SECTION I

INSPECTION OBJECTIVES

To confirm that the plant operating procedures are prepared to adequately control safety related operations within the applicable regulatory requirements.

SECTION II

INSPECTION REQUIREMENTS

1. Procedure Administration

   Verify that Procedure 42400B has been completed for plant procedures identified in item 3 below.

2. Procedure Scope

   Obtain an index of the plant operating procedures and review it for completeness.

3. Procedure Content

   Conduct a review of 10%, but not less than four, of the plant operating procedures included in each of the following categories:

   Administrative Procedures
   General Plant Operating Procedures
   Procedures for Startup, Operation and Shutdown of Safety Related Systems
   Surveillance Test Procedures

4. During the review of procedures conducted in item 3 above verify that each is in the appropriate format as specified in the administrative controls and is technically adequate to accomplish its stated purpose.

SECTION III

INSPECTION GUIDANCE

2. Procedure Scope

The listing of plant operating procedures should include those identified in Regulatory Guide 1.33 in the following categories:

Administrative Procedures

General Plant Operating Procedures

Procedures for Startup, Operation and Shutdown of Safety Related Systems

Surveillance Test Procedures- Operations, i.e., related to test and demonstration of operability.

Special Note:

Although some of the review of licensee's facility procedures will be performed by the inspection staff at the site, it may be advantageous to borrow certain procedures for effective technical review in the office.

NOTE: The specific procedures must not be identified until needed, so that the licensee will not know in advance which ones will be reviewed.

In each case, the inspector shall inform the licensee that:

1. The procedures so borrowed do not consequently become part of the docket;

2. Future changes in the procedures by the licensee are not restricted because of the loan;
3. The IE review is for the purpose of understanding the scope and depth of the procedure and does not constitute a step-by-step review or an approval of the procedure in any way; and
4. The procedures will be returned at the approximate time specified by the licensee.

If the licensee informs the inspector that requested procedures are not available because they are in draft form, not yet approved internally, or some other similar reason, procurement may be deferred temporarily, but not later than is necessary to have adequate review time. The licensee should be informed that, in reviewing them, the inspector will take into account their tentative status. If a licensee refuses to lend a copy of a necessary procedure, refer the case to Headquarters for action.

3. Procedure Content

The procedures should include applicable operating limits, should be consistent with applicable regulatory requirements and prescribe steps important to the protection of the health and safety of the public. They should be consistent with the general guidance of ANSI N18.7, as well as the following.

a. Startup Procedures

General

The startup procedure guides reactor operation from cold or hot conditions, through nuclear startup, and up to power with the generator synchronized to the line. The startup procedure may also have special provisions for scram recoveries. The inspector is primarily concerned whether the procedure adequately specifies plant conditions and prerequisites for startup and the limits in effect during the startup, since these are directly related to conducting a safe startup.

Prerequisites and Plant Conditions

The following are among the things that should be performed or checked before nuclear startup begins:

(1) A check to insure that instruments are operable and properly set for startup.

(2) An operating panel check to verify the position of remotely operated valves, that coolant flow is on or in readiness, and that proper equipment is operating. Proper operations should not be dependent on the functioning of permissives. For example, even if permissives or mode switches induce scrams if flow is inadequate in the power range, the procedure should specify when coolant flow is to be turned

on and beyond what point startup cannot proceed without it.

(3) A check that valves have been lined up for startup.

(4) Emergency shutdown system has been put in readiness.

(5) Mode switch is properly set.

(6) Anticipated critical control rod position (or boron concentration) and rod withdrawal sequence is available.

(7) The neutron counting rate is above the minimum (even if an interlock exists) needed to insure adequate source strength and reliable counting rates.

Various other prerequisites may be required depending on the type of startup and the conditions from which the reactor is being started.

Limitation and Actions

The following parameters normally are limited or provided for during startup.

(1) Rod withdrawal sequence , or allowable dilution rate.

(2) Minimum instrumentation for startup - Provides multiplicity of instrumentation for reliability of information and protection and provides assurance of instrument overlap so that information gaps will not occur. The startup procedure should state the overlap required.

(3) The incremetal reactivity addition in the final approach to critical - The procedures should specify that continuous rod withdrawal or boron dilution be stopped at a specified value of subcriticality; and, subsequent to this, proceed more cautiously. This insures that reactivity additions will not be large enough to put the reactor on too short a period when the reactor passes through critical

(4) Reactor period or startup rate - This insures a controlled safe startup that will avoid an undue risk of overshooting power.

(5) Heatup rate (or maximum heatup power) - This limits stresses on the primary system.

(6) Temperature vs pressure relationship - This insures that stresses on the reactor vessel are limited to prescribed values until the vessel is at a temperature which exceeds the NDT temperature by a required amount.

Scram Recovery

Procedures should be included for abreviated pre-startup checks for scram recoveries and short outages during which limited work is done.

b. Power Operation Procedures

General

These procedures are used by the licensee to guide operations of the reactor after achieving power. The inspector is concerned that adequate surveillance be given the process to insure integrity of operations.

Reactivity Control

(1) The power operation procedure should specify the method of reactivity control for long term and short term transients, i.e., how the control rods, chemical shim, variable primary system flow, or any other systems are to be used, and when reactor control should be permitted in automatic.

(2) Good procedures will specify that reactivity be deliberately changed by only one parameter at a time - other than compensation for this change by the control system to hold power constant. For example, increasing power by withdrawal of control rods and simultaneously increasing reactivity by increasing recirculation pump speed should not be permitted.

Process Surveillance

Surveillance of the plant systems is intended to insure that the core does not generate too much heat, either locally or overall, for the coolant to remove; that the coolant quality and coolant boundary

integrity are maintained while operating, that emergency equipment is in a state of readiness, if needed to put the plant in a safe condition; and that adequate reactivity margin is available for a rapid hot shutdown. The following provisions should be included in the licensee's power operation procedures:

(1) Routine readings should be required on most systems to detect any abnormal condition, and these readings should be compared with previous readings. (This function may be provided by a data logger or computer surveillance). In addition, operators should patrol areas of the plant where equipment is operating to detect abnormal operations.

(2) Core performance should be determined routinely to detect any change of the flux distribution. The position of each control rod should be routinely verified, including rods that have been withdrawn. These procedures should warn operators to be alert to abnormal rod withdrawal when the reactor is in automatic control.

(3) Coolant quality should be determined by sampling routinely and by on-line instrumentation. Corrective action should be specified in the procedures, if a parameter approaches operating limits.

(4) The frequency of periodic tests and calibration of equipment, especially emergency and engineered safety equipment, should be specified, unless covered in the test and calibration or surveillance procedures. There should be supervisory or senior operator audits to insure that the tests and calibration schedules are met. The minimum requirements for checks, calibrations, and tests are specified in the Surveillance Requirements section of technical specfications.

Limitations and Actions

Power operation procedures should, as a minimum, specify or refer to safety limits and limiting conditions for operation, as required by the technical specifications. The procedure should specify the actions that must be taken when a limit is reached or exceeded.

c. Shutdown Procedures

General

These facility procedures guide operations during and following a controlled shutdown; and they prescribe the subsequent actions of operators after a scram has occurred, if the reactor is not to be returned to power immediately. Conditions for these operations are controlled at many facilities by a mode switch.

Shutdown operations, as well as startup operations, may be guided by a controlling procedure which refers to other procedures for equipment operation, or these operations may be an integral part of the shutdown procedures.

Limitations and Actions

Certain limitations should be included, as appropriate, while shutting the reactor down or when shut down with fuel in the reactor. Additional limitations are necessary if refueling is in progress.

(1) Rate of load reduction.

(2) Rod insertion sequence.

(3) Cooldown rate.

(4) Pressure vs temperature.

(5) Prevention of return to criticality - This may require (for PWR's) addition of boron and a delibrate return to critical periodically to determine shutdown margin during xenon decay.

(6) Shutdown cooling system - The shutdown flow rate should be specified to insure adequate decay heat removal to prevent fuel damage. If the rate is adjustable, a control point (temperature or flow) should be specified to insure adequate

heat removal. Cooling should not be turned off or decreased unless a time-to-temperature limit determination has been made.

The procedure should specify the temperature and pressure which are suitable for activating the shutdown cooling system.

(7) Minimum personnel manning requirements - Shutdown or administrative procedures should define the shutdown condition and should prescribe minimum personnel manning requirements for various core conditions. An example illustrating these requirements is: The reactor is considered to be shutdown when all rods are fully inserted and the reactor is at ambient temperature and pressure; a licensed reactor must be present at the controls during these conditions. If the core is void of fuel, operator attendance in the control room is not required.

(8) Reactor head removal - For reactors with top drive control rods, rod delatching and freedom of the head from rods should be demonstrated before the head is moved too far.

(9) Flux monitoring - The neutron flux should be monitored throughout shutdown, as long as fuel is in the reactor.

(10) Technical specification limits - These limits may relate to containment integrity, coolant flow, nuclear instrumentation for flux monitoring, safety injection operability status,

emergency power availability, and reactivity shutdown margin. The procedures should prescribe actions to be taken, as appropriate.

d. Systems Procedures

General

The licensee's system procedures are usually the largest segment of the facility procedures. They prescribe the detailed steps to insure safe operation of the systems which support and control reactor operation. These procedures are better when they contain a section that identifies the technical specifications for limiting conditions for operation and surveillance requirements that pertain to that system.

Selected procedures should be reviewed to determine that the important safety requirements are satisfied and that the procedure contains the necessary prerequisites, precautions, limitations, and check lists. A complete step-by-step evaluation of adequacy should not be made, nor should the review include verification of correct identification, positioning, or sequencing in value and circuit breaker check lists. The review should verify that provisions are made to fill, drain, vent, start up, shut down, change from one operating mode to another, and identify abnormal conditions. It is important that caution notes be included to identify possible reactivity effects may result as a consequence of starting up, shutting down, or changing system operating modes.