February 5, 2002

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: APPROVAL OF RELIEF REQUEST I2R-40 FOR APPLICATION OF RISK-INFORMED INSERVICE INSPECTION PROGRAM AS AN ALTERNATIVE TO THE ASME BOILER AND PRESSURE VESSEL CODE SECTION XI REQUIREMENTS FOR CLASS 1 AND CLASS 2 PIPING WELDS FOR BYRON STATION, UNITS 1 AND 2 (TAC NOS. MB0567 AND MB0568)

Dear Mr. Kingsley:

By letter dated November 17, 2000, Commonwealth Edison Company (ComEd) requested approval of an alternative risk-informed inservice inspection (RI-ISI) program for Byron Station, Units 1 and 2, ISI program for ASME Class 1 and 2 piping welds.

Subsequent to the date of the original request, ComEd was merged into Exelon Generation Company, LLC (Exelon). By letter dated February 7, 2001, Exelon informed the Nuclear Regulatory Commission (NRC) that it assumed responsibility for all pending NRC actions that were requested by ComEd. Additional information supporting the November 17, 2000, request was provided in Exelon letters dated September 5, 2001, October 16, 2001, and November 9, 2001.

The Byron Station RI-ISI program was developed in accordance with NRC approved Electric Power Research Institute Topical Report TR-112657, Revision B-A, using the Nuclear Energy Institute template methodology. The results of our review indicate that Exelon’s proposed RI-ISI program is an acceptable alternative to the requirements of the American Society of Mechanical Engineers Code Section XI for inservice inspection, and therefore, the request for relief (I2R-40) is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety. The request for relief is authorized through the end of the second ISI interval for each unit. The intervals are scheduled to end on September 15, 2005 (Unit 1), and August 21, 2007 (Unit 2). Our safety evaluation is enclosed.

Sincerely,

/RA/
Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos.: STN 50-454
STN 50-455

cc w/encl: See next page

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<u>SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION</u>

<u>RISK-INFORMED INSERVICE INSPECTION PROGRAM RELIEF REQUEST</u>

<u>EXELON GENERATION COMPANY</u>

<u>BYRON STATION, UNITS 1 AND 2</u>

<u>DOCKET NOS. STN 50-454 AND STN 50-455</u>

1.0 INTRODUCTION

Current inservice inspection (ISI) requirements for the Byron Nuclear Power Station are contained in the 1989 Edition of Section XI, Division 1, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, entitled *Rules for Inservice Inspection of Nuclear Power Plant Components* (hereinafter referred to as the ASME Code). In a submittal dated November 17, 2000 (Reference 1), Commonwealth Edison Company proposed a new risk-informed inservice inspection (RI-ISI) program as an alternative to a portion of their current ISI program for the second 10-year interval. Additional clarifying information was provided in letters from the licensee dated September 5, 2001 (Reference 2), and October 16, 2001 (Reference 3), and November 9, 2001 (Reference 13).

Subsequent to the date of the original relief request, ComEd was merged into Exelon Generation Company, LLC (Exelon or licensee). By letter dated February 7, 2001, Exelon informed the Nuclear Regulatory Commission (NRC) that it assumed responsibility for all pending NRC actions that were requested by ComEd.

The RI-ISI program is limited to ASME Class 1 and Class 2 piping welds. The program was developed in accordance with the Electric Power Research Institute (EPRI) methodology contained in the NRC approved EPRI Topical Report EPRI TR-112657, Revision B-A (TR-112657) (Reference 4).

In the licensee's proposed RI-ISI program, piping failure potential estimates were determined using TR-112657 guidance, which utilizes industry piping failure history, plant-specific piping failure history, and other relevant information. Using the failure potential and supporting insights on piping failure consequences from the licensee's probabilistic risk assessment (PRA), safety ranking of piping segments was established for determination of new inspection locations. The proposed program maintains the fundamental requirements of the ASME Code, such as the examination technology, examination frequency, and acceptance criteria. However, the proposed program reduces the required examination locations significantly while demonstrating that an acceptable level of quality and safety is maintained. Thus, the proposed alternative approach is based on the conclusion that it provides an acceptable level of quality and safety and, therefore, is in conformance with Title 10, Code of Federal Regulations (10 CFR), Part 50.55a(a)(3)(i).

2.0 SUMMARY OF PROPOSED APPROACH

The ASME Code, Section XI, requires that for each successive 10-year ISI interval, 100 percent of Category B-F welds and 25 percent of Category B-J welds for ASME Code Class 1 piping greater than one inch in nominal diameter be selected for volumetric and/or surface examination based on existing stress analyses and cumulative usage factors. For Category C-F piping welds, 7.5 percent of non-exempt welds shall be selected for volumetric and/or surface examination.

The licensee submitted the application as a RI-ISI "template" application. Template applications are short overview submittals intended to expedite preparation and review of RI-ISI submittals that comply with a pre-approved methodology. The licensee proposed to implement the staff-approved RI-ISI methodology delineated in TR-112657.

In accordance with Table 6.2 of the EPRI TR-112657, the existing augmented ISI programs implemented in response to NRC Bulletins 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems," 88-11, "Pressurizer Surge Line Thermal Stratification," and Information Notice 93-20, "Thermal Fatigue Cracking of Feedwater Piping to Steam Generators," may be subsumed into the proposed RI-ISI program for those components that are within the scope of the RI-ISI program and for which the potential for thermal fatigue is explicitly considered in the RI-ISI process based on the EPRI TR-112657. Also, the augmented program in response to IE Bulletin 79-17, "Stagnant Borated Water Systems," has been addressed by the evaluation of stress corrosion cracking that is part of the degradation assessment for RI-ISI. Other existing augmented ISI programs that are unaffected by the proposed RI-ISI program include Generic Letters 89-13, "Service Water Integrity Program," 89-08, "Flow Accelerated Corrosion (FAC)," and USNRC Branch Technical Position MEB 3-1, "High Energy Line Breaks."

The licensee also indicated that all existing relief requests remain applicable as they are addressed in their safety evaluation (SE) reports. The licensee stated that the differences in the examination category and associated item numbers between the existing ISI and RI-ISI programs are strictly editorial and do not nullify the intent of the Section XI relief requests as they apply to the RI-ISI program.

3.0 EVALUATION

The licensee's submittal was reviewed with respect to the methodology and criteria contained in TR-112657. Further guidance in defining acceptable methods for implementing an RI-ISI program is also provided in Regulatory Guide (RG) 1.174, RG 1.178, and Standard Review Plan (SRP) Chapter 3.9.8 (References 5, 6, and 7).

3.1 <u>Program Inspection Periods and Intervals</u>

The licensee requested approval of this alternative for implementation during the second period of the second ISI interval for Unit 1 and first period of the second ISI interval Unit 2. According to the information provided in Reference 2, Byron Unit 1 is currently in the second 10-year interval that started on July 1, 1996, and ends on September 15, 2005. The current period (i.e., the second period of the interval) started on September 16, 1999, and ends on

August 21, 2001. Unit 2 is currently in the second 10-year interval that started on August 16, 1998, and ends on August 21, 2007. The current period (i.e., the second period of the interval) started on August 22, 2001, and ends on August 21, 2004.

The implementation of an RI-ISI program for piping should be initiated at the start of a plant's 10-year ISI interval consistent with the requirements of the ASME Code and Addenda committed to by the licensee in accordance with 10 CFR 50.55a. However, the implementation may begin at any point in an existing interval as long as the examinations are scheduled and distributed consistent with the ASME Code requirements (e.g., the minimum examinations completed at the end of the three inspection intervals under ASME Code Program B should be 16 percent, 50 percent, and 100 percent, respectively, and the maximum examinations credited at the end of the respective periods should be 34 percent, 67 percent, and 100 percent).

It is also the staff's view that the inspections for the RI-ISI program and for the balance of the ISI program should be on the same interval start and end dates. This can be accomplished by either implementing the RI-ISI program at the beginning of the interval or merging the RI-ISI program into the ISI program for the balance of the inspections if the RI-ISI program is to begin during an existing ISI interval. One reason for this view is that it eliminates the problem of having different Codes of record for the RI-ISI program and for the balance of the ISI program. A potential problem with using two different interval start dates and hence two different Codes of record would be having two sets of repair/replacement rules depending upon which program identified the need for repair (e.g., a weld inspection versus a pressure test). In Reference 2, the licensee stated that Byron will schedule and credit both risk-informed and the balance of the ASME Code examinations consistent with ASME Section XI minimum and maximum requirements. Selected Risk Category 2, 3, 4, and 5 welds that have been examined in the first period prior to the approval of the RI-ISI program will be credited in the RI-ISI program.

The staff finds that the Byron Station Units 1 and 2 RI-ISI programs meet the ASME Code and 10 CFR 50.55a requirements for minimum and maximum inspections during inspection periods and intervals and for program submittal to the NRC.

3.2 Proposed Changes to ISI Program

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has proposed to implement an RI-ISI program in accordance with the methodology contained in TR-112657 as an alternative to the ASME Code examination requirements for ASME Class 1 and 2 piping for Byron Station, Units 1 and 2. A general description of the proposed changes to the ISI program was provided in Section 3 of the licensee's submittal (Reference 1).

3.3 Engineering Analysis

In accordance with the guidance provided in RGs 1.174 and 1.178, an engineering analysis of the proposed changes is required using a combination of traditional engineering analysis and supporting insights from the PRA. The licensee elaborated as to how the engineering analyses conducted for the Byron Stations RI-ISI program ensures that the proposed changes are consistent with the principles of defense-in-depth. This is accomplished by evaluating a location's susceptibility to a particular degradation mechanism and then performing an independent assessment of the consequence of a failure at that location. No changes to the evaluation of design basis accidents in the final safety analysis report are being made by the RI-ISI process. Therefore, sufficient safety margins will be maintained.

The licensee's RI-ISI program at Byron Station is applicable to ASME Class 1 Categories B-F and B-J and ASME Class 2 Categories C-F-1 and C-F-2 piping welds. The licensee stated in its submittal that other non-related portions of the ASME Code will be unaffected by this program. Piping systems defined by the scope of the RI-ISI program were divided into piping segments. Pipe segments are defined as lengths of pipe that are exposed to the same degradation mechanisms and whose failure leads to similar consequences. That is, some lengths of pipe whose failure would lead to the same consequences may be split into two or more segments when two or more regions are exposed to different degradation mechanisms.

The submittal states that failure potential categories were generated utilizing industry failure history, plant-specific failure history, and other relevant information using the guidance provided in TR-112657. The degradation mechanisms identified in the submittal include thermal fatigue, intergrannular stress-corrosion cracking (IGSCC), primary water stress corrosion cracking, localized corrosion, and flow accelerated corrosion (FAC).

Augmented programs developed for service water integrity (Generic Letter 89-13), flow accelerated corrosion (Generic Letter 89-09), and high energy line break (US NRC Branch Technical Position MEB 3-1) are not subsumed into the RI-ISI program and remain unaffected. Elements in the Byron Station that are covered by these augmented programs were included in the consequence assessment, degradation assessment, and risk categorization evaluations to determine whether the affected piping was subject to damage mechanisms other than those addressed by the augmented program. If another damage mechanism was identified, the element was retained within the scope of consideration for element selection as part of the RI-ISI program. When inspections are required under the RI-ISI and augmented programs, all inspection requirements for both RI-ISI and augmented programs are met. If no other damage mechanism was identified, the element was excluded from the RI-ISI element selection population (i.e., not included in the population of elements from which 25 percent or 10 percent must be selected for inspection) and retained in the appropriate augmented inspection program. The licensee's approach deviates from the approved methodology because the methodology in TR-112657 includes all elements in the RI-ISI element selection population but allows crediting up to 50 percent of the augmented inspections as RI-ISI element inspections. The deviation as described in References 1 and 2 is acceptable because inspections required only in the augmented programs are not credited as RI-ISI inspections, elements in the augmented programs will continue to be inspected for the appropriate degradation mechanisms, and the RI-ISI program will address other damage mechanisms.

The licensee stated that the consequences of pressure boundary failure were evaluated and ranked based on their impact on core damage probability and large early release probability. Both direct and indirect effects of pipe ruptures were evaluated and included in the consequence characterization. The licensee used its PRA models to directly support their estimation of the consequences of pressure boundary failure for each piping element in the evaluation. The licensee reported no deviations from the segment definition and consequence characterization methodology approved by the staff in TR-112657 and their analyses are acceptable.

3.4 Probabilistic Risk Assessment

To support this RI-ISI submittal, the licensee used the Byron Station PRA CDF Calculation, BYR-99-040, Rev. 0 and Byron Station PRA LERF Calculation, BYR-99-096, Rev. 0. The licensee reported a CDF of 4.98E-5/yr and LERF of 5.55E-6/yr for each unit. The licensee submitted its individual plant examination (IPE) on December 13, 1993, and a modified version of the IPE on December 17, 1996. The staff evaluation report on the IPE submitted in December 1996, was issued July 9, 1997, and concluded that the IPE satisfied the intent of Generic Letter 88-20 but noted that the common cause factors used in the IPE were lower than the generic factors. In Reference 1, the licensee stated that it has incorporated the common cause factors from NUREG/CR-5497, Common-Cause Failure Parameter Estimations (Reference 8) into the PRA analysis used to support the RI-ISI submittal.

The licensee stated that Byron and Braidwood are sister plants with nearly identical design. In Reference 1, the licensee provided a list of improvements made to the IPEs to produce the updated PRAs. Subsequent to these improvements, the licensee's Braidwood Nuclear Power Station's PRA underwent the Westinghouse Owners Group PRA peer review certification in September 1999. Based on the results of this certification review, both the Braidwood and Byron PRAs were further updated to include appropriate changes recommended by the peer certification team. The licensee also reported that it has implemented a PRA Maintenance and Update Procedure that formalizes the PRA update process.

The approved TR-112657 requires that functions relied upon to mitigate external events and to mitigate transients during operation modes outside the scope of the PRA also be systematically included in the categorization. The licensee reported no deviations from the approved methodology in this area and, therefore, the staff finds its evaluation acceptable.

The staff did not review the PRA analysis to assess the accuracy of the quantitative estimates. Quantitative results of the PRA are used, in combination with a quantitative characterization of the pipe segment failure likelihood, to support the assignment of segments into broad safety significance categories reflecting the relative importance of pipe segment failures on CDF and LERF and to provide an illustrative estimate of the change in risk. Inaccuracies in the models or assumptions large enough to invalidate the analyses developed to support RI-ISI should have been identified in the licensee's or the staff's reviews. Minor errors or inappropriate assumptions will only affect the consequence categorization of a few segments and will not invalidate the general results or conclusions. Furthermore, the continuous use and documented maintenance of the PRA provides further opportunities to identify inaccuracies, if any, in the PRA models and assumptions. The staff finds that the quality of the Byron Station PRA is sufficient to support this submittal.

As required by Section 3.7 of TR-112657, the licensee evaluated the change in risk expected from replacing the current ISI program with the RI-ISI program. The analysis estimates the net change in risk due to the positive and negative influence of adding and removing locations from the inspection program. As discussed in Section 3.2 of this SE, the licensee deviated from the EPRI methodology by excluding some elements from the population of elements from which RI-ISI locations for inspection were selected. In Reference 3, the licensee stated that the change in risk estimates included the increase in risk caused by discontinued ASME Section XI inspections in the population of elements excluded from RI-ISI element selection. Therefore, excluding some elements from the population of elements for possible inspection does not affect the change in risk calculations. The failure frequencies used in the calculation are the frequencies excluding the degradation mechanism addressed by the augmented program. This is consistent with the staff's position that the augmented programs adequately control the degradation mechanism and is acceptable.

The licensee used the failure frequencies developed in EPRI Topical Report TR-111880 (Reference 9) to support the estimate for the change in risk. The non-proprietary version of TR-111880 (Reference 10) illustrates the characteristics and format of the information used, but does not include the calculated parameters. The change in risk is calculated utilizing the Markov model described in EPRI Topical Report TR-111061 (Reference 11), and further specified in Reference 2, to estimate the "inspection efficiency factor" (IEF). The IEF calculation incorporates the time between ISI inspections and the time between opportunities to detect a leak together with the probability of detection (POD) to estimate the reduction in pipe failure frequency arising from including the element in an ISI program. The method is the same as used by the licensee, and approved by the staff, in the Dresden RI-ISI submittal (Reference 12). The staff finds the calculations acceptable to use in support of this RI-ISI submittal.

The licensee estimated the change in CDF and LERF for Byron 1 to be -3E-7/yr and -7E-8/yr, respectively. For Byron 2 the estimated change in CDF and LERF is 7E-9/yr and -6E-8/yr, respectively. The licensee also reported the system level changes for all the systems included in the scope of the submittal. All of the estimated changes in risk are below the EPRI guideline for acceptable estimated changes in CDF and LERF.

The staff finds that the licensee's process to evaluate the potential change in risk is reasonable because it accounts for the change in the number and location of elements inspected, recognizes the difference in degradation mechanism related to failure likelihood, and considers the synergistic effects of multiple degradation mechanisms within the same piping segment. The staff finds that redistributing the welds to be inspected with consideration of the safety-significance of the segments provides assurance that segments whose failures have a significant impact on plant risk receive an acceptable and often improved level of inspection. Therefore, the staff concludes that the implementation of the RI-ISI program as described in the application is acceptable and, based on the reported quantitative results, any increase in risk associated with the implementation of the RI-ISI program is small and is consistent with RG 1.178.

3.5 Integrated Decision-Making

As described in the November 17, 2000, Commonwealth Edison Company submittal and September 5 and October 16, 2001, Exelon submittals, an integrated approach is utilized in defining the proposed RI-ISI program by considering in concert the traditional engineering analysis, risk evaluation, and the implementation and performance monitoring of piping under the program. This is in compliance with the guidelines of RG 1.178.

The selection of pipe segments to be inspected is described in Section 3.5 of the submittal using the results of the risk category rankings and other operational considerations. The submittal states that in accordance with the EPRI TR, 25 percent of high safety-significant (HSS) and 10 percent of medium safety significant (MSS) elements are selected for inspection. As discussed in the submittal and earlier in this SE, these percentages are drawn from the population of welds included in the RI-ISI element selection population. The inspections are generally selected on a system-by-system basis. The licensee stated that an attempt is made to ensure that all damage mechanisms and all combinations of damage mechanisms are represented in the elements selected for inspection.

Table 2 of the submittal provides the failure potential assessment summary for Units 1 and 2. Tables 3 and 4 of the submittal identify on a per system basis for Units 1 and 2, respectively, the number of elements (welds) by risk category. Tables 5 and 6 provide a summary comparing the number of inspections required under the existing ASME Code ISI program with the alternative RI-ISI program for each applicable system. In Reference 1, the licensee proposed using weld failure frequencies derived from an updated evaluation of observed failure data instead of the frequencies from Reference 10. The staff informed the licensee that an integrated review of the updated data base, evaluation methods, and results would be required before the use of the new frequency estimates could be accepted. The licensee chose to use the original failure frequencies and not to pursue the review of the new failure frequencies concurrent with the review of the relief request. Table By-16-B in Reference 3 identifies welds at Units 1 and 2 that were added to the inspection locations to maintain the change in risk at acceptable levels using the frequencies from Reference 10.

The licensee used the methodology described in TR-112657 to guide the selection of examination elements within high and medium ranked piping segments. The EPRI report describes targeted examination volumes (typically associated with welds) and methods of examination based on the type(s) of degradation expected. The staff has reviewed these guidelines and has determined that, if implemented as described, the RI-ISI examinations should result in improved detection of service-related discontinuities over that currently required by the ASME Code.

The staff finds the location selection process to be acceptable since it is consistent with the process approved in TR-112657, takes into account defense-in-depth, and includes coverage of welds subjected to degradation mechanisms in addition to those covered by augmented inspection programs. As described in section 3.2 of this SE, excluding elements exposed only to a damage mechanism addressed by an augmented program from the RI-ISI element selection population is an acceptable deviation from the EPRI methodology.

The objective of ISI required by the ASME Code is to identify conditions (i.e., flaw indications) that are precursors to leaks and ruptures in the pressure boundary that may impact plant safety. Therefore, the RI-ISI program must meet this objective to be found acceptable for use. Further, since the risk-informed program is based on inspection for cause, element selection should target specific degradation mechanisms. Chapter 4 of TR-112657 provides guidelines for the areas and/or volumes to be inspected as well as the examination method, acceptance standard, and evaluation standard for each degradation mechanism. Based on the review of the cited portion of the EPRI report, the staff concludes that the examination methods are appropriate since they are selected based on specific degradation mechanisms, pipe sizes, and materials of concern.

3.6 Implementation and Monitoring

Implementation and performance monitoring strategies require careful consideration by the licensee and are addressed in Element 3 of RG 1.178 and SRP 3.9.8. The objective of

Element 3 is to assess the performance of the affected piping systems under the proposed RI-ISI program by implementing monitoring strategies that confirm the assumptions and analyses used in the development of the RI-ISI program. To approve an alternative pursuant to 10 CFR 50.55a(a)(3)(i), implementation of the RI-ISI program, including inspection scope, examination methods, and methods of evaluation of examination results, must provide an acceptable level of quality and safety.

The licensee stated in its submittal that upon approval of the RI-ISI program, procedures that comply with the EPRI TR-112657 guidelines will be prepared to implement and monitor the RI-ISI program. The licensee confirmed that the applicable portions of the ASME Code not affected by the change, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements would be retained.

The licensee stated in Reference 1 and further clarified in Reference 13 that the RI-ISI program is a living program and its implementation will require feedback of new relevant information to ensure the appropriate identification of high safety significant piping locations. Such relevant information would include major updates to the Byron Station Units 1 and 2 PRA models which could impact both the risk characterization and risk impact assessments, any new trends in service experience with piping systems at Byron Station and across the industry, and new information on element accessibility that will be obtained as the risk informed inspections are implemented. Reference 13 states that as a minimum, risk ranking of piping segments will be reviewed and adjusted on an ASME-period basis and that significant changes may require more frequent adjustment as directed by NRC bulletin or generic letter requirements, or by industry or plant-specific feedback. Reference 13 also states that the RI-ISI program will be updated and submitted to the NRC at the end of the 10-year ISI interval and may be submitted to the NRC prior to the end of the 10-year ISI interval if there is a deviation from the RI-ISI methodology described in the initial 10-year interval ISI submittal to the NRC, or if industry experience determines that there is a need for significant revision to the program as described in the initial 10-year interval ISI submittal to the NRC for that interval.

The proposed periodic reporting requirements meet existing ASME Code requirements and applicable regulations and, therefore, are considered acceptable. The proposed process for RI-ISI program updates meets the guidelines of RG 1.174 that risk-informed applications must include performance monitoring and feedback provisions, therefore, the process for program updates is considered acceptable.

4.0 CONCLUSIONS

In accordance with 10 CFR 50.55a(a)(3)(i), proposed alternatives to regulatory requirements may be used when authorized by the NRC when the applicant demonstrates that the alternative provides an acceptable level of quality and safety. In this case, the licensee's proposed alternative is to use the risk-informed process described in the NRC approved EPRI TR-112657. The staff concludes that the licensee’s proposed RI-ISI program which is consistent with the methodology described in EPRI TR-112657, will provide an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i) for the proposed alternative to the piping ISI requirements with regard to the number of inspections, locations of inspections, and methods of inspection.

The staff finds that the results of the different elements of the engineering analysis are considered in an integrated decision-making process. The impact of the proposed change in the ISI program is founded on the adequacy of the engineering analysis and acceptable change in plant risk in accordance with RG 1.174 and RG 1.178 guidelines.

The Byron Station methodology also considers implementation and performance monitoring strategies. Inspection strategies ensure that failure mechanisms of concern have been addressed and there is adequate assurance of detecting damage before structural integrity is affected. The risk significance of piping segments is taken into account in defining the inspection scope for the RI-ISI program.

System pressure tests and visual examination of piping structural elements will continue to be performed on all ASME Class 1, 2, and 3 systems in accordance with the ASME Code program. The RI-ISI program applies the same performance measurement strategies as existing ASME Code requirements and, in addition, increases the inspection volumes at some weld locations.

The Byron Station methodology provides for conducting an engineering analysis of the proposed changes using a combination of traditional engineering analysis with supporting insights from a PRA. Defense-in-depth and quality are not degraded in that the methodology provides reasonable confidence that any reduction in existing inspections will not lead to degraded piping performance when compared to existing performance levels. Inspections are focused on locations with active degradation mechanisms as well as selected locations that monitor the performance of piping systems.

The licensee has stated that the ASME Code minimum and maximum inspection requirements for ASME Section XI Program B will be met and that the RI-ISI inspections and the balance of the inspections will be on the same interval start and end dates. The staff finds that the Byron Units 1 and 2 RI-ISI programs meet the ASME Code requirements for minimum and maximum inspections during inspection periods and intervals. The staff also finds that the Byron Units 1 and 2 RI-ISI programs meet the 10 CFR 50.55a requirements for program submittal to the NRC.

This SE authorizes application of the proposed RI-ISI program during the second ten-year ISI interval for Byron Nuclear Power Station, Units 1 and 2. The second ISI intervals end on September 15, 2005 for Unit 1, and on August 21, 2007 for Unit 2.

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