UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NRC INSPECTION MANUAL

SRXB

TEMPORARY INSTRUCTION 2515/113

RELIABLE DECAY HEAT REMOVAL DURING OUTAGES

SALP CATEGORY: SOSAGV-0

APPLICABILITY: This temporary instruction is to be performed during a plant outage at one unit for each power reactor site.

2515/113-01 OBJECTIVE

The objective of this TI is to review licensee activities during reactor plant outages which have the potential for contributing significantly to a loss of capability to remove decay heat from the reactor, and to provide this information to the Reactor Systems Branch, NRR, for their review. Activities identified that may have a negative impact on safety are to be reviewed by the regional office and NRR for discussion with the licensee.

2515/113-02 BACKGROUND

During plant shutdown, maintenance and surveillance activities will normally result in (1) the unavailability of a single train of the shutdown cooling systems, electrical systems, and other safety systems; (2) the opening of the primary and/or containment systems; (3) the erection of temporary installations for modification work; and (4) the movement of heavy equipment within the protected area and inside the plant. Switchyard maintenance activities can also require personnel to move equipment into and through the switchyard. When redundant safety systems are not available, personnel errors and the inadequate administrative control of activities can cause an extended loss of decay heat removal capability during periods in which the reactor may not have containment integrity. The event at the Diablo Canyon Nuclear Power Plant on April 10, 1987 highlighted the fact that operation of a pressurized water reactor (PWR) with a reduced inventory in the reactor coolant system was a particularly sensitive condition and prompted the U.S. Nuclear Regulatory Commission (NRC) to issue Generic Letter 88-17, "Loss of Decay Heat Removal." More recently, a report by an incident investigation team (IIT), "Loss of Vital AC Power and the Residual Heat Removal System During Mid-Loop Operations at Vogtle Unit 1 on March 20, 1990," (NUREG-1410) emphasized the need to manage risk during shutdown operations. In Information Notice 91-22, "Four Plant Outage Events Involving Loss of AC Power or Coolant Spills," the NRC staff reviewed events at Diablo Canyon Unit 1, and the Oyster Creek Nuclear Generating Station, and the Oconee Nuclear Generating Station Unit 3. These events reaffirmed the need to improve

operations during shutdown. The continued occurrence of events prompted the Director of NRR to write to the chief executive officer (CEO) of each utility operating a commercial nuclear power plant requesting that licensee personnel recognize the importance of carefully planning and coordinating planned outages of equipment, tests of systems and components, and plant conditions.

2515/113-03 INSPECTION REQUIREMENTS

The inspection requirements for this TI are for the inspector to gather information on the actions or considerations the licensee has taken to ensure reliable decay heat removal capability during plant outages. The specific areas to be reviewed by the inspection are as follows:

03.01 The inspector should check the following concerning decay heat removal systems:

a. Determine if the licensee has reviewed and approved special test procedures and operations during reactor plant outages that have the potential for contributing significantly to a loss of capability to remove decay heat from the reactor, and determine what licensee controls and practices have been made to ensure the continued removal of decay heat from the reactor.

b. Determine if the licensee has procedures to ensure that (1) forced circulation decay heat removal is maintained when required; or (2) that when natural circulation is used all required conditions are met and temperature monitoring is taking place.

03.02 The inspector should check following regarding the supply and distribution of electric power to the decay heat removal system and supporting systems:

a. Determine if one offsite power source and one onsite power source are available to each required shutdown load when less than the full complement of power sources or switchgear is available.

b. Determine if dc power, backed up by battery, is available to required loads when battery testing or maintenance is being performed.

c. Determine if nonstandard electrical line-ups have been analyzed to ensure they can carry sufficient load, and can properly activate protective circuitry. These nonstandard electrical line-ups could include the use of bus tie breakers normally not closed, the use of unit auxiliary transformers with main generator disconnect links removed, the use of old construction power sources, or the use of temporary cabling. Determine if the licensee's analysis considered the effects on the system of the use of backup power sources such as emergency diesel generators (EDGs) or alternate offsite circuits. Determine if the licensee used approved procedures for using such line-ups.

d. Determine if operators are prepared to (that is, trained with appropriate procedures) manually control electric power systems if they are needed when automatic control systems, such as the load sequencer or power relays are disabled for maintenance.

e. Determine if periods of increased vulnerability do or do not coincide with the minimal availability of electric power sources. These periods of increased vulnerability may include reduced inventory in pressurized water reactors (PWRs) or when work is being done below a boiling water reactor (BWR) vessel that could lead to draining the vessel.

f. Determine whether the licensee declares an EDG inoperable when its field flashing source (normally a dc battery bus) is removed from service for maintenance or testing.

03.03 Upon completion of the above observations, any identified safety concerns should be immediately reported to regional management for coordination with NRR.

2515/113-04 GUIDANCE

Inspectors should review the circumstances of events during shutdown that are documented in the information notices and generic letter referenced in this temporary instruction.

2515/113-05 REPORTING REQUIREMENTS

The inspector should reference TI 2515/113 and state in a routine inspection report that information was obtained on licensee practices for maintaining reliable decay heat removal during outages and has no further comment. In addition, the inspector should transmit, through appropriate regional office management, the detailed information observed from performing the individual inspection requirements of this TI, along with an assessment of that information, to the Chief, Reactor Systems Branch, NRR, OWFN 8-E-23.

2515/113-06 COMPLETION SCHEDULE

The inspectors should complete this inspection during the current or next scheduled maintenance or refueling outage at each power reactor site that occurs between the issue date of this TI and June 30, 1992.

2515/113-07 EXPIRATION

This temporary instruction will remain in effect until July 30, 1993, or until superseded by another inspection instruction, whichever occurs first.

2515/113-08 CONTACT

Please address general questions regarding this temporary instruction to Mark Caruso at 301-492-3235 or Warren Lyon at 301-492-0892. Please address questions regarding the specific guidance on electrical systems to Jim Lazevnick at 301-492-0782 or Jim Knight at 301-492-3264.

2515/113 STATISTICAL DATA REPORTING

Record actual inspection time to 2515/113 for the regulatory information tracking system (RITS) with an IPE code of SI.

2515/113-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility. The Reactor Systems Branch (SRXB) and the Electrical Systems Branch originated this temporary instruction.

10.02 Resource Estimate. The estimated number of onsite inspection hours necessary to complete this temporary instruction is 24 hours.

10.03 Followup Inspection. Charge the followup inspection effort performed after the expiration of this temporary inspection to IP 71715.

2515/113-11 TRAINING

No special training is planned for the conduct of this temporary instruction.

2515/113-12 REFERENCES

Generic Letter 88-17, "Loss of Decay Heat Removal," October 17, 1988. (47279/156)

Information Notice 90-25, "Loss of AC Power at Vogtle, April 16," 1990. (53440/001)

Information Notice 90-25, Sup. 1, "Loss of AC Power at Vogtle," March 11, 1991. (57037/001)

Information Notice 90-55, "Recent Operating Experience on Loss of Reactor Coolant Inventory While in a Shutdown Condition," August 31, 1990. (55083/091)

Information Notice 91-17, "Fire Safety of Temporary Installations," March 11, 1991. (57008/149)

Information Notice 91-22, "Four Outage Events Involving Loss of AC Power or Coolant Spills," March 19, 1991. (57266/031).

END