REGULATORY BASELINE

The "regulatory baseline" for an issue is comprised of a "licensing basis" and a "technical basis."

LICENSING BASIS

The "licensing basis" for an issue is comprised of:

- The set of obligations established by rules, regulations, licenses, and orders.
- The plant-specific licensing basis documented in the final safety analysis and other docketed correspondence.
- The regulatory guidance that a non-licensee is expected to satisfy in order to conform to NRC staff expectations, for example safety evaluations of vendor topical reports.
- Official NRC interpretations by the Office of the General Counsel.
- Precedent-setting regulatory decisions.

TECHNICAL BASIS

The "technical basis" for an issue is comprised of:

- The standards and guidance documents that are incorporated by reference into the CFR, or cited by another NRC guidance document as an acceptable way to meet NRC expectations.
- The plant-specific PRA.

I. Background: NRC's Regulatory Scheme.

The fundamental building blocks of the NRC's regulatory scheme for nuclear power reactors are the Atomic Energy Act of 1954, as amended (AEA); the Commission's regulations located in Title 10 of the Code of Federal Regulations; and licenses issued pursuant to 10 C.F.R. Parts 50 and 52, which contain legally binding requirements in the form of conditions and technical specifications. Section 103 of AEA authorizes the NRC to issue licenses for production and utilization facilities. Applications for such licenses must include, in part, information needed to evaluate the technical and financial qualifications of the applicant, as well as technical specifications. *See* AEA § 182. For reactors to be licensed under 10 C.F.R. Parts 50 and 52, the license application must demonstrate how the applicant has or will satisfy the substantive regulatory requirements contained in 10 C.F.R. Parts 50, 20, 73, and 100. Ultimately, the application must be sufficient to enable the NRC to make the findings required by 10 C.F.R. §§ 50.57 (for an operating license) or 52.97 (for a combined license). In addition to the required findings, the license will contain any conditions necessary to support the findings[1], as well as technical specifications. *See* 10 C.F.R. § 50.36. Specifically, the technical specifications will consist of:

- Safety Limits, Limiting Safety System Settings, and Limiting Control Settings;
- Limiting Conditions for Operation;
- Surveillance Requirements;
- Administrative Controls; and

[1] Certain license conditions are imposed by regulation and need not be restated in the license. *See* 10 C.F.R. 50.54.

- Notification and Reports

The NRC's regulations located at Title 10 of the C.F.R, any orders issued to the licensee, license conditions, and technical specifications constitute obligations or legally binding requirements. Changes to technical specifications and license conditions require prior NRC approval, which is obtained by submitting an application for a license amendment per 10 C.F.R. § 50.90.[2] In addition, permission to deviate from the regulatory requirements must be obtained from the NRC in the form of an exemption from the regulations.[3] *See, e.g.,* 10 C.F.R. § 50.12.

In addition to the regulations and the license, there are several additional key regulatory concepts vital to the regulation of operating nuclear power plants. One of these concepts is known as the "design basis." The term "design basis" is defined in 10 C.F.R. § 50.2 as:

> [T]hat information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints derived from generally accepted "state of the art" practices for achieving functions goals, or (2) requirements derived from analysis . . . of the effects of a postulated accident for which a structure, system, or component must meet its functional goals.

The licensing basis for a nuclear power plant – which includes the plant-specific "design basis" and the regulatory requirements – is embodied in the concept of the "current licensing basis" or CLB. The CLB is defined as:

> [T]he set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 52, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

10 C.F.R. § 54.3.[4] Thus, the CLB of a licensed nuclear power plant consists primarily of three types of information:

1. **Obligations or Legally Binding Requirements**: conditions or actions that are legally binding requirements imposed on licensees through applicable regulations[5], orders, and licenses.

[2] Certain changes may be made without prior NRC approval pursuant to specific regulatory provisions, such as 10 C.F.R. § 50.59.
[3] Other forms of relief, such as code relief (see 10 C.F.R. 50.55a), are available in certain circumstances.
[4] The "current licensing basis" (CLB) is defined in 10 CFR Part 54, which contains requirements for renewing operating and combined licenses. While Part 54 is only directly applicable to license renewal, the definition of CLB is useful here because it captures all of the licensing basis documents that are relevant during the original license term.

2. **Mandated Licensing Basis Documents**: documents, such as the updated FSAR, the quality assurance program, the security plan, and the emergency plan, for which the NRC has established requirements for content, change control, and reporting.

3. **Regulatory Commitments**: explicit, written, docketed statements by a licensee agreeing or volunteering to take specific actions that change the licensing basis of a nuclear power plant. Regulatory commitments are appropriate for matters in which the staff has a significant interest but which do not warrant either a legally binding requirements or inclusion in the updated FSAR or program subject to a formal regulatory change control program.

See SECY-98-224, "Staff and Industry Activities Pertaining to the Management of Commitments Made by Power Reactor Licensees to the NRC," (Sept. 28, 1998).

II. Regulatory Basis: Submerged, Inaccessible or Underground Cables

The regulatory requirements that pertain to submerged, inaccessible or underground cables (submerged cables) include certain general design criteria contained in Appendix A to 10 CFR 50 (GDC); certain quality assurance requirements contained in Appendix B to 10 CFR 50; and the maintenance rule (10 C.F.R. § 50.65). The applicability of each of these requirements to the submerged cables generic issue is discussed below. The purpose of this section is to provide an analysis of the regulatory requirements that are directly relevant to resolving this generic issue. This analysis is vital because it identifies the applicable regulations and provides a discussion of what those regulations require. Through this analysis, compliance with respect to this generic issue can be more clearly defined, understood, and achieved.[6]

A. General Design Criteria

1. Background

The General Design Criteria (GDC) were added to Title 10 of the Code of Federal Regulations in order to "establish the minimum requirements for the principal design criteria for water-cooled nuclear power plants." 36 Fed. Reg. 3255 (Feb. 20, 1971). In turn, the "[p]rincipal design criteria established by an applicant and accepted by the Commission [are] incorporated by reference in the construction permit. In considering the issuance of an operating license under part 50, the Commission will require assurance that these criteria have been satisfied in the

[5] There is also a vast body of documents that can be generally categorized as "guidance." These documents – such as Regulatory Guides, NUREG reports, and Regulatory Issue Summaries (RIS) – provide guidance to licensees on acceptable methods of compliance with applicable regulations, and describe NRC staff technical or policy positions.

[6] While this section is designed to capture the regulations that are germane to resolving the submerged cable generic issue, it does not necessarily represent an all-inclusive list of regulations that are applicable to electrical cables generally. Rather, this section focuses on regulations that are relevant and inform the development of a generic resolution to the submerged cable issue.

detailed design and construction of the facility and that any changes in such criteria are justified." 36 Fed. Reg. 3256. Thus, with respect to plants licensed under Part 50, the primary purpose of the GDC is to provide a set of minimum requirements for the principal design criteria, which are incorporated into construction permits and used by the NRC in considering issuance of an operating license.

It is well-settled that the GDC "are cast in broad, general terms and constitute the minimum requirements for the principal design criteria of water-cooled nuclear power plants." *Petition for Emergency Remedial Action*, CLI-78-6, 7 NRC 400, 406 (1978); *see also*, *Northeast Nuclear Energy Company* (Millstone Nuclear Power Station, Unit No. 3), CLI-01-10, 53 NRC 353 (2001). Further, while the GDC may be viewed as legally binding, "issues associated with licensing, inspection or enforcement are usually tied to more explicit NRC requirements (technical specifications or specific regulations)." *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), 62 NRC 389, 398 (2005)(quoting LIC-100, "Guideline for Managing Licensing Bases for Operating Reactors").

Compliance with the GDC was evaluated by the NRC during the initial licensing of each individual plant.[7] Ongoing compliance with the GDC during operation is ensured primarily through regulations governing change control, such as 10 C.F.R. § 50.59, which provide an adequate basis for concluding that nuclear power plants continue to conform with their licensing basis. These existing regulatory processes are "sufficiently broad and rigorous to ensure that plants continue to be safe and to comply with the intent of the GDC." *Vermont Yankee*, 62 NRC at 396. The broad and general nature of the GDC limits their utility in resolving the submerged cable generic issue. Nonetheless, the most relevant and instructive GDC are discussed below.

2. Applicability to the Submerged IUC Generic Issue

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 4, "Environmental and Dynamic Effects Design Bases."

"*Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping*."

Discussion: GDC 4 requires that structures, systems, and components (SSC) important to safety be designed to accommodate the effects of the environmental conditions associated with normal

[7] Plants licensed prior to promulgation of the GDC (pre-GDC plants) were licensed to plant-specific criteria that were essentially the same at the GDC. *See, e.g.*, "Proposed Generic Letter Entitled *Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal Pumps,* As Revised to Reflect Public Comments," SECY-97-217 (Sept. 26, 1997).

operation, maintenance, testing, and postulated accidents. As explained above, at GDC-plants compliance with the GDC was evaluated by the NRC during the initial licensing of each individual plant, however a new environmental condition – i.e., submergence – has been identified, creating a question as to whether cables are designed to accommodate this condition. The industry believes that the cables at issue were "designed for" wet conditions, up to and including submergence. Note that GDC 4 *does not* require "qualification" of cables for use in specific environmental conditions, over predetermined time periods. Acknowledging that cables were "designed for" wet use in accordance with GDC 4, however, does not mean that poor cable performance in submerged conditions does not need to be addressed. It simply means that the focus of the generic resolution will be on evaluating the current condition of submerged cables to ensure that they will continue to perform their intended functions, rather than on whether cables are "qualified" for submergence over specific time periods. In order address design questions raised by cable submergence, resolution of the submerged cable generic issue will include an evaluation documenting that the cable types in use at operating plants were "designed for" wet conditions, up to and including submergence.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 17, "Electric Power Systems."

"*An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.*

The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained.

Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies."

Discussion: GDC 17 requires that onsite and offsite power systems be provided; that onsite power supplies have sufficient independence, redundancy, and testability to perform their safety functions; that power supply circuits are physically independent; and that provisions are in place to minimize the probability of losing electric power. As with GDC 4, compliance with GDC 17 was evaluated at

GDC-plants at the time of initial licensing. While this design criteria is relevant to electric systems generally, it is not specific enough to provide any useful guidance on crafting a generic resolution to the submerged cable issue.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 18, "Inspection and Testing of Electric Power Systems."

"*Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components. The systems shall be designed with a capability to test periodically (1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses, and (2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system, and the transfer of power among the nuclear power unit, the offsite power system, and the onsite power system.*"

Discussion: GDC 18 requires that electrical power systems important to safety be designed to permit periodic inspection and testing of important areas and features, including wiring, insulation, and connections. While this GDC requires a design that accommodates inspection and testing, the actual inspection and testing requirements for power systems – including wiring and insulation – are contained in other licensing basis documents, such as the technical specifications and the UFSAR. As with GDC 4 and 17, compliance with GDC 18 was evaluated at the time operating licenses were issued to GDC-plants. The industry believes that electric power systems at operating plants were designed to accommodate appropriate inspection and testing to ensure operability and functionality. The question raised by the submerged cable issue is not whether electric power systems have been designed to accommodate appropriate functional or operational inspection and testing, but rather whether the condition of cables exposed to submerged conditions is adequately understood and whether such cables are being appropriately maintained to ensure that they continue to perform their intended functions. Thus, while GDC 18 is applicable to electric power systems generally, it will not directly impact the generic solution to the submerged cable issue.

B. Quality Assurance Requirements

1. Background

The NRC's quality assurance requirements are contained in Appendix B to 10 C.F.R. Part 50. These regulations establish quality assurance requirements for the design, manufacture, construction, and operation of SSCs "that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public." The requirements of Appendix B apply to all "activities affecting the safety-related functions of these [SSCs]," including design, purchase, fabrication, handling, shipping, storage, cleaning, erecting, installation, inspection, testing, operation, maintenance, repair, refueling, and modification. 10 C.F.R. 50, Appendix B, at Intro. The specific quality assurance requirements that are relevant to the submerged cable generic issue are discussed in detail below.

2. Applicability to the Submerged IUC Generic Issue

10 CFR Part 50, Appendix B, Criterion III, "Design Control."

"*Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.*

. . . .

The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The verifying or checking process shall be performed by individuals or groups other than those who performed the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions. Design control measures shall be applied to items such as the following: reactor physics, stress, thermal, hydraulic, and accident analyses; compatibility of materials; accessibility for inservice inspection, maintenance, and repair; and delineation of acceptance criteria for inspections and tests."

Discussion: Criterion III ensures that the applicable regulatory requirements and design bases for the SSCs covered by Appendix B are effectively implemented and maintained. Criterion III achieves this end by requiring that these regulatory requirements and the design basis are translated to specifications, drawings, procedures, and instructions. Criterion III also requires that licensees establish measures to select and ensure the suitability of materials, parts, equipment, and processes that are essential to the safety-related functions of the SSCs covered by Appendix B. These design control measures may include design reviews, calculational methods, or testing programs that allow the licensee to verify or check the adequacy of the design. As explained above in the discussion of GDC 4, the industry believes that the cable types currently in use were "designed for" use in wet conditions, up to and including submergence. To this end, resolution of the submerged cable generic issue will include an evaluation documenting that cables procured and installed during plant construction were "designed for" environmental conditions consistent with those currently being observed. The discovery that certain types of cable insulation may not be performing as well as anticipated in submerged conditions raises questions about whether the current condition of these cables is adequately understood so that continued functionality can be ensured. But the fact that questions have been raised regarding the current condition of submerged cables does not mean that the cables were not originally "designed for" use in wet environments, nor does it necessarily call design control measures required under Criterion III into question. Thus, Criterion III will not drive resolution of the submerged cable generic issue.

10 CFR Part 50, Appendix B, Criterion XI, "Test Control."

"*A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant or fuel reprocessing plant operation, of structures, systems, and components. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. Test results shall be documented and evaluated to assure that test requirements have been satisfied*."

Discussion: Criterion XI also helps to ensure maintenance of a plant's design basis. Specifically, Criterion XI requires that licensees establish programs ensuring that all testing needed to demonstrate that SSCs will perform satisfactorily is identified and executed in accordance with written test procedures. These test procedures must incorporate the requirements and acceptance limits contained in the applicable design documents and include provisions to ensure that all testing prerequisites have been met, that appropriate instrumentation is used, and that the test is carried out under suitable environmental conditions. The submergence of cables has raised questions regarding the current condition and performance of cable insulation. Thus, if a cable testing program is part of the solution to the submerged cable generic issue for Appendix B cables, then the program would need to comply with Criterion XI.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions."

"*Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management*."

Discussion: Criterion XVI requires that licensees establish measures to ensure that conditions adverse to qualify are identified and corrected. Criterion XVI is relevant to the submerged cable generic issue because any conditions adverse to quality that are revealed for Appendix B cables – e.g., through implementation of programs designed to ensure compliance with Criterion XI, or the maintenance rule – would need to be addressed via the licensee's corrective action program.

C. Maintenance Rule – 10 CFR 50.65(a)(1)

1. Background

The maintenance rule was added to 10 C.F.R. Part 50 on July 10, 1991. 56 Fed. Reg. 31,306. Like the Appendix B criteria described above, one important purpose of the rule was "to ensure that design assumptions and margins in the original design basis are either maintained or are

not unacceptably degraded." 56 Fed. Reg. 31,307. In this way, the maintenance rule – like the Appendix B criteria – contributes to ensuring that the design basis is maintained.

2. Applicability to the Submerged IUC Generic Issue

10 CFR § 50.65

"*The requirements of this section are applicable during all conditions of plant operation, including normal shutdown operations.*

(a)(1) Each holder of an operating license for a nuclear power plant under this part and each holder of a combined license under part 52 of this chapter after the Commission makes the finding under § 52.103(g) of this chapter, shall monitor the performance or condition of structures, systems, or components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components, as defined in paragraph (b) of this section, are capable of fulfilling their intended functions. These goals shall be established commensurate with safety and, where practical, take into account industrywide operating experience. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken. For a nuclear power plant for which the licensee has submitted the certifications specified in § 50.82(a)(1) or 52.110(a)(1) of this chapter, as applicable, this section shall only apply to the extent that the licensee shall monitor the performance or condition of all structures, systems, or components associated with the storage, control, and maintenance of spent fuel in a safe condition, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions.

(2) Monitoring as specified in paragraph (a)(1) of this section is not required where it has been demonstrated that the performance or condition of a structure, system, or component is being effectively controlled through the performance of appropriate preventive maintenance, such that the structure, system, or component remains capable of performing its intended function.

(3) Performance and condition monitoring activities and associated goals and preventive maintenance activities shall be evaluated at least every refueling cycle provided the interval between evaluations does not exceed 24 months. The evaluations shall take into account, where practical, industry-wide operating experience. Adjustments shall be made where necessary to ensure that the objective of preventing failures of structures, systems, and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems, and components due to monitoring or preventive maintenance.

(4) Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. The scope of the assessment may be limited to structures, systems, and components that a risk-informed evaluation process has shown to be significant to public health and safety.

(b) The scope of the monitoring program specified in paragraph (a)(1) of this section shall include safety related and nonsafety related structures, systems, and components, as follows:

(1) Safety-related structures, systems and components that are relied upon to remain functional during and following design basis events to ensure the integrity of the reactor coolant pressure boundary, the capability to shut down the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the guidelines in Sec. 50.34(a)(1), Sec. 50.67(b)(2), or Sec. 100.11 of this chapter, as applicable.

(2) Nonsafety related structures, systems, or components:

(i) That are relied upon to mitigate accidents or transients or are used in plant emergency operating procedures (EOPs); or

(ii) Whose failure could prevent safety-related structures, systems, and components from fulfilling their safety-related function; or

(iii) Whose failure could cause a reactor scram or actuation of a safety-related system.

(c) The requirements of this section shall be implemented by each licensee no later than July 10, 1996."

Discussion: As described above, the maintenance rule ensures that the design basis for the plant is not degraded by requiring that licensees either monitor or perform preventative maintenance on safety-related and certain non-safety-related SSCs. Like the quality assurance requirements described above, the ultimate goal of the maintenance rule is to ensure the continued capability of SSCs to fulfill their intended functions. While the quality assurance requirements and the maintenance rule share a common focus on plant performance, the scope of the maintenance rule is broader than the quality assurance requirements. *See* 56 Fed. Reg. 31,308. Specifically, while the quality assurance requirements have been interpreted to cover safety-related SSCs,[8] the maintenance rule covers both safety-related and certain non-safety-related SSCs.

Submerged cables that are within the scope of the maintenance rule are subject to the requirements in § 50.65(a). Industry guidance on the implementation of the maintenance rule is provided in NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." As noted in NUMARC 93-01, the key parameter in implementing the maintenance rule at nuclear power plants is performance. More specifically, the guidance explains that SSCs that are determined to be performing in an acceptable fashion are managed under preventative maintenance programs established in accordance with § 50.65(a)(2). On the other hand, performance goals are established for SSCs that are determined to be performing in an unacceptable fashion. These SSCs are managed under monitoring programs established in accordance with § 50.65(a)(1) in order to ensure that the performance goals are achieved. As described in § 50.65(a)(1), licensee performance goals should be established "commensurate with safety and, where practical, take into account industrywide operating experience." Performance of structures, systems, trains, or components

[8] *See* "Quality Assurance Program Requirements (Operation)," Regulatory Guide 1.33 (Feb. 1978), at 1.33-7.

will be monitored until the licensee determines that the performance goals have been achieved and performance can be managed under the preventative maintenance program.

Development of a maintenance rule program for cables within the scope of the rule will be informed by the information gathered and/or developed in reviewing the performance of various cable types in wet conditions, up to and including submergence. The results of this review will assist in determining whether monitoring in accordance with § 50.65(a)(1), or preventative maintenance in accordance with § 50.65(a)(2) is appropriate. In addition, any maintenance rule programs for safety-related cables that include testing covered by Criterion XI would need to conform to that quality assurance requirement.

D. Conclusions: Regulatory Compliance

In sum, the primary issue confronting industry and the NRC is that some cable types are not performing as well as expected under submerged conditions. Thus, resolution of the submerged cable generic issue should focus on developing an understanding of the current condition of cables through robust maintenance rule, and possibly quality assurance, programs. Focusing on understanding current cable condition and performance will result in NRC and industry resources being properly devoted to ensuring that these cables continue to perform their intended functions. For submerged cables within the scope of the maintenance rule, some form of monitoring or preventative maintenance program will be necessary. The degree of monitoring or preventative maintenance necessary to ensure compliance will depend on the conclusions reached regarding the performance of specific cable types in submerged conditions. As explained above, there are multiple regulatory requirements that are generally applicable to electrical systems, however some of these requirements – such as the GDC – are too broadly worded to be useful in developing a generic solution to the submerged cable issue. This does not mean that cable performance in submerged conditions does not need to be addressed. Rather, it simply means that the generic resolution will be guided by the more specific, relevant regulatory requirements, such as the maintenance rule and the quality assurance requirements, which will properly focus the NRC and industry efforts on evaluating the current condition of submerged cables to ensure that they will continue to perform their intended functions. [9] Thus, from a compliance standpoint, generic resolution of the submerged cable issue should include the following actions:

Action	Regulatory Basis	Applicability
Provide an evaluation documenting that cable types currently in use at operating plants were "designed for" use in wet conditions, up to and including submergence.	• GDC 4: GDC 4 does not require that cables be "qualified" for specific environmental conditions over predetermined periods of time. While submerged conditions may affect the functional life of	• Structures, systems, and components important to safety. GDC 4.

[9] This position is consistent with the NRC's recognition that while the GDC may be viewed as legally binding, "issues associated with licensing, inspection or enforcement are usually tied to more explicit NRC requirements (technical specifications or specific regulations)." *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), 62 NRC 389, 398 (2005)(quoting LIC-100, "Guideline for Managing Licensing Bases for Operating Reactors").

Action	Regulatory Basis	Applicability
	certain cable types, this does not necessarily mean that these cables were not "designed for" use in wet conditions, up to and including submergence.	
Development of a common understanding of how submerged conditions encountered during normal operation affects the performance of various cable types.	• Maintenance Rule § 50.65: Necessary to develop appropriate monitoring or preventative maintenance programs pursuant to maintenance rule. •	• Safety-related and certain non-safety-related SSCs pursuant to § 50.65(b). •
Evaluation of whether additional cable monitoring, or preventative maintenance, programs need to be developed in order to ensure that submerged cables will continue performing their intended functions. Development of such programs as needed.	• Maintenance Rule § 50.65.	• Safety-related and certain non-safety-related SSCs pursuant to § 50.65(b).
If additional cable testing is required for Appendix B cables, establishment of a program (if such a program does not already exist) to ensure that all testing needed to demonstrate that cables will perform satisfactorily is identified and executed in accordance with written test procedures.	• Appendix B Criterion XI.	• SSCs "that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public." Appendix B to 10 C.F.R. Part 50.
Ensuring that any conditions adverse to quality that are revealed through implementation of cable monitoring or preventative maintenance programs are addressed via the licensee's corrective action program.	• Appendix B Criterion XVI.	• SSCs "that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public." Appendix B to 10 C.F.R. Part 50.