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

April 4, 1990

TO: ALL HOLDERS OF OPERATING LICENSES OR CONSTRUCTION PERMITS FOR NUCLEAR POWER PLANTS

SUBJECT: SERVICE WATER SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT (GENERIC LETTER 89-13, SUPPLEMENT 1)

On July 18, 1989, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." On October 23, 1989, the NRC announced in the Federal Register that it would hold four workshops on this generic letter. The NRC conducted these workshops in Philadelphia, Atlanta, Chicago, and Denver on November 28 and 30 and December 5 and 7, 1989, respectively. The NRC answered written questions submitted through appropriate project managers in the Office of Nuclear Reactor Regulation before the first workshop and questions submitted at each workshop. Transcripts of these meetings are available in the NRC Public Document Room, 2120 L Street NW, Washington, DC.

This supplement contains the questions and answers read into the transcripts during the workshops, except for the following changes. Questions received in the general, Action I, and Action II categories have been grouped according to topic. In addition, the NRC staff modified some answers after the workshops with the aim of furnishing additional guidance. Please contact the project manager if you have questions on this matter.

Sincerely,

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Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Questions and Answers
2. List of Recently Issued NRC Generic Letters

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IDR-5
GL

Enclosure 1

QUESTIONS AND ANSWERS

I. GENERAL

A. Reporting Requirements

1. If we are looking into several options to determine which one is the most beneficial, however, [if] we have not made a decision by the date that our response is due, would it be acceptable to explain this and confirm that whatever option is chosen will be completed on time? (Wisconsin Public Service)

Answer

Yes. The purpose of the 180-day response was to obtain the commitments, plans, and schedules of licensees and applicants to implement the recommended actions of the generic letter (GL) or their equally effective alternatives. The licensee's or applicant's decision-making process should be made a part of the plans and schedules and submitted to the NRC when the response is due. If other circumstances prevent such submittal, such as the regulatory requirements of the technical specifications or outside government agencies, the licensee or applicant should arrange any adjustments of the schedule with the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

2. What was the basis (experience) used to determine the schedule of completion for Items 2 and 4? Do these schedules consider utilities with more than one plant? (Northeast Utilities)

Answer

The basis for the schedule was an appearance of reasonableness. The schedules given apply to single units. Schedules are intended to be flexible and should be reported to the staff in the licensee's or applicant's response with justification if the recommended schedule in Generic Letter 89-13 is not used. The licensee or applicant should arrange any adjustments of the schedule with the appropriate NRR project manager.

3. If the CCWS [component cooling water system] is part of the scope for Items IV, V of the generic letter, would it be possible to modify the completion date commitments to fit this into our already existing SSFI [safety system functional inspection] schedule? (Wisconsin Public Service)

Answer

Yes. See the answer to Question I.A.1. Also, this request appears to be reasonable for good cause. The licensee or applicant should arrange any adjustments of the schedule with the appropriate NRR project manager.

4. Can we defer the Unit 2 required action dates so that they coincide with those of Unit 1 (i.e., October 1990 to April 1991 for Unit 2)? (Houston Lighting and Power)

Answer

Yes, with appropriate justification and arrangement with the appropriate project manager.

5. For Action Items 4 and 5 of the GL 89-13, HL&P [Houston Lighting and Power] plans to utilize the information gathered from a safety system functional inspection (SSFI) for the essential cooling water (ECW) and component cooling water (CCW) systems.

The SSFI for the ECW system supports the GL 89-13 reporting requirements; however, the CCW SSFI is scheduled for 1990. Is it acceptable to separate the reporting for the ECW and CCW systems, that is, extend the CCW portion of GL 89-13? (Houston Lighting and Power)

Answer

Yes. See the answers to Questions I.A.1 and I.A.3.

6. The SSFI method currently being used to satisfy Recommended Actions IV and V is manhour intensive. Can program deficiencies identified in the open-loop system be applied horizontally to the closed-loop systems in lieu of an additional SSFI? (Houston Lighting and Power)

Answer

Yes. A licensee or applicant may extend identified deficiencies, based on other actions already taken (such as an SSFI) on the open-loop system, to the closed-loop system, provided the licensee or applicant confirms that existing configuration control programs have been applied to the closed-loop system.

B. Backfit

1. The actions proposed by GL 89-13 constitute new staff positions. To perform the testing and inspection requested by the GL, it may well be necessary for licensees to make significant plant modifications. For example, licensees will likely be forced to install new instrumentation in order to perform tests and to monitor test results. Furthermore, changes will be required of procedures. An additional requirement of a walkdown has been made. The proposed tests may be beyond the licensing basis of the plant. These requirements seem to fit the definition of a backfit under 10 CFR 50.109(a)(1). Therefore, why were the requirements in the GL promulgated under the provisions of Section 50.54(f)? (Nuclear Utility Backfitting and Reform Group [NUBARG])

   Answer

   The NRC concluded that it was not assured that licensees and applicants are in compliance with existing regulations, namely General Design Criteria 44, 45, and 46 of Appendix A of 10 CFR Part 50 and Appendix B of that part. The recommended actions in this generic letter do represent new staff positions and are considered a backfit in accordance with NRC procedures. This backfit is to bring facilities into compliance with existing requirements. The regulatory request for information under 10 CFR 50.54(f) represented by the generic letter is designed to gain this assurance.

2. Was a backfit analysis of the testing and inspection requirements performed? Will the staff make that analysis available to the public? In particular, did the staff's backfitting analysis, if any, justify the need for actions on closed systems? (NUBARG)

   Answer

   The staff performed an analysis for review by the NRC Committee to Review Generic Requirements (CRGR). Because the CRGR reviews all proposed bulletins and generic letters, among other proposed staff actions, this may properly be referred to as a regulatory analysis pursuant to 10 CFR 50.54(f). The CRGR analysis is available in the NRC public document room (Accession No. 8907180077).

   Indeed, the staff was not able to justify inclusion of closed systems in the recommended actions of the generic letter, as it had once proposed to do. Accordingly, the generic letter was issued without the requirement for reporting heat transfer capability of closed-cycle heat exchangers.

C. Inspections

1. What level of detail should be included in the descriptions of existing and proposed programs? (Philadelphia Electric)

Answer

The level of detail retained in plant records should be sufficient to demonstrate that the heat removal requirements of the service water system are satisfied. Each recommended action delineated in the generic letter or equivalent should be addressed in sufficient detail to demonstrate the licensee's evaluation of the action. It should be noted that this information should be available in appropriate plant records but need not be submitted to the NRC.

2. Generic Letter 89-13 provides the licensee with a great deal of leeway in defining their programs. This leeway is desirable and justifiable given the wide variation in conditions that may prevail. It is anticipated that the main mechanism for judging compliance with the generic letter will be NRC site inspections. During such inspections, what will be the basis for judging the acceptability of the program? What is being done to promote consistency in interpretations among regions? (Duke Power)

Answer

The engineering judgment of the inspector, based on the addressee's documentation for the program, will be relied upon to determine acceptability of the program. The purpose of the generic letter is for licensees and applicants to assure that the heat removal requirements for the service water system are satisfied. This is required by regulations, particularly General Design Criteria 44, 45, and 46 of Appendix A of 10 CFR Part 50 and Appendix B of that part.

The workshops constitute to date the NRC effort to promote consistency among the regions regarding Generic Letter 89-13. The NRC will issue the questions and answers submitted before and during the workshops as a supplement to Generic Letter 89-13 within the next two months. The traditional method of issuing a temporary instruction for inspection from headquarters to regional offices will not be used for this generic letter. At this time, only audits of implementation of Generic Letter 89-13 are planned rather than systematic inspections. If an event or problem related to the service water system occurs at a particular plant, that plant's actions in response to Generic Letter 89-13 will be reviewed to determine if inadequacies in the implementation of the Generic Letter contributed to the event or problem. The supplement to Generic Letter 89-13 will also reference the transcripts for these workshops, which will be placed in the NRC public document room. Authors of the generic letter will be available by telephone to licensees, applicants, and inspectors to address questions on implementation of the Generic Letter.

3. Many of your responses this morning (Workshop II in Atlanta on November 30, 1989) fall back to the standard NRC position that the licensee should provide adequate assurance that they have a program or actions in place to satisfy the generic letter concerns. This position could create a problem later when the inspector shows up to review our program. What kind of guidance will the NRR and RES [Office of Nuclear Regulatory Research] staff be providing to the inspector? If you don't provide specific instruction in something like a TI [temporary instruction], the acceptability of a given program will be left to the opinion of an individual inspector. When will this type of guidance be available? (Florida Power)

   Answer

   Both the kind of guidance and the schedule are discussed in the answer to the previous question, C.2.

4. When does the NRC envision inspections to begin on this letter? (Florida Power)

   Answer

   At this time, only audits of implementation of Generic Letter 89-13 are planned rather than systematic inspections. The schedules for such audits have not been determined at this time.

D. Miscellaneous

1. Similar regional meetings regarding Generic Letter 89-04 were conducted in the June 1989 time frame. To date, the minutes from these meetings have not been received. When can we expect the minutes from the Generic Letter 89-13 meetings? (Duke Power)

Answer

Concerning Generic Letter 89-04, the minutes were issued by letter dated October 25, 1989, signed by James Partlow, Associate Director for Projects, Office of Nuclear Reactor Regulation. The minutes are being distributed to all licensees and applicants, meeting attendees, NRR project managers, and the NRC public document room.

Concerning Generic Letter 89-13, see the answer to Question I.C.2. To repeat, the NRC will issue the questions and answers submitted before and during the workshops as a supplement to Generic Letter 89-13 within the next two months. The supplement to Generic Letter 89-13 will also reference the transcripts for these workshops, which will be placed in the NRC public document room.

2. Do Recommended Actions IV and V apply to closed cooling systems? (Kansas Gas and Electric)

Answer

Yes. The generic letter defines service water systems as including both open-cycle portions and intermediate closed-cycle loops that function to remove heat from safety-related structures, systems, or components to the ultimate heat sink. Recommended Actions I, II, and III specifically apply to open-cycle portions of the service water system. Recommended Action II can be extended to the closed-cycle portions as conditions warrant. Whether a cooling loop is open or closed is not specified for Actions IV and V.

II. ACTION I - BIOFOULING

A. Terms

1. What is the definition of layup? (Philadelphia Electric)

Answer

Layup is the treatment of a system that is isolated or in a standby condition under stagnant flow conditions to prevent corrosion. Refer to "Plant Layup and Equipment Preservation Sourcebook," EPRI NP-5106 (March 1987). Those service water cooling loops normally operated with water in the system, even in a standby condition, should contain chlorinated or equivalently treated water rather than untreated water.

2. What constitutes an infrequently used component? (Philadelphia Electric)

Answer

Paragraph C in Enclosure 1 in the generic letter states that redundant and infrequently used cooling loops should be flushed and flow tested periodically at the maximum design flow to ensure that they are not fouled or clogged. This recommended action refers to emergency core cooling system loops or other safety-related cooling loops that are normally in the standby condition. The next sentence states that other components in the service water system should be tested on a regular schedule to ensure that they are not fouled or clogged. This recommended action refers to pumps, pipes, valves, strainers, or other components even in loops in which water is normally flowing. Often inadequate flow may exist in these loops and not be detected without such testing.

Consider a system in which water is normally flowing that has parallel branches in which the states of the components in the branches are not often changed. For example, branch throttle valves initially set before the plant began operation may not be controlled by procedure. Subsequent changes in the throttle valve positions for various reasons or clogging of them or other components in the branches would upset the initial system flow balance without detection.

3. Redundant and infrequently used cooling loops: (Unidentified)

   a. Define infrequently used.

   Answer

   The wording "infrequently used cooling loops" is intended to apply to those normally in a standby mode under stagnant flow conditions. The Generic Letter 89-13 program should address means for ensuring that fouling does not occur under such conditions.

   b. If performance testing is done on all heat exchangers periodically, will this satisfy the intent of the recommendation?

Answer

Yes. Periodic performance monitoring of all safety-related heat exchangers is acceptable, provided it ensures heat transfer capability, not merely flow or pressure drop.

4. Recommendation I of Generic Letter 89-13 states that "initial activities should be completed before plant startup following the first refueling outage beginning nine months or more after the date of this letter." What is the intent of the phrase, "initial activities"? Does it mean:

The first "round" of activities (inspections, flushes, biocide treatment, etc.) has been completed; or,

The mechanisms have been put in place which will culminate in the implementation of the program (biocide discharge permits submitted, procedures written and approved)? (Duke Power)

Answer

Both these possibilities could be included in the intent of the phrase. For those activities involving an outside governmental agency, the licensee or applicant should arrange a needed adjustment in the schedule with the appropriate NRR project manager. For those activities involving procedural changes or new procedures, "initial activities" refers to those inspections or other activities by which the need for procedural changes or new procedures is identified.

B. Inspection of Intake Structure

1. When determining whether a plant has clams in its source water, does consideration need to be given to the presence of clams in the plant vicinity (local environment) or solely in the water body (source of cooling water)? (Philadelphia Electric)

Answer

The purpose of this recommended action is to enable a licensee or applicant to know if the service water system might be subject to biofouling. All potential sources of water for the service water system should be examined annually for the presence of biofouling species. If no waters in the local environment of a plant can get inside piping and components to cause biofouling degradation of the heat transfer function of the service water system, then such waters do not need to be sampled.

2. Enclosure 1 to Generic Letter 89-13 recommends varying requirements for service water systems based on intake structure configuration and location. In a service water system in which the suction point of the service water pumps is in the collecting basin for the ultimate heat sink (cooling tower) would the basin be considered the intake structure or would the source of basin makeup water be considered the intake structure? (Mississippi Power and Light)

Answer

Each licensee or applicant should define the scope of the intake structure. The NRC considers that an intake structure would contain all the waters eventually used in the system. See the answer to Question II.B.1.

3. Does the visual inspection of the intake structure apply to the intake piping as well? If so, will NRC give guidance as to replacement criteria of piping? If not, is [American National Standards Institute Standard] B31.1 for wall thinning the appropriate criteria? (Wisconsin Public Service)

Answer

Visual inspection of the intake structure may apply to the intake piping. The minimum wall thickness is defined by the code of record that was used to design the piping system. Before 1971, ANSI B31.1 was applicable. Since 1971, ASME Code Section 3 applies to piping design and fabrication.

4. When stating we should be aware of other plants (refer to Philadelphia workshop transcript, p. 21), facilities, etc., that use the same service water source (e.g., river) and their biofouling problems, how far does that extend? Within 5 miles? 50 miles? Please clarify. (Unidentified)

Answer

The NRC cannot place a quantitative range on biofouling awareness. Conditions at each site would determine an appropriate program or how far away to monitor for biofouling. The licensee or applicant should use the best available site-specific information and establish an appropriate monitoring program.

5. Refer to Action Item I in Gen. Ltr 89-13. If the current sampling program, which was initiated to detect Asiatic clams, has not found any mollusk infestation do the sampling methods need to be modified to detect Zebra mussels? (Niagara Mohawk Power)

Answer

The recommended sampling methods in Recommended Action I are intended to be general enough to enable licensees and applicants to become aware of macrobiofouling agents early enough to prevent the associated fouling problem from adversely affecting the safety-related function of the service water system. See Information Notice 89-76, "Biofouling Agent: Zebra Mussel."

6. Inspection of intake structure each refuel cycle. Could inspection of other intake structures (fossil units) on the same body of water that have been in place and in service for up to 40 years be used to justify either to extend the frequency of inspection or maybe no inspection at all? (Unidentified)

Answer

The inspection of the intake structure should not be restricted to potential macroinvertebrate fouling. If the program in place at the fossil unit mentioned has been shown to be effective to date for detecting of fouling, including biofouling, mud, and silt, then it may be sufficient for future monitoring. However, the licensee or applicant should be aware of and should consider possible rapid changes in environmental conditions and ensure that its program includes the best available site-specific information.

7. If it can be shown that the introduction of mollusks into the service water system is not plausible based on service water system design and makeup water system design, can the requirements of Generic Letter 89-13 concerning both inspection for and control of mollusks be waived? (Mississippi Power and Light)

Answer

The purpose of the generic letter is for licensees and applicants to assure that the heat removal requirements for the service water system are satisfied. If this can be done by the proposed program, then it is acceptable.

8. If yearly inspection of a plant's service water intake structure shows no indication of Asiatic clams, and testing results indicate that corrosion is not microbiologically influenced, is it acceptable to continue with the annual inspections for clams and perform maintenance and testing as required in Actions II and III of GL 89-13, in lieu of a chlorination injection program? (Commonwealth Edison)

Answer

This appears to be reasonable for good cause shown. See the answers to the previous two questions.

9. Larva sampling is difficult to do. We already have a sampling commitment, but we don't want to do this and can justify not doing it. (Kansas Gas and Electric)

Answer

An equally effective course of action with justification is acceptable. However, the earlier that a licensee or applicant can identify the presence of a biofouling species in a source body of water for the service water system, the better chance it will have to control the situation and prevent a potential safety problem.

10. Does the generic letter imply that biofouling monitoring methods are required? Are sidestream or inline monitoring methods necessary? Does the NRC have a preference concerning the methods of visual, UT [ultrasonic testing], radiography, or electrochemical (Corrator) probes to monitor for biofouling? (South Carolina Electric and Gas)

Answer

Biofouling monitoring of the source water would generally be necessary. Licensees and applicants may use, however, equally effective programs for Recommended Action I. Sidestream or inline monitoring is effective and could be used for this purpose. The NRC has no preference concerning methods for biofouling monitoring or nondestructive service water system examination provided the selected method is effective.

11. For NTOL [near-term operating license] plants, when does GL 89-13 have to be implemented? (Unidentified)

Answer

As stated in Generic Letter 89-13, both licensees and applicants should observe the same schedule. The licensee or applicant should arrange any justified adjustments of the schedule with the appropriate NRR project manager.

12. On Item C, Enclosure 1, since macroscopic biological fouling and MIC [microbiologically influenced corrosion] have not been problems at CNS [Cooper Nuclear Station], does that exempt us from the recommendation for chlorinating systems using raw water before layup? (Nebraska Public Power District)

Answer

Yes, if appropriate justification is provided.

13. Is periodic maintenance adequate to address layup without chlorination? (Nebraska Public Power District)

Answer

Yes, if appropriate justification is provided.

14. On Item D, Enclosure 1, in lieu of taking annual water samples to determine if Asiatic clams have populated the water source, could we perform annual visual inspections of sample heat exchangers cooled by river water? (Nebraska Public Power District)

Answer

The purpose of sampling the water source itself was to ensure that means of potential fouling were identified early. However, if the best available site-specific information does not indicate a means of biofouling, then visual examination of a sample of service water system heat exchangers may be sufficient, with proper justification, to detect fouling.

C. Biocide Guidance

1. Enclosure 1 to Generic Letter 89-13 describes an acceptable program, to the NRC, to implement Recommendation No. I of the generic letter. This program includes biocide treatment regardless of whether the plant is susceptible to macroscopic biological fouling or not. Will a program that does not include biocide treatment be acceptable to the NRC? (Duke Power)

Answer

Yes, if good cause is shown. Note the guidance in Paragraph B of Enclosure 1 to Generic Letter 89-13. Chlorination or equally effective treatment is included for freshwater plants without clams because it can help prevent microbiologically influenced corrosion.

2. With regards to Enclosure 1 of the generic letter; (Wisconsin Public Service)

a. Will NRC give guidance on use of biocides other than chlorine?

Answer

No. The NRC is interested in the effective heat transfer of the systems. It is not in a position to consult on the various biocide treatments. Refer to "Plant Layup and Equipment Preservation Sourcebook," EPRI NP-5106 (March 1987).

b. Do we need to continuously chlorinate, if under our inspection program, we find no evidence of macroscopic fouling? Do WPDES [sic; National Pollutant Discharge Elimination System] discharge limits take precedence to this?

Answer

No. The program described in Enclosure 1 represents an acceptable program for implementing Recommended Action I. A licensee or applicant can choose to pursue an equally effective alternative course of action if justified. Precautions should be taken to obey Federal, State, and local environmental regulations regarding the use of biocides. This includes the National Pollutant Discharge Elimination System (NPDES) discharge limits administered by the U.S. Environmental Protection Agency, which were referenced in the question.

c. Is demineralized water acceptable for use in wet layup of stagnant SW [service water] piping?

Answer

This question must be decided by the licensee or applicant. The result should be that the heat removal requirements for the service water system are satisfied. To accomplish this, the NRC recommends that such piping be flushed and flow tested periodically to ensure that clogging is absent and that chlorinated or equivalently treated water will be used to fill service water loops before layup to help prevent MIC. We note also that industry recommends treatment of service water systems during outages to prevent microbes. See EPRI NP-5106.

3. Some State regulations do not permit the use of biocides above the minimum detectable level, yet Enclosure 1 to the GL appears to require biocides while cautioning plants not to violate State and local regulations. Since it is not possible in some jurisdictions to use any biocides without violating State and local regulations, what alternatives to biocides are acceptable to the staff? (Nuclear Utility Backfit Action Reform Group [NUBARG])

Answer

An alternative course of action is acceptable if the heat removal requirements for the service water system are satisfied. Biocides can be deactivated before discharge. The treated biocides must meet NPDES discharge limits. At least one utility (Trojan) is deactivating the biocides before discharge. See the answers to the previous two questions.

D. Fire Protection Systems

1. To what extent should fire protection systems be addressed in response to the generic letter? (Philadelphia Electric)

Answer

The generic letter is not designed to focus on fire protection systems, which are not safety-related, but to incidentally include them if they use untreated water that could be subject to the service water system problems described in the generic letter.

2. We use well water (raw water) as a source to the fresh water/fire protection storage tanks. Do we need to chlorinate these tanks or do we need to conduct full-flow surveillance tests on all fire protection piping runs? We presently only surveil the fire pumps for flow, not the piping runs. We do not presently chlorinate these tanks. The SW system per se is not used to fill these tanks; separate well pumps are used. (Public Service Electric and Gas)

Answer

The recommended program described in Enclosure 1 of the generic letter was developed under a government-sponsored research program. If a licensee or applicant chooses an alternative course of action from that recommended in Enclosure 1, it should assess the potentials for macroscopic biofouling and microbiologically influenced corrosion (MIC) and justify that the alternative course of action will result in satisfaction of the heat removal requirements for the service water system.

Paragraph B of Enclosure 1 of the generic letter recommends chlorination whenever the potential for a macroscopic biological fouling species exists. Such a potential may not exist for these wells, but the potential for MIC should also be considered.

Paragraph C of Enclosure 1 of the generic letter recommends periodic flow testing of infrequently used loops at the maximum design flow to ensure that they are not fouled or clogged. If the fire protection piping runs are subject to biofouling but the water is not treated to protect against biofouling, then full-flow testing of the runs may be appropriate to ensure that the potential for clogging is minimal. This paragraph also recommends chlorination to help prevent MIC.

3. Do Generic Letter 89-13 requirements apply to the fire protection systems which are not fed by either the service water system or the service water Intake? (South Carolina Electric and Gas)

Answer

The generic letter is not designed to focus on fire protection systems, but to incidentally include them if they use untreated water that could be subject to the service water system problems described in the generic letter.

4. What is the basis for requiring treatment of fire protection systems that use raw service water as a source (Enclosure 1, Section C)? (NUBARG)

Answer

See the answers to the previous two questions.

5. For a fire protection system supplied by raw water which meets flow requirements and does not provide safety-related cooling, are any actions required? (Iowa Electric Light and Power)

Answer

No. See the answer to Question II.D.1.

III. ACTION II - HEAT TRANSFER TESTING

A. Testing Method

1. Should the proposed heat exchanger heat transfer testing method be provided for prior NRC review and approval? (Philadelphia Electric)

   Answer

   No.

2. Has the NRC reviewed the EPRI SWWG [Electric Power Research Institute Service Water Working Group] document prepared by Duke Power and Toledo Edison describing several methods of heat transfer testing? If so, is the temperature effectiveness method acceptable? Which methods are acceptable? (Philadelphia Electric)

   Answer

   The staff has not formally reviewed this document but has received a draft copy. A method of heat transfer testing is acceptable for purposes of satisfying the generic letter if it can assure that the heat removal requirements for the service water system are satisfied.

3. If the pressure drop across a heat exchanger at design flow is less than or equal to the manufacturer's specification, is heat transfer testing required, provided the baffles have been inspected to ensure that the flow is not bypassing the coils? (Philadelphia Electric)

   Answer

   The objective is not to satisfy the manufacturer's specification for flow in a heat exchanger so much as it is to ensure that the heat removal requirements for the service water system are satisfied. If the latter assurance can be achieved by showing design flow to be necessary and sufficient, then heat transfer testing would be superfluous.

4. Page 5, paragraph 3. What is meant by "The relevant temperatures should be verified to be within the design limits?" Does this imply testing should be conducted with the design-basis heat load? Is it acceptable to conduct testing for all heat exchangers at off normal conditions, provided accurate and relevant data can be acquired, and analytical methods used to determine the heat transfer capacity at design conditions? (Portland General Electric)

   Answer

   Enclosure 2 of the generic letter discusses in detail verifying various parameters to be within design limits. Testing with design-basis heat loads is recommended ideally. If testing can be done under design conditions, it should be done under those conditions. Realizing this may not be practicable in nonaccident circumstances, the next best step is to

conduct tests under off-design conditions and analytically correct the results to the design conditions. Such a procedure is acceptable if it is necessary but not if testing under design conditions is practicable.

5. For heat exchangers that cannot be tested at the design heat removal rate, what is the NRC-recommended method to extrapolate the test data to design conditions? Does the NRC have any additional recommendations for extrapolating test data taken at very low loads (less than 10% design load) to design conditions? (Southern California Edison)

Answer

The staff does not have a recommended method of extrapolation. However, the EPRI service water system working group has been developing such guidance as have some licensees such as Duke Power. These may be places to start when developing appropriate testing programs.

6. Recommended Action II requires that "the relevant temperatures should be verified to be within design limits." Also, Enclosure 2, Item II.A states, "Perform functional testing with the heat exchanger operating, if practical, at its design heat removal rate to verify its capabilities. Temperature and flow compensation should be made in the calculations to adjust the results to the design conditions."

It is not practical to test the heat exchangers at design heat removal rates. Also, we are unable to find a method which has the requisite level of precision to adjust the test results to design conditions.

Please discuss an acceptable method to adjust the test results to the design conditions. Also provide the scientific bases, or a reference, for the proposed method.

Also, the heat removal test cannot be performed on the containment spray heat exchangers because there is no heat source. The only test that can be performed is a pressure drop test. Is this acceptable? If not, what is recommended? (Indiana and Michigan Power)

Answer

As mentioned previously, the NRC does not have a recommended test method. See the answer to the previous question. With regard to the testing of containment spray heat exchangers, as of all safety-related heat exchangers, a pressure drop test alone is not sufficient to satisfy the indicated heat transfer capability concerns. If it is not practicable to test a heat exchanger, then the licensee or applicant may propose a program of periodic inspection, maintenance, and cleaning as an alternative. We are aware, however, of one licensee who was able to test the containment spray heat exchanger by heating the refueling water storage tank water approximately 10°F and then performing temperature monitoring tests as well as pressure drop tests.

7. To what degree should a utility endeavor to monitor real-time corrosion rates of the service water system? Is trending of heat exchanger performance and visual inspections sufficient documentation of the component's internal condition? (South Carolina Electric and Gas)

   Answer

   It is not necessary to determine numerical real-time corrosion rates in the service water system. The licensee's or applicant's monitoring program should be sufficient to identify degradation and to take the necessary corrective action before system performance is unacceptably affected. Trending of data is a recommended approach to monitoring system performance.

8. Is the NRC staff stating that a technical evaluation of a heat exchanger's capability to perform its design safety function cannot be used in lieu of initial testing? Therefore, all heat exchangers must be tested and even maintenance/cleaning cannot be used in lieu of initial testing because it would require a technical evaluation to determine maintenance/cleaning frequency. Also, when considering several identical heat exchangers in one loop, do all the heat exchangers require testing or maintenance/cleaning? (Philadelphia Electric)

   Answer

   No, the initial heat exchanger "test" program may consist of both performance testing of some heat exchangers and maintenance and cleaning of others. The initial test program was intended to ensure that the licensee or applicant has established a baseline for all safety-related heat exchangers served by the service water system and, therefore, is confident that they can perform their heat removal function. As further clarification, if there are several identical heat exchangers in one service water loop, a licensee or applicant may perform testing or develop a maintenance and cleaning program for these heat exchangers based on the most limiting one as part of its initial "test" program. Justification for the basis of comparable service conditions should be included in the evaluation when all identical heat exchangers are not tested.

9. Refer to Action Item II of Gen. Ltr 89-13. Can the test program include data taken during routine operating intervals, with minimum load on heat exchangers, and extrapolated to substantiate adequate HX [heat exchanger] performance? Or when does the NRC consider it impractical to test a HX at the design heat removal rate? (Niagara Mohawk Power)

   Answer

   Yes, if testing under design conditions is not practicable. See the answers to Questions III.A.4, III.A.5, and III.A.6 above. The licensee or applicant should determine whether such testing is practicable. See the answer to Question III.A.14.

10. In Enclosure 2 of the generic letter, a statement is made that testing should be done with necessary and sufficient instrumentation. Flow measurement is one of the two key parameters when measuring heat exchanger performance. It is also the most difficult since most plants never provided means to measure individual flow rates to service water users. In general, orifice plates, venturi tubes, pitot tubes and flow nozzles are the only recognized traceable type of flow measuring devices, all of which require intrusive elements. To be able to utilize such devices would require plant system modifications at great expense to the utility and its customers. A less expensive alternative to this would be to use non-intrusive, non-traceable devices such as transit-time ultrasonic flow meters which with current technology give very reliable results. Trending of data taken with such devices would appear to be equally effective for detecting degradation in cooling water systems. Would the NRC recognize the value and benefit of using such devices and accept programs which utilize them? (Detroit Edison)

Answer

Yes.

11. Thermographic cameras could potentially be used to scan the tubes on air to water heat exchangers to see temperature profiles of the tubes and detect tube blockage or sediment in the tubes. Will the NRC accept such qualitative checks rather than quantitative measurements to prove that a heat exchanger is not fouled? (Detroit Edison)

Answer

Yes. However, additional means should be included in the program to ensure adequate heat transfer.

12. If off-the-shelf software is reviewed for technical adequacy and subsequently utilized to perform heat exchanger performance calculations, will it be acceptable to the NRC? (Detroit Edison)

Answer

Yes.

13. If a heat exchanger performance test reveals that a heat exchanger is in a degraded condition, the first obvious question will be as to what the impact of the degraded condition is on system operability. Will a heat exchanger performance program be considered the same as the plant's surveillance program with the same ramifications for questioning plant/system operability? If so, is the NRC considering asking the licensees to include limiting condition for operation statements in their technical specifications? (Detroit Edison)

Answer

If a heat exchanger's heat transfer capability is shown to be degraded below levels needed for performance of its safety-related function, it is considered inoperable. The staff does not intend that elements of these programs be included in plant technical specifications.

14. Restate what you would consider acceptable as "impractical conditions for testing." What are "acceptable alternatives," especially for utilities not privy to EPRI information? (Portland General Electric)

Answer

An impractical condition would be a situation where flow or the means of applying a heat load cannot be achieved because of system configuration. An acceptable alternative is a periodic inspection or maintenance program for such heat exchangers. Impracticality itself is not a sufficient reason for excluding any heat exchanger from some verification of performance.

15. What if performable HX testing conditions (off design) cannot be used to demonstrate acceptable heat transfer (i.e., low delta T combined with instrument accuracies)? Is maintenance inspection our only alternative? (Portland General Electric)

Answer

If reasonable results cannot be obtained from performance testing, then inspection or maintenance is an appropriate alternative. A licensee may, however, be able to justify another acceptable alternative.

16. If the utility performs a baseline test that exceeds the design requirements but is below the mfg [manufacturer's] rating for this component HX, does the NRC consider this as a concern in that "design margin" has been lowered? (Arkansas Power and Light)

Answer

No. The staff's concern is not that a licensee or applicant maintain the initially specified design margin. If the licensee or applicant chooses to operate with a reduced margin, this is acceptable provided the safety-related heat removal requirements are satisfied.

B. Maintenance of Heat Exchangers

1. To what extent can routine maintenance/cleaning of heat exchangers replace testing? (Philadelphia Electric)

Answer

A licensee or applicant should determine the appropriate frequency of testing or maintenance activities to ensure that the heat removal requirements for the service water system are satisfied. For a given heat exchanger, a licensee or applicant may elect to clean, replace, repair, or otherwise maintain it initially before beginning a routine testing program. If the licensee or applicant elects to not implement a routine testing program for the heat exchanger, then a routine maintenance program may be necessary to provide the sought assurance. In the absence of a routine test program, no basis may be available for detecting potential degradation of heat transfer performance. In the absence of such a basis, the frequency of maintenance may have to be a maximum value to provide the sought assurance.

2. Page 5, paragraph 4. If the maintenance period is known why can't a test be performed before maintenance to establish a data point for the required testing or maintenance? If the overall maintenance period has been 3 or more fuel cycles could this be used to establish the test frequency? Is it necessary to retest a heat exchanger after maintenance if the work performed was a restoration only (i.e., cleaning not tube plugging) and testing had previously been conducted with clean heat transfer surfaces? (Portland General Electric)

Answer

All these steps are acceptable alternatives to the program outlined in Enclosure 2 in the generic letter. The justifications that these alternative procedures ensure that the heat removal requirements for the service water system are satisfied should be documented and retained in appropriate plant records.

3. Recommended Action II paragraph 5 states that frequent regular maintenance is an acceptable alternative to testing. What is meant by "frequent regular maintenance"? Does this mean more frequently than if testing were performed? This paragraph further states that this alternative might apply to small heat exchangers, . . . located in low radiation areas. . . . Would low radiation areas be defined by ALARA [as low as is reasonably achievable] practices or less than 100 mr/hr? (Unidentified)

Answer

The licensee or applicant is to establish the frequency of periodic testing or regular maintenance once sufficient data have been collected. The frequency should ensure that unacceptable degradation does not occur between testing or maintenance cycles. Low radiation areas as intended in Generic Letter 89-13 are included in the licensee's ALARA program so that

radiation levels will not preclude personnel access for maintenance and cleaning of heat exchangers.

4. GL 89-13 seems to imply that periodic maintenance (i.e., cleaning) of small accessible heat exchangers is acceptable in lieu of performance testing. If so, is a refueling maintenance frequency acceptable? (Northeast Utilities)

Answer

Yes. This is an acceptable initial frequency and may be acceptable in the long-term with justification based on data from a minimum of three refueling outages.

5. If maintenance is performed in lieu of testing for degraded performance of the heat exchanger, how extensive does the maintenance have to be? That is, does maintenance have to be performed on both sides of the HX or just on the service water side? (Niagara Mohawk Power)

Answer

Maintenance should be extensive enough to assure the heat removal requirements of the service water system are satisfied. See the answers to Questions III.B.1 and III.F.1.

6. Would a program involving inspection and maintenance activities in lieu of a performance test program be an acceptable program for all heat exchangers and components? (Nuclear Utility Backfit Action Reform Group [NUBARG])

Answer

Yes, if justification is provided.

7. Clarification of Item IV. B., Enclosure 2, on periodic visual inspection of small heat exchangers such as seal coolers. Are they included in the class to be inspected when the pump is inspected? (Nebraska Public Power District)

Answer

If the seal coolers in question are integral parts of larger components, such as pumps, then the coolers may be inspected visually during the regularly scheduled disassembly of the larger component. If not, then the seal coolers should be treated separately. Once it has been established that a small heat exchanger such as a seal cooler is performing satisfactorily, the licensee or applicant may choose to justify an extended program of periodic inspection (e.g., up to 5 years) on the basis of existing operating conditions, such as the cooling of loops not subject to fouling mechanisms.

8. ANO [Arkansas Nuclear One] is scheduled to chemically clean the entire SW system in the fall of 1990. Does this constitute an acceptable method to restore thermal performance in lieu of performance testing for the first outage? (Arkansas Power and Light)

Answer

The licensee or applicant should justify such an approach to satisfy this part of the generic letter. Since chemical cleaning is a corrective action, some followup verification such as visual examination or limited performance testing may be appropriate.

C. Number of Heat Exchangers To Be Tested

1. Is it acceptable to determine the most restrictive heat exchangers in each group for testing in lieu of testing every heat exchanger? (Philadelphia Electric)

Answer

The purpose of the generic letter is for licensees and applicants to assure that the heat removal requirements for the service water system are satisfied. If this can be done by the proposed program, then it is acceptable.

2. How much detail does the NRC expect for the response to Action II? Would the proposed test/maintenance/inspection method for each heat exchanger be necessary? (Public Service Electric and Gas)

Answer

Specific details of the licensee's or applicant's program in response to Action II should be developed and retained as part of plant records. Those heat exchangers not being included in programs under Action II should be identified and the basis given for their exclusion. Grouping of heat exchangers into categories based on the approach to be used would be acceptable.

3. Enclosure 2, page 2. The term "all heat exchangers" is used. Does this imply every heat exchanger of a given design must be tested or where more than one identical heat exchanger is used can one representative unit be selected? (Portland General Electric)

Answer

Recommended Action II calls for the testing of the heat transfer capability of all safety-related heat exchangers cooled by service water. The service water system is defined as the system or systems that transfer heat from safety-related structures, systems, or components to the ultimate heat sink. Each heat exchanger, regardless of redundancy, should be tested or maintained initially to establish that the heat removal requirements for the service water system are satisfied. Existence of identical conditions then can be used to determine the best test or maintenance frequencies to ensure that the heat removal requirements for the service water system are satisfied.

4. We would like to limit heat exchanger performance testing to one unit since the two units are identical. Is this an acceptable approach? (Houston Lighting and Power)

Answer

Not totally. See the answer to the previous question.

5. Is it acceptable to eliminate heat exchangers from the testing requirement of Action II if they are in parallel and/or in series with other heat exchangers which are tested and operated under similar service conditions (e.g., velocity, temperature, process fluid) (Ref. EPRI Heat Exchanger Performance Monitoring Guidelines for Service Water Systems)? (Commonwealth Edison)

Answer

Not totally. See the answer to Question III.C.3.

D. Frequency of Testing or Maintenance

1. Recommendation No. III [sic] does not specify a frequency for heat exchanger inspections. Is it the NRC's intent that the utility establish the frequency of these inspections? (GPU Nuclear)

Answer

Yes. Recommended Action II indicates limits. Initially, tests should be conducted at least once every fuel cycle. More frequent testing may be necessary to enable a conclusion that the heat removal requirements for the service water system are satisfied. After about three tests, a licensee or applicant may be in a position to set a different testing frequency. However, the finally determined testing frequency should not be less than once every 5 years.

2. Page 6, paragraph 1. Why were three tests chosen? Could a different number, more or less, be appropriate? (Portland General Electric)

Answer

The number three is the minimum number needed to establish a trend. A larger number would be appropriate, but a smaller number is insufficient.

3. Page 5, paragraph 5. What is meant by frequent regular maintenance? Can frequency be determined in a similar method as test frequency? (Portland General Electric)

Answer

Frequent regular maintenance is an acceptable alternative to Recommended Action II, which calls for heat exchanger performance testing. For small heat exchangers such as lube oil coolers, testing might be excessively burdensome compared with maintenance of the heat exchangers. A licensee or applicant can choose to routinely maintain the heat exchangers instead of testing them. Either the frequency of maintenance or the frequency of testing should be determined to ensure that the equipment will perform the intended safety functions during the intervals between maintenances or tests.

E. Schedule

1. In an effort to minimize the amount of time that a single, redundant division of safety-related equipment is out of service some utilities employ a "divisional outage" concept for major planned plant outages. By utilizing this concept significant maintenance work activities, i.e., system flow balance test, standby D/G [diesel generator] teardowns, electrical distribution bus work, etc., are performed on an alternating outage schedule for each division. This permits comprehensive maintenance on each division to be performed while reducing the overall impact on redundant safety system availability.

   The ability of a utility to implement and maintain a service water heat removal capability monitoring program would be significantly enhanced by the installation of permanent plant monitoring equipment. Installation of dedicated monitoring equipment would also reduce the impact of future testing on service water and heat exchanger availability.

   For a utility that employs the "divisional outage" concept and wishes to install permanent plant equipment to perform the system testing identified in Generic Letter 89-13, is it permissible to defer baseline data acquisition for one division of the service water system until the second refueling outage following the issuance of the generic letter? (Mississippi Power and Light)

   Answer

   This request appears to be reasonable for good cause. Any request for an adjusted schedule should be arranged through the appropriate project manager in the Office of Nuclear Reactor Regulation (NRR) of the NRC.

2. In reference to Recommended Action II of Generic Letter 89-13. (Niagara Mohawk Power)

   Asking an item of clarification Do all safety-related heat exchangers connected to or cooled by service water or raw water have to be tested or verified clean by maintenance, to insure satisfaction of the heat removal requirements, prior to plant startup following the first refueling outage beginning 9 months or more after the issuance of Gen. Ltr 89-13?

   Answer

   Yes.

   Reason for asking If a heat exchanger was cleaned 13 or possibly 18 months prior to issuance of Gen. Ltr 89-13 and found to be clean or tested and found acceptable and the current program does not call for recleaning or testing for 3 years then the program would have to be revised. Also trend data may already exist indicating that there is no need to clean or test on less than a 5-year interval. [This would also hold] if the heat exchanger is part of a larger component that is not scheduled for maintenance.

Answer

The generic letter is designed to provide flexibility in determining a justifiable alternative program for testing. The goal of the letter is to ensure that the heat removal requirements for the service water system are satisfied.

F. Closed-Cycle Systems

1. What is really required by the sentence on adequacy of chemistry control programs in the first paragraph of page 5 of the generic letter? (Kansas Gas and Electric)

Answer

Even though a closed cooling loop may contain water with controlled chemistry, the loop might be contaminated as a result of inleakage, inadequate chemistry controls, or materials in the system before the current chemistry control program became effective. An example of this was recently disclosed at the EPRI Service Water System Reliability Improvement Seminar at Charlotte, North Carolina, on November 6-8, 1989. In the internal study discussed there, optical examination of the primary side of the decay heat removal (DHR) heat exchanger (HX) tubes disclosed no fouling. The tubes were shiny bright. Optical examination of the closed component cooling water (CCW) HX, however, disclosed significant fouling. The tubes did not reflect any light. The problem was a paraffin-based packing material inadvertently left in the system when the plant was being constructed.

Suppose the licensee in this case can argue that it has a chemistry control program for water circulating through the CCW HX, but cannot show that the program has been in place since the system was filled initially. A proper response to the generic letter then would include testing the CCW HX. At any point in the program, if a finding of degraded heat transfer cannot be explained or remedied by maintenance in the open-cycle portion of the system, as would be possible in this case, the CCW HX should be tested and, depending on those results, the DHR HX should be tested. The process should be continued until the problem is remedied.

2. Does our CCWS [component cooling water system] need to be addressed as part of our response? We have recently shown, through eddy current testing of the CCW HTX's [heat exchangers], that the physical barrier between SW [service water] and CCW is adequate. Makeup to the CCW is via makeup water. (Wisconsin Public Service)

Answer

Not necessarily. See the answer to the previous question.

3. Page 5, paragraph 1. What level of documentation is required to justify excluding closed-cycle system heat exchangers from testing to verify heat transfer capability? (Portland General Electric)

Answer

The goal of the generic letter is to obtain assurance that the heat removal requirements for the service water system are satisfied. To exclude a closed-cycle system heat exchanger from testing, a licensee or applicant should show that the chemistry of the primary fluid and the heat transfer characteristics of the heat exchanger have been controlled since the system was first filled.

4. The ACRS [Advisory Committee on Reactor Safeguards] June 14, 1989, letter to the Commission noted five areas of concern with which NUBARG agrees. Some of the concerns were accommodated in the GL; however, we are interested to know the resolution of the following. (Nuclear Utility Backfit Action Reform Group [NUBARG])

   a. An intermediate closed cooling water system is exempt from the GL provided it is not subject to significant sources of contamination, is chemistry controlled, and does not reject heat directly to a heat sink. However, the adequacy of the chemistry control program must be verified over the total operating history of the plant. The ACRS questioned whether the absence of an adequate water chemistry control system over any part of the operating history of a closed-cycle system was adequate justification for including the system within the scope of the GL. How did the staff resolve this concern?

      Answer

      The staff relaxed its position on including closed-cycle cooling systems in Recommended Action II but added the precautionary recommendation that if degradation of heat transfer could not be explained or remedied by maintenance of the open-cycle part of the service water system, then testing may have to be selectively extended to the closed-cycle part of the system. See the answer to Question III.F.1.

   b. Are plants required to review closed cooling water system operating logs for the history of the plant to verify adequate chemistry control?

      Answer

      Licensees and applicants are required to assure that the safety-related heat removal requirements for the service water system are satisfied. If review of closed cooling water system operating logs for the history of the plant can help provide this assurance, then that review would be an acceptable part of the program.

G. Miscellaneous

1. Do both emergency service water systems and normal service water systems need to be reviewed? (Kansas Gas and Electric)

Answer

In some cases this may be necessary. The NRC is concerned about the safety-related effects of both systems. Sometimes the mode of operation of a service water system is changed under emergency conditions. This change may result in the introduction of uncontrolled water and thus the potential introduction of biofouling agents, corrosion products, and silt that may adversely affect the heat transfer performance of the system.

2. Page 6, paragraph 1. The generic letter does not specifically address testing of automatic safety features actuation which may be required to provide the required service water flow to safety-related heat exchangers. Does the NRC have any recommendations on functional tests of systems? (Portland General Electric)

Answer

The generic letter was written with the tacit assumption that all other regulatory conditions would be observed. In particular, functional testing required by technical specifications must be accomplished independently of the recommended actions of the generic letter. Where there is overlap, credit may be taken for the functional tests required by the technical specifications. The procedures, results, and considerations of such tests should be documented with the response to the generic letter and retained in appropriate plant records.

3. Recommended Action II paragraph 4 states tests should be performed following corrective action. Would bulleting tubes be considered as corrective actions? (Unidentified)

Answer

Yes.

4. Generic Letter 89-13 states that tests should be performed on heat exchangers before and after "corrective action" is performed. What is meant by "corrective action"? (Southern California Edison)

Answer

Corrective action is any action that improves the condition of the heat exchanger.

IV. ACTION III - ROUTINE INSPECTION AND MAINTENANCE

A. Recommendation III states, "Ensure by establishing a routine inspection and maintenance program . . . that corrosion, erosion . . . cannot degrade the performance of the safety-related systems supplied by service water." [Emphasis added.] It would seem unrealistic to assume that a program could be developed that will ensure absolutely no degradation of the system. Could you clarify that the intent here is to establish a program which will ensure that the system cannot degrade to the point at which its ability to perform its safety function is impaired? (Duke Power)

Answer

The NRC staff concurs in this interpretation.

B. Must all safety-related service water piping be cleaned or only the piping that is susceptible to corrosion buildup, i.e., low flow areas? Nondestructive examinations would be used to confirm the areas needed to be cleaned. (Wisconsin Public Service)

Answer

Recommended Action III is intended to provide assurance that the performance of open-cycle service water piping and components is not degraded as a result of corrosion, erosion, protective coating failure, silting, and biofouling. Once this assurance is made, the routine maintenance and inspection program can concentrate on those piping segments that are susceptible to these problems.

C. Would it be considered acceptable to omit from inspection piping which is practically inaccessible (i.e., underground piping) based on inspections of practically accessible piping? (Philadelphia Electric)

Answer

Inaccessibility itself would not be a sufficient reason for not inspecting piping. However, if additional justification including operational data and prior history is available, along with an evaluation that clearly shows that inspections would not be necessary, then inspection could be omitted.

D. Refer to Item III. Does the maintenance program have to include sampling of any crud or sediment found to determine its source; e.g., during routine maintenance a small amount of sediment was cleaned from a heat exchanger and the only documentation stated that it appeared to be a normal corrosion deposit? (Niagara Mohawk Power)

Answer

If the maintenance program can ensure that the heat removal requirements for the service water system are met, then it is acceptable. The better the root cause analysis of a problem is, however, the more effective will be the corrective action.

E. Refer to Item III. If minimum fouling is found during maintenance it should be acceptable to assume that the heat exchanger can still perform to the original design specification. Does the NRC have a problem with this assumption? (Niagara Mohawk Power)

Answer

The NRC staff cannot judge the adequacy of heat transfer capability based on the broad statement of "minimum" fouling. The licensee or applicant must determine what fouling level requires corrective action and justify the approach taken.

F. Under Specific Action III(A) on page 6 of the GL, what constitutes excessive accumulations of biofouling agents, corrosion products, and silt? (Nuclear Utility Backfit Action Reform Group [NUBARG])

Answer

The staff does not have a quantitative criterion for this parameter. If such accumulations degrade the heat transfer capability of the system such that the system cannot perform its safety-related function as shown by performance trend data, then such accumulations are excessive.

G. Are plant work requests adequate relevant documentation to support the inspection and maintenance documentation requirement of Specific Action III? (NUBARG)

Answer

Yes, as long as they can be made available to an NRC inspector.

H. Programs acceptable to the NRC in response to GL 89-13 Actions I and II were identified. What are some examples of acceptable inspection and maintenance programs in response to Action III? (Commonwealth Edison)

Answer

The NRC has not defined an acceptable program for Action III. However, the generic letter is designed to give the licensee or applicant sufficient flexibility in developing an appropriate program.

V. ACTION IV - SINGLE-FAILURE WALKDOWN

A. To what extent does this walkdown have to be performed? We are presently conducting a design-basis documentation reconstitution effort. A system walkdown is performed only if a problem is identified during documentation review. Walkdowns are not conducted all the time and are not full scope. Is the intent to complete walkdowns as required to ensure the system meets the licensing basis for the plant or to verify the as-built condition? (Public Service Electric and Gas)

Answer

The intent of the recommended action is to verify that the as-built condition of the system is sufficient to ensure performance of the intended function of the service water system. A design-basis reconstitution suffices for the walkdown inspection recommended here.

B. A service water system walkdown inspection was completed in 1986 at our plant. Can we take credit for that effort for this action or must we repeat it now to meet the 2-year criterion? (Niagara Mohawk Power)

Answer

You may take credit for the 1986 walkdown to meet this recommended action. The suggested time of 2 years to qualify the word "recent" was not meant to be rigidly interpreted. The NRC is interested in the walkdown being done now or recently, not in the distant past.

C. Does the system walkdown take into account piping, valves, and in-line components? What about cabling walkdown? Is our 79-14 walkdown sufficient to address this? (Wisconsin Public Service)

Answer

The system walkdown should ensure that the system's safety-related function can be accomplished in the event of failure of a single active component. Cabling walkdowns are thus not in the scope of Generic Letter 89-13. The intent of Recommended Action IV is to make maximum use of other pertinent activities in reviewing the system, but it is not sufficient to depend on 10-year-old reviews to ascertain the condition of the system today. However, the staff understands that Bulletin 79-14, "Seismic Analyses for As-Built Safety-Related Piping Systems," is not closed at all plants; therefore, if the walkdowns have been done recently, they would be acceptable. Activities included in the Individual Plant Examination (IPE) program may also constitute an acceptable response to this recommended action.

D. Recommendation No. IV discusses system walkdown inspections. GPU Nuclear assumes that the intent of the walkdown is down to the level of the flow diagram only. Does the NRC agree with this assumption or do we intend for a more detailed walkdown? (GPU Nuclear)

Answer

See the answer to the previous question. Single-failure inadequacies can occur in control systems as well as equipment in which water flows. The staff notes that single-failure inadequacies have been found at some plants apart from routine surveillance procedures.

E. Page 6, paragraph IV. Are there any specific requirements which are new that should be added into existing single-failure analysis? Explain what is meant by "reconstitution of the design basis of the system is not intended." (Portland General Electric)

Answer

As discussed in the answers to the next two questions, the staff does not intend that the licensing basis of a given plant be changed. Recommended Action IV for single-failure walkdown was not designed to incorporate any new feature into existing single-failure analysis techniques. The phrase "reconstitution of the design basis of the system is not intended" refers to excessively difficult determinations of design data. For example, this may be the case for small skid-mounted heat exchangers that were purchased as piece parts of larger units of equipment and for which the vendor may not have provided design data to the licensee or applicant. It would be enough to demonstrate that the equipment module of which the heat exchanger is a part could do its job.

F. Please elaborate on the requirements of Item 4. Specifically, what is intended by confirmation of the performance of the service water system in accordance with the design basis, without a reconstitution of the design basis? Also, is it intended by this requirement to perform a complete single-failure analysis of the service water system? (Northeast Utilities)

Answer

The licensee or applicant is expected to confirm that the installed as-built system satisfies the design requirements stated in the plant's licensing basis, that is, the final safety analysis report (FSAR), the technical specifications, and licensing documentation. See the answers to Questions V.C and V.D.

G. The generic letter states that the licensee should verify that the service water system is in accordance with the licensing basis of the plant. Is the licensing basis, in the context of this generic letter, considered to be the FSAR and tech specs [technical specifications] or will a more expansive interpretation be used? (Wisconsin Electric Power)

Answer

The licensing basis is as defined in the FSAR, technical specifications, and other licensing documentation. It is not the staff's intent that the licensing basis be redefined when addressing Generic Letter 89-13.

H. With regard to Action IV which requests confirmation that the service water system will perform its intended function in accordance with the licensing basis for the plant, which specific licensing basis must be reconfirmed at this time? Only the single active failure review? (Commonwealth Edison)

Answer

The licensing basis is considered to include the FSAR, technical specifications, and licensing documentation. See the answers to the previous two questions.

I. Action item 4 of GL 89-13 states that system walkdown inspections are required to confirm the as-built configuration of the service water systems. As a recently licensed plant, we are confident that our configuration control program satisfies this requirement. We believe system walkdowns are unnecessary for STPEGS [South Texas Project Electric Generating Station]. (Houston Lighting and Power)

Answer

This position appears to be reasonable for good cause. Ongoing programs that contain results pertinent to Generic Letter 89-13 should be referenced in the response as justification for an equally effective program and retained in appropriate plant records.

J. If other design-related issues are being addressed by other regulatory actions is it acceptable to exclude them from the scope of review for Action IV? (Commonwealth Edison)

Answer

Yes. See the answer to the previous question.

K. Should the single-failure analysis of the SW system include motive power (electrical/pneumatic, etc.) to active components (motor, valve, etc.)? If so, should it be limited only to the delivery of the motive power to the component, and not the single-failure reliability of the motive power sources (i.e., do not need to do single-failure analysis on motive power system)? (Carolina Power and Light)

Answer

The licensee or applicant should consider single failures in power-operated equipment or components that are part of the service water system. Single failures in power supply systems themselves do not need to be considered under Generic Letter 89-13.

VI. ACTION V - PROCEDURES REVIEW

A. Please discuss what constitutes the desired response for Action Item 5. (Confirming the adequacy of maintenance practices, operating and emergency procedures, and training that involves the service water system). The letter states that the confirmation "should include" recent reviews of practices, procedures, and training modules. Please provide some guidance for performing an adequate review. Also, are there other actions which the NRC recommends as part of the confirmation? (South Carolina Electric and Gas)

Answer

The staff has no specific guidance on what procedures, training, and maintenance practices should be evaluated or revised. The intent of this item is to increase personnel awareness of the importance of the service water system with the aim of reducing human errors. Refer to the wording in Action Item V in Generic Letter 89-13. Personnel or procedural errors were identified in the Office for Analysis and Evaluation of Operational Data (AEOD) case study (NUREG-1275, Volume 3, November 1988) discussed in the generic letter as a significant cause of service water system failures and degradations. One acceptable response would be to review those maintenance practices, operating and emergency procedures, and training modules that pertain to the events listed in the appendices in the AEOD case study.

Enclosure 2

LIST OF RECENTLY ISSUED GENERIC LETTERS

Generic Letter No.	Subject	Date of Issuance	Issued To
88-20, SUPP. 2	ACCIDENT MANAGEMENT STRATEGIES FOR CONSIDERATION IN THE INDIVIDUAL PLANT EXAM PROCESS	04/04/90	ALL HOLDERS OF OLs AND CPs FOR NUCLEAR POWER REACTOR FACILITIES
90-03	RELAXATION OF STAFF POSITION IN GL 83-28, ITEM 2.2, PART 2 "VENDOR INTERFACE FOR SAFETY-RELATED COMPONENTS"	03/20/90	ALL POWER REACTOR LICENSEES AND APPLICANTS
90-02	ALTERNATIVE REQUIREMENTS FOR FUEL ASSEMBLIES IN THE DESIGN FEATURES SECTION OF TECHNICAL SPECIFICATIONS	02/01/90	ALL LWR LICENSEES AND APPLICANTS
90-01	REQUEST FOR VOLUNTARY PARTICIPATION IN NRC REGULATORY IMPAC SURVEY	01/18/90	ALL LICENSEES OF OPERATING REACTORS & CONSTRUCTION PERMITS FOR LWR NUCLEAR POWER PLANTS
89-23	NRC STAFF RESPONSES TO QUESTIONS PERTAINING TO IMPLEMENTATION OF 10 CFR PART 26 - GENERIC LETTER 89-23	10/23/89	ALL HOLDERS OF OPERATING LICENSEES AND CONSTRUCTION PERMITS FOR NUCLEAR POWER PLANTS
89-22	POTENTIAL FOR INCREASED ROOF LOADS AND PLANT AREA FLOOD RUNOFF DEPTH AT LICENSED NUCLEAR POWER PLANTS DUE TO RECENT CHANGE IN PROBABLE MAXIMUM PRECIPITATION CRITERIA DEVELOPED BY THE NATIONAL WEATHER SERVICE (GENERIC LETTER 89-22)	10/19/89	ALL LICENSEES OF OPERATING REACTORS AND HOLDERS OF CONSTRUCTION PERMITS (EXCEPT BYRON BRAIDWOOD, VOGTLE, SOUTH TEXAS, AND RIVER BEND)
89-21	REQUEST FOR INFORMATION CONCERNING STATUS OF IMPLEMENTATION OF UNRESOLVED SAFETY ISSUE (USI) REQUIREMENTS	10/19/89	ALL HOLDERS OF OPERATING LICENSES AND CONSTRUCTION PERMITS FOR NUCLEAR POWER REACTORS

April 4, 1990

TO: ALL HOLDERS OF OPERATING LICENSES OR CONSTRUCTION PERMITS FOR NUCLEAR POWER PLANTS

SUBJECT: SERVICE WATER SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT (GENERIC LETTER 89-13, SUPPLEMENT 1)

On July 18, 1989, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." On October 23, 1989, the NRC announced in the Federal Register that it would hold four workshops on this generic letter. The NRC conducted these workshops in Philadelphia, Atlanta, Chicago, and Denver on November 28 and 30 and December 5 and 7, 1989, respectively. The NRC answered written questions submitted through appropriate project managers in the Office of Nuclear Reactor Regulation before the first workshop and questions submitted at each workshop. Transcripts of these meetings are available in the NRC Public Document Room, 2120 L Street NW, Washington, DC.

This supplement contains the questions and answers read into the transcripts during the workshops, except for the following changes. Questions received in the general, Action I, and Action II categories have been grouped according to topic. In addition, the NRC staff modified some answers after the workshops with the aim of furnishing additional guidance. Please contact the project manager if you have questions on this matter.

Sincerely,

Original signed by
James G. Partlow
James G. Partlow
Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Questions and Answers
2. List of Recently Issued NRC Generic Letters

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