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Docket No.: 50-423

Mr. W. G. Council
Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
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Hartford, Connecticut 06101

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ACRS

Dear Mr. Council:

Subject: Request for Additional Information for Millstone Nuclear Power Station, Unit 3

- Reference: (1) B. J. Youngblood to W. G. Council, Request for Additional Information for Millstone Nuclear Power Station, Unit 3 dated May 3, 1983
- (2) B. J. Youngblood to W. G. Council, Request for Additional Information for Millstone Nuclear Power Station, Unit 3 dated May 31, 1983

Enclosed are requests for additional information which the staff requires to complete its evaluation of your application for an operating license for Millstone 3. These requests for additional information are the result of the staff's Procedures and Systems Review Branch review of the information in your FSAR. These questions were not included in References 1 or 2.

The staff expects that you will be able to provide your responses to these questions when you respond to the questions in References 1 and 2, however if necessary you will be given ninety days from the date of this transmittal to provide your responses.

For further information or clarification, please contact the Licensing Project Manager, Elizabeth L. Doolittle (301/492-4911).

Sincerely,

Original signed by:
B. J. Youngblood

B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing

8307140522 830629
PDR ADOCK 05000423
A PDR

Enclosure:
As stated

OFFICE	cc w/enc1.:	See next page	DL:LB#1	DL:LB#1		
SURNAME			EDoolittle/lg	JYoungblood		
DATE			06/28/83	06/28/83		

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ENCLOSURE 1

REQUEST FOR ADDITIONAL INFORMATION

MILLSTONE NUCLEAR POWER STATION, UNIT 3

NORTHEAST NUCLEAR ENERGY COMPANY

DOCKET NO. 50-423

ATTACHMENT

LIST OF QUESTIONS IN ENCLOSURE 1

BRANCH

QUESTION NOS.

TOTAL

PSRB

640.02-640.29

28

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640.02
(14.2.7)

FSAR Subsection 14.2.7.7, exception 1 to Regulatory Guide 1.68 (Initial Test Programs for Water-Cooled Nuclear Power Plants), Appendix A, Section 5q states that Millstone 3 does not have a failed fuel detection system. FSAR Subsection 11.5.2.3.7 describes a Failed Fuel Monitor used to continuously monitor the reactor coolant system for failed fuel. Delete the exception in FSAR Subsection 14.2.7.7 and add an appropriate test description to FSAR Subsection 14.2.12.

640.03
(14.2.7)

Your exception to testing the automatic closure of all main steam isolation valves (FSAR Subsection 14.2.7.7(3)) at 100% power does not supply adequate technical justification for conducting the test at a low power level. Provide adequate technical justification or revise the FSAR to indicate that the test will be conducted at full power.

640.04
(14.2.7)

If you intend to conduct an initial control room gross leakage rate test as part of the preoperational test program, delete FSAR Paragraph 14.2.7.11. FSAR Section 14.2.7 should be limited to discussion of Regulatory Guide exceptions relating to the initial test program.

640.05
(14.2.7)

Certain exceptions to Regulatory Guide 1.140 (Design, Testing, and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants) listed in FSAR Section 1.8 need to be deleted or modified as described below to be acceptable.

1. Modify exception to paragraph C.2.f to delineate how the ductwork leak tests performed using the methods of the Associated Air Balance Council differ from the requirements given in Section 6 of ANSI N510:1975, and provide technical justification for any testing that does not address those differences.
2. Modify exception 1 to paragraph C.3.i to provide assurance that the data provided in the certified fan performance curves will most closely represent the manner in which the fan will be installed in the appropriate system.

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3. Modify exception 2 to paragraph C.3.i to either reference the displacement criteria that will be used, or agree to meet the criteria given in the 1980 revision to ANSI N509 Section 5.7.3.
4. The exception to paragraph C.3.1 states that an exception is taken to the following: "Class B leakage rates shall be determined for one damper of each type instead of every damper." If the intent is to not test each damper's leak rate, expanded technical justification will be required and the exception rewritten to clarify what is actually intended.
5. Modify FSAR Subsection 14.2.7.15 to either include the exceptions listed in FSAR Section 1.8 or to reference FSAR Section 1.8.

640.06
(14.2.12)

Modify FSAR Subsection 14.2.11 to conform to Regulatory Guide 1.68 (Appendix B) such that not less than 60 days prior to the scheduled fuel loading date, copies of procedures for fuel loading, initial startup testing, and supporting activities will be available. Drafts of these procedures should be made available as early as practical. Exceptions to the 60 day criterion are subject to the approval of the NRC Region I Administrator. Failure to comply may result in delay of operating license issuance.

640.07
(14.2.12)

Regulatory Guide 1.70 paragraph 14.2.12 states that test descriptions should include a "summary of acceptance criteria." To comply, you should include, for all tests listed below, acceptance criteria or a discussion of the sources for the acceptance criteria to be used when test procedures are prepared. This information is necessary for the NRC inspectors who review test procedures and evaluate test results. The test description should provide "traceability" to acceptance criteria sources such as: specific FSAR Subsections, Technical Specifications, topical reports, vendor-furnished test specifications, and/or accident analysis assumptions.

1. Preoperational Test Numbers 1-11, 13-14, 16-29, 31-60, 62-68, 71, and 73-75.
2. Startup Test Numbers 1-2, 7-8, 11-13, 17-19, 22-24, 26, 28-35, and 38.

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640.08
(14.2.12)

Regulatory Guide 1.68, Revision 2, Appendix A.1.h(3) prescribes testing to demonstrate that containment spray piping is free of debris. Modify Preoperational Test Number 9 (Containment Recirculation) and Number 13 (Quench Spray) to state that testing will be conducted to verify that paths for the air-flow test of the spray nozzles overlap the water-flow test paths of the pumps to demonstrate that there is no blockage in that section of the flow path.

640.09
(14.2.12)

Modify Preoperational Test Number 12 (High Pressure Safety Injection) to specifically address whether the testing includes both the two safety injection pumps and the two centrifugal charging pumps, and what specific flow paths will be tested. As currently stated in FSAR Chapter 14, it is not clear that both systems are scheduled to be tested in accordance with Regulatory Guide 1.79 (Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors), Position C.1.a and C.1.b.

640.10
(14.2.12)

A March 28, 1983 letter from W. G. Council (Northeast Nuclear Energy Company) to R. C. Haynes (NRC-Region I) stated that a modification to the charging system would be made to provide two alternate miniflow paths which would be available to protect the operable charging pumps whenever an engineered safeguard system(s) actuation signal is present and the normal miniflow path is isolated. The auxiliary miniflow path will be placed in service, any time the "S" actuation signal is present, by the automatic opening of the one upstream motor operated isolation valve which is normally closed. Modify your preoperational test descriptions to include testing to be performed to verify the proper operation of this new design feature.

640.11
(14.2.12)

To conform with Regulatory Guide 1.68, Revision 2, Appendix A.1.h, modify Preoperational Test Number 20 (Engineered Safety Features Building HVAC), Startup Test Number 30 (Ventilation System Operability), and/or Startup Test Number 38 (Auxiliary Coolant Systems Performance Test) to provide additional testing to ensure that the emergency ventilation systems are capable of maintaining all safety equipment within their design temperature range with the equipment operating in a manner that will produce the maximum

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post-accident heat load in the compartment. If it is not practical to produce maximum post-accident heat loads in a compartment, describe the methods that will be used to develop acceptance criteria that verify design heat removal capability of the emergency ventilation system.

Note that it is not apparent that post-accident design heat loads will be produced in ESF equipment rooms during the scheduled test phase; therefore, simply assuring that area temperatures remain within design limits during this period will not demonstrate the design heat removal capability of these systems. One acceptable method of demonstrating the design heat removal capability is to measure air and cooling water temperatures and flows, and extrapolate to verify that the ventilation systems can remove the postulated post-accident heat loads.

640.12
(14.2.12)

Modify Preoperational Test Number 30 (Auxiliary Feedwater) to include the following testing:

1. A 48-hour endurance test on all Auxiliary Feedwater (AFW) system pumps, if such a test or continuous period of operation has not been accomplished to date (to comply with Standard Review Plan Section 10.4.9). Following the 48-hour pump run, the pumps should be shut down and cooled down and then restarted and run for one hour. (Letter to all pending operating license applicants of NSSS designed by Westinghouse and Combustion Engineering from D. F. Ross, NRC, dated March 10, 1980.)
2. To verify conformance with Item GS-5 of the above referenced letter, the AFW system should be tested for capability to start and operate for two hours under simulated loss of all AC power conditions.

Test acceptance criteria for the above tests should include demonstrating that (a) the pumps remain within design limits with respect to bearing/bearing oil temperatures and vibration, (b) both normal and backup water supply source flowpaths are verified, and (c) pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety-related equipment in the room.

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640.13
(14.2.12)

FSAR Subsection 9.3.1.1.4.1 states that while the instrument air system is not safety related, it does have an interface with components that are part of safety related systems. Modify Preoperational Test Number 38 (Instrument Air and Containment Instrument Air), or the preoperational test objectives in FSAR Table 14.2-1 for all safety related systems that interface with instrument air, to include individual valve testing in accordance with Section C.8 of Regulatory Guide 1.68.3 (Preoperational Testing of Instrument and Control Air Systems), or revise the current exception to Regulatory Guide 1.68.3 in FSAR Subsection 14.2.7.9 to include a listing of the applicable safety related systems.

640.14
(14.2.12)

To comply with Regulatory Guide 1.68, Revision 2, Appendix A.1.1, modify Preoperational Test Number 39 (Radioactive Liquid Waste) to include a description of the testing to be conducted on the Condensate Demineralizer Liquid Waste System described in FSAR Subsection 11.2.2.2.

640.15
(14.2.12)

In accordance with the test requirements listed in Regulatory Guide 1.41 (Preoperational Testing of Redundant On-Site Electric Power Systems to Verify Proper Load Group Assignments), Position C.2:

1. Modify Preoperational Test Number 50 (125 V DC Distribution) to incorporate testing to verify that at the minimum and maximum design battery voltages, required Class 1E systems can be started and operated. At minimum battery voltage, with chargers deenergized demonstrate capability to start all 1E loads. Then, with the chargers energized, verify ability of the chargers to supply loads and charge batteries. For more information on problems with maximum battery voltage conditions, see I&E Information Notice 83-08, March 9, 1983.
2. Modify Preoperational Test Number 53 (Reserve Station Service Transformers) to demonstrate the proper operation of transformer cooling under design load or describe how data from testing under available load will be extrapolated to verify cooling capability under design loading.

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640.16
(14.2.12)

1. In accordance with Regulatory Guide 1.108 (Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants), Position C.2.a.4, modify Preoperational Test Number 51 (Diesel Generator) or Number 67 (Engineered Safety Features Test With Loss of Normal Power) to demonstrate proper operation during diesel generator load shedding, including a test of the loss of the largest single load and complete loss of load and verify that the voltage requirements are met and that the overspeed limits are not exceeded. Your testing should, in addition, provide assurance that any time delays in the diesel generator's restart circuitry will not cause the supply of starting air to be consumed in the presence of a safety injection signal (see I&E Information Notice Number 83-17, March 31, 1983).
2. Modify Preoperational Test Number 51 (Diesel Generator) to include testing to ensure the satisfactory operability of all check valves in the flow path of cooling water for the diesel generators from the intake to the discharge (see I&E Bulletin No. 83-03: Check Valve Failures in Raw Water Cooling Systems of Diesel Generators).

640.17
(14.2.12)

Modify Preoperational Test Number 59 (Solid State Protection System) to provide assurance that a manual reactor trip will both remove voltage from the under-voltage trip coil and energize the shunt trip coil (see I&E Bulletin 83-01, February 25, 1983).

640.18
(14.2.12)

To comply with Branch Technical Position CMEB 9.5-1, modify Preoperational Test Number 65 (Emergency Lighting) to include testing to demonstrate that the Essential DC Lighting System automatically actuates upon the loss of Essential AC Lighting.

640.19
(14.2.12)

Regulatory Guide 1.68, Revision 2, Appendix A.1.2 and A.5.t prescribe testing for various valves. Modify Preoperational Test Number 71 (Integrated Precore Hot Functional Testing) to provide for a more complete demonstration of the operability of pressurizer power operated relief valves; main steam line relief valves; atmospheric steam dump valves; main steam bypass valves; and main steam control valves. Such a demonstration should include response times, relieving capacities,

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setpoints, and reset pressures. Open and reclosure setpoints for all relief valves should be checked at temperature. Where valves are not tested in-situ with the process fluid, testing should be conducted to verify that discharge piping is clear and will not choke or produce back-pressure affecting set-reset pressures of the valves. When referencing bench tests instead of performing installed capacity checks, technical justification should be provided.

(NOTE: This item is not applicable to ASME Code safety valves subject to ASME Section XI preservice tests.)

640.20
(14.2.12)

In FSAR Section 1.8 (Table 1.8N-1, p. 6 of 39) the degree of compliance to Regulatory Guide 1.20 (Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing) states that testing and test inspections will be conducted during hot functional testing.

1. Modify Preoperational Test Number 71 (Integrated Precore Hot Functional Testing) item 11 in FSAR Table 14.2-1 to include a cross-reference to FSAR Section 3.9.2 for additional information on vibration testing.
2. Modify or provide a new startup test description in FSAR Table 14.2-2 that describes the post-core load vibration assessment testing and inspection intended to be accomplished. (Appropriate reference may be used for description.)

640.21
(14.2.12)

Modify Startup Test Number 20 (Pseudo Rod Ejection Test) such that the test will be accomplished at greater than 10% power in accordance with Regulatory Guide 1.68, Appendix A, 5.e, or provide technical justification for your current intention to perform this test at hot zero power.

640.22
(14.2.12)

NUREG-0694, "TMI Related Requirements for New Operating Licenses," Item I.G.1, requires applicants to perform "a special low power testing program approved by NRC to be conducted at power levels of greater than 5% for the purposes of providing meaningful technical information

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beyond that obtained in the normal startup test program and to provide supplemental training." To comply with this requirement, modify Startup Test Number 21 (Natural Circulation) to ensure accomplishment of the following objectives:

Testing -- The tests should demonstrate the following plant characteristics: length of time required to stabilize natural circulation, core flow distribution, ability to establish and maintain natural circulation with or without onsite and offsite power, the ability to uniformly borate and cool down to hot shutdown conditions using natural circulation, and subcooling monitor performance.

Training -- Each licensed reactor operator (RO or SRO who performs RO or SRO duties, respectively) should participate in the initiation, maintenance, and recovery from natural circulation mode. Operators should be able to recognize when natural circulation has been stabilized and should be able to control saturation margin, RCS pressure, and heat removal rate without exceeding specified operating limits.

If these tests have been performed at a comparable prototype plant, they need be repeated only to the extent necessary to accomplish the above training objectives. Test data should be used as feedback for simulator verification and update. Attachment 4 to a letter from E. P. Rahe (Westinghouse) to H. R. Denton (NRC) dated July 8, 1981, contains an acceptable approach for accomplishing the testing objectives listed above.

640.23
(14.2.12)

Modify Startup Test Number 25 (Shutdown from Outside the Control Room) to:

1. Include a demonstration that the reactor can be tripped from outside the control room.

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2. Incorporate in the prerequisites verification (including reference to specific test abstracts) that preoperational testing of plant instrumentation, controls, and systems to be used at remote shutdown locations have been tested in accordance with Regulatory Guide 1.68.2 (Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants), Position C.2.d.

640.24
(14.2.12)

Modify Startup Test Number 26 (Station Blackout) to ensure that the loss of power is maintained long enough for the plant conditions to stabilize (>30 minutes). (Regulatory Guide 1.68.3 Position C.3.b)

640.25
(14.2.12)

Modify Startup Test Number 30 (Core Performance) such that the acceptance criteria explicitly state what parameters are being verified.

640.26
(14.2.12)

Our review of your test program description concludes that the operability of several of the systems and components listed in Regulatory Guide 1.68 (Revision 2) Appendix A may not be adequately demonstrated by your initial test program. Expand FSAR 14.2.12 to address the following items:

NOTE: Although some of these systems are designated for testing in Preoperational Test Number 71 (Integrated Precore Hot Functional Testing) Part 15, individual test descriptions for these systems should be included in FSAR Chapter 14 to adequately describe what testing will be done. Inclusion of a test description in FSAR Chapter 14 does not necessarily imply that the test becomes subject to FSAR Chapter 17 Quality Assurance Program controls. Certain tests to be performed prior to fuel loading to verify system operability may be referred to as "acceptance tests" to distinguish them from "preoperational tests" subject to FSAR Chapter 17 test control.

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HILLSTONE NUCLEAR POWER STATION, UNIT 3
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Preoperational Testing

<u>R. G. 1.68 Appendix A</u>	<u>FSAR Section</u>	<u>Description</u>
1.a(2)(f)	5.4.12	Loop stop valves
1.a(2)(h)	5.4.15	Reactor vessel head vent system
1.d(9)	10.4.7	Condensate storage system
1.e(5)	10.4.7	Steam extraction system
1.e(8)	10.4.7	Condensate system
1.e(10)	10.4.7	Feedwater heater and drain systems
1.e(12)	10.4.2	Condenser air evacuation system
1.g(1)	8.3.1.1.1	Normal AC power distribution system
1.h(5)	7.6.6	Reactor coolant system loop isolation valve interlocks
1.h(8)	6.3.5	Refueling water storage tank level and temperature indication
1.h(10)	9.2.5	Ultimate heat sink
1.j(7)	6.3.2.5	Leak detection systems used to detect failures in ECCS and containment recirculation spray systems located outside containment
1.j(16)	10.4.7	Hotwell level control systems
1.j(17)	10.4.7	Feedwater heater temperature, level and bypass control system
1.j(22)	7.5	Instrumentation used to track the course of postulated accidents:

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- a) containment wide range pressure indicators
 - b) containment sump level monitors
 - c) containment radiation monitors
 - d) humidity monitors.
- | | | |
|---------|---------|---|
| 1.j(24) | 7.1.1.5 | Reactor control and ESF annunciators |
| 1.k(2) | 12.5 | Personnel monitors and radiation survey instrument tests |
| 1.k(3) | 12.5 | Laboratory equipment used to analyze or measure radiation levels and radioactivity concentrations |
| 1.k(4) | 6.5.1.4 | HEPA filter and charcoal adsorber efficiency and in-place leak tests. Modify the appropriate test abstracts to ensure that testing in accordance with Regulatory Guide 1.52 (Design, Testing, and Maintenance Criteria for Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants), Positions C.5.a - C.5.d, and Regulatory Guide 1.140 (Design, Testing, and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants), Positions C.5.a - C.5.d, is accomplished. |

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1.1(8)	9.3.2	Turbine plant sampling system
1.m(3)	9.1.4	Operability and leak tests of sectionalizing devices and drains and leak tests of gaskets or bellows in the refueling canal and fuel storage pool
1.m(4)	9.1.4	Dynamic (100%) and static (125%) tests of cranes, hoists and associated fuel storage and handling systems
1.n(3)	9.2.7	Turbine plant component cooling system
1.n(16)	6.3.2.2.2	Cooling and heating systems for the refueling water storage tank
1.n(18)		Heat tracing and freeze protection systems
1.o(1)	9.1.5	Polar crane dynamic (100%) and static (125%) loading tests.

Power Ascension Tests

5.w	Containment penetration coolers. Provide a pre-operational test description or, on those penetrations where coolers are not used, provide a startup test description that will demonstrate that concrete temperatures surrounding hot penetrations do not exceed design limits.
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5.11

15.3.2

Demonstrate that the dynamic response of the plant is in accordance with design for limiting reactor coolant pump trips. The method for initiating pump trip should result in the fastest credible coastdown in flow.

640.27
(14.2.12)

Modify FSAR Figure 14.2-5 to include the following preoperational tests listed in FSAR Table 14.2-1:

- 4 - Polar Crane
- 10 - Residual Heat Removal
- 14 - Reactor Plant Sampling
- 26 - Steam Dump Control
- 27 - Steam Generator Blowdown
- 39 - Radioactive Liquid Waste
- 53 - Reserve Station Service Transformers
- 54 - Communications
- 65 - Emergency Lighting
- 72 - Reactor Coolant and Associate System Expansion and Restraint
- 73 - Reactor Coolant and Selected Systems Piping Vibration
- 74 - Thermal Expansion of Piping and Components of Secondary Systems
- 75 - Control System Test for Turbine Runback Operation

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640.28
(14.2.12)

Certain startup tests listed below do not specify the power level at which the test will be conducted, instead stating that testing will be conducted at selected or various power levels. Modify the individual test abstracts to include the specific power level values at which each of the tests will be conducted, modify FSAR Figure 14.2-6 to indicate which tests will be conducted during each power plateau during the startup program, or provide a clarification stating that these tests will be conducted at power levels consistent with Regulatory Guide 1.68, Revision 2.

- 14 - Loose Parts Monitoring System
- 15 - Water Chemistry Control
- 16 - Radiation Survey
- 28 - Operational Alignment of Nuclear Instrumentation
- 29 - Process and Effluent Radiation Monitoring System
- 30 - Core Performance
- 31 - Power Coefficient Measurements
- 33 - Ventilation System Operability
- 34 - Turbine Generator and Feedwater Turbine Operability Test
- 35 - Calibration of Steam and Feedwater Flow Instrumentation at Power
- 37 - Load Swing Test

640.29
(14.2.12)

A response to this item is not required, however, to facilitate approval of future changes to the Millstone Initial Test Program you should:

1. For portions of any preoperational tests (including review and approval of test results) which are intended to be conducted after fuel loading:
 - (a) list each test;
 - (b) state what portions of each test will be delayed until after fuel loading;
 - (c) provide technical justification for delaying these portions; and
 - (d) state when each test will be completed.

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2. List and provide technical justification for any tests or portions of tests described in FSAR Chapter 14 which you believe should be exempted from the license condition requiring prior NRC notification of major test changes to tests intended to verify the proper design, construction, or performance of systems, structures, or components important to safety (fulfill General Design Criteria (GDC) functions and/or are subject to 10 CFR 50 Appendix B Quality Assurance requirements).