

## **NON-CONCURRENCE PROCESS COVER PAGE**

The U.S. Nuclear Regulatory Commission (NRC) strives to establish and maintain an environment that encourages all employees to promptly raise concerns and differing views without fear of reprisal and to promote methods for raising concerns that will enhance a strong safety culture and support the agency's mission.

Employees are expected to discuss their views and concerns with their immediate supervisors on a regular, ongoing basis. If informal discussions do not resolve concerns, employees have various mechanisms for expressing and having their concerns and differing views heard and considered by management.

Management Directive (MD) 10.158, "NRC Non-Concurrence Process," describes the Non-Concurrence Process (NCP).

The NCP allows employees to document their differing views and concerns early in the decision-making process, have them responded to (if requested), and include them with proposed documents moving through the management approval chain to support the decision-making process.

NRC Form 757, "Non-Concurrence Process," is used to document the process.

Section A of the form includes the personal opinions, views, and concerns of a non-concurring NRC employee.

Section B of the form includes the personal opinions and views of the non-concurring employee's immediate supervisor.

Section C of the form includes the agency's evaluation of the concerns and the agency's final position and outcome.

NOTE: Content in Sections A and B reflects personal opinions and views and does not represent the official agency's position of the issues, nor official rationale for the agency decision. Section C includes the agency's official position on the facts, issues, and rationale for the final decision.

1. Was this process discontinued? If so, please indicate the reason and skip questions 2 and 3:  
Process was not discontinued
2. At the completion of the process, the non-concurring employee(s):  
Agreed with some of the changes to the subject document, but continued to non-concur
3. For record keeping purposes:  
This record has been reviewed and approved for public dissemination

<b>NRC FORM 757</b> (06-2019) NRC MD 10.158		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>1. NCP Tracking Number</b> NCP-2021-007
<b>NON-CONCURRENCE PROCESS (Continued)</b>				<b>Date</b> 2021-11-09
<b>Section A – To Be Completed by Non-Concurring Employee</b>				
<b>2. Title of Subject Document</b> Safety Evaluation Report Related to the Subsequent License Renewal of North Anna Power Station, Units 1 and 2			<b>3. ADAMS Accession Number</b> ML21264A011	
<b>4. Document Signer</b> Smith - NRR, Brian - DIRECTOR, DIV NEW AND RENEWED LIC.		<b>5. Document Signer's Office</b> NRR		<b>6. Document Signer's Email</b> Brian.Smith@nrc.gov
<b>7. Name of Non-Concurring Employees</b> Gavula, James - MECHANICAL ENGINEER		<b>8. Non-Concurring Employee Offices</b> NRR		<b>9. Employee Emails</b> James.Gavula@nrc.gov
<b>10. Non-Concurring Employee's Role for the Subject Document</b> Document Contributor				
<b>11. Name of Non-Concurring Employee Supervisors</b> Bloom, Steven - BRANCH CHIEF		<b>12. Non-Concurring Employee Supervisor Offices</b> NRR		<b>13. Supervisor Emails</b> Steven.Bloom@nrc.gov
<b>14.</b> I would like my non-concurrence considered and would like a written evaluation in Sections B and C.				
<b>15. When the process is complete, I would like management to determine whether public release of the NCP Form (with or without redactions) is appropriate (Select "No" if you would like the NCP Form to be non-public):</b> Yes				
<b>16. Reasons for the Non-Concurrence, Potential Impact on Mission, and the Proposed Alternatives</b> DNRL management modified the technical staff's SER input for Section 3.0.3.2.14, Buried and Underground Piping and Tanks (in ML21264A011), by deleting the staff's Open Item discussion and accepting the program proposed by Dominion. Management's SER version accepts Dominion's Enhancement 6 to the program by stating "the number and multiple locations of additional inspections and destructive examinations that will be conducted are adequate to provide reasonable assurance that cracking due to cyclic loading will be adequately managed." Without additional information from Dominion, I do not agree that information provided for Enhancement 6 demonstrates that the associated aging effects will be adequately managed, as required by 10CFR54.21(a)(3). In addition, Management's SER version states that the UFSAR Supplements for the Buried and Underground Piping and Tanks aging management program (AMP) and the Selective Leaching AMP (SER Section 3.0.3.1.10) are adequate summary descriptions of the programs. Based on the changes made for Enhancements 5 and 6 to the Buried and Underground Piping and Tanks program in Dominion's July 29th and August 26th submittals (ML21210A396 and ML21238A297), SLRA Sections A1.21 and A1.27 containing the associated UFSAR Supplements for the programs are not sufficiently comprehensive, such that later changes can be controlled by 10CFR50.59, as delineated in SRP-SLR Section 3.3.2.5. I do not agree with the conclusions that the UFSAR Supplements for these programs meet the requirements of 10CFR54.21(d). In order to provide some context to the staff's concerns, note that the staff highlighted the complexity of the underlying technical issue (cracking due to cyclic loading) in the September 13, 2020, Acceptability and Sufficiency for Docketing letter to Dominion (ML20258A284). The letter stated that cyclic fatigue of buried gray cast iron fire protection piping is not an aging effected addressed in the Generic Aging Lessons Learned (GALL) Report and that the staff's review of the topic may require additional review time and requests for additional information. However, during the ongoing interactions as part of the license renewal review, Dominion stone-walled the staff by saying that details about the program would be provided in subsequent documentation. When finally pressed for additional information about the leak-before-break approach being proposed (as allowed by the Buried and Underground Piping and Tanks program through jockey pump monitoring), Dominion pivoted and provided the proposed excavation-and-inspection approach for the buried grey cast iron fire protection piping on August 26, 2021. Few (if any) prior applications for renewed licenses have chosen to use the direct visual examination approach (excavate-and-inspect) for fire water piping, with the vast overwhelming majority choosing to use jockey pump monitoring. In that regard, however, no other application included failures caused by cracking due to cyclic loading. When the staff asked about a path forward regarding additional questions regarding Dominion's revised approach, NRC management responded that "we have everything we are going to				

get.” Because this is the first consideration of this aging effect/mechanism in the Buried and Underground Piping and Tanks program, the staff’s review will be precedent setting and should be sufficiently validated before accepting Dominion’s approach. The specific technical aspects associated with this nonconcurrency are as follows: 1. Justification of Sample Size. The overarching issue with Dominion’s consideration of cracking due to cyclic loading in buried gray cast iron fire water system piping is that this material-environment-aging effect/mechanism combination has never been addressed by any GALL-SLR Report program. Consequently, consistency with guidance for any existing aging management program in the GALL-SLR Report is not necessarily sufficient to demonstrate that the effects of aging will be adequately managed, as required by 10CFR54.21(a)(3). Management’s SER version includes the following paragraph that attempts to rationalize the use of GALL-SLR Report AMP XI.M41 as being an acceptable approach: The staff notes that cracking due to cyclic loading of buried gray cast iron piping is not explicitly identified within the scope of GALL-SLR Report AMP XI.M41, “Buried and Underground Piping and Tanks.” However, the material is included in the AMP and the scope of the program states that the program addresses the aging effect of cracking. Therefore, it is reasonable that cracking due to cyclic loading of buried gray cast iron fire protection system piping is addressed by the applicant’s enhanced program. The reasonableness of Dominion’s enhancements to the XI.M41 program does not logically follow from the second sentence underlined above. The cracking managed by XI.M41 is caused by a fundamentally different aging mechanism (intergranular stress corrosion cracking resulting from exposure to an aggressive environment) than the cracking due to cyclic loading that is being considered. The underlying concept for the number of buried piping inspections in GALL-SLR XI.M41 is based on preventive actions that limit the amount of corrosion on the external surface of the components. The highest sample size recommended by the Buried and Underground Piping and Tanks program is six excavations based on Preventive Action Category F in GALL-SLR Table XI.M41-2. However, the preventive actions provided in AMP XI.M41 (i.e., coatings, cathodic protection, and backfill) have no direct correlation with the prevention or mitigation of the aging effect in question (cracking due to cyclic loading). In that respect, previous failure analyses by Dominion did not identify external corrosion as contributing to the cause of the piping ruptures. Cracking due to cyclic loading is not an aging effect/mechanism addressed in GALL-SLR Report AMP XI.M41, “Buried and Underground Piping and Tanks.” In response to the NRC staff’s questions, Dominion provided Supplement 4 to the SLRA in its letter dated Aug-26-2021 (ML21238A297). In its clarification of aging management of buried gray cast iron piping for cracking due to cyclic loading, Dominion stated that the quantity of inspections was selected for consistency with AMP XI.M41, Table XI.M41-2 for Preventive Action F. Based on the discussion above, the staff notes that establishing an inspection sample size (for cracking due to cyclic loading) on an inspection category based on preventive actions in GALL-SLR Report AMP XI.M41 has limited to no technical bases. However, the staff recognizes that if external corrosion is occurring on the buried gray cast iron piping, then the failure probability of cracking due to cyclic loading will increase due to higher stresses potentially driving previously stable cracks in the pipe. Although the NRC staff acknowledges that sample size development is only loosely based on a 90-90 statistical approach (i.e., 90 percent confidence that 90 percent of the population does not contain an attribute (NUREG-2221, Technical Bases for Changes in SLR Guidance Documents)), Dominion did not provide any information regarding how the current inspection sample size of five inspections per unit in each 10-year period statistically compensates for the previous six ruptures of fire water system piping. Based on the Dominion’s assertion that the previous failures stemmed from initial manufacturing defects, consideration should be given to defining the sample population as being the number of spool pieces that were supplied for the buried grey cast iron fire water system piping. The sample population can be reduced by the number of spool pieces that have been replaced over the years due to previous failures or as part of the partial replacement project associated with previous corrective actions (e.g., DCP\_04\_018). However, Dominion should provide information to show that their proposed sample will provide a reasonable confidence level and reasonable acceptability level given the past system failures. 2. Evaluations for crack growth and flaw stability. If a flaw is determined to be the result of cyclic loading, then Dominion will perform crack growth and flaw stability evaluations. Dominion has never established the magnitude of the cyclic loading to be used in these evaluations. Dominion continues to attribute the past failures to pressure surges from pump starts, but it is not clear what value will be used in the associated evaluations. Although Management’s SER version currently states that corrective actions have “reduced the frequency and magnitude of the hydraulic transients,” this statement lacks technical merit. Dominion has never provided any documentation related to the magnitude of the hydraulic transients that occur whenever a pump starts and has provided no discussion about reducing the magnitude of these transients. The corrective actions being credited in the current SER version are only associated with routine surveillance testing protocols. Prior surveillance testing reflected the system configuration that would be seen during an actual demand on the fire protection water suppression system. The corrective actions

changed the system surveillance configuration by closing the pump discharge valves, starting the pumps, then slowly opening the pump discharge valves. These corrective actions have only reduced the frequency of the pressure transients and have not reduced the magnitude of the pressure transient that will occur on an actual demand on the system. The pressure transients that caused the previous system ruptures will occur any time the system responds to an actual demand. One of the most recent system ruptures occurred due to a smoke alarm actuation, demonstrating that the pressure transient may cause a failure of the system if it is called upon to extinguish a fire. In addition, it is not clear how many load cycles will be used to determine whether a crack could eventually cause a loss of intended function. Although corrective actions have eliminated the monthly occurrences of the pressure transient during surveillance testing, fire suppression system actuations have occurred in the past and will occur in the future. As noted above, valid smoke alarm actuations have occurred, and the fire protection water suppression system is prone to inadvertent actuations for various reasons. Because Dominion has not previously performed crack growth or flaw stability evaluations for this situation, the staff has not been able to review the specific parameters that will be involved for these evaluations.

3. Clarification of "crack determined to be the result of a manufacturing flaw and not the result of aging." Enhancement 6 states "If a crack is determined to be the result of a manufacturing flaw and not the result of aging, then the results will be documented in a metallurgical analysis report with no further actions required." The current methodology provided in Enhancement 6 will only pursue the bounding crack location to further destructive examination. If a manufacturing flaw is found to be about the same size as a crack due to aging that would cause a loss of intended function, then it is not clear why further actions (e.g., additional inspections) would not be performed on any comparable crack indication. The program discussion includes attributes of typical indications of crack growth due to cyclic loading, but typical indications may not be bounding. The discussion about seeing cement lining in a crack to support the contention that a crack was from manufacturing and not the result of aging, is not supported by operating experience where one of the past failures was attributed to a manufacturing flaw that had mortar on the crack surface, but grew over time and eventually failed. The uncertainty associated with attributing an existing crack to a manufacturing defect and not taking any further actions needs additional clarification by Dominion.

4. Validation to show that subsurface flaws do not exist by more extensive use of RT. The current program will use radiographic test (RT) to only validate indications of cracking from magnetic particle testing (MT). MT is an effective surface examination technique and it less effective for subsurface flaws. For any given sample, if there are no indications of cracking identified through MT, then additional RT shots should be made for at least some of the non-crack-like MT indications to validate that subsurface flaws are not agents in the failure process. In that regard, Dominion has never discussed the specific types of manufacturing defects involved in the past failures and it is not known whether a specific manufacturing process (spin cast or pit cast) was used and whether all of the piping used the same process. The applicable manufacturing process for the piping supplied to the site potentially factors into issue 1 (above) as it relates to the sample size.

5. Descriptions of programs in the FSAR Supplement are insufficient for both the a) Buried and Underground Piping and Tanks AMP, and the b) Selective Leaching AMP. As delineated in SRP-SLR Section 3.3.2.5, Final Safety Analysis Report Supplement, the summary description of the programs and activities in the FSAR Supplement for managing the effects of aging should be sufficiently comprehensive that later changes can be controlled by 10CFR50.59 and should contain any future aging management activities, including enhancements [emphasis added], to be completed before the subsequent period of extended operation. In previous license renewal reviews, the adequacy of the FSAR supplement was typically considered only after the details about the aging management program had been resolved. In this current case, the staff notes that the details for the Buried and Underground Piping and Tanks program may not yet have been fully resolved. Consequently, the adequacy of the program description in the associated FSAR supplement cannot be evaluated until the technical adequacy of the program has been determined. Based on the above discussion, in my opinion, the FSAR Supplements for both the Buried and Underground Piping and Tanks AMP and the Selective Leaching AMP do not meet the requirements of 10CFR54.21(d), contrary to the statements in SER Sections 3.0.3.2.14 and 3.0.3.1.10, respectively.

<p><b>17. Submitted By / Submitted On</b>  Gavula, James - MECHANICAL ENGINEER</p>	<p>2021-11-09</p>
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<b>NRC FORM 757</b> (06-2019) NRC MD 10.158		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>1. NCP Tracking Number</b> NCP-2021-007
<b>NON-CONCURRENCE PROCESS (Continued)</b>				<b>Date</b> 2021-11-12
<b>Section B – To Be Completed by Non-Concurring Employee’s Supervisor</b>				
<b>2. Title of Subject Document</b> Safety Evaluation Report Related to the Subsequent License Renewal of North Anna Power Station, Units 1 and 2			<b>3. ADAMS Accession Number</b> ML21264A011	
<b>4. Name of Non-Concurring Employee’s Supervisor</b> Bloom, Steven - BRANCH CHIEF		<b>5. Non-Concurring Employee’s Supervisor Email</b> Steven.Bloom@nrc.gov		<b>6. Office</b> NRR
<b>7. Comments for the NCP Reviewer to Consider</b> I support my staff’s use of the non-concurrence process and agree with the technical merits of this non-concurrence with respect to North Anna adequately revising the Buried and Underground Piping and Tanks Aging Management Program (AMP) due to failures of buried gray cast iron fire protection system piping caused by cracking due to cyclic loading from pre-existing manufacturing flaws or flaws initiated during the installation process. However, Dominion has included an enhancement to detect cracking by cyclic loading by performing excavations in which the excavated piping will be examined by non-destructive and destructive methods. If cracking is identified, Dominion will perform a crack growth evaluation and a flaw stability evaluation at the end of the subsequent period of extended operation. If necessary, an extent of condition, extent of cause, and the need for further follow-on actions will be entered in the Corrective Action Program. This enhancement forms the basis for the determination with reasonable assurance that this AMP will address cracking due to cyclic loading of the gray cast iron piping of the fire protection system piping.				
<b>8. Reviewed By / Reviewed On</b> Bloom, Steven - BRANCH CHIEF				2021-11-12

<b>NRC FORM 757</b> (06-2019) NRC MD 10.158		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>1. NCP Tracking Number</b> NCP-2021-007
<b>NON-CONCURRENCE PROCESS (Continued)</b>				<b>Date</b> 2021-12-30
<b>Section C – To Be Completed by NCP Coordinator</b>				
<b>2. Title of Subject Document</b> Safety Evaluation Report Related to the Subsequent License Renewal of North Anna Power Station, Units 1 and 2			<b>3. ADAMS Accession Number</b> ML21264A011	
<b>4. Name of NCP Coordinator</b> Johnson, Marieliz - PROJECT MANAGER		<b>5. NCP Coordinator's Email</b> Marieliz.VeraAmadiz@nrc.gov		<b>6. Office</b> NRR
<b>7. Agreed Upon Summary of Issues</b> <p>The non-concurring employee contends that the information provided by the applicant in Enhancement 6 to subsequent license renewal application section B2.1.27 (Buried and Underground Piping and Tanks) does not demonstrate that the associated aging effects, cracking due to cyclic loading of buried gray cast iron piping, will be adequately managed, as required by 10 CFR 54.21(a)(3).</p> <ul style="list-style-type: none"> <li>• No information is provided to justify the current inspection sample size of five inspections per unit in each 10-year period statistically given the prior operating experience of six ruptures of fire water system piping.</li> <li>• The specific parameters that will be used for crack growth or flaw stability evaluations have not been provided.</li> <li>• The amended application does not address uncertainty associated with attributing an existing crack to a manufacturing defect and not taking any further actions.</li> <li>• The specific types of manufacturing defects involved in the past failures, whether surface flaws or embedded flaws, have not been described to provide insights. If no indications of cracking are identified through the proposed surface examination methods, then additional exploratory radiographic testing should be implemented for some of the samples to validate that subsurface flaws could not result in failure.</li> <li>• The FSAR Supplement descriptions are insufficient for both the Buried and Underground Piping and Tanks AMP, and the Selective Leaching AMP.</li> </ul>				
<b>8. Evaluation of Non-Concurrence and Rationale for Decision</b> <p>The non-concurring staff member's use of the non-concurrence process is appreciated as an appropriate mechanism to raise concerns and differing views. I also appreciate the comments provided by the non-concurring employee's supervisor in Section B and find them to be consistent with my evaluation discussed below. The technical issues identified in the non-concurrence are legitimate technical issues related to aging management of buried gray cast iron piping. However, the issues identified in the non-concurrence will be appropriately evaluated and addressed within the context of the principles of license renewal, the NRC's reactor oversight activities, and the standard of "reasonable assurance" in approving renewed licenses. The process outlined in 10 CFR Part 54 for license renewal (which includes subsequent license renewal) is founded on these principles as stated in the Statements of Consideration for the 1995 license renewal rule (60 Federal Register 22464):</p> <ul style="list-style-type: none"> <li>· The ongoing regulatory process is adequate to ensure the safety of currently operating plants</li> <li>· The plant-specific licensing basis must be maintained in the same manner and to the same extent as during the original licensing term, in part through a program of age-related degradation management for plant structures and components that meet the scoping and screening requirements of the rule</li> </ul> <p>One part of the NRC's ongoing regulatory process is the implementation of the oversight program, which includes several aspects that are pertinent to aging management program implementation and potential licensee corrective actions: resident inspector reviews, regional inspector reviews of ISI-related activities, and review of corrective actions. The basis for approval of subsequent license renewal applications is the concept of "reasonable assurance," as stated in 10 CFR 54.29 (with emphasis added): A renewed license may be issued by the Commission up to the full term authorized by § 54.31 if the Commission finds that:</p> <ul style="list-style-type: none"> <li>(a) Actions have been identified and have been or will be taken with respect to the matters identified in Paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:</li> <li>(1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1); and</li> <li>(2) time-limited aging analyses that have been identified to require review under § 54.21(c).</li> </ul> <p>In addition to the requirements for subsequent license renewal, the agency's overall regulatory process involves numerous NRC activities related to operating plants, including the reactor oversight process to verify operation in</p>				

compliance with the CLB. In particular, the process involves oversight of licensee performance relative to regulatory requirements, such as conformance to the quality assurance requirements of Appendix B to 10 CFR Part 50. As an example, Criterion XVI of Appendix B, "Corrective Actions," describes the need to determine the cause of the condition and to take corrective action to preclude repetition for significant conditions adverse to quality. Although the applicability of Appendix B is limited to license renewal SSCs that are in scope in accordance with 54.4(a)(1), Appendix A1 of the NAPS subsequent license renewal application (SLRA) states: The scope of the existing QA Program is expanded to also include safety-related and nonsafety-related structures and components (SCs) subject to AMPs. Regarding the specific bases cited in the non-concurrence: 1. Justification of Sample Size This topic has two interrelated aspects: (1) relating inspections for cracking due to cyclic loading to an inspection category in GALL-SLR Report AMP XI.M41 (without adequate technical justification) is not appropriate, and (2) the use of Preventive Action Category F (as prescribed in LR-ISG-2015-01 and later incorporated into GALL-SLR Report AMP XI.M41) in this instance is not appropriate. Use of GALL-SLR Report AMP XI.M41: Two objectives of AMPs are the ability to detect the aging effect(s) of interest and the implementation of preventive actions to limit the impacts of aging on component and structure intended functions. Although cracking due to cyclic loading is not explicitly identified in the cited GALL-SLR AMP, the AMP is stated to be appropriate to manage cracking in steel buried piping, albeit from a corrosion cracking mechanism. The applicant's proposed use of this AMP to manage cracking due to cyclic loading is acceptable because cracks resulting from cyclic loading (i.e., planar, non-branching cracks) should have a higher likelihood of detection as compared to a stress-corrosion cracks or cracking from a similar mechanism that produces branched cracks. Therefore, in this case the precise mechanism of the cracks is not relevant in determining whether the aging effect of cracking can be managed by the AMP. Regarding preventive measures, the effectiveness of the NAPS changes in pump testing procedures is clear in that no failures of the piping have occurred since 2003, after six prior failures in the previous 19 years. Although these actions are not consistent with the preventive measures identified in the GALL-SLR AMP to address corrosion-induced mechanisms, the intent of preventive measures is to reduce the number of failures – the NAPS test procedure changes have clearly done that. The Category F inspections in the GALL-SLR Report AMP represent the worst case for corrosion-related aging effects in the AMP, with no effective implementation of preventive measures (i.e., cathodic protection system, coating and/or backfill do not meet acceptance criteria), and are a conservative inspection regimen. For the circumstances at NAPS, the successful implementation of preventive measures and no operating experience of pipe failures since 2003 are indicative that the causes of the cracking have been controlled; therefore the Category F inspections are adequate for this piping. Any adverse findings from the planned inspections would be entered into the corrective action program and would result in implementation of corrective actions, one step of which would likely be an expansion of the inspection sample. The non-concurrence accurately identifies that "Dominion did not provide any information regarding how the current inspection sample size of five inspections per unit in each 10-year period statistically compensates for the previous six ruptures of fire water system piping." For the present circumstances, the changes in the pump test procedures and the consequential absence of failures in the last 19 years appear to have effectively mitigated cracking due to cyclic loading; thus, it is reasonable to not overemphasize these prior failures when identifying an appropriate inspection sample size to manage aging of this piping in the subsequent period of extended operation. Category F of GALL-SLR Report AMP XI.M41 specifies inspection of "[t]he smaller of 10% of the piping length or 6 inspections." Although one sample (either from fire protection piping or a different component type, e.g., hydrant) will be examined for selective leaching, the applicant's proposal to remove six sections of the buried gray cast iron piping is consistent with the intent of the GALL-SLR AMP in examining material from multiple locations. The absences of pipe failures since 2003 provides one indication that the operating experience since that time has not compromised the piping in such a manner that more samples are necessary. 2. Evaluations for crack growth and flaw stability The non-concurrence is correct that there are many technical details that would be necessary to implement the crack growth and flaw stability evaluations. Although the staff would prefer to have details on the crack growth and flaw stability evaluations that will be implemented as a part of corrective actions, this information is not necessary to find the program acceptable and is more appropriately reviewed as a part of oversight should these evaluations be implemented. 3. Clarification of "crack determined to be the result of a manufacturing flaw and not the result of aging" Excluding manufacturing flaws that do not have growth due to cyclic loading or other mechanism is reasonable from the perspective that these flaws have been proof-tested many times by the pump start tests and the inadvertent actuations, and they have neither failed, had cracks initiate nor had growth of cracks. If these manufacturing flaws have not exhibited additional cracking nor previously failed under the loading conditions to which they have been exposed, it is reasonable to conclude that these manufacturing flaws will not suddenly fail under the same loading conditions that they have previously experienced. 4.

Validation to show that subsurface flaws do not exist by more extensive use of RT. The failure of a cracked structure is driven by the fracture toughness of the material, which can be translated into a critical value of the crack opening, i.e., the amount the crack opens under load. For similarly sized flaws (e.g., length and depth), the same load will cause a larger crack opening (i.e., larger stress intensity factor) in a surface breaking flaw as compared to an embedded flaw due to the surrounding material restraint. Therefore, the failure behavior of a surface breaking flaw will bound a similarly sized embedded flaw. Visual examinations are capable of finding surface-breaking flaws, whereas magnetic particle testing is also a surface examination technique but it is cited as having a penetration depth of 2 3 mm, or a combined ~0.2 inch of the pipe cross section out of a pipe wall thickness of ~0.5 in. Therefore the proposed examination methods are capable of interrogating a substantial portion of the near-surface material that could lead to failure of the piping. With the much reduced stress intensity that would exist for an embedded flaw in the non-interrogated region of the piping, failure of an undetected flaw within that volume would be unlikely. With the adequacy of the proposed surface examination techniques directly tied to the very low likelihood of failure of potentially missed embedded flaws in the non interrogated piping material, the techniques discussed in the application are judged to be effective in detecting cracking on the piping surface and near surface material that could lead to piping failure. The non-concurrence accurately identifies that "Dominion has never discussed the specific types of manufacturing defects involved in the past failures and it is not known whether a specific manufacturing process (spin cast or pit cast) was used and whether all of the piping used the same process," likely because this topic was not discussed with the applicant. Although a literature review indicates that the strength and toughness of spin cast and pit cast gray cast iron are different due to microstructural differences, identification of the specific casting method (at this point) would not affect the acceptability of the aging management approach proposed by the applicant. Should crack growth and flaw stability evaluations be necessary, then the method of casting the pipe would become important to define appropriate material properties.

5. Descriptions of programs in the FSAR Supplement are insufficient for both the a) Buried and Underground Piping and Tanks AMP, and the b) Selective Leaching AMP. To address this item, a request for additional information (RAI) has been issued to the applicant regarding the need for additional information in the FSAR supplement for the Buried and Underground Piping and Tanks AMP and the Selective Leaching AMP. Summary I want to re-state my appreciation to the employee for using the non-concurrence process to raise his concerns and differing views. For the reasons stated above and with an expectation that the FSAR supplement descriptions will be appropriately strengthened, I am confident that the proposed aging management program(s) will effectively manage the aging effects associated with the buried gray cast iron piping during the subsequent period of extended operation. Therefore, there is reasonable assurance that that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB and the renewed license can be issued.

<b>9. Coordinated By / Coordinated On</b> Johnson, Marieliz - PROJECT MANAGER	2021-12-30
<b>10. Approved By / Approved On</b> Taylor, Robert - DEP. OFFICE DIRECTOR FOR NEW REACTORS	2022-01-04