2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

2.1 Safety Limits

Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. The principal physical barrier shall be the fuel cladding.

Applicability: These specifications apply to the variables that affect thermal, hydraulic, and materials performance of the core.

Objective: To ensure fuel cladding integrity.

Specifications:

(1) The fuel and cladding temperatures shall not exceed 986° F.

(2) The specific resistivity of the primary coolant water shall not be less than 0.4 megohm–cm for periods of reactor operations over 4 hours.

Bases: Operating experiences and detailed calculations of Argonaut reactors and for the HEU to LEU conversion have demonstrated that Specification (1) suffices to maintain core flow conditions to assure no onset of nucleate boiling within the core and the fuel and fuel cladding below temperatures at which fuel degradation would occur. Specification (2) suffices to maintain adequate water quality conditions to prevent deterioration of the fuel cladding and still allow for expected transient changes in the water resistivity.

2.2 Limiting Safety System Settings

Limiting safety system settings for nuclear reactors are settings for automatic protective devices related to those variables having significant safety functions.

Applicability: These specifications are applicable to the reactor safety system set points.

Objective: To ensure that automatic protective action is initiated before exceeding a safety limit or before creating a radioactive hazard that is not considered under safety limits.

Specifications: The limiting safety system settings shall be

(1) Power level at any flow rate shall not exceed 119 kW.

(2) The primary coolant flow rate shall be
   (a) greater than 36 gpm at all power levels greater than 1 watt if the fuel coolant channel spacing tolerance is ≤ 15 mils.
   (b) greater than 41 gpm at all power levels greater than 1 watt if the fuel coolant channel spacing tolerance is ≤ 20 mils.

(3) The average primary coolant
   (a) inlet temperature shall not exceed 109° F when the fuel coolant channel spacing tolerance is ≤ 10 mils.
   (b) inlet temperature shall not exceed 99° F when the fuel coolant channel spacing tolerance is ≤ 20 mils.
   (c) outlet temperature shall not exceed 155° F when measured at any fuel box outlet.

(4) The reactor period shall not be faster than 3 sec.

(5) The high voltage applied to Safety Channels 1 and 2 neutron chambers shall be 90% or more of the established normal value.

(6) The primary coolant pump shall be energized during reactor operations.

(7) The primary coolant flow rate shall be monitored at the return line.

(8) The primary coolant core level shall be at least 2 in. above the fuel.

(9) The secondary coolant flow shall satisfy the following conditions when the reactor is being operated at power levels equal to or larger than 1 kW:

   (a) Power shall be provided to the well pump and the well water flow rate shall be larger than 60 gpm when using the well system for secondary cooling.

   or

   (b) The water flow rate shall be larger than 8 gpm when using the city water system for secondary cooling.

(10) The reactor shall be shut down when the main alternating current (ac) power is not operating.

(11) The reactor vent system shall be operating during reactor operations.

(12) The water level in the shield tank shall not be reduced 6 in. below the established normal level.

Bases: The University of Florida Training Reactor (UFTR) limiting safety system settings (LSSS) are established from operating experience and safety considerations. The LSSS 2.2.3 (1) through (10) are established for the protection of the fuel, the fuel cladding, and the reactor core integrity. The primary and secondary bulk coolant temperatures, as well as the outlet temperatures for the six fuel boxes, are monitored and recorded in the control room. LSSS 2.2.3 (11) are established for the protection of reactor personnel in relation to accumulation of argon-41 in the reactor cell and for the control of radioactive gaseous effluents from the cell. LSSS 2.2.3 (12) are established to protect reactor personnel from potential external radiation hazards caused by loss of biological shielding.

3.0 LIMITING CONDITIONS FOR OPERATION

Limiting conditions for operation are the lowest functional capabilities or performance levels required of equipment for safe operation of the facility.

3.1 Reactivity Limitations

(1) Shutdown Margin: The minimum shutdown margin, with the most reactive control blade fully withdrawn, shall not be less than 2% $\Delta k/k$.

(2) Excess Reactivity: The core excess reactivity at cold critical, without xenon poisoning, shall not exceed 1.4% $\Delta k/k$.

(3) Coefficients of Reactivity: The primary coolant void and temperature coefficients of reactivity shall be negative.

(4) Maximum Single Blade Reactivity Insertion Rate: The reactivity insertion rate for a single control blade shall not exceed 0.06% $\Delta k/k$ sec, when determined as an average over any 10 sec of blade travel time from the characteristic experimental integral blade reactivity worth curve.

(5) Experimental Limitations: The reactivity limitations associated with experiments are specified in Section 3.5 of this report.

(6) Bases: These specifications are provided to limit the amount of excess reactivity to within limits known to be within the self-protection capabilities of the fuel, to ensure that a reactor shutdown can be established with the most reactive blade out of the core, to ensure a negative overall coefficient of reactivity, and to limit the reactivity insertion rate to levels commensurable with efficient and safe reactor operation.

3.2 Reactor Control and Safety Systems

3.2.1 Reactor Control System

(1) Four cadmium-tipped, semaphore-type blades shall be used for reactor control. The control blades shall be protected by shrouds to ensure freedom of motion.

(2) Only one control blade can be raised by the manual reactor controls at any one time. The safety blades shall not be used to raise reactor power simultaneously with the regulating blade when the reactor control system is in the automatic mode of operation.

(3) The reactor shall not be started unless the reactor control system is operable.

(4) The control-blade-drop time shall not exceed 1 sec from initiation of blade drop to full insertion (rod-drop time), as determined according to surveillance requirements.

(5) The following control blade withdrawal inhibit interlocks shall be operable for reactor operation for the following conditions:

   (a) a source (startup) count rate of less than 2 cps (as measured by the wide range drawer operating on extended range)

   (b) a reactor period less than 10 sec

   (c) safety channels 1 and 2 and wide range drawer calibration switches not in OPERATE condition

   (d) attempt to raise any two or more blades simultaneously when the reactor is in manual mode, or two or more safety blades simultaneously when the reactor is in automatic mode

   (e) power is raised in the automatic mode at a period faster than 30 sec (The automatic controller action is to inhibit further regulating blade withdrawal or drive the regulating blade down until the period is ≥ 30 sec.)

(6) Following maintenance or modification to the reactor control system, an operability test and calibration of the affected portion of the system, including verification of control blade drive speed, shall be performed before the system is considered operable.

3.2.2 Reactor Safety System

(1) The reactor shall not be started unless the reactor safety system is operable in accordance with Table 3.1.

(2) Tests for operability shall be made in accordance with Table 3.2.

3.2.3 Reactor Control and Safety Systems Measuring Channels

The minimum number and type of measuring channels operable and providing information to the control room operator required for reactor operation are given as follows:

Channel	No. Operable
Safety 1 and 2 power channel	2
Linear with auto controller	1
Log N and period channel*	1
Startup channel*	1
Rod position indicator	4
Coolant flow indicator	1
Coolant temperature indicator	
Primary	7
Secondary	1
Core level	1
Ventilation system	
Core vent annunciator	1
Exhaust fan annunciator	1
Exhaust fan rpm	1

* Subsystems of the wide range drawer

Table 3.1 Specifications for reactor safety system trips

Specification	Type of safety system trip
<u>Automatic Trips</u>	
Period less than 3 sec	Full
Power at 119% of full power	Full
Loss of chamber high voltage (≥ 10%)	Full
Loss of electrical power to control console	Full
Primary cooling system	Rod-drop
Loss of pump power Low-water level in core (< 42.5") No outlet flow Low inlet water flow (< 36 gpm for fuel coolant channel spacing tolerance at ≤15 mils; < 41 gpm for fuel coolant channel spacing tolerance at ≤20 mils)	
Secondary cooling system (at power levels above 1 kW)	Rod-drop
Loss of flow (well water < 60 gpm, city water < 8 gpm) Loss of pump power	
High primary coolant average inlet temperature (≥ 109° F for fuel coolant channel spacing tolerance at ≤ 10 mils; ≥ 99° F for fuel coolant channel spacing tolerance at ≤ 20 mils)	Rod-drop
High primary coolant average outlet temperature (≥ 155° F)	Rod-drop
Shield tank	Rod-drop
Low water level (6" below established normal level)	
Ventilation system	Rod-drop
Loss of power to dilution fan Loss of power to core vent system	
<u>Manual Trips</u>	
Manual scram bar	Rod-drop
Console key-switch OFF (two blades off bottom)	Full

Table 3.2 Safety system operability tests

Component or scram function	Frequency
Log-N period channel Power level safety channels	Before each reactor startup following a shutdown in excess of 6 hr, <u>and</u> after repair <u>or</u> deenergization caused by a power outage
10% reduction of safety channels high voltage	4/year (4-month maximum interval)
Loss of electrical power to console	4/year (4-month maximum interval)
Loss of primary coolant pump power	4/year (4-month maximum interval)
Loss of primary coolant level	4/year (4-month maximum interval)
Loss of primary coolant flow	4/year (4-month maximum interval)
High average primary coolant inlet temperature	With daily checkout
High average primary coolant outlet temperature	With daily checkout
Loss of secondary coolant flow (at power levels above 1 kW)	With daily checkout
Loss of secondary coolant well pump power	4/year (4-month maximum interval)
Loss of shield tank water level	4/year (4-month maximum interval)
Loss of power to vent system and dilution fan	4/year (4-month maximum interval)
Manual scram bar	With daily checkout

3.2.4 Bases

The reactor control system provides the operator with reactivity control devices to control the reactor within the specified range of reactivity insertion rate and power level. The operator has available digital blade position indicators for the three safety blades and the regulating blade. The three safety blades can only be manipulated by the UP-DOWN blade switches (manual); the regulating blade can be manually controlled or placed under automatic control, which uses the linear channel as the measuring channel, and a percent of power setting control. The two independent reactor safety channels provide redundant protection and information on reactor power in the range 1%–150% of full power. The linear power channel is the most accurate neutron instrumentation channel, and provides a signal for reactor control in automatic mode. The percent of power information is displayed by the linear channel two-pen recorder. It does not provide a protective function. The log wide range drawer provides a series of information, inhibit, and protection function from extended source range to full power. The safety channel 1 signal and the period protection signal are derived from the wide range drawer. The wide potential hazards, a determination will be made about the acceptable reactor power level and length of irradiation, taking into account such factors as: isotope identity and chemical and physical form and containment, toxicity, potential for contamination of facility or environment, problems in removal or handling after irradiation including containment, transfer, and eventual disposition. Guidance should be obtained from the ANS 15.1 Standard. Experimental apparatus, material, or equipment to be inserted in the reactor shall be reviewed to ensure noninterference with the safe operation of the reactor.

(2) Classification of Experiments

Class I – Routine experiments, such as gold foil irradiation. This class shall be approved by the reactor manager; the radiation control officer may be informed if deemed necessary.

Class II – Relatively routine experiments that need to be documented for each new group of experimenters performing them, or whenever the experiment has not been carried out for one calendar year or more by the original experimenter, and that pose no hazard to the reactor, the personnel, or the public. This class shall be approved by the reactor manager and the radiation control officer.

Class III – Experiments that pose significant questions regarding the safety of the reactor, the personnel, or the public. This class shall be approved by the reactor manager and the radiation control officer, after review and approval by the Reactor Safety Review Subcommittee (RSRS).

Class IV – Experiments that have a significant potential for hazard to the reactor, the personnel, or the public. This class shall be approved by the reactor manager and radiation control officer after review and approval by the RSRS and specific emergency operating instructions shall be established for conducting the experiments.

(3) Reactivity Limitations on Experiments

(a) The combined absolute reactivity worth of all movable or nonsecured experiments shall not exceed 0.6% $\Delta k/k$.

(b) The total absolute reactivity worth of all experiments shall not exceed 1.4% $\Delta k/k$.

(c) When determining the absolute reactivity worth of an experiment, no credit shall be taken for temperature effects.

(d) An experiment shall not be inserted or removed unless all the control blades are fully inserted or its absolute reactivity worth is less than that which could cause a positive 20-sec stable period.

(4) Explosive Materials

Explosive materials shall not be irradiated.

(1) The evacuation alarm is actuated automatically when two area radiation monitors alarm high ($\geq$ 25 mrems/hr) in coincidence.

(2) The evacuation alarm is actuated manually when an air particulate monitor is in a valid alarm condition.

(3) The evacuation alarm is actuated manually when a reactor operator detects a potentially hazardous radiological condition and preventive actions are required to protect the health and safety of operating personnel and the general public.

Bases: To provide early and orderly evacuation of the reactor cell and the reactor building and to minimize radioactive hazards to the operating personnel and reactor building occupants.

3.7 Fuel and Fuel Handling

Applicability: These specifications apply to the arrangement of fuel elements in core and in storage, as well as the handling of fuel elements.

Objectives: The objectives are to establish the maximum core loading for reactivity control purposes, to establish the fuel storage conditions, and to establish fuel performance and fuel-handling specifications with regard to radiological safety considerations.

Specifications:

(1) The maximum fuel loading shall consist of 24 full fuel elements consisting of 14 plates each containing enriched uranium and clad with high purity aluminum.

(2) Fuel element loading and distribution in the core shall comply with the fuel-handling procedures.

(3) Fuel elements exhibiting release of fission products because of cladding rupture shall, upon positive identification, be removed from the core. Fission product contamination of the primary water shall be treated as evidence of fuel element failure.

(4) The reactor shall not be operated if there is evidence of fuel element failure.

(5) All fuel shall be moved and handled in accordance with approved procedures.

(6) Fuel elements or fueled devices shall be stored and handled out of core in a geometry such that the k_{eff} is less than 0.8 under optimum conditions of moderation and reflection.

(7) Irradiated fuel elements or fueled devices shall be stored so that temperatures do not exceed design values.

Bases: The fuel loading is based on the present fuel configuration. The reactor systems do not have adequate engineering safeguards to continue operating with a detectable release of fission products into the primary coolant. The fuel is to be stored in a safe configuration and shall be handled according to approved written procedures for radiological safety purposes.

3.8 Primary Water Quality

Applicability: These specifications apply to primary cooling system water in contact with fuel elements.

Objective: To minimize corrosion of the aluminum cladding of fuel plates and activation of dissolved materials.

Specifications:

(1) Primary water temperature shall not exceed 155° F.

(2) Primary water shall be demineralized, light water with a specific resistivity of not less than 0.5 megohm-cm after the reactor is operated for more than 6 hr.

(3) Primary water shall be sampled and evaporatively concentrated, and the gross radioactivity of the residue shall be measured with an adequate measuring channel. This specification procedure shall prevail (a) during the weekly checkout, (b) upon the appearance of any unusual radioactivity in the primary water or the primary water demineralizers, and (c) before the release of any primary water from the site.

(4) Primary equipment pit water level sensor shall alarm in the control room whenever a detectable amount of water (1 in. above floor level) exists in the equipment pit.

(5) Primary water pH shall be < 7.0.

Bases: Specifications 3.8.3(1), 3.8.3(2) and 3.8.3(5) are designed to protect the fuel element integrity and are based upon operating experience. At the specified quality, the activation products (of trace minerals) do not exceed acceptable limits. Specification 3.8.3(3) is designed to detect and identify fission products resulting from fuel failure and to fulfill reportability requirements pertaining to liquid wastes. Specification 3.8.3(4) is designed to alert the operator to potential loss of primary coolant, to prevent reactor operations with a reduced water inventory, and to minimize the possibility of an uncontrolled release of primary coolant to the environs.

3.9 Radiological Environmental Monitoring Program

3.9.1 General

The UFTR Radiological Environmental Monitoring Program is conducted to ensure that the radiological environmental impact of reactor operations is as low as reasonably achievable (ALARA); it is conducted in addition to the radiation monitoring and effluents control specified under Section 3.8 of these Technical Specifications.

4.2.6 Reactor Building Evacuation Alarm Surveillance

(1) The coincidence automatic actuation of two area monitors and the manual actuation of the evacuation alarm shall be tested as part of the weekly checkout.

(2) The automatic shutoff of the air conditioning system and the reactor vent system shall be tested as part of the weekly checkout.

(3) Evacuation drills for facility personnel shall be conducted quarterly, at intervals not to exceed 4 months, to ensure that facility personnel are familiar with the emergency plan.

4.2.7 Surveillance Pertaining to Fuel

(1) The incore reactor fuel elements shall be inspected every 10 years at intervals not to exceed 12 years, in a randomly chosen pattern, as deemed necessary. At least 8 elements will be inspected. At least 3 days shall have passed since the last operation at power ($\geq$ 1 kW) before the last two layers of concrete block shielding may be moved to reach the core area and before commencement of fuel handling to limit the possible/potential consequences of fuel handling accidents.

(2) Fuel-handling tools and procedures shall be reviewed for adequacy before fuel loading operations. The assignment of responsibilities and training of the fuel-handling crew shall be performed according to written procedures.

4.2.8 Primary and Secondary Water Quality Surveillance

(1) The primary water resistivity shall be determined as follows:

(a) Primary water resistivity shall be measured during the weekly checkout by a portable Solu Bridge using approved procedures. The measured value shall be larger than 0.4 megohm-cm.

(b) Primary water resistivity shall be measured during the daily checkout at both the inlet and outlet of the demineralizers (DM). The measured value, determined by an online Solu Bridge alarming in the control room, shall be larger than 0.5 megohm-cm at the outlet of the DM.

(2) The primary water radioactivity shall be measured during the weekly checkout for gross $\beta-\gamma$ and gross α activity.

(a) The measured α activity shall not exceed 50 dpm above background level.

(b) The measured $\beta-\gamma$ activity shall not exceed 25% above mean normal activity level.

(3) The secondary water system shall be tested for radioactive contamination during the weekly checkout according to written procedures.

(4) The primary water pH value shall be measured during the weekly preoperational checkout using approved procedures. The measured value shall be < 7.0.

prevent entrance during reactor operation. The freight door and panel shall not be used for general access to or egress from the reactor cell. This is not meant to preclude use of these doors in connection with authorized activities when the reactor is not in operation.

5.3 Reactor Fuel

Fuel elements shall be of the general MTR type, with thin fuel plates clad with aluminum and containing uranium fuel enriched to no more than about 19.75% U-235. The fuel matrix may be fabricated from uranium silicide-aluminum (U_3Si_2-Al) using the powder metallurgy process. There shall be nominally 12.5 g of U-235 per fuel plate.

The UFTR facility license authorizes the receiving, possession, and use of

(1) up to 5.2 kg of contained uranium-235
(2) a 1-Ci sealed plutonium-beryllium neutron source
(3) an up-to-25-Ci antimony-beryllium neutron source

Other neutron and gamma sources may be used if their use does not constitute an unreviewed safety question pursuant to 10 CFR 50.59 and if the sources meet the criteria established by the Technical Specifications.

5.4 Reactor Core

The core shall contain up to 24 fuel assemblies of 14 plates each. Up to six of these assemblies may be replaced with pairs of partial assemblies. Each partial assembly shall be composed of either all dummy or all fueled plates. A full assembly shall be replaced with no fewer than 13 plates in a pair of partial assemblies.

Fuel elements shall conform to these nominal specifications:

Item	Specification
Overall size (bundle)	2.845 in. x 2.26 in. x 25.6 in.
Clad thickness	0.015 in.
Plate thickness	0.050 in.
Water channel width	0.111 in.
Number of plates	standard fuel element – 14 fueled plates partial element – no fewer than 13 plates in a pair of partial assemblies
Plate attachment	bolted with spacers
Fuel content per plate	12.5 g U-235 nominal

The reactor core shall be loaded so that all fuel assembly positions are occupied.

The fuel assemblies are contained in six aluminum boxes arranged in two parallel rows of three boxes each, separated by about 30 cm of graphite. The fuel boxes are surrounded by a 5 ft x 5 ft x 5 ft reactor grade graphite assembly.

The top of the fuel boxes are covered during operations at power above 1 kW, by the use of the shield plugs and/or gasketed aluminum covers secured to the top of the fuel boxes. The devices function to prevent physical damage of the fuel, to minimize evaporation/leakage of water from the top of the fuel boxes, and to minimize entrapment of argon in the coolant water for radiological protection purposes.

5.5 Reactor Control and Safety Systems

Design features of the components of the reactor control and safety systems that are important to safety, as specified under Section 3.2 of these Technical Specifications, are given below.

5.5.1 Reactor Control System

Reactivity control of the UFTR is provided by four control blades, three safety blades and one regulating blade. The control blades are of the swing-arm type consisting of four aluminum vanes tipped with cadmium, protected by magnesium shrouds. They operate in a vertical arc within the spaces between the fuel boxes. Blade motion is limited to a removal time of at least 100 sec and the insertion time under trip conditions is stipulated to be less than 1 sec. The reactor blade withdrawal interlock system prevents blade motion which will exceed the reactivity addition rate of 0.06% $\Delta k/k$ per sec, as specified in these Technical Specifications. The control blade drive system consists of a two-phase fractional horsepower motor that operates through a reduction gear train, and an electrically energized magnetic clutch that transmits a motor torque through the control blade shaft, allowing motion of the control blades. The blades are sustained in a raised position by means of this motor, acting through the electromagnetic clutch. Interruption of the magnetic current results in a decoupling of the motor drive from the blade drive shaft, causing the blades to fall back into the core. Position indicators, mechanically and electronically geared to the rod drives, transmit rod position information to the operator control console. Reactor shutdown also can be accomplished by voiding the moderator/coolant from the core. Two independent means of voiding the moderator/coolant from the core are provided:

(1) water dump via the primary coolant system dump valve opening under full trip conditions
(2) water dump via the rupture disk breaking under pressure conditions above design value

The integral worths of the individual safety blades vary from about 1.3% to 2.0% $\Delta k/k$ depending on position in the core and individual characteristics. The regulating blade worth is about 0.6%–0.8% $\Delta k/k$. The rod worths, drive speeds, and drop-time values are sufficiently conservative to ensure compliance with the multirange pico-ammeter. The pico-ammeter sends a signal to one channel of the two-pen recorder to display power level from source level to full power. It also sends a signal to the automatic flux controller which, in comparison with a signal from a percent of power setting control acts to establish and/or hold power level at a desired value. The rate of power increase is controlled by the action of a limiter in the linear channel/automatic control system which maintains the reactor period at or slower than 30 sec.

5.6 Cooling Systems

5.6.1 Primary Cooling System

The primary coolant is demineralized light water, which is normally circulated in a closed loop. The flow is from the 200-gal storage (dump) tank to the primary coolant pump; water is then pumped through the primary side of the heat exchanger and to the bottom of the fuel boxes, upward past the fuel plates to overflow pipes located about 6 in. above the fuel, and into a header for return to the storage tank. A purification loop is used to maintain primary water quality. The purification loop pump circulates about 1 gpm of primary water, drawn from the discharge side of the heat exchanger, through mixed-bed ion-exchange resins and a ceramic filter. The purification loop pump automatically shuts off when the primary coolant pump is operating, since flow through the purification system is maintained. Primary coolant may be dumped from the reactor fuel boxes by opening an electrically operated solenoid dump valve, which routes the water to the dump tank. A pressure surge of about 2 lb above normal in the system also will result in a water dump by breaking a graphite rupture disc in the dump line. This drains the water to the primary equipment pit floor actuating an alarm in the control room. The primary coolant system is instrumented as follows:

(1) thermocouples at each fuel box outlet and the main inlet and outlet (eight total), alarming and recording in the control room

(2) a flow sensing device in main inlet line, alarming and displayed in the control room

(3) a flow sensing device (no flow condition) in the outlet line, alarming in the control room

(4) resistivity probes monitoring the inlet and outlet reactor coolant flow, alarming and displayed in the control room

(5) an equipment pit water level monitor, alarming in the control room

The reactor power is calibrated annually by the use of the coolant flow and temperature measuring channels.

5.6.2 Secondary Cooling System

Two secondary cooling systems are normally operable in the UFTR: a well secondary cooling system and a city water secondary cooling system. The well secondary cooling system is the main system used for removal of reactor

(e) abnormal and significant degradation in reactor fuel, or cladding, or both, coolant boundary, or containment boundary (excluding minor leaks), where applicable, which could result in exceeding prescribed radiation exposure limits of personnel or environment or both

(f) an observed inadequacy in the implementation of administrative or procedural controls such that the inadequacy causes or could have caused the existence or development of an unsafe condition with regard to reactor operations

(g) a violation of the Technical Specifications or the facility license

6.6.3 Other Special Reports

There shall be a written report sent to the Commission within 30 days of the following occurrences:

(1) permanent changes in facility organization involving Level 1, 2 or 3 personnel;

(2) significant changes in the transient or accident analyses as described in the UFTR Safety Analysis Report dated January 1981 and in the HEU to LEU fuel conversion analyses.

6.7 <u>Records</u>

Records of the following activities shall be maintained and retained for the periods specified below. The records may be in the form of logs, data sheets, or other suitable forms. The required information may be contained in single, or multiple records, or a combination thereof. Recorder charts showing operating parameters of the reactor (i.e., power level, temperature, etc.) for unscheduled shutdown and significant unplanned transients shall be maintained for a minimum period of 2 years.

6.7.1 Records To Be Retained for a Period of at Least Five Years

(1) normal reactor facility operation (Supporting documents such as checklists, log sheets, etc. shall be maintained for a period of at least 1 year.)

(2) principal maintenance operations

(3) reportable occurrences

(4) surveillance activities required by the Technical Specifications

(5) reactor facility radiation and contamination surveys where required by applicable regulations

(6) experiments performed with the reactor

(7) fuel inventories, receipts, and shipments