ANSI/ANS-15.4 "American National Standard for the Selection and Training of Personnel for Research Reactors" for a Level Two individual.

2. Reactor Health Physicist. This individual shall meet the requirements of ANSI/ANS-15.4 "American National Standard for the Selection and Training of Personnel for Research Reactors" for a Level Three individual in addition to training in health physics.

SEMIANNUAL/ANNUAL SURVEILLANCES

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
ARM Setpoints	ARM Setpoints	ARM Setpoints	ARM Setpoints	CAM Calib.	ARM Setpoints
ALARA/Rad Prot audit	Ion Chamber Cal (IDNS)		Sealed Source Leak checks	ARM Setpoints	EP Training
HP Quarterly Surveillances	HP Quarterly Surveillances		HP Quarterly Surveillances	Calibrate PDs & EPDs	
Sealed Source Leak checks				HP Quarterly Surveillances	Police/Fire Indoc
EPA report			Material Status Report due	Ion Chamber Cal (IDNS)	Intrusion Sys
			Quarterly Checklist		
Annual Report (NRC)					
SNM Fuel Inventory					
Quarterly Checklist					
RC Audit of OPS					
JULY	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**
Sealed Source Leak checks	ARM Calib	Rad Worker Training	ARM Setpoints	Ion Chamber Cal (IDNS)	ARM Setpoints
RSO Annual Report	Ion Chamber Cal (IDNS)	EP Equip. Maint Inv.	Sealed Source Leak checks	ARM Setpoints	Annual H3
HP Quarterly Surveillances	ARM Setpoints	Calibrate GM Inst. (EH&S)	HP Quarterly Surveillances	HP Quarterly Surveillances	
ARM Setpoints	HP Quarterly Surveillances	ARM Setpoints			Intrusion Sys
			Material Status Report due	Key Inventory	
Fuel Inspection	Tunnel Insp		Annual SRO Exams		
SNM Fuel Inventory	Vault Insp		Quarterly Checklist		
EPlan Drill/Exercise					
Quarterly Checklist					

BIENNIAL

- EP/EPIP Review by RC due 1/99
- Biennial Requal - Holm - due 2/99
- Biennial Physical - Kaczor - due 1/99
- Biennial Requal - Kaczor - due 6/99
- RC Audit of Requal Program - due 1/00
- SNM Procedure Review by RC - due 1/00
- PSP Review by RC - due 1/00
- Biennial Physical - Holm - due 3/00
- Biennial Control Rod Visual inspection - due 6/00

RED - Health Physics surveillances
BLUE - Reactor Committee
BLACK - OPS

HP Quarterly Surveillances

- Sealed source Leak Test (GUS) (C)
- Beta/alpha (MDA/MDC)
- Entire Building survey (C,R)
- 222 MRL (C,R)
- Primary Tank Water (γ spec)
- BST water (γ spec)
- Rx Ambient air (γ spec)
- Environmental TLDs
- Ion Chamber Cal. (1/qtr)
- License expiration dates

Figure 3

Operations Weekly Checklist

Licensed Operator _____ **Date**_____

Purification System [< 16 psid]
Filters: Purification Inlet pressure _____ Outlet pressure _____ Flowmeter reading _____
BST Pump Disch _____psig BST Filter Out _____psig
BST Fine Filter: Inlet Pressure_____psig Outlet Pressure_____psig

Conductivity Local Meter
Purif. Sys. (< 4μS/cm) Inlet_____ Outlet _____
BST Purif. (< 4μS/cm) Inlet_____ Outlet _____
City Wtr. (< 2μS/cm) Inlet_____

Emergency Core Cooling System
Water meter reading: start_____ stop_____ amount_____gal
Time system on: _____min _____sec Calculated flow: _____gal
Conductivity (<2μmho/cm): _____μmho/cm
Flow indication: [3gpm] _____gpm [8gpm] _____gpm
Filters checked or replaced: _____

Air System
Drain accumulator _____ Drain air dryer _____ Drain Compressor_____ Check oil level_____

Intrusion Alarm
Operational check satisfactory _____ Sensor Checked _____

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Reviewed by Reactor Administrator _____
Reactor Administrator (or designated alternate)

Figure 4

Operations Quarterly Checklist

Licensed Operator _____ **Date**_____

Building Walk Through

Truck door_____ Closed
Truck Bay Storage Pits_____ Locked
Physical Plant Check_____
Primary Aux. Cooling Pump_____ On
Air System: Accumulator_____ Dryer_____ Compressor tank_____ Check Compressor Oil_____
Mechanical Equip. Room Check_____
BST Visual Check_____
BST Purification Pump_____ On
Run Lazy Susan _____ 3min.

Emergency Exit_____ Locked _____Closed
Storage Cage_____ Locked_____ Fuel Present
Beam Ports: Shut & Locked_____
Primary Tank Heater_____ On
Radioactive Waste Storage Area Check_____
BST Fuel Checks_____ Number of Elements Present_____
Primary Tank Visual Check_____
Primary Tank Fuel Check_____ Number of Elements Present____

Comments_____

Retention Tank

Valve to sewer shut_____ Pump operates_____ Check vault_____ Alarm enabled_____

Makeup Water

Primary Totalizer _____ Prev. Reading_____ Amount Added_____

Ventilation System

Exhaust Filters [<2.0 in]
room general _____in.
room abs. _____in.

Flow meter
normal (>1100)_____fpm
alarm point _____fpm
damper closed _____fpm

Radiation Monitoring Systems

Verify alarm setpoints operational on ARMs/CAMs _____

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Reviewed by Reactor Administrator _____
Reactor Administrator (or designated alternate)

Figure 5

Chapter 3: Funding for SAFSTOR and Final Decommissioning

3.1 SAFSTOR funding

In addition to the commitment for staffing previously discussed, the College of Engineering will provide the necessary funds for maintenance of the support systems in the Nuclear Reactor Laboratory during the SAFSTOR period. These expenditures are estimated to be a maximum of $23,000 per year not including salaries.

3.2 Decommissioning Funding and Update

In early 1998 the University of Illinois contracted to GTS Duratek Radiological Engineering and Field Services to perform a decommissioning cost estimate. The current cost estimate to fully decommission the UIUC Nuclear Reactor Laboratory is $4,378,380 in 1998 dollars. This estimate will be updated on a biennial basis for internal planning purposes. At such time that a fuel shipment date is expected a new decommissioning cost estimate will be contracted as part of a full decommissioning plan.

At such time that the fuel is shipped offsite and final decommissioning is begun the necessary funds will be appropriated from the State of Illinois to complete the task.

Attachment 1

Letter from DOE dated July 23, 1998 concerning future receipt by DOE of University of Illinois Spent Nuclear Fuel at INEEL.

Department of Energy
Idaho Operations Office
850 Energy Drive
Idaho Falls, Idaho 83401-1563

July 23, 1998

Dr. R. L. Holm
University of Illinois at Urbana-Champaign (RIS:ZJR)
Department of Nuclear Engineering
214 Nuclear Engineering Laboratory
103 South Goodwin Avenue
Urbana, IL 61801

SUBJECT: Receipt of University of Illinois Spent Nuclear Fuel at the INEEL (OPE-SFP-98-254)

REFERENCE: 1) Richard L. Holm letter to Peter J. Dirkmaat dated July 13, 1998.

2) October 17, 1995 DOE/Navy/State of Idaho Consent Order/Settlement Agreement on Spent Nuclear Fuel and Nuclear Waste.

3) Telephone conversation between E. D. Houck, LMITCO, and Mark Kazsor, University of Illinois, on June 19, 1997.

Dear Dr. Holm:

This letter responds to your request (Reference 1) inquiring when the Idaho National Engineering and Environmental Laboratory (INEEL) could receive spent nuclear fuel (SNF) from the University of Illinois (UI) reactor. In accordance with the Idaho Settlement Agreement (Reference 2), the INEEL cannot receive domestic SNF before January 1, 2001. In implementing this constraint, a tentative receipt schedule for domestic SNF receipts has been developed. The schedule currently identifies receipt of the UI SNF in 2020 and is based on the UI input last year (Reference 3).

With the decision to close down the reactor in 1998, we recognize your need to have the shipping date moved up if possible. For your planning purposes, the INEEL could probably support any post 2009 receipt date given sufficient notification and funding. Receipt of the UI SNF from 2001 through 2009 is currently precluded due to high priority SNF receipts already scheduled and limitations on the number of receipts within the State of Idaho as established by the Settlement Agreement.

Should you have questions or comments, please contact Ron Ramsey, of my staff, at (208) 526-1545 or Doug Toomer, Lockheed Martin Idaho Technologies Company at (208) 526-3009.

Sincerely,

for

Peter J. Dirkmaat, Director
Spent Fuel Program

cc: D. V. Toomer, LMITCO

Attachment 2

Decom. ussioning Cost Estimate for the University of Illinois, Urbana, Illinois UIUC Reactor. Perfomed by GTS Duratek Radiological Engineering & Field Services. April 1998.