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Chief, Rules Review and Directives Branch
Division of Freedom of Information and Publications Services
Mail Stop P-223
U.S. Nuclear Regulatory Commission
Washington, MD 20555

Dear Sir or Madam:

Please find attached our comments on draft NUREG-1482. If you have any questions regarding our comments, please contact either myself or Mr. Edward Grove at 516-282-5558.

Sincerely yours,

Adele DiBiasio
Engineering and Testing Group
Engineering Technology Division

Attachments

- cc: P. L. Campbell, USNRC, NRR
- J. Taylor
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BNL's Comments on Draft NUREG-1482

General

1. There are many references to Section XI and the OM Standards, without any reference to the specific Edition and Addenda. Sometimes, the 1983 edition of Section XI is used and sometimes the 1986 edition is used. This should be clarified. For example, in Section 4.3.6 the NRC Position is based on the 1983 Edition of Section XI, and the first paragraph of the Introduction should reference the edition of OM referenced in the 1989 Edition of Section XI (i.e., OMa-1988).

2. The references to OM and Section XI interpretations in this document should be consistent (e.g., in the Basis of 5.5.4, OM Interpretation 91-3 (File number OMI-90-01) and Section XI File number IN 91-037 (Interpretation number XI-1-92-14) are referenced). The interpretation number (and not the file number) should be used (i.e., OM-91-3 and XI-1-92-14 in 5.5.4; XI-1-92-41 (IN92-025A) in 3.1.3 Basis; XI-1-92-37 (IN92-027) in 4.3.3 Basis; XI-1-92-16 (IN91-045) and XI-1-92-38 (IN92-031) in 4.4.4 Basis; add OM in front of Interpretation 92-6 in 5.2 Basis; add Interpretations XI-1-92-14 and XI-1-92-37 to Section 8 and correct the following references in Section 8:

Interpretation XI-1-92-38, "Section XI, IWA-3200; Valve Testing — Adjustment of Packing," File Number IN92-031, August 27, 1992.

Interpretation XI-1-92-16, "Section XI, IWV-3200; Valve Stroke-Time Test," File Number IN91-045, March 10, 1992.

Interpretation XI-1-92-41, "Section XI, IWV-3410 and IWV-3520; Valve Testing - Extended Shutdown," File Number IN92-025A, February 9, 1993.

3. This document provides acceptable alternatives to the Code for existing power plants/systems. New designs, however, should include provisions for complying with the Code. This should be stated in the NUREG.

Section 2.1

1. The third paragraph should be revised to: The regulations **provide** the upper tier requirements for inservice testing.

2. Add to the fifth paragraph a discussion of providing provisions for IST for replaced or modified components, such as: "When components are added or systems are modified, provisions for inservice testing should be provided, when practical." This position is discussed in 5.5.1 for replacement instruments. It applies to components also. This was an issue at one licensee where they installed new solenoid valves that did not have position indication to allow the measurement of stroke times.

3. Code Case N-444 on Preparation of Inspection Plans should be added to the list of Code Cases in Reg. Guide 1.147 concerning IST and a statement that relief is required if portions of a Code Case are used and that any Code Case used must be documented in the IST Program, as discussed in Code Case N-427.

4. Subsections IWP and IWV were not replaced in the 1989 Edition, but revised to simply reference the OM Standards. Additionally, the 1990 OM Code included the OM Standards with Addenda through OMc-1990 and the OM Code addresses snubber examinations as well as testing. The tenth paragraph might be reworded as:

In the 1988 Addenda and the 1989 edition of Section XI, Subsections IWP and IWV were revised to simply reference Parts 6 and 10 of the ASME Operation and Maintenance (OM) Standard, "Operation and Maintenance of Nuclear Power Plants, ASME/ANSI OM-1987" (1988a addenda of OM-6 and OM-10), respectively. The OM Standards, including the Addenda through the OMc-1990, were rewritten, though no significant technical changes, and were approved by the Board on Nuclear Codes and Standards in 1990 as the "Code for Operation and Maintenance of Nuclear Power Plants, ASME OM Code-1990." The OM Code includes pump, valve, and snubber testing and snubber examination requirements. While OM-6 and OM-10 have been incorporated into the regulation through the 1989 edition of ASME Section XI, the NRC has not yet incorporated the OM Code into 10 CFR 50.55a.

Section 2.2

1. Reference the appropriate editions of Section XI in the first sentence, e.g., Subsections IWV-1100 and IWP-1100 of Section XI **prior to the 1988 Addenda** define the scope of the IST program for pumps and valves with exceptions defined in IWP-1200 and IWV-1200.

2. Clarify the requirements of the regulations and Code in the first paragraph, e.g., Both Section XI and 10 CFR 50.55a(f) specify that the IST program must include **certain** pumps and valves **classified as ASME Code Class 1, 2, and 3** required to perform a specific safety function....However, the scope of the OM Standards and Code has been expanded to require that **certain** safety-related pumps and valves be included in the inservice testing program. Until the scope of 10 CFR 50.55a is changed, the scope of the inservice testing program will remain those components **classified by the licensee as ASME Code Class 1, 2 or 3.**

Section 2.3

1. Add clarification that: Not all of the systems or components described in Tables 2.1 and 2.2 are considered safety-related at every plant, nor are all classified as Code Class 1, 2, or 3.

2. Add NUREG-0800, Section 3.2.2 to end of last sentence concerning information on classifications. Also add a statement that licensee's safety analysis generally contain a section which describes the Code classification of components. The IST Program scope must be consistent with the safety analysis.

Section 2.4

1. A paragraph that discusses periodic updates to keep the IST Program current with design modifications or other activities performed under 50.59 would fit nicely here, as well as a discussion of when the program should be submitted (e.g., annually or only after non-editorial revisions, and X months or weeks prior to the beginning of the next interval). The first two paragraphs of 2.4.1 are appropriate for both pumps and valves. Section 2.4 could be revised to read:

The following discussion applies to both pumps and valves and describes **the documentation of the IST program**. Section XI of the Code includes the rules for inservice inspection (ISI) and IST of nuclear power plant components. Subsection IWA includes general requirements for the inservice inspection **and testing** of components, and Article IWA-6000 of that subsection addresses records and reports required for these programs. IWA-6210(a) states that the owner shall prepare plans and schedules for inservice examinations and tests to meet the requirements of Section XI. IWA-6220(a) states that examination, test, replacement, and repair records shall be prepared in accordance with the requirements of respective articles of Section XI. However, Article IWP **and IWV-6000** include minimal guidance for the information that should be included in the IST program for pumps **and valves** that perform a safety function. **Appendix F of Section XI, which was introduced in the 1987 Addenda, provides non-mandatory guidance for the preparation of inspection (and testing) plans.** Licensees have found that tables are a convenient format for the information.

The pump **and valve** table is a convenient format for identifying pumps **and valves** and testing requirements. The tables typically include enough information to allow ~~for~~ NRC inspectors to evaluate if the testing complies with the Code requirements for test method and frequency and note applicable NRC positions or recommendations for each pump **or valve**.

Licensees should maintain the IST Program current with design modifications and other activities performed under 10CFR50.59. The Program Plan should be submitted to the NRC prior to the beginning of the interval and following any technical revisions during the interval. The Program should include documentation of the use of positions contained herein, GL 89-04 positions and Code Cases.

2.4.1

In preparing pump tables, the licensee could consider the following information, which includes headings and a description of the text that could be included under each heading, as depicted in Table 2.3.....

2. Add Code Class to the Tables, so that the reviewers can determine if the test is required or included by the licensee voluntarily (This is discussed in Current Considerations for Position 7 in App. A).
3. Table 2.3- Revise the speed parameter to "N" (not H).
4. Under the heading Tests Performed and in Table 2-2, a discussion that licensees should identify each direction that the valve is exercised should be provided, as the

frequency may not be the same for each direction. Additionally, under the remarks column, the applicable Generic Letter Position and methods used (e.g., disassembly/inspection or non-intrusives) should be noted.

Section 2.5

1. The Staff should emphasize in Section 2.5 and 3.3.3 that relief requests are approved for the ten year interval and are subject to review when the IST Program is updated for consistency with current NRC positions (See Question 70 response in Appendix A).

Section 2.5.1

1. Revise second sentence of first paragraph to read:

In requesting relief, the licensee should typically describe the specific **Code requirement and associated paragraph for which relief is requested**, describe the proposed alternative(s), describe the basis for relief or for the alternative, and clarify the burden that would result if the requirements were imposed.

Section 2.5.3

1. For the Relief Request Number the licensee should specify a unique identifier for each relief request that is used throughout the ten-year interval.

2. Relief requests and justifications for check valves need to be clear about which test direction(s) (i.e., the full-open or closed) relief is required.

Section 3

1. Table 3.1- Revise the fail-safe frequency to "Once every 3 months **if practical**". Add primary containment vacuum relief valves-6 months and non-reclosing pressure relief devices (rupture disks)- replace every 5 years (OM-1) or as specified by the Owner (Section XI).

Section 3.1.1

1. Add ¶6.2 (Test Plans) to related requirements for deferring testing to refueling (p.3-1). Delete ¶6.2 as a related requirement in Section 3.1.1.1.

2. The example in Item 1 from the 1976 letter mentions that HPCI steam supply and pump discharge valves should not be tested quarterly. Most, if not all, BWRs, however, do test these valves quarterly and testing is practical. In general, testing should not, itself, cause failures and should only be excluded if a failure could go undetected and cause a loss of system function (See Draft Reg. Guide dated Nov. 1981).

3. Add to 3.1.1.3 that if the containment is deinerted during specific cold shutdowns, the licensee should perform tests. Additionally, the basis for this position is that testing during inerted cold shutdowns is impractical (per (f)(4)(iv)), however, the discussion talks about the hardship, not impracticality. Section XI Interpretation XI-77-02, Question 6 states that Section XI does not accept reasons such as high temperature, radiation, or a lack of oxygen for not performing tests inside containment during operation.

4. It does not appear that testing the RBCCW Cat. A valve (which should take only 2-5 minutes) could significantly increase the containment temperature and is impractical (Example 3.2).

5. Example 3.3 does not discuss why the valve cannot be full-stroke exercised at cold shutdown. The explanation is different than that discussed in the example of Section 3.1.2 (It appears to be the same valve/plant). Additionally, delete the second "would" from reason 2 in the basis.

6. Example 3.4, in the Test Frequency section, states that the check valves are stroked closed at RFOs for the reasons described above. There is no explanation of the closed test-only open.

Section 3.1.1

1. Add in front of the second paragraph of the NRC Recommendation: "Section XI, IWA-6210(a), requires documentation of the test schedule."

Section 3.1.2

1. The last sentence of the fourth paragraph states: Entry into multiple LCO is to be avoided (although the safety analysis may not prohibit certain situations and plant configurations). Entry into multiple LCO **should be** avoided, however, there is no requirement that prohibits this.

Section 3.1.3

1. The second sentence of the second paragraph of the NRC Recommendation should read:

However, the licensee **should** not extend the test intervals for safety and relief valves ~~tested in accordance with intervals~~ defined in OM-1 and Paragraphs IWV-3510 - IWV-3514 and Table IWV-3510-1 of Section XI, other than to coincide with a refueling outage.

Section 3.2

1. The word "inoperative" is used. The Code term "inoperable" should be used for consistency.

2. The Recommendation states that the licensee must perform the detailed analysis in a "timely manner". What does this mean? Days, weeks, months? Some specific guidance is needed.

3. In the Basis the second sentence of the first paragraph could be revised to read, for clarity: The plant safety analysis **includes the minimum required performance parameters** for a component to meet the most limiting conditions under which it may be required to operate **for various scenarios**.

4. The first sentence of the third paragraph might be reworded to:

Upon finding the pump **in the Code required action range**, technical specifications (if applicable) would require the licensee to declare it inoperable while reviewing the test results and making comparisons to previous test results to ensure that a condition has not developed that will further degrade the pump and **cause it to exceed** the safety analysis limits. If the licensee finds that the pump is not in danger of further degradation over an acceptable period of time, the licensee's **engineering** analysis may be an acceptable alternative to the repair or replacement of the pump for that period until such time that repairs can be effected.

This change would clarify engineering analysis versus the Safety Analysis and replace the double "inoperable".

Section 3.3.2

1. This position is confusing. Why would anybody use concurrent intervals without relief? Revising both programs more often than every 10 years is a costly burden. Recommend deleting this position.

Section 3.3.3

1. The last paragraph of the NRC Recommendation, which states that the relief requests may be submitted up to one year after the new interval starts per 10CFR50.55a(f)(4)(iv), contradicts Section 6, which states that the relief requests should be sent in within 2 weeks, and (f)(4)(iv), which requires the submittal and approval by NRC within 1 year. The licensee must submit the relief requests within 6 months in order for them to be approved within 1 year. Section 6 addresses this issue in more detail and this sentence only confuses the issue. Recommend deleting the sentence. Additionally, the Staff should address the submittal of relief requests in the middle of the 10 year interval.

Section 3.4

1. This discussion on skid-mounted components may be more appropriate in Section 2.2.

2. Delete "of" in the first sentence of the first paragraph

3. This section discusses two issues. The first is that some utilities have not classified skid-mounted equipment in Code Class systems as Code Class. The other is that the Code does not specifically address skid-mounted equipment. In the NRC Recommendation it is stated that the testing of the major component is considered adequate to verify the operational readiness of the skid-mounted and component subassemblies. There may be situations where this is not true. For instance, for the EDG air start subsystem, where there are redundant paths, testing of the EDG only verifies that one of the two air start subsystems is operable (See Palo Verde Special Report on this topic). The licensee should review the testing of the major component and ensure that it adequately tests each safety related pump and valve commensurate with their importance to safety as required by Appendix A. For components that are outside the scope of the regulations, testing in accordance with the IST Program, although not required, would provide adequate assurance of the component's operational readiness. For these components, other testing methods may be adequate. However, if the skid is classified by the licensee as Class 1, 2, or 3, the pumps and valves are required to be tested in accordance with the Code. The main component tests may be an acceptable alternate to the Code requirements.

4. The Basis should include NUREG-0800 for NRC guidance on classifying components. Many plants use this guidance, as documented in their SARs. The Basis should also state that if these components are classified by the licensee as Code Class 1, 2, or 3; they are required to be tested in accordance with Section XI.

Section 4.1-General

1. The current Considerations for Question 24 and Position 3 (following Question 26) in Appendix A, regarding the NRC's position that exercising a check valve open before backflow testing is not required, should be discussed in Section 4.1.

2. A discussion of the NRC's position on the hierarchy of check valve testing should be included in Section 4 instead of as discussion in Appendix A on Position 2. A flow chart is provided. Licensees should be given direction that when proposing disassembly/inspection they need to demonstrate the impracticality of full-flow and full-stroke exercising.

Section 4.1

1. **Revise:** The NRC considers that check valves, and other automatic valves designed to **open or** close without operator action after an accident and for which flow is not blocked...

Section 4.1.1

1. The NRC Recommendation states that both series check valves should be subject to

"the equivalent quality assurance criteria." Does this mean that they both have to be safety-related or that they have to be the same Code Class? This statement should be clarified.

Section 4.1.2

1. This section requires the licensee to use non-intrusive techniques "in accord with quality assurance program requirements." Does this mean that the computer software used in many non-intrusive techniques requires "QA"? Additionally, it appears that this position does not require that the criteria contained in GL89-04, Position 1 be met. Position 1 states that to substantiate the acceptability of any alternate techniques, licensees "must," as a minimum, address six criterium.

Section 4.2.1

1. The NRC Recommendation includes a statement that "This also applies to valve stroke times in an "alert" range when compared to reference values for testing..." This statement is unclear, as IWV-3417(a) provides alert limits based on previous test results and licensees use multiples of reference values only to determine limiting stroke times and not alert values (in accordance with Part 10). Recommend deleting this sentence.

2. The Recommendation also states that "the increased testing is not required if a licensee is testing against portions or all of the stroke time requirements of OM-10 in accord with 10 CFR 50.55a(f)(4)(iv)." 10 CFR 50.55a(f)(4)(iv) requires that if portions of editions of Section XI are used, all related requirements must be met. Therefore, per (f)(4)(iv), portions of the stroke time requirements cannot be used (NUREG, Section 4.2.7 confirms this). Recommend deleting "portions or all of" from the sentence and referencing 4.2.7.

Section 4.2.4

1. MSIVs in BWRs are required by SARs to close on springs only. While PWRs may require safety-related air to assist the valve springs in closing and, therefore, do not fail-close on a loss of air. The valves should be tested with the non-safety-related air isolated, however.

Section 4.2.5

1. OM-10 allows other indications to be used to verify valve position indication only when local observation is **not possible**. Licensees must request specific relief if local observation is **possible but burdensome**. For example, the Prairie Island MOV that is contained in an enclosure (i.e., tank).

Section 4.2.7

The NRC Recommendation includes ¶1.3, Terminology, as a related requirement for stroke time measurements. Definitions do not provide requirements and ¶1.3 should be deleted.

Section 4.2.9

1. The NRC position requires stroke time measurements for control valves that only have a fail-safe safety function, however, would it be more appropriate that only the requirements of IWV-3415 on fail-safe testing be met?

2. The intent of the statement "Although stroke timing by an alternate method is preferred based on the Code requirements, the licensee can use other methods if stroke timing is impractical" is unclear. Recommend deleting this sentence.

Section 4.3.1

1. The following revision is recommended to clarify the scope:

In Paragraph IWV-1100 of the 1986 edition of Section XI, the Code committee increased the scope of the valves subject to inservice testing to include those valves which protect **Code Class 1, 2, or 3 systems, that are required to perform a specific function in shutting down the reactor, maintaining the safe shutdown condition, or in mitigating an accident;** from overpressure. Pressure relief valves installed in the applicable systems protect against overpressure may not themselves typically perform a "safety-related" function (**The ADS valves in BWRs are one exception, since they are required for overpressure protection and to perform the safety-related function to depressurize the RCS when opened by an operator or system signals**). However, these valves are now required to be included in the inservice testing program and tested according to the schedules stipulated in OM-1-1981 or OM-1-1987 "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices." This requirement must be included in 120-month updated IST programs.

2. This section should discuss whether relief valves that protect safety related components/systems from overpressurization only when the system is lined up for maintenance (e.g., for heat exchangers) are required to be included in the IST program. Although these valves are only required to open during maintenance activities. Their premature opening may compromise a safety system.

Section 4.3.2

1. Clarify the edition/addenda of OM Parts 1, 6, and 10 to be used when using the 1989 Edition of Section XI. The following revision is suggested:

The 1989 Edition of Section XI, IWA-1600, references the 1987A of OM Parts 6 and 10, and the 1987 Edition of Part 1. As discussed in 10CFR50.55a(b)(2)(viii), when using the 1987 Addenda, 1988 Addenda, or 1989 Edition of Section XI; the OMa-1988 Addenda of Parts 6 and 10 shall be used. This was corrected in the 1990 Addenda of Section XI, as errata.

If the section is to be limited to a discussion of Part 1, the following revision is suggested:

OM-1-1981 was the edition of OM-1 referenced in the 1986 edition of Section XI. IST programs developed and implemented in accordance with the **1989 Edition of Section XI** are to use OM-1-1987, **in accordance with IWA-1600.**

Section 4.3.3

1. The same reasoning used in this position for test personnel qualifications could be applied to maintenance personnel qualifications, since OM-1 requires the Owner to be responsible for the qualification of personnel who perform testing **and** maintenance. The "test procedures specify the qualifications of the individuals performing the tests and documents are available showing these qualifications are met. A general statement is not sufficient." Isn't the Owners QA program that addresses the training and qualification of personnel performing all activities important to safety adequate, such that specific documentation is not required in the test or maintenance procedure?

Section 4.3.6

1. Clarify the Section XI definition of repair. The following revision to the Basis is recommended: "A Section XI repair or replacement activity is defined as a **repair by welding, brazing, or metal removal** of the pressure....."

Section 4.3.8

1. The discussion should clarify that OM-1 only specifies the test frequency for Class 2 and 3 primary containment vacuum relief valves and therefore is only applicable to these valves and not all vacuum relief valves.

Section 4.4.3

1. Delete "and Appendix J of 10CFR Part 50" from the second paragraph of the Basis (middle of para.). Appendix J does not require individual leak tests.

Section 4.4.4

1. The NRC Recommendation should clarify "to meet Code requirements" in the first sentence of the second paragraph. Additionally, the Recommendation should address leakage test requirements. The third paragraph of the Recommendation is unclear concerning adjustments beyond the manufacturer's limits. Since this position is stating that an engineering evaluation may be made when determining if maintenance could affect performance parameters (and, as such, meets the Code), testing when it is practical should not be required. The following revision is suggested:

4.4.4 Post-Maintenance Testing Following Stem Packing Adjustments

Paragraph IWV-3200 of Section XI requires that, upon performing maintenance to a valve in a manner that could affect its performance, such as by adjusting the stem packing, the licensee shall, before returning the valve to service, test it to demonstrate that the performance parameters are within acceptable limits. Paragraph 3.4 of OM-10 contains similar requirements.

The licensee may need to adjust the stem packing during power operations when it is impractical to stroke valves that must remain in position for operations to continue. Recent examples include main steam isolation valves and main feedwater isolation valves. If the leakage does not pose a personnel safety hazard, licensees often may adjust the packing without removing the valves from service. **Caution should be exercised when performing this maintenance, as** improper adjustment of valve stem packing could adversely affect the valve's functional capability.

NRC Recommendation The staff has determined that whenever valve stem packing is adjusted **and a stroke or leak test in the current plant mode is impractical**, the licensee can assess the effect of this adjustment on the valve's functional capability to open and close and to meet stroke-time **and leakage** requirements ~~and verify the stroke time and leakage rate by test when it is practical to perform.~~

The staff has determined that it is acceptable to perform an engineering evaluation of the impact of adjusting valve stem packing **to demonstrate that the performance parameters are within acceptable limits**. If it is necessary to adjust the stem packing to stop leakage and if a required stroke test or leak rate test is not practical in the current plant mode, the licensee must justify that the packing adjustment is within torque limits specified by the manufacturer for the existing configuration of packing such that the performance parameters of the valve are not adversely affected. **Packing adjustments beyond the manufacturer's limits, however, may not be performed without an engineering analysis and approval of the manufacturer unless tests can be performed after adjustments.**

An example of such valves is the main feedwater isolation valve or main steam isolation valve, which remain open to continue power operations. The licensee must evaluate any data available from previous testing with the packing torqued to the limit specified and verify that the valve was **leak tight and** previously stroked within acceptable limits with the packing adjusted to the higher value.

Relief is not **appropriate** because this action is in accordance with the Code requirements if the licensee can demonstrate that the performance parameters will not be adversely affected. In implementing this guidance, the licensee must perform a partial-stroke test if practical to obtain further assurance that the valve stem is free to move. At the first opportunity when the plant enters an operating mode in which testing is allowed, the licensee **should** test all valves that have packing adjustments that were made without post-maintenance testing to the extent practical. The maintenance procedure used to adjust the packing must include the limits, and any changes to the limits must be subject to a 10 CFR 50.59 review. The licensee would typically avoid adjusting redundant valves without performing post-maintenance testing. When plant conditions allow, however, the licensee **should** partially stroke the valve to ensure that the stem is not binding.

To implement this guidance, the licensee must perform individual valve evaluations unless it has established a valve packing program in which desired limits, justified

by test data, allow adjustments that do not affect performance parameters.

Specific or general relief is not appropriate for this activity. If the licensee cannot justify that the packing adjustment does not adversely affect performance parameters, there would be no basis for relief and the Code requirements must be met. Therefore, the licensee should consider this issue for each valve individually.

Section 4.4.5

1. Section 4.4.3 requires the IST program to include a discussion of the method for establishing group leakage limits. Section 4.4.5 and the 1989 Edition of Section XI do not require this documentation. Is this necessary?

Section 4.4.6

1. This section only addresses manual valves that are capable of being repositioned to shutdown the plant, etc. The Code, however, also addresses passive manual valves that are Category A or that have position indication. This section should reflect the Code requirements.

New Section 4.4.7

1. Add new Section to 4.4 to address valves that are CIVs, but also have a leak rate requirement based on other functions, such as temperature isolation valves. When using Part 10, these valves should be tested in accordance with both Appendix J and ¶4.2.2.3. The current Code would only require the valves to be tested in accordance with Appendix J. This clarification of the Code could expedite the removal of the current modification in the regulations concerning CIVs.

Section 5.2

1. The position should clarify that instruments that are "at least as accurate as required by the Code" requires that both the Code accuracy and range requirements be met.

Section 5.3

1. The paragraph in the Basis addressing analog gauge scale increments should be moved to Section 5.5.1, concerning the NRC Recommendations on the range and accuracy of analog instruments, instead being buried in a section on reference point variations. This section should also discuss the tolerance when setting the pump speed, for variable speed pumps. The recently approved comprehensive pump test code revision allows a $\pm 1\%$ tolerance for speed.

2. The Basis section could be clarified. Although Section XI, before the 1988 Addenda, did not address situations where system resistance cannot be varied, OM-6 does. Additionally, both Q and ΔP are subject to acceptance criteria for pumps in these

systems. The section could be revised as follows:

Section XI does not address the possibility that a flow rate or differential pressure cannot be controlled to an exact value. ~~However, the limits for flow rate and differential pressure do not both apply for monitoring the condition of pumps.~~ When the Code specifies that the system resistance be varied until either the flow or differential pressure equals the corresponding reference value, it does not intend that the set value have an acceptable range as stated in Table IWP-3100-2 (OM-6, Table 3b). **The acceptance criteria is only applied to the parameter being determined after the resistance is varied.** Licensees recognize that for certain pumps, the reference value can only be achieved within an approximate value. The staff determined that the licensees should set the repeatable parameter as close as possible to the reference value during each test rather than treating any variance in the value with a pump curve. If, upon establishing trends in data, the licensee determines that the parameter varies such that the readings are outside the accuracy of the instrument, it should consider establishing pump curves and requesting relief for the pump (see Section 5.2 above).

The basis for allowing a variance of ± 2 -percent from the reference value is paragraph IWP-4150 of Section XI which lists the requirements for instrument fluctuations. IWP-4150 allows symmetrical damping devices or averaging techniques to reduce instrument fluctuations to within 2-percent of the observed reading for values specified in the implementing procedures.

The Code, in paragraph 5.2(c) of OM-6, states that, if the pump is in a system for which the resistance cannot be varied, the "flow rate and pressure shall be determined and compared to their respective reference values." ~~This provides further justification for the position that the limits for pressure and flow do not both apply to each test parameter, but only to the parameter being measured. For these pumps, both the pressure and flowrate are subject to the acceptance criteria provided in Table IWP-3100-2 (OM-6, Table 3b).~~

Section 5.4

1. OM-6, ¶ 5.2 is a related requirement concerning pump vibration velocity measurements. It requires unfiltered peak (V) or p-p (D) measurements. This should also be referenced in the first paragraph of the NRC Recommendation.
2. The Basis states that frequencies less than running speed may not apply for pumps with certain types of bearings. Subharmonic, low frequency vibration may be indicative of things other than bearing degradation such rotor rub, seal rub, loose seals, and coupling damage. The licensees should be required to demonstrate that their pumps are not subject to degradation that could be detected at low frequencies.
3. The Code allows the measurement of either vibration displacement or velocity, although there is an implied preference for specifying displacement for slow speed pumps (in Table 3a of OM Part 6). In general, velocity pickups are not sensitive to low frequency vibration (<10 Hz.). As stated in NUREG/CP-0111, page 41, "At slow speeds, less than 600 rpm, displacement is the better parameter to use and is

recommended by specifying units in mils" (i.e., in Table 3a of Part 6). The Staff should provide a specific recommendation that displacement be measured for slow speed pumps (<600rpm). Additionally, the Staff should address the

Section 5.5.1

1. Section XI interpretation XI-1-89-55 seems to contradict the NRC position. Why reference it?

2. Why is a generic request acceptable for temporary instruments? Even if the temporary instruments are used, the licensee should discuss the instrument's accuracy and the required range based on each pumps' reference value. If the range and accuracy are not equivalent to the Code, another option is for the licensee to demonstrate that replacing the instrument is excessively burdensome without a compensating increase in the level of quality and safety. The paragraph could be revised as follows:

When the licensee submits a relief request, each group of affected pumps should be addressed separately. However, the NRC may not approve relief if the readings will not be equivalent to the Code requirements unless the licensee can demonstrate that the variance is not sufficient for the degradation to be overlooked **or replacing the instrument is excessively burdensome without a compensating increase in the level of quality and safety.** The licensee should describe the effect on each group of applicable pumps. If the instruments do not meet the intent of the Code requirements, the NRC may require the licensee to adjust acceptance limits to account for the inaccuracies. The licensee should discuss this adjustment in the relief request.

Section 5.5.3

1. The NRC Recommendation states that licensees may implement a calculational method for determining inlet pressure without obtaining relief because "the ASME Code allows for the calculation of the pressure on the pump inlet." Section XI, ¶IWP-3100, however, states that inlet pressure must be "measured" and ¶IWP-4100 only addresses pressure instruments. If the intent of the Code was to allow for the calculation of inlet pressure, then words similar to those in IWP-4600 for the calculation of flowrate based on a quantity meter would have been included. Additionally, a recently submitted Code interpretation concerning this issue was rejected. The committee felt that a Code Case to provide alternate requirements was more appropriate. Therefore, relief to calculate inlet pressure should be required.

Section 5.6

1. The adjustment of ΔP ranges (i.e., from 0.93-1.02 to 0.89 to 1.03) in the Interpretation is an example. The Basis implies this adjustment is a requirement. This could be clarified as follows:

If these ranges cannot be met, the Owner can specify new range limits, **for example from a range of 0.93 — 1.02 to a range of 0.89 — 1.03 for differential pressure.** Using the less conservative ranges, the owner must show that the overall pump

performance has not degraded from its intended function.

Section 5.7

1. Per J. Zudan's paper on the technical differences between Part 6 and ASME Section XI, Subsection IWP in NUREG/CP-01111, the centrifugal pump hydraulic acceptance criteria has been relaxed considering that the pump condition would be more closely evaluated with vibration. It appears that the intent of the Code is that the vibration requirements are related to the hydraulic requirements (which were both changed), and must, therefore, be used together as required by 10CFR50.55a(f)(4)(iv).

Section 6.0

1. The various revisions of the STS should be referenced.

2. This section recommends that licensees revise their Tech Specs to reflect the recently revised STS (9/93). These STS, however, will be revised to delete the reference to Section XI and simply reference 10CFR50.55a (This will accommodate the incorporation of the OM Code). Additionally, the STS or regulations will be revised to include all safety-related snubbers and not only Class 1, 2, and 3 snubbers (See W.C. Liu's memo to G. Millman, dated 1/11/93). The recommendation in this section may cause licensees to have to revise their TS twice.

Section 8.0-References

1. Add NUREG-0123 to the Fall 1980 GE BWR 5 STS.

2. Add the most recently revised STS, NUREGs-1431 through 1434 (Sept. 92).

Appendix A

Question 5

Clarify what test methods would require both Q and ΔP to be measured in the Current Considerations.

Question 26

The second paragraph of the Current Considerations would be more appropriate as a NRC Position in 4.1.2.

Current Considerations for Position 10

The requirements of the regulations should be stated (i.e., CIVS must be tested in accordance with 4.2.2.2 and 4.2.2.3(e) and (f)).