

SAFETY LIMIT

- c. The neutron flux shall not exceed its scram setting for longer than 1.5 seconds as indicated by the process computer. When the process computer is out of service, a safety limit violation shall be assumed if the neutron flux exceeds the scram setting and control rod scram does not occur.

To ensure that the Safety Limit established in Specifications 2.1.1a and 2.1.1b is not exceeded, each required scram shall be initiated by its expected scram signal. The Safety Limit shall be assumed to be exceeded when scram is accomplished by a means other than the expected scram signal.

- d. Whenever the reactor is in the shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be more than 6 feet, 3 inches (-10 inches indicator scale) below minimum normal water level (Elevation 302'9") except as specified in "e" below.
- e. For the purpose of performing major maintenance (not to exceed 12 weeks in duration) on the reactor vessel; the reactor water level may be lowered 9' below the minimum normal water level (Elevation 302'9"). Whenever the reactor water level is to be lowered below the low-low-low level setpoint redundant instrumentation will be provided to monitor the reactor water level.

LIMITING SAFETY SYSTEM SETTING

- d. The reactor water low level scram trip setting shall be no lower than -12 inches (53 inches indicator scale) relative to the minimum normal water level (302'9").
- e. The reactor water low-low level setting for core spray initiation shall be no less than -5 feet (5 inches indicator scale) relative to the minimum normal water level (Elevation 302'9").
- f. The flow biased APRM rod block trip settings shall be less than or equal to that shown in Figure 2.1.1.

BASES FOR 2.1.1 FUEL CLADDING - SAFETY LIMIT

During periods when the reactor is shut down, consideration must also be given to water level requirements, due to the effect of decay heat. If reactor water level should drop below the top of the active fuel during this time, the ability to cool the core is reduced. This reduction in core cooling capability could lead to elevated cladding temperatures and clad perforation. The core will be cooled sufficiently to prevent clad melting should the water level be reduced to two-thirds of the core height.

The lowest point at which the reactor water level can normally be monitored is approximately 7 feet 11 inches below minimum normal water level or 4 feet 8 inches above the top of the active fuel. This is the location of the reactor vessel tap for the low-low-low water level instrumentation. The actual low-low-low water level trip point is 6 feet 3 inches (-10 inches indicator scale) below minimum normal water level (Elevation 302'-9"). The 20 inch difference resulted from an evaluation of the recommendations contained in General Electric Service Information Letter 299 "High Drywell Temperature Effect on Reactor Vessel Water Level Instrumentation." The low-low-low water level trip point was raised 20 inches to conservatively account for possible differences in actual to indicated water level due to potentially high drywell temperatures. The safety limit has been established here to provide a point which can be monitored and also can provide adequate margin. However, for performing major maintenance as specified in Specification 2.1.1.e, redundant instrumentation will be provided for monitoring reactor water level below the low-low-low water level set point. (For example, by installing temporary instrument lines and reference points to redundant level transmitters so that the reactor water level may be monitored over the required range.) In addition written procedures, which identify all the valves which have the potential of lowering the water level inadvertently, are established to prevent their operation during the major maintenance which requires the water level to be below the low-low level set point.

The thermal power transient resulting when a scram is accomplished other than by the expected scram signal (e.g., scram from neutron flux following closure of the main turbine stop valves) does not necessarily cause fuel damage. However, for this specification a safety limit violation will be assumed when a scram is only accomplished by means of a backup feature of the plant design. The concept of not approaching a safety limit provided scram signals are operable is supported by the extensive plant safety analysis.

REFERENCES FOR BASES 2.1.1 AND 2.1.2 FUEL CLADDING

- (1) General Electric BWR Thermal Analysis Basis (GETAB) Data, Correlation and Design Application, NEDO-10958 and NEDE-10958.
- (2) Linford, R. B., "Analytical Methods of Plant Transient Evaluations for the General Electric Boiling Water Reactor," NEDO-10801, February 1973.
- (3) FSAR, Volume II, Appendix E.
- (4) FSAR, Second Supplement.
- (5) FSAR, Volume II, Appendix E.
- (6) FSAR, Second Supplement.
- (7) Letters, Peter A. Morris, Director of Reactor Licensing, USAEC, to John E. Logan, Vice-President, Jersey Central Power and Light Company, dated November 22, 1967 and January 9, 1968.
- (8) Technical Supplement to Petition to Increase Power Level, dated April 1970.
- (9) Letter, T. J. Brosnan, Niagara Mohawk Power Corporation, to Peter A. Morris, Division of Reactor Licensing, USAEC, dated February 28, 1972.
- (10) Letter, Philip D. Raymond, Niagara Mohawk Power Corporation, to A. Giambusso, USAEC, dated October 15, 1973.
- (11) Nine Mile Point Nuclear Power Station Unit 1 Load Line Limit Analysis, NEDO 24012, May, 1977.
- (12) Licensing Topical Report General Electric Boiling Water Reactor Generic Reload Fuel Application, NEDE-24011-P-A, August, 1978.
- (13) Nine Mile Point Nuclear Power Station Unit 1, Extended Load Line Limit Analysis, License Amendment Submittal (Cycle 6), NEDO-24185, April 1979.
- (14) General Electric SIL 299 "High Drywell Temperature Effect on Reactor Vessel Water Level Instrumentation."

LIMITING CONDITION FOR OPERATION

c. If a redundant component in each of the core spray systems becomes inoperable, both systems shall be considered operable provided that the component is returned to an operable condition within 7 days and the additional surveillance required is performed.

d. If a core spray system becomes inoperable and all the components are operable in the other system, the reactor may remain in operation for a period not to exceed 7 days.

e. If Specifications a, b, c and d are not met, a normal orderly shutdown shall be initiated within one hour and the reactor shall be in the cold shutdown condition within ten hours.

If both core spray systems become inoperable the reactor shall be in the cold shutdown condition within ten hours and no work (except as specified in "f" and "h" below) shall be performed on the reactor or its connected systems which could result in lowering the reactor water level to more than six feet, three inches below minimum normal water level (-10 inches indicator scale).

SURVEILLANCE REQUIREMENT

d. Core spray header ΔP instrumentation

| | |
|-----------|---------------|
| check | Once/day |
| calibrate | Once/3 months |
| test | Once/3 months |

e. Surveillance with Inoperable Components

When a component or system becomes inoperable its redundant component or system shall be demonstrated to be operable immediately and daily thereafter.

f. Surveillance during control rod drive maintenance which is simultaneous with the suppression chamber unwatered shall include at least hourly checks that the conditions listed in 3.1.4f are met.

LIMITING CONDITION FOR OPERATION

SURVEILLANCE REQUIREMENT

- h. For the purpose of performing major maintenance (not to exceed 12 weeks in duration) on the reactor vessel, the reactor water level may be lowered to 9' below the minimum normal water level (elevation 302'9"). Whenever the reactor water level is to be lowered below the low-low-low level set point redundant instrumentation will be provided to monitor the reactor water level and written procedures will be developed and followed whenever the reactor water level is lowered below the low-low level set point. The procedures will define the valves that will be used to lower the vessel water level. All other valves that have the potential of lowering the vessel water level will be identified by valve number in the procedures and these valves will be red tagged to preclude their operation during the major maintenance with the water level below the low-low level set point.

During the period of major maintenance requiring lowering the water level to more than 6 feet, 3 inches below minimum normal water level (-10 inches indicator scale), either both Core Spray Systems must be operable or, if one Core Spray System is inoperable because of the maintenance, all of the redundant components of the other Core Spray System must be operable.

BASES FOR 3.1.5 AND 4.1.5 SOLENOID-ACTUATED PRESSURE RELIEF VALVES

Pressure Blowdown

In the event of a small line break, substantial coolant loss could occur from the reactor vessel while it was still at relatively high pressures. A pressure blowdown system is provided which in conjunction with the core spray system will prevent significant fuel damage for all sized line breaks (Appendix E-11.2.0*).

Operation of three solenoid-actuated pressure relief valves is sufficient to depressurize the primary system to 110 psig which will permit full flow of the core spray system within required time limits (Appendix E-11.2*). Requiring all six of the relief valves to be operable, therefore, provides twice the minimum number required. Prior to or following refueling at low reactor pressure, each valve will be manually opened to verify valve operability. The malfunction analysis (Section II.XV, "Technical Supplement to Petition to Increase Power Level," dated April 1970) demonstrates that no serious consequences result if one valve fails to close since the resulting blowdown is well within design limits.

In the event of small line break, considerable time is available for the operator to permit core spray operation by manually depressurizing the vessel using the solenoid-actuated valves. However, to ensure that the depressurization will be accomplished, automatic features are provided. The relief valves shall be capable of automatic initiation from simultaneous low-low-low water level (6 feet, 3 inches below minimum normal water level at Elevation 302' 9", -10 inches indicator scale) and high containment pressure (3.5 psig). The system response to small breaks requiring depressurization is discussed in Section VII-A.3.3* and the time available to take operator action is summarized in Table VII-1*. Additional information is included in the answers to Questions III-1 and III-5 of the First Supplement.

Steam from the reactor vessel is discharged to the suppression chamber during valve testing. Conducting the tests with the reactor at low pressure such as just prior to or just after refueling minimizes the stress on the reactor coolant system.

The test interval of once per operating cycle results in a system failure probability of 7.0×10^{-7} (Fifth Supplement, p. 115)* and is consistent with practical consideration.

* FSAR

LIMITING CONDITION FOR OPERATION

- c. If a redundant component in each of the containment spray systems or their associated raw water systems become inoperable, both systems shall be considered operable provided that the component is returned to an operable condition within 7 days and that the additional surveillance required is performed.
- d. If a containment spray system or its associated raw water system becomes inoperable and all the components are operable in the other systems, the reactor may remain in operation for a period not to exceed 7 days.
- e. If Specifications "a" or "b" are not met, shutdown shall begin within one hour and the reactor coolant shall be below 215F within ten hours.

If both containment spray systems become inoperable the reactor shall be in the cold shutdown condition within ten hours and no work (except as specified in "f" below) shall be performed on the reactor which could result in lowering the reactor water level to more than six feet, three inches (-10 inches indicator scale) below minimum normal water level: (Elevation 302' 9").

SURVEILLANCE REQUIREMENT

- c. Raw Water Cooling Pumps
At least once per quarter manual startup and operability of the raw water cooling pumps shall be demonstrated.
- d. Surveillance with Inoperable Components
When a component or system becomes inoperable its redundant component or system shall be demonstrated to be operable immediately and daily thereafter.
- e. Surveillance during control rod drive maintenance which is simultaneous with the suppression chamber unwatered shall include at least hourly checks that the conditions listed in 3.3.7.f are met.

Table 3.6.2f

INSTRUMENTATION THAT INITIATES AUTO DEPRESSURIZATIONLimiting Condition for Operation

| <u>Parameter</u> | <u>Minimum No. of Tripped or Operable Trip Systems</u> | <u>Minimum No. of Operable Instrument Channels per Operable Trip System</u> | <u>Set-Point</u> | <u>Reactor Mode Switch Position in Which Function Must Be Operable</u> | | |
|--|--|---|---------------------------------|--|-----|---|
| <hr/> | | | | | | |
| <u>INITIATION</u> | | | | | | |
| (1) a. Low-Low-Low Reactor Water Level | 2 (a) | 2 (a) | ≥ -10 inches* (Indicator scale) | (b) | (b) | x |
| and | | | | | | |
| b. High Drywell Pressure | 2 (a) | 2 (a) | ≤ 3.5 psig | (b) | (b) | x |

* greater than (\geq) means less negative

