UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF THE SECOND TEN YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

REQUESTS FOR RELIEF RI-01 THROUGH RI-19

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

The Technical Specifications for the Cooper Nuclear Station (CNS) state that the inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Cooper Nuclear Station second 10-year inservice inspection (ISI) interval is the 1980 Edition through Winter 1981 Addenda. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

ENCLOSURE 1

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed. In a letter dated June 21, 1995, the Nebraska Public Power District submitted to the NRC its second 10-Year interval inservice inspection program plan, Requests for Relief Nos. RI-01 through RI-19 for the CNS.

2.0 EVALUATION AND CONCLUSIONS

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its second 10-year interval inservice inspection program plan, Requests for Relief Nos. RI-01 through RI-19 for CNS.

Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report. The staff concludes that for Requests for Relief Nos. RI-09, RI-10, RI-11, RI-12, and RI-14, the licensee's proposed alternatives will provide an acceptable level of quality and safety, with certain provisions, as specified. Therefore, the proposed alternatives contained in Requests for Relief Nos. RI-09, RI-10, RI-11 (as requested), RI-12, and RI-14 are authorized pursuant to 10 CFR 50.55a(a)(3)(i), with provisions for Requests for Relief Nos. RI-09, RI-10, RI-12, and RI-14, as listed below:

(1) Request for Relief No. RI-09 to use Code Case N-522 is authorized, provided that the test procedures permit the detection and location of through-wall leakage in containment isolation valves (CIV), and pipe segments between the CIVs, and that the testing is done under the peak calculated containment pressure;

(2) Request for Relief No. RI-10 is authorized, provided that the licensee performs the proposed supplemental visual examination as described in the licensee's request for relief;

(3) Request for Relief No. RI-12 to use Code Case N-524 is authorized, provided the volumetric examination of the adjacent circumferential welds provide scanning for reflectors transverse to the weld; and

(4) Request for Relief No. RI-14 to use Code Case N-509 is authorized, provided the licensee schedules a minimum of 10% of all integral attachments in non-exempt Code Class 1, 2, and 3 systems for examination.

The licensee has demonstrated that for Request for Relief No. RI-08, specific Section XI requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and the proposed testing to use Code Case N-498-1 provides reasonable assurance of operational readiness. Therefore, the licensee's proposed alternative contained in Request for Relief No. RI-08 to use Code Case N-498-1 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), with the provision noted below.

The above requests to use Code Cases N-509, N-522, N-524, and N-498-1 are authorized until such time as the code cases are published in Regulatory Guide 1.147. From that time, if the licensee continues to implement these code cases, the licensee should follow all provisions in Code Cases N-509, N-522, N-524, and N-498-1 with limitations as issued in Regulatory Guide 1.147, if any.

In Request for Relief No. RI-16, the licensee requested relief from performing the Code-required VT-3 visual examinations of pump and valve internal surfaces by disassembling pumps and valves for the sole purpose of conducting the examinations. The 1989 Edition of the ASME Code has eliminated disassembly of pumps and valves for the sole purpose of examining the internal surfaces and states that the internal surface visual examination requirement is only applicable to pumps and valves that are disassembled for reasons such as maintenance, repair, or volumetric examination. The staff approves the licensee's use of that portion of the 1989 Edition of the ASME Code noted above, pursuant to 10 CFR 50.55a(g)(4)(iv), provided that all related requirements of the 1989 Code are met.

The staff has concluded that certain inservice examinations contained in Requests for Relief Nos. RI-15, RI-18, and RI-19 cannot be performed to the extent required by Section XI of the ASME Code. In the cases of Relief Requests Nos. RI-15, RI-18, and RI-19, the licensee has demonstrated that specific Section XI requirements are impractical. The licensee's proposed testing will provide reasonable assurance of operational readiness of the subject systems. Therefore, Requests for Relief Nos. RI-15, RI-18, and RI-19 are granted as requested pursuant to 10 CFR 50.55a(g)(6)(i). The granting of relief will not endanger life, property, or the common defense and security and is otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Requests for Relief Nos. RI-01 and RI-04 were deleted from the program plan. Request for Relief No. RI-02 was denied in NRC's safety evaluation (SE) dated January 27, 1986 and was removed in the licensee's May 1987 addenda. The original dispositions of Requests for Relief Nos. RI-03 (Rev. 1), RI-05 (Rev. 1), RI-06 (Rev. 1), and RI-07 (Rev. 1) remain in effect, since the bases for relief and the alternative examinations proposed are unchanged from those described in previous NRC SEs dated January 27, 1986 (RI-03, RI-05 and RI-06), and August 31, 1995 (RI-07).

Request for Relief No. RI-13 regarding snubber examination and testing will be evaluated as a separate action by the staff. The licensee withdrew Request for Relief No. RI-17 by letter dated October 26, 1995.

Principal Contributor: T. McLellan

Date: December 13, 1995

TECHNICAL LETTER REPORT
ON THE SECOND TEN-YEAR INSERVICE INSPECTION INTERVAL
REQUESTS FOR RELIEF RI-01 THROUGH RI-19
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
DOCKET NO. 50-298

1.0 INTRODUCTION

In a letter dated June 21, 1995, the licensee, Nebraska Public Power District, deleted requests for relief RI-01, RI-02, and RI-04 and submitted revisions of requests for relief RI-03, RI-05, RI-06, and RI-07 and new requests for relief RI-08 through RI-19 for the Second Ten-Year Inservice Inspection (ISI) Interval at the Cooper Nuclear Station. The Idaho National Engineering Laboratory (INEL) staff has evaluated the subject requests for relief in the following section.

2.0 EVALUATION

The Code of record for the Cooper Nuclear Station Second Ten-Year ISI Interval is the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, 1980 Edition with the Winter 1981 Addenda. The information provided by the licensee in support of the requests for relief has been evaluated and the bases for disposition are documented below.

A. Deletion of Requests for Relief RI-01, RI-02, and RI-04

The licensee stated that Relief Requests RI-01 and RI-04 have been deleted on the basis of selection of alternative welds in accordance with 10 CFR 50.55a(b)(2)(ii) and Code Case N-408-2. Case N-408-2, *Alternative Rules for Examination of Class 2 Piping*, is endorsed in Regulatory Guide 1.147. Relief request RI-02, "ASME Category C-F, RHR Drywell Spray Internal to the Drywell," was denied in a Safety

Evaluation (SE) dated January 27, 1986. The licensee stated that this relief request was thus removed in the May 1987 addenda. In a conference call on October 11, 1995, the licensee clarified that this was an addenda to the licensee's ISI Program Plan.

B. Request for Relief RI-03 (Rev. 1), Examination Category B-D, Item B3.100, Class 1 Reactor Head Nozzle Inner Radii

The original version of this relief request was granted in an SE dated January 27, 1986. Revision 1 is an editorial reformat. The basis for relief and the alternative examination proposed are unchanged. The original evaluation and conclusion, therefore, are applicable to Revision 1 of this relief request.

C. Request for Relief RI-05 (Rev. 1), Examination Category C-A, Item C1.30, Class 2 Residual Heat Exchanger Vessel Welds

The original version of this relief request was granted in an SE dated January 27, 1986. Revision 1 was submitted to correct an error in the weld number. The basis for relief and the alternative examination proposed are unchanged. The original evaluation and conclusion, therefore, are applicable to Revision 1 of this relief request.

D. Request for Relief RI-06 (Rev. 1), Examination Category B-A, Item B1.10, Class 1 Reactor Vessel Welds

The original version of this relief request was granted in an SE dated January 27, 1986. Revision 1 was submitted to incorporate the provision in the referenced SER that requires welds VLA-BA-1, 2, and 3 to be examined to the extent practical during nozzle examinations. The licensee notes that this relief request is still applicable per 10 CFR 50.55a(g)(6)(ii)(A)(3)(iv) because the augmented examinations of the reactor vessel have been deferred to the first period of the

third inspection interval. The original evaluation and conclusion, therefore, are applicable to Revision 1 of this relief request.

E. Request for Relief RI-07 (Rev. 1), Examination Category B-H, Reactor Vessel Support Skirt to Reactor Vessel Bottom Head Weld

In discussion with the licensee's staff, it was determined that Revision 1 of RI-07 was merely included in the June 21, 1995, licensee submittal for completeness and that the request was technically unchanged from the original RI-07. The original evaluation and conclusion in an SE dated August 31, 1995, therefore, are applicable to Revision 1 of this relief request.

F. Request for Relief RI-08, Examination Categories D-A, D-B, and D-C, 10-Year Hydrostatic Pressure Test Requirements for Class 3 Systems

Code Requirement: Table IWA-5210-1, Examination Categories D-A, D-B, and D-C require a system hydrostatic pressure test (IWA-5211d) and accompanying VT-2 visual examination at least once each inspection interval.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required hydrostatic tests of Class 3 systems.

Licensee's Basis for Relief (as stated):

"Approved Code Case N-498 currently allows Class 1 and 2 System Hydrostatic testing at a reduced pressure equal to system nominal operating pressure. The recent ASME approved Code Case N-498-1, while repeating these requirements for Class 1 and 2, also clarifies the intent of using installed plant instrumentation without the need for test gauging or the imposed requirements of IWA-5260 when performing these nominal operating pressure tests.

"Performing system pressure tests on Class 1 and 2 systems consistent with the requirements of N-498-1, together with the applicable volumetric examinations in accordance with the ISI Program, provides a level of quality and safety equivalent to, or greater than, that provided by the Code hydrostatic test pressure

and instrumentation requirements. Code Case N-498-1 also permits the reduced pressure testing in lieu of Hydrostatic Tests for Class 3 Systems.

"CNS employs a very active erosion/corrosion monitoring and control program which periodically measures wall thickness in selected Class 3 piping and components. This program primarily focuses on those portions of piping which are most susceptible to erosion, microbiologically influenced corrosion (MIC) and other identified corrosion mechanisms which are inherent to the service water and like systems. The screening criteria for selection of piping and components to be chosen for "Thickness Examination" includes:

"(1) sections susceptible to wall thinning by erosion, (2) low flow sections, and (3) intermittent or no flow sections.

"It is CNSs intention to select those portions of piping and components for examination most susceptible to erosion and corrosion thereby giving a conservative representation of overall pressure boundary integrity.

"It is CNSs position that performing system pressure tests on Class 3 systems consistent with the requirements of N-498-1, together with augmented test programs (e.g. erosion/corrosion monitoring for piping determined to be most susceptible to erosion and corrosion), provides a level of quality and safety equivalent to, or greater than, that provided by the Code hydrostatic test pressure and instrumentation requirements."

Licensee's Proposed Alternative (As stated):

"As a supplement to existing Section XI requirements, CNS will adopt the provisions of Code Case N-498-1.

"In lieu of performing a hydrostatic pressure test at a pressure above nominal operating pressure or system pressure for which overpressure protection is required, as required by Table IWA-5210-1, Examination Categories B-P, C-H, D-A, and D-B, a system pressure test at nominal operating pressure and temperature shall be performed.

"In lieu of instrumentation requirements specified in IWA-5260, existing plant instrumentation will be used per IWA-5212(b). Where instrumentation may be required and does not exist, the rules of IWA-5260 shall be used.

"For Class 3 Systems, CNS shall also continue to maintain and implement an erosion/corrosion monitoring program for piping determined to be most susceptible to erosion and corrosion, as previously described."

Evaluation: Information prepared in conjunction with ASME Code Case N-498-1 notes that the system hydrostatic test is not a test of the structural integrity of the system but rather an enhanced leakage test. A technical paper* confirms this. Piping components are designed for the number of loadings that would be postulated to occur under the various modes of plant operation. Hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity since piping dead weight, thermal expansion, and seismic loads, which may present a far greater challenge to the structural integrity of a system than fluid pressure, are not part of the loading imposed during a hydrostatic test. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leakage detection during the examination of components under pressure, rather than as a measure to determine the structural integrity of the components.

Nebraska Public Power District requested approval for implementation of the alternative rules of ASME Section XI, Code Case N-498-1, dated May 11, 1994, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems*, in lieu of 10-year hydrostatic testing of Class 3 systems. Use of Code Case N-498 for Class 1 and 2 systems was previously approved by the NRC in Regulatory Guide 1.147. The rules for Code Class 1 and 2 in N-498-1 are unchanged from N-498. The staff found N-498 acceptable because the alternative provided adequate assurance of quality and safety and because compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Revision N-498-1 incorporated Class 3 components and specifies requirements for them that are identical to those for Class 2 components. In lieu of 10-year hydrostatic pressure testing at or

---

*S. H. Bush and R. R. Maccary, *Development of In-Service Inspection Safety Philosophy for USA Nuclear Power Plants*, ASME, 1971.

near the end of the 10-year interval, Case N-498-1 requires a visual examination (VT-2) in conjunction with a system leakage test in accordance with IWA-5000.

Currently, licensees expend considerable time, radiation dose, and economic resources meeting hydrostatic test requirements. The added safety assurance provided by the slight increase in system pressure during a hydrostatic test is offset or negated by the following factors: having to gag or remove Code safety and or relief valves, placing the system in an off-normal state, erecting temporary supports in steam lines, possible extension of refueling outages, and resource requirements to set up testing with special equipment and gages.

Class 3 systems do not normally receive the number and/or type of nondestructive examinations that Class 1 and 2 systems receive. While Class 1 and 2 system failures are relatively uncommon, Class 3 leaks occur more frequently and the failure mode typically differs. Based on review of Class 3 system failures requiring repair reported for the last five years in Licensee Event Reports and the Nuclear Plant Reliability Data System databases, the most common causes of failure are erosion-corrosion (EC), microbiologically-induced corrosion (MIC), and general corrosion. Licensees generally have programs in place for prevention, detection, and evaluation of EC and MIC. Leakage from general corrosion is readily apparent to inspectors when performing a VT-2 examination during system pressure tests. The industry indicates that experience has demonstrated that leaks are not being discovered as a result of hydrostatic test pressures propagating a preexisting flaw through wall and indicates that leaks in most cases are being found when systems are at normal operating pressure. Also, with systems at normal operating pressure, the existing plant instrumentation, in accordance with IWA-5212(b), is suitable in lieu of the requirements of IWA-5260 for hydrostatic testing instrumentation.

Considering the minimal amount of increased assurance provided by the increased pressure of the Code-required hydrostatic test, it is concluded that compliance with the Section XI hydrostatic pressure requirements results in hardship and/or unusual difficulty for the licensee without a compensating increase in the level of quality and safety. Accordingly, it is recommended that the licensee's proposed alternative, use of Code Case N-498-1, *Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems*, be authorized for the second ten-year interval pursuant to 10 CFR 50.55a(a)(3)(ii). All the requirements of the Code Case and related Section XI requirements must be met. This alternative should be authorized until such time as the Code Case is referenced in Regulatory Guide 1.147. At that time, if the licensee continues to implement this alternative, all provisions in Code Case N-498-1, including any additional limitations listed in Regulatory Guide 1.147, should be followed.

G. Request for Relief RI-09, Examination Category C-H, Class 2 Containment Penetration Piping and Valves

Code Requirement: Table IWC-2500-1, Examination Category C-H, requires a system pressure test, inservice or functional (IWC-5221), and a system hydrostatic test (IWC-5222) in conjunction with a VT-2 visual examination of pressure-retaining components, piping, and valves.

Licensee's Code Relief Request: The licensee requested relief from performing the Code-required tests for piping that penetrates the containment and is attached to non-Code Class piping.

Licensee's Basis for Requesting Relief (as stated):

"The portion of piping that penetrates containment and the associated inboard and outboard containment isolation valves are required to be constructed in accordance with Class 1 or Class 2 design requirements. In the instance where the piping penetration is for a nonsafety-related system, the sole safety function of the penetration piping and associated valves is to provide containment

isolation and maintain containment integrity in the event of a failure of the attached nonsafety-related piping. In all cases during normal plant operation, the isolation valves associated with these penetrations are maintained in the locked closed position, are administratively closed (controlled procedurally), or they close automatically upon receipt of a containment isolation signal or on loss of flow. The integrity of these penetrations is verified by 10 CFR 50, Appendix J, leakage testing.

"Additionally, per Code Case N-522, "Pressure Testing of Containment Piping Section XI, Division 1," the ASME Section XI Code Committee has determined that pressure testing in accordance with 10 CFR 50, Appendix J, is an acceptable alternative to the pressure testing requirements of Table IWC-2500-1, Category C-H, for piping that penetrates the containment vessel and is attached to non-Code Class piping.

"Performing system pressure tests each inspection period and a hydrostatic test each inspection interval as required by Section XI would be redundant to Appendix J testing. Additional pressure testing per the requirements of Table IWC-2500-1, Category C-H, would provide no significant increase in quality or safety. Pressure testing of piping in nonsafety-related systems penetrating containment pursuant to the requirements of 10 CFR 50, Appendix J, in lieu of Section XI pressure testing provides an acceptable level of quality and safety."

Licensee's Proposed Alternative (as stated):

"As an alternative to existing Section XI requirements, CNS will adopt the provisions of Code Case N-522. Pressure testing shall be performed in accordance with the requirements of 10 CFR 50, Appendix J, in lieu of the additional requirements specified in Table IWC-2500-1, Category C-H. This alternate testing shall be applicable to Class 2 containment penetration piping and associated valves attached to non-safety system (non-Class) piping."

Evaluation: The hydrostatic pressure test required in Table IWC-2500-1, Category C-H, provides periodic verification of the leak-tight integrity of Class 2 piping systems, or segments, at least once during every 10-year ISI interval. The Appendix J pressure testing provides periodic verification of the leak-tight integrity of the primary reactor containment and of systems and components that penetrate containment. Appendix J requires that three Type A tests be performed at approximately equal intervals during the 10-year ISI interval, with the third test during shutdown

for the 10-year plant ISI. Appendix J also requires Type B and Type C tests to be performed during each refueling outage, but in no case at intervals greater than 2 years.

The Class 2 containment isolation valves (CIVs) and connecting pipe segments must withstand the peak calculated containment internal pressure related to the maximum design accident conditions. The licensee states that (1) the containment penetration piping is classified as Class 2 because of its function as part of the containment pressure boundary, and (2) because containment integrity is the only safety-related function performed by this penetration piping, it is logical to test the penetration piping portion of the associated system to the Appendix J criteria. The pressure-retaining integrity of the CIVs and connecting piping, and their associated safety functions, may be verified with an Appendix J, Type C test if it is conducted at the peak calculated containment pressure. The seal between the connecting pipe segment and containment may be verified using an Appendix J, Type B test. Therefore, when the connecting pipe segment is subjected to either a Type B or C test, its safety function is verified and Code Case N-522 may be used. For Class 2 pipe segments between the CIVs that are not subjected to either a Type B or C test, the safety function is not verified and Code Case N-522 may not be used.

Section XI, IWC-5210(b) requires that where air is used as a testing medium, the test procedure shall permit the detection and location of through-wall leakages. Because an Appendix J, Type C test most likely uses air as a testing medium, the licensee's test procedure should meet the above requirement for the CIVs and pipe segments between the CIVs.

Based on the information submitted and this analysis, it is concluded that compliance with Appendix J would provide an acceptable level of quality and safety in lieu of the Code-required hydrostatic test of Class 2 piping that penetrates containment,

where the balance of the piping system is non-Code class. The licensee's proposal, Relief Request RI-09, for the use of Code Case N-522 is recommended to be authorized pursuant to 10 CFR 50.55a(a)(3)(i), provided that the test procedure permits the detection and location of through-wall leakages in CIVs, and pipe segments between the CIVs, and that the testing is done under the peak calculated containment pressure.

H. Request for Relief RI-10, IWA-5244, Examination Category C-H, VT-2 Visual Examination of Redundant Systems for Buried Components

Code Requirement: IWA-5244 (b) requires that for redundant systems where the buried components are nonisolable, the VT-2 visual examination shall consist of a test that determines the change in flow between the ends of the buried pipe.

Licensee's Code Relief Request: The licensee requested relief from the flow measurement requirements of the Code for the buried service water critical supply headers leading from the service water building to the control building.

Licensee's Basis for Requesting Relief (as stated):

"Isolation valves are installed in the redundant buried portion of the service water critical supply headers. Buried components in redundant systems that are isolable are not address in IWA-5244. However, leakage testing of the buried piping is impractical because the isolation valves located in the service water building and the control building are large butterfly valves which are extremely unreliable for performing a pressure isolation function. Each critical header supplies two RHRSW booster pumps, one REC heat exchanger and one diesel generator. A butterfly isolation valve is installed in the main header in the service water building and in each of these branch supply lines in the control building. Since the valves are not designed to be leak tight, these five butterfly valves would provide multiple leakage paths. Leak testing this buried piping to determine the rate of pressure loss would require extensive valve seat maintenance and would not provide conclusive test results.

"Current Code rules allow determining a change in flow between the ends of the buried components [IWA-5244(a) and 5244(b)]. Flow instruments are installed in the service water lines in the control building. However there are not flow instruments installed in the system upstream of the buried piping. Accurate flow measurements using temporary flow instrumentation (e.g., ultrasonic flow meters) are not possible due to insufficient runs of straight pipe between the pump discharge and the buried piping. Therefore, direct measurement of the change in flow between the ends of the buried piping is not practical.

"The installation of permanent flow instruments would require significant system modifications which would be burdensome. The cost of these modifications, when weighed against the benefits, are not justifiable."

Licensee's Proposed Alternative (as stated):

"In lieu of performing a visual examination VT-2 in accordance with IWA-5244, CNS shall use existing plant instrumentation for determining the integrity of buried pipe. Discharge pressure is indicated by pressure gauges provided at each individual pump (SW-PI-360 A, B, C, & D). Service water pumps A & C discharge to a common header, as do pumps B & D. Each header is provided with pressure indication prior to exiting the intake structure (SW-PI-383 A&B). When these headers resurface in the control building, pressure indication (SW-PI-384 A & B) and flow indication (SW-FI-385 A & B and SW-FI-364 A & B) are provided.

"The integrity of the buried piping is verified during quarterly pump testing. Using the downstream flow instruments, flow rate is set at the fixed test reference value and documented in the test record. The pump discharge pressure is then measured and used to determine the head produced by the pump. Head and flow rate are interdependent variables which, together, define pump hydraulic performance. As the pump degrades, the developed head will decrease at the reference flow rate. Due to the location of the flow rate instruments (downstream of the buried piping), a decrease in pump head during testing may also indicate side-stream leakage into the isolated non-critical header or through-wall leakage in the buried portion of the service water system piping. This is because the head developed by the pump decreases as flow rate increases. Significant through-wall leakage would be evident because the total flow rate would increase even though the downstream indicated flow rate is set at the reference value. Therefore, a satisfactory quarterly service water pump test also verifies the integrity of the buried system supply piping.

"Should the pump test results fall in the required action range, additional tests and evaluations will be performed to determine whether the unsatisfactory test results are due to side-stream

leakage past butterfly isolation valves, degraded pump performance, or through-wall leakage."

Evaluation: The alternative proposed by the licensee, to test this buried pipe in conjunction with quarterly testing of pumps, will provide an acceptable level of quality and safety when supplemented by a visual examination for leakage on the surface above the buried pipe. Significant through-wall leakage would be detected in a similar manner to what would be expected with the Code-required flow measurement test. Therefore, it is recommended that the proposed alternative, with the supplemental visual examination described above, be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

I. Request for Relief RI-11, IWD-5223, VT-2 Examination of Relief Valve Piping which Discharges into the Suppression Pool

Code Requirement: IWD-5223(f) requires a pneumatic test (at a pressure of 90% of the pipe submergence head of water) of relief valve piping that discharges into the containment suppression pool.

Licensee's Code Relief Request: The licensee requested relief from the Code pneumatic test for the relief valve piping that discharges into the suppression pool.

Licensee's Basis for Requesting Relief (as stated):

"These relief valves are currently actuated once each operating cycle commensurate with Reactor Vessel pressure ≥ 100 psig. Suppression Pool temperature and levels monitored during this test substantiate the integrity of the discharge piping by its ability to direct flow from the relief valve to the suppression pool.

"The Code required 10 year pressure test of the discharge piping with a pneumatic test at a pressure of 90% of the pipe submergence head of water equates to an applied pressure of approximately 1.17 psig equivalent to the 3 ft of submerged piping.

"The Code requirement has been removed from the 1994 Addenda of ASME Section XI 1992 Edition.

"Current test parameters significantly exceed Code requirements in piping pressurization and frequency. Performance of the current Code required testing would not increase the margin of assurance for safety beyond current test parameters, and would only serve as a redundant inferior test requirement."

Licensee's Proposed Alternative (as stated):

"In lieu of performing a visual examination VT-2 in accordance with the requirements specified in IWD-5223 (f), CNS shall use existing plant surveillance tests of the operability of each Main Steam Safety Relief Valve to demonstrate the integrity of the discharge piping."

Evaluation: The alternative proposed by the licensee, to test the relief valve piping that discharges into the suppression pool in conjunction with the actuation of the valves each operating cycle, will provide more frequent tests at a higher pressure. Therefore, the alternative provides an acceptable level of quality and safety, and it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

J. Request for Relief RI-12, Examination Category B-J, Item B9.12 and Examination Category C-F, Item C5.22, Longitudinal Piping Welds

Code Requirement: For Class 1 piping, Table IWB-2500-1, Examination Category B-J, Item B9.12, requires surface and volumetric examinations of longitudinal welds in piping greater than or equal to NPS 4. For Class 2 piping, Table IWC-2500-1, Examination Category C-F, Item C5.22 requires surface and volumetric examinations of longitudinal welds in piping with a nominal wall thickness greater than ½ inch.

Licensee's Code Relief Request: The licensee requests that the longitudinal weld examinations be restricted to those portions of the welds within the examination boundaries of intersecting circumferential welds. These provisions are contained in Code Case N-524, *Alternative Examination Requirements for Longitudinal Pipe Welds in Class 1 and 2 Piping.*

Licensee's Basis for Requesting Relief (as stated):

"The area of the longitudinal seam weld which is most susceptible to failure is that portion immediately adjacent to the circumferential weld. During the circumferential welding process, this area is most likely to undergo material changes, resulting in flaw development and potential failure. This critical area is included in the required volume of material examined during the volumetric scanning of the circumferential weld."

Licensee's Proposed Alternative (as stated):

"CNS proposes as an alternative to the Code required volumetric examination and/or surface examination of Class 1 and 2 longitudinal pipe welds, to perform the examinations in accordance with ASME Section XI Code Case N-524, 'Alternative Examination Requirements for Longitudinal Pipe Welds in Class 1 and 2 Piping; Section XI, Division 1.'"

Evaluation:

The Code requires surface and volumetric examination of segments of longitudinal welds in Class 1 and 2 piping. The licensee requested relief from performing the required surface and volumetric examinations of the longitudinal welds based on the fact that the potentially critical portions of the longitudinal welds intersect the circumferential welds and will be examined during the examinations of the circumferential welds.

The licensee's proposed alternative is to use Code Case N-524. This Code Case requires surface examinations of the segments of longitudinal welds in the circumferential weld examination area and volumetric examination of the circumferential welds, during which the length of longitudinal weld that falls within the circumferential weld area will receive volumetric examination. A possible error in use of this case could occur if it were applied to ferritic welds where there is not normally a Code-required scan for reflectors located transverse to the circumferential welds.

Therefore, use of this case should be contingent on the volumetric examinations of the adjacent circumferential welds providing scanning for reflectors transverse to the weld.

The licensee's proposed alternative, when modified as above, to apply Case N-524, will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), it is recommended that the proposed alternative be authorized, provided the supplemental condition given above is met.

K. Request for Relief RI-13, ISI of Snubbers Included in CNS Technical Specifications

Note: This relief request is considered part of the Inservice Testing program and is, therefore, not included in this evaluation. This relief request will be evaluated by the NRC staff.

L. Request for Relief RI-14, Use of Code Case N-509 for Selection and Examination of Class 1, 2, and 3 Integrally-Welded Attachments

Code Requirement: For Class 1, Examination Category B-K-1, volumetric or surface examination, as applicable, is required for integrally-welded attachments exceeding 5/8 inch design thickness. For Class 2, Examination Category C-C, surface examination is required for all integrally-welded attachments exceeding 3/4 inch design thickness. For Class 3, Examination Categories D-A, D-B, and D-C, surface examination is required for all integrally-welded attachments corresponding to those component supports selected by IWF-2510(b).

Licensee's Code Relief Request: The licensee requested authorization to use Code Case N-509 for selection and examination of Class 1, 2, and 3 integrally welded attachments.

Licensee's Basis for Requesting Relief (as stated):

"Code Case N-509, "Alternative Rules for the Selection and Examination of Integrally Welded Attachments, Section XI, Division 1, provides an alternative to the tables of IWB/C/D-2500-1 for integrally welded attachments. The alternative requires a surface examination of 10% of the integrally welded attachments associated with the component supports selected for examination under IWF-2510. In addition an examination is required whenever component support member deformation is identified. This Code Case recognizes the results of over 20 years of inservice inspections and the considerable attention that component supports have received through NRC bulletins."

Licensee's Proposed Alternative (as stated):

"In lieu of performing the Code required examinations, CNS proposes to examine integrally welded attachments in accordance with Code Case N-509 requirements."

Evaluation: The licensee proposes to apply the requirements of Code Case N-509 for the selection and examination of integral attachments on Code Class 1, 2, and 3 piping and components. This is in lieu of the existing Code requirement to examine 100% of the non-exempt Class 1, 2, and 3 integrally-welded attachments.

The notes of the Code Case N-509 examination tables could be misinterpreted, allowing selection of component supports for examination, per IWF of the 1989 Edition with the 1990 Addenda, that do not contain any welded attachments. Thus, no welded attachments would be required to be examined. The INEL staff believes that, to use Code Case N-509, the licensee should schedule a minimum of 10% of all integral attachments in non-exempt Code Class 1, 2, and 3 systems for examination.

The licensee's proposed alternative, to implement Code Case N-509 for the examination of integral attachments, should provide an acceptable level of quality and safety provided that a minimum 10% sample of all non-exempt Code Class 1, 2, and 3 integral attachments

is examined. Therefore, it is recommended that the licensee's proposed alternative, with the supplemental condition, be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

M. Request for Relief RI-15, Examination Category B-O, Item B14.10, CRD Housing Welds

Code Requirement: Table IWB-2500-1, Examination Category B-O, Item B14.10 requires a surface examination to be performed on 10% of the peripheral CRD housing welds.

Licensee's Code Relief Request: Relief is requested to use an alternative to the Code-required sampling plan for these welds. Under this plan only the lower CRD housing welds would be examined.

Licensee's Basis for Requesting Relief (as stated):

"There are thirty six CRD housings on the periphery. Each housing has an upper and lower weld. A surface examination of 10% of these welds would require the welds in four housings be examined. The upper CRD housing welds are located inside the reactor vessel skirt. The twelve inch diameter hole in the reactor vessel support skirt is too small to permit access for a surface examination. The lower CRD housing welds are partially accessible, however, the adjacent CRD housings prevent surface examination of approximately 50% of the weld."

Licensee's Proposed Alternative (as stated):

"In lieu of performing the Code required examinations, CNS proposes to examine 50% of eight peripheral CRD lower housing welds during the inspection interval and visually examine (VT-2) the remaining CRD housing welds (upper and lower) in conjunction with the Class 1 system leakage test after each refueling outage."

Evaluation: The Code requires a 100% surface examination of a 10% sample of the subject peripheral CRD housing welds. However, based on review of the documentation provided by the licensee, it is evident that the design of the CRD housing and location of the welds make the surface examination impractical to perform to the extent required by the Code. To perform the Code-required surface

examination, the CRD's and reactor vessel support skirt would require design modification to allow access for examination. Imposition of this requirement would cause a considerable burden on the licensee. Surface examination of 50% of the eight peripheral CRD lower housing welds and the VT-2 visual examinations of CRD housing welds, in conjunction with Class 1 system leakage testing after each refueling outage, will detect a pattern of degradation, if present. As a result, reasonable assurance of operational readiness will be confirmed. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

N. Request for Relief RI-16, Examination Categories B-L-2 and B-M-2, Items B12.20 and B12.50, Pump Casing and Valve Body Internal Surfaces

Code Requirement: Table IWB-2500-1, Examination Categories B-L-2 and B-M-2, Items B12.20 and B12.50, requires a VT-3 visual examination to be performed on the component internal pressure boundary once during each interval.

Licensee's Code Relief Request: Relief is requested from performing the Code-required VT-3 visual examinations.

Licensee's Basis for Requesting Relief (as stated):

"Later editions of ASME Section XI (1989 and later) clarify that the VT-3 examination is required only when a pump or valve is disassembled for maintenance, repair or volumetric examination. This is not stated in the 1980 Edition through winter 1981 Addenda of ASME Section XI, but it was not the intent of the code to require disassembly of pumps and valves solely for the purpose of conducting a visual examination of the internal pressure retaining boundary surfaces. This would require unnecessary maintenance of components without offering a commensurate increase in safety."

Licensee's Proposed Alternative (as stated):

"In lieu of performing the Code required examinations, CNS proposes to perform visual (VT-3) examination only when a pump or valve is disassembled for maintenance, repair or volumetric examination.

Examination of the internal pressure boundary shall be performed to the extent practical. Examination is required only once during the inspection interval."

Evaluation: Visual examination of pump and valve internal surfaces is performed to determine if unanticipated degradation of the pump casing or valve body is occurring due to phenomena such as erosion, corrosion, or cracking. To perform this examination, compete disassembly of the component is necessary. Thus, the Code-required visual examinations involve a major effort, requiring many hours from skilled maintenance and inspection personnel, who undergo significant radiation exposure. Therefore, disassembly of pumps and valves for the sole purpose of performing the Code-required visual examination is considered an imposition.

The 1989 Edition of the ASME Code has eliminated disassembly of pumps and valves for the sole purpose of examining the internal surfaces and states that the internal surface visual examination requirement is only applicable to pumps and valves that are disassembled for reasons such as maintenance, repair, or volumetric examination. The concept of visual examination of the internal surfaces of pumps and valves, if disassembled for maintenance, repair, or volumetric examination, is acceptable because no major problems have been reported in the industry with regard to pump or valve internal surfaces.

The use of later approved editions and addenda of Section XI is allowed by 10 CFR 50.55a(g)(4)(iv). Portions of editions or addenda may be used provided that all related requirements are met, i.e., the requirements of the 1989 Edition may be applied for the subject examinations. Therefore, it is recommended that the requirements in the 1989 Edition for pump and valve internal surface visual examinations be approved for use by the licensee, pursuant to 10 CFR 50.55a(g)(4)(iv), provided that all related requirements are met.

O. Request for Relief RI-17, Class 1 and Class 2 Integrally Welded Shear Lugs on Piping

In an October 11, 1995, conference call between the NRC, licensee, and INEL, it was agreed that this relief request would be withdrawn by the licensee. Therefore, it has not been evaluated.

P. Request for Relief RI-18, Examination Category C-C, Item C3.70, Integrally Welded Attachments to the Residual Heat Removal Pump Casing

Code Requirement: Table IWC-2500-1, Examination Category C-C, Item C3.70 requires a surface examination of 100% of the length of the pump integral attachment welds as defined by Figure IWC-2500-5.

Licensee's Code Relief Request: Relief is requested from performing the Code-required surface examination of the subject welds.

Licensee's Basis for Requesting Relief (as stated):

"Each RHR pump has an integrally welded attachment connecting the pump to the pump baseplate located on the underside of the pump as shown on Figure RR-18-1*. This weld is completely inaccessible and examination is not possible."

Licensee's Proposed Alternative (as stated):

"As an alternate examination, CNS will perform a VT-2 visual examination of the applicable pump and baseplate in conjunction with Class 2 system pressure test required by Category C-H."

Evaluation: The Code requires a 100% surface examination of the subject welded attachments. However, based on review of the drawings* provided by the licensee, it is evident that the design of the base plate support and location of the welded attachments make the surface examination impractical to perform. To perform the

*Not included with this evaluation.

Code-required surface examination of the weld, the supports and welded attachments would require design modification to allow access for examination. Imposition of this requirement would cause a considerable burden on the licensee. Examination of other welded attachments and the VT-2 Code-required visual examination performed on the subject RHR pump welded attachments will detect significant degradation, if present. As a result, reasonable assurance of operational readiness will be confirmed. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

Q. Request for Relief RI-19, IWB-5210, Examination Category B-P, Item B15.10, Pressure Test of Reactor Vessel Head Seal Leak Detection System

Code Requirement: IWB-5210(a)(1) requires that following opening and closing within each system boundary, pressure-retaining components be subjected to a system leakage test after pressurization to nominal operating pressure. IWB-5210(a)(2) requires the pressure-retaining components within each system boundary to be subjected to a system hydrostatic pressure test.

Licensee's Code Relief Request: Relief is requested from performing the Code-required pressure test of Line No. 1-MS-152-1.

Licensee's Basis for Requesting Relief (as stated):

"The Reactor Vessel Head Flange Leak Detection Line is separated from the reactor pressure boundary by one passive membrane, a silver plated o-ring located on the vessel flange. A second o-ring is located on the opposite side of the tap in the vessel flange (See Figure RR-19-1). This line is required during plant operation in order to indicate failure of the inner flange seal o-ring. Failure of the o-ring would result in the annunciation of a High Level Alarm in the control room. On this annunciation, control room operators would quantify the leakage rate from the o-ring and then isolate the leak detection line from the drywell sump by closing the valves

NBI-AOV-736AV and NBI-AOV-737AV (see Figure RI-19-1*). This action is taken in order to prevent steam cutting of the o-ring and the vessel flange. Failure of the inner o-ring is the only condition under which this line is pressurized.

The configuration of this system precludes hydrostatic testing while the vessel head is removed because the odd configuration of the vessel tap coupled with the high test pressure requirement (1000 psig minimum), prevents the tap in the flange from being temporarily plugged. Adequate testing cannot be performed when the head is installed because the seal prevents complete filling of the line, which has no vent available."

Licensee's Proposed Alternative (as stated):

"A VT-2 visual examination will be performed on the line during vessel flood-up in a refueling outage. The hydrostatic head developed due to the water above the vessel flange during flood-up will allow for the detection of any gross defects in the line. This examination will be performed once each refueling outage"

Evaluation: The Code requires that system pressure tests be conducted for those systems required to function during normal plant operation. The reactor pressure vessel (RPV) head flange leak detection line is pressurized only when the inner O-ring fails. To submit these O-rings to a pressure test from the outer diameter would not be consistent with their design and would likely damage the O-rings. The design of this line, therefore, makes the Code-required system pressure tests impractical. To perform the system pressure tests in accordance with the requirements, the RPV Head Flange Leak Detection System and the RPV flange would have to be redesigned, fabricated, and installed. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee has committed to perform a VT-2 visual examination on the RPV Head Flange Leak Detection Line during vessel flood-up.

---

* Not included with this evaluation.

This proposed alternative will provide adequate assurance that if gross inservice flaws have developed in the subject line, they will be detected.

The system pressure test required by Section XI for the subject Class 1 line is impractical because of the possibility of damage to the O-ring seals. The VT-2 visual examination of the RPV Head Flange Leak Detection Line during vessel flood-up will provide adequate assurance that gross inservice flaws will be detected and repaired. As a result, reasonable assurance of operational readiness will be provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.0 CONCLUSION

Pursuant to 10 CFR 50.55a(a)(3)(i), it is concluded that for Relief Request 11, the licensee's proposed alternatives, and for Relief Requests 09, 10, 12, and 14 the licensee's proposed alternatives with the supplemental conditions stated in the relief request evaluations above, will provide an acceptable level of quality and safety. Therefore, it is recommended that the proposed alternatives be authorized for Relief Request 11 and that the proposed alternatives be authorized only if the licensee satisfies the supplemental conditions for Relief Requests 09, 10, 12, and 14.

Pursuant to 10 CFR 50.55a(a)(3)(ii), it is concluded that, for Relief Request 08, the licensee has demonstrated that specific Section XI requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. For this relief request, it is recommended that the licensee's proposed alternative be authorized only if the licensee satisfies the condition stated in the relief request evaluation above.

Pursuant to 10 CFR 50.55a)g)(4)(iv), it is recommended that the pump and valve internal surface visual examination provisions of the 1989 Edition

of Section XI be approved for use, provided that the licensee satisfies the condition stated in the relief request evaluation above.

It has been determined that certain inservice examinations cannot be performed to the extent required by Section XI of the ASME Code. In the cases of Relief Requests 15, 18, and 19, the licensee has demonstrated that specific Section XI requirements are impractical; it is therefore recommended that relief be granted as requested. The granting of relief will not endanger life, property, or the common defense and security and is otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

No action is needed on Relief Requests 01, 02, 03 (Rev. 1), 04, 05 (Rev. 1), 06 (Rev. 1), 07 (Rev. 1). Relief requests 01, 02 and 04 have been deleted by the licensee. The original dispositions* of Relief Requests 03 (Rev. 1) 05 (Rev. 1), 06 (Rev. 1), and 07 (Rev. 1) should remain in effect, since the bases for relief and alternative examinations proposed are unchanged in the revisions.

Relief Requests 13 and 17 were not evaluated as part of this report.

---

*Safety Evaluation dated January 27, 1986, for Relief Requests 03 (Rev. 1), 05 (Rev. 1) and 06 (Rev. 1). Safety Evaluation dated August 31, 1995, for Relief Request 07 (Rev. 1)