

# GENERAL ELECTRIC

NUCLEAR ENERGY

SYSTEMS DIVISION

BWR PROJECTS DEPARTMENT

GENERAL ELECTRIC COMPANY, 475 CUMPTNER AVENUE, SAN JOSE, CALIFORNIA 95125  
MAIL CODE 635 Phone (408) 297-3550 TWX No. 910-335 0116

Letter No. 780-264-76

July 13, 1976

Office of Nuclear Reactor Regulation  
ATTN: Mr. D.J. Skovholt, Assistant Director  
Quality Assurance and Operations  
Division of Project Management  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUBJECT: GENERAL ELECTRIC COMPANY'S ALTERNATE POSITION TO THE USNRC  
REGULATORY GUIDE 1.54, "QUALITY ASSURANCE REQUIREMENTS FOR  
PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR POWER  
PLANTS", JUNE 1973

Dear Mr. Skovholt:

General Electric as a nuclear steam supply system vendor has had broad quality assurance programs in place for many years in its own manufacturing facilities, as well as outside equipment vendors' facilities. Since the issuance of Regulatory Guide 1.54, which imposes all the requirements of ANSI N101.4, these same GE quality assurance programs have been broadened to include the engineering requirements for qualified coatings on NSSS equipment as outlined in the GE process specifications (copies attached) and the reporting of these quality control checks in the already existing GE Product Quality Certification forms (copies attached). These GE process specifications fully describe the requirements for cleanliness of the substrate, the degree of blast as well as the blast profile, application and curing in accordance with the paint manufacturer's recommended procedures, the dry film thickness and the requirement for certifications from the paint manufacturer for each batch of paint used by the equipment manufacturer.

The General Electric Company considers its adaptation of the controls for coating class 1 equipment (equipment located within the containment facility), as implemented at our manufacturing facilities (both GE and equipment vendor), to be an adequate basis for complying with the pertinent quality assurance requirements of 10 CFR 50, Appendix B. These controls as established by General Electric's Quality Assurance Program are represented in the attached General Electric Alternate Position to the USNRC Regulatory Guide 1.54. The GE Alternate Position is applicable to NSSS equipment for the General Electric BWR/6 design. Since the NRC Regulatory Guide 1.54 invokes the requirements of ANSI N101.4 - 1972 in total, this review follows the text of that document. General Electric will be in compliance with those sections of ANSI N101.4 - 1972 not specifically referenced in the following pages.

EXHIBIT "A"

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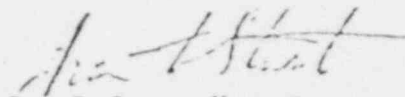
GENERAL ELECTRIC

D.J. Skovholt

Page 2

The exceptions listed in GE's Alternate Position occur for the most part because ANSI N101.4, in these cases, addresses the "Project (Coating) Specification" and site coating controls where different environmental conditions exist from those at equipment manufacturers' shops. In other cases, ANSI N101.4 addresses requirements for the paint manufacturer only.

The General Electric Company is hereby requesting that the attached GE Alternate Position be reviewed and accepted as a satisfactory alternate for meeting the intent of Regulatory Guide 1.54. Acceptance of this proposal should be sent to myself. If I can be of further assistance, please feel free to contact me or W. H. D'Ardenne, (408) 297-3000, ext. 2441.



Ivan F. Stuart, Manager  
Safety and Licensing

IPS:WHD:jh

MFN 244-76

cc: IS Clifford

bcc: A. Breed  
CW Albert  
WR Shelton

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281

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

1.2.2.1 Class I service level applies to those systems and components of nuclear facilities which are essential (1) to prevent postulated accidents which could affect the public health and safety or (2) to mitigate the consequences of these accidents. The quality assurance for Class I service level shall conform to the requirements of this standard.

1.2.2.1 Alternate Proposal:

Class I service level applies to equipment installed within the containment structure and for which a potential pathway for coating debris to the emergency cooling water pools exist. The quality assurance for Class I service level shall conform to the requirements of this standard and the acceptable alternates as enumerated herein.

Rationale:

Equipment function is secondary to location with regard to coating failures. For example, failure of a coating on ECCS equipment located outside the containment facility or located inside the containment facility for which there is no pathway for coating debris to the emergency-cooling water pools, does not jeopardize that equipment's function. Coating failure on equipment in the containment facility, for which there is a pathway for coating debris to get into the emergency-cooling water pools, regardless of function, has the possibility of jeopardizing the availability of these water supplies.

1.2.2.2 Class II service level applies to those systems and components of nuclear facilities which are essential to the attainment of the intended normal operating performance. The quality assurance and/or documentation for Class II service level is not mandatory and shall be used only to the extent required by the project specification.

1.2.2.2 Alternate Proposal:

For all equipment not classified as Class I in 1.2.2.1 compliance with this standard is not mandatory and shall be used only to the extent required by the equipment specification.

Rationale:

Same as 1.2.2.1.

Page 2

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

282

1.2.4 Because of the impracticability of imposing all the requirements of this standard on certain specific items (requiring only a small quantity of coating material), the

1.2.4 Alternate Proposal:

Because of the impracticability of imposing all of the requirements of this standard on certain

Rationale:

Same as 1.2.2.1.

Page 2

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

1.2.4 Because of the impracticability of imposing all the requirements of this standard on certain specific items (requiring only a small quantity of coating material), the owner, consistent with his formal Quality Assurance Program, may accept affidavits of verification attesting to the quality of a shop or field coating.

1.2.4 Alternate Proposal:

Because of the impracticability of imposing all of the requirements of this standard on certain specific items requiring only a small quantity of coating material, GE's engineering function will determine the applicability of this standard to these small equipments on an individual limited basis.

Rationale:

Very small painted surface areas would not be a safety concern even though they were dislodged following a LOCA. Both due to their size and their random location in the containment area, they would be incapable of seriously clogging the ECCS strainers. Therefore, such components as valve handles, face plates, small switch & solenoid covers, instrumentation trim and similar items will be exempted.

1.3 Use of This Standard. This standard, N101.4, may be incorporated in the project specification by direct reference or may be used to provide guidelines for quality assurance requirements, on the basis of the owner's requirements. Effective use of this standard may also require the incorporation of applicable clauses in project specifications for concrete, steel, equipment, and other related items.

1.3 Comment:

This section addresses the project specification and the owner. However, GE, acting as the Owner's representative, refers to ANSI N101.4 in our coating process specifications.

2.3.1 The Quality Assurance Program shall include all the documentation, which shall consist of written policies, procedures, or instructions, to establish quality assurance for the coating materials and the coating manufacturer, the coating applicator, and the coating inspection agency. This program shall also include qualification criteria and individual Quality Assurance Programs which meet the requirements stated in 2.3.2 through 2.3.5.

2.3.1 Comment:

The "coating applicator" in the case of NSSS vendor is our equipment manufacturers. The "coating inspection agency" likewise is our own Quality Control personnel, both in our own manufacturing facilities and at our outside equipment vendors' shops.

Page 3

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.2 Qualification Criteria. The qualifications of the

2.3.2 Alternate Proposal:

283

coating applicator, and the coating inspection agency. This program shall also include qualification criteria and individual Quality Assurance Programs which meet the requirements stated in 2.3.2 through 2.3.5.

"coating inspection agency" likewise is our own Quality Control personnel, both in our own manufacturing facilities and at our outside equipment vendors' shops.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.2 Qualification Criteria. The qualifications of the coating materials, the coating manufacturer, the coating applicator, and the coating inspection agency shall be evaluated by the owner or his representative on the basis of the criteria stated in Sections 2.3.3 through 2.3.5.

2.3.2 Alternate Proposal:

Evaluation of these criteria by GE is to the extent as listed below for the individual requirements.

2.3.3.1 All coating materials shall meet the applicable requirements of ANSI N5.0 and ANSI N101.2 to the extent defined in the project specification.

2.3.3.1 Alternate Proposal:

Coating materials are selected on the basis of applicable requirements of ANSI N512 and N101.2 for EWR/6 criteria. GE will respond to special Project specifications as appropriate.

2.3.3.2 The coating manufacturer shall furnish a Quality Assurance Program which shall describe his current practices for quality control of the specified coatings.

2.3.3.2 Comment:

Not directly applicable to the NSSS vendor. (See paragraph 3.2. comment.)

2.3.3.3 The coating manufacturer shall furnish a description of his technical and field service capabilities.

2.3.3.3 Comment:

Not directly applicable to the NSSS vendors.

2.3.3.4 The coating manufacturer shall furnish application procedures for each coating system on each substrate for each method of application as covered by the project specification. This shall include the maximum and minimum ambient conditions at which application can be properly made.

2.3.3.4 Comment:

Not directly applicable to the NSSS vendors. However, GE reviews vendors' coating procedures against the coating manufacturers' application recommendations.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.3.4 The coating manufacturer shall furnish application procedures for each coating system on each substrate for each method of application as covered by the project specification. This shall include the maximum and minimum ambient conditions at which application can be properly made.

Not directly applicable to the NSSS vendors. However, GE reviews vendors' coating procedures against the coating manufacturers' application recommendations.

Page 4

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.4.2 The applicator shall furnish a description of his prior experience on jobs of comparable scope with generic coating systems similar to those specified. The owner or his representative shall have the option of inspecting the coating applicator's quality of work at a selected job site.

2.3.4.2 Comments:

Not directly applicable to the NSSS vendors. This applies to large site jobs only.

Coating Inspection Agency.

2.3.5.1 The inspection agency shall furnish a Quality Assurance Program which shall describe its current or proposed practices for inspection of the specified coating work.

2.3.5.2 The inspection agency shall provide a summary of its qualifications and prior experience for inspection of jobs of comparable scope with generic coating systems similar to those specified.

2.3.5.1 and 2 Comments:

Not directly applicable to the NSSS vendors. The GE Quality Assurance Program and Quality Control Personnel perform these functions. Refer to response on paragraph 2.4.

2.4 Quality Control Program. The Quality Control Program shall include a program for shop and/or field control of all the physical measures necessary to ensure that the completed coating work meets all requirements of the project specification. Control of all work (shop, field, plant, product, etc.) shall meet the requirements stated in this standard.

2.4 Alternate Proposal:

The GE Quality Control Program includes a program for shop control of the physical measures necessary to assure that the completed coating work meets all requirements of the equipment specifications. The equipment specifications include coating process specifications reflecting the requirements stated in the standard. GE does not field coat any equipment.

Page 5

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

285

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.5 *Conditions of Work.* To ensure that the purpose of this standard and the requirements of the project specification are met, it is essential to comply with the following conditions of work:

2.5.1 During the bid period for the coating work and also before the awarding of the contract, all parties to the coating bids or the coating contract should understand the conditions of work in the shop and/or in the field including all interface relationships and responsibilities. (This understanding may be achieved by a meeting of bidders at the project site during the bid period.)

2.5.2 Before the start of the coating work in the shop and/or in the field, there shall be a shop meeting and/or a site meeting (if required by the owner or his representative) of the owner, coating manufacturer, coating applicator, and coating inspection agency or their representatives.

2.5.2.1 At this meeting, an agreement shall be made as to the interpretation of standards of acceptance or rejection of the coating work. Each phase of the work, such as receipt and storage of coating materials, equipment to be used, preparation of substrates and/or previously primed surfaces, application of each coat of the coating system, degree and extent of inspection, etc., shall be specifically reviewed.

2.5.2.2 Also at this meeting a field demonstration of surface preparation and coating application shall be conducted and an agreement shall be reached regarding conformance with the project specification.

2.5.2.3 The agreement reached at the site shall be prepared as a quality-control document by the owner or his representative and shall constitute the basis for inspection by the coating inspection agency and for acceptance or rejection of each phase of the coating work.

2.5 Comment:

Since the NSSS supplier is not normally involved in the contract negotiations between the owner or his representative and the site applicator, this section is not applicable to the NSSS suppliers. Response to special project specification requirements by the owner would be through the owner-NSSS supplier contract.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.6 Control Measures for Ambient Conditions. The successful application of coating systems in the shop and/or in the field is highly dependent on ambient conditions. Acceptable measures for the control of ambient conditions, in accordance with the requirements of this standard, shall be carefully defined in the project specification. The Quality Control Program shall stipulate the measures to be taken to assure that appropriate controls are fully implemented.

3.2 Manufacturing. The coating manufacturer shall maintain a Quality Assurance Program and shall provide adequate documentation to show that the quality of a given coating system as supplied is reasonably identical to the coating system previously qualified under ANSI N19 and/or ANSI N101.2. The coating system shall be requalified if there are significant changes in formulation or end-product properties.

3.3 Product Identity.

3.3.1 The manufacturer shall certify that the product identities of the materials being supplied meet the requirements of the project specification for the intended service. To establish identity, the owner or his representative shall be furnished with the Coating Manufacturer's Product Identity Certification for each batch. This certification shall include at least the information requested in Sample Form 1, Section

2.6 Alternate Proposal:

Coating application procedures from GE's vendors define measures, in accordance with coating manufacturer recommendations, to be taken to assure that appropriate controls of ambient conditions are maintained. These procedures are reviewed and dis-positioned by the responsible GE engineering function. (Most NSSS equipment coatings are applied in manufacturing facilities with controlled ambient conditions.

3.2 Comment:

GE will establish a program of audits of coating materials manufacturers to assure compliance with this requirement. GE equipment specifications shall define qualified coating materials by proprietary name and manufacturer.

3.3.1 Comment:

Not directly applicable to NSSS vendors. GE will obtain through its vendors for each batch of material the coating manufacturer's certification stating that the paint supplied is essentially the same as the formulation used in qualifying this paint under ANSI N101.2 and N512.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT



REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

3.3.2 The owner or his representative shall maintain a materials control program to ensure the identity of the coating material as received and as applied. (See Section 5.)

3.3.3 The applicator shall maintain a materials control program to ensure the identity of the coating materials as received and as applied, to ensure that the coating materials have not been substituted or altered in any manner from the coating manufacturer's written recommendations, and to assure that no materials which have exceeded their recommended shelf life are applied without authorization by the owner or his representative. (See Section 5 and Sample Forms 3 and 6, Section 7.)

3.3.2 and 3 Alternate Proposal:

GE's Quality Assurance Program requires our own manufacturing facilities and our vendors to establish and maintain an adequate materials control program. Periodic scheduled audits of these programs are performed.

3.4 Labeling of Materials: Each container shall be labeled with the product designation. The label or container shall bear a batch number or other factory marking, permanently affixed, showing the individual lot or batch designation. If the batch number or other factory marking does not incorporate the date of manufacture, the date shall appear separately on the label or container.

3.4 Comment:

Not directly applicable to NSSS vendors. Applicable to the coating manufacturer and verified during GE audit of the coating manufacturer.

3.5 Sample Retention: Retained batch samples from products furnished for the work shall be kept by the coating manufacturer for the stated shelf life but no longer than two years from date of manufacture.

3.5 Comment:

Not applicable to the NSSS vendors. Applicable to the coating manufacturer and verified during GE audit of the coating manufacturer.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

3.6 Performance Verification of Shop and/or Field-applied Coating Systems.

3.6 Alternate Proposal:

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

3.3 Performance Verification of Shop-and/or Field-applied Coating Systems.

3.3.1 The owner may require, in the project specification, that a DDA exposure test or other test(s) as discussed in ANSI N101.2 be performed on specimens of each coating system used for the coating work to verify that the performance of each shop- and/or field-applied coating system is comparable to that of the same coating system qualified under the standard.

3.3.2 If the owner does require such tests, the project specification shall specify at least the following:

3.3.2.1 What tests are required and what testing agency will perform the tests.

3.3.2.2 Who shall prepare the test specimens; where they shall be prepared (plant, shop, and/or field); the number, size, manner of preparation, identification and method of storage; the minimum cure time and cure conditions before testing; and the manner of shipping to the testing agency.

3.3.2.3 That the specimens shall be made with the owner or his representative present to observe, report, and record the manner of preparation. In addition, a similar record may be required from the agency applying the coatings to the test specimens.

3.3.3 Agreement that the specimens are representative before they are subjected to testing shall be reached by the owner or his representative, the coating manufacturer, the coating applicator, and the coating inspection agency.

3.3.4 No material which are subject to such tests shall be released for application until acceptance test results have been reported.

3.6 Alternate Proposal:

GE will respond to special requirements of Project Specifications as appropriate. Additionally, GE reviews test data for the BWR environment submitted by the coating manufacturers prior to accepting proprietary coatings for listing in equipment specifications.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

4.1 Conformance with the Specified Requirements.

4.1.1 The surface preparation of substrates or of previously painted surfaces shall conform to the applicable requirements of ANSI N59.2 and/or ANSI N101.2 and to the requirements of the project specification.

4.1.2 Surface preparation directed by the requirement of ANSI N101.2, which stipulate that any concrete or masonry substrate having a coating shall be compatible with subsequent coating systems. Discussion on the type of coating to be used and used shall be determined for all concrete surfaces and masonry surfaces even though these surfaces are not initially coated. It is intended that the information shall be furnished by the contractor who performs the concrete work and shall be supplied by the owner or his representative (for example by use of Section 1, Section 7).

4.1.3 The project specification shall specify the inspection methods to be used for the inspection of the specifications for all substrates, including previously painted surfaces, if any. These inspection methods shall include determination of items such as the following:

4.1.3.1 Moisture content of concrete or steel substrates.

4.1.3.2 Condition of concrete substrates, such as form release agents, mold release, curing compounds, or other deleterious matter.

4.1.3.3 Surface condition of concrete substrates and the remedial work required.

4.1.3.4 Condition of steel substrates, such as packing residues or other deleterious matter.

4.1.3.5 Surface pollution on steel substrates.

4.1.3.6 Surface temperature of substrates.

4.2 Alternate Proposal:

Requirements for surface preparation of substrates are contained in the coating specifications applied to the equipment and is limited to steel substrates. Since GE's coatings are all shop applied, quality assurance programs cover cleanliness, degree of blast, blast profile and dry film thickness.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

4.3 General Requirements for Surface Preparation of Substrates

4.3 Comments:

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

4.3 Control of the process from start to finish. The operator, including production personnel, shall control the process. The operator shall be responsible for the control of the process and shall be responsible for the control of the process. The operator shall be responsible for the control of the process and shall be responsible for the control of the process.

- 4.4 Records of Compliance. To avoid contamination of materials, the process of fabrication shall provide for:
- 4.4.1 Control and removal of all burning processes, gels, and dust.
  - 4.4.2 Control of welding fumes and removal of residual carbon.
  - 4.4.3 Removal of all welding acids and by-products.
  - 4.4.4 Removal of fumes of residues.
  - 4.4.5 Removal of residues of sprays, dusts, and fumes.
  - 4.4.6 Removal of residues of acids, alkalis, and other chemicals.
  - 4.4.7 Removal of all residues of toxic materials.

4.5 Quality assurance Requirements. The quality assurance department shall report to the customer preparation of materials and procedures during each step of the manufacturing process. The report shall be distributed by the customer to his representative. (See Sample Forms A and B, Section 7.)

4.1 General

GE and equipment vendors must comply with GE qualified specifications and the coating manufacturer's recommended procedures for application and curing.

4.3 Comments

Not directly applicable to the MSS vendors as furnished. A note address the product specification. However, cleanliness of substrate prior to coating is covered in the process specifications.

4.5 Comments

Not applicable to the MSS vendors. Addressed site conditions only.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

Purpose and Scope.

5.1.1 This section defines the quality-assurance requirements necessary for compliance with this standard in a way that meets the design-performance requirements of the specification.

5.1.2 The scope includes:

- 5.1.2.1 Application Procedures.
- 5.1.2.2 Qualification of Personnel.
- 5.1.2.3 Quality-Assurance Documentation.

Application Procedures.

5.2.1 The coating applicator shall submit written application procedures for application of the coating system on each surface of each previously coated surface.

5.2.2 These application procedures shall be approved by the coating applicator, the coating manufacturer, and the owner or his representative.

5.2.3 These application procedures shall provide instructions in the following:

- 5.2.3.1 Qualification of application personnel.
- 5.2.3.2 Receiving, storing, handling, and dispensing of coating materials.
- 5.2.3.3 Application equipment.
- 5.2.3.4 Application parameters, such as environmental conditions, regulation of equipment, ventilation, wetness, viscosity, viscosity control, film-thickness control, or of coats, inherent requirements such as curing and other pertinent factors.
- 5.2.3.5 Field preparation of coating material, such as mixing, activating, and other pertinent factors.
- 5.2.3.6 Health, safety, fire, and all other applicable protective elements.
- 5.2.3.7 Instruments, and their proper use, for relative humidity, temperature, viscosity, and wet film thickness, for detecting holidays, etc.

5.2.4 Qualification of Personnel. All application personnel shall be qualified in accordance with the coating applicator's procedures.

Quality Assurance Documentation.

5.3.1 Receiving, storing, handling, and dispensing of materials shall be appropriately reported. (See Figures 2A, 2B and 3, Section 7.)

5.3.2 Qualification of personnel shall be properly reported. (See Sample Form 1C, Section 7.)

5.3.3 The coating applicator shall report daily on the work performed for each shift for each area of work. This report shall be verified by the owner or his representative. (See Figure 1, Section 7.)

b. Comment:

APPLICATION OF COATING SYSTEMS - This section is not directly applicable to the NSSS vendors as it addresses the site coating Applicator and his response to the Project Specification in relation to the Applicator's written application procedures, qualification of personnel and quality-assurance documentation. Again, GE will respond appropriately to the Project Specification when its requirements are different from our standard procedures for NSSS equipment as outlined herein.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

6. COATING INSPECTION

6.1 Purpose and Scope.

6.1.1 This section defines the quality-assurance requirements for a coating inspection to ensure that the completed coating work meets all requirements of the Project Specification.

6.1.2 The scope includes:

6.1.2.1 Qualification of Coating Inspection Personnel.

6.1.2.2 Scope of Inspection.

6.1.2.3 Dryfilm Thickness of Coatings.

6.1.2.4 Coating Inspection Equipment.

6.1.2.5 Defects and Remedial Actions.

6.1.2.6 Quality-assurance Documentation.

6.2 General

6.2.1 Strictest inspection of the entire coating work is mandatory to achieve the required quality for the completed coating work.

6.2.2 Inspection shall be performed by inspection agencies which shall be responsible for the inspection of all shop and/or field coating work to ensure that the completed coating work conforms to the requirements of the Project Specification.

6.2.3 Inspection agencies shall provide the services of one or more qualified inspectors devoted solely to coating inspection whenever coating work is being performed.

6.2.4 Inspection shall conform to all the applicable requirements of Section 7, Inspection, of ANSI N101.5, and to the further requirements of this section 6 and all other applicable requirements of ANSI N101.4.

6.1 and 2 Alternate Proposal:

This section addresses the independent inspection agencies and their site functions during site coating work to assure compliance with the requirements of the Project Specification. Inspection of coatings at vendor and GE facilities is made by GE-QC personnel in accordance with approved procedures and instructions from our responsible engineering functions. Certificates of compliance, in the form of Product Quality Certifications (copies attached), to engineering specifications, including coating process specifications, are signed off by GE-QC personnel for each piece of equipment before being released for shipment.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

6.3 Qualification of Coating Inspection Personnel.

6.3.1 In addition to the requirements of 2.3.5, the Quality Assurance Program as authorized by the coating inspection agency shall include the requirements for qualifying their inspectors, as well as the specific qualifications of a coating inspector to do the work. These qualifications

6.3 Alternate Proposal:

GE-QC personnel are being sent to industry coating schools to further educate them in inspection techniques and inspection in-

REGULATORY POSITION

(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT3 Qualification of Coating Inspecting Personnel.

6.3.1 In addition to the requirements of 2.3.1.5, the Quality Assurance Program as submitted by the coating inspection agency shall include the requirements for qualifying their inspectors, as well as the specific qualifications of a coating inspector assigned to the work. These qualifications shall include, but not be limited to, inspection experience on work of comparable scope with general coating systems similar to those used for the work in question.

6.3.2 As an additional quality assurance measure, the user may require that before starting work, each assigned coating inspector undergo a training course with the materials to be used for the coating work. The project specification shall state whether this training is required.

4 Scope of Inspection.

6.4.1 The site agreement, as stated in 2.3.2.2, shall be the basis for inspection of the coating work.

6.4.2 Inspection shall be implemented for all phases of the coating work, in the shop and/or in the field, as specified in Section 7 of ANSI N5.0.

6.4.3 The coating manufacturer shall be accorded access to the coating work, in the shop and/or in the field, for the purpose of advising the owner, or his representative, the coating applicator, and the coating inspection agency on all aspects of the coating work.

6.5 Dry-Film Thickness (DFT) of Coatings. The specified dry-film thickness of each coat and of the coating system shall be the thickness at the thinnest part of each coat and of the coating system. The maximum thickness may also be critical and therefore shall not exceed that agreed to by the owner and the coating manufacturer.

6.3 Alternate Proposal:

GE-QC personnel are being sent to industry coating schools to further educate them in inspection techniques and inspection instrumentation. This is a continuing program.

6.4 Alternate Proposal:

Scope of inspection will be those requirements enumerated in the GE process specifications.

6.5 Alternate Proposal:

The test method used for checking dry-film thickness will be SSPC-PA2 and this is a requirement of the GE process specifications.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

Coating Inspection Equipment:

6.4 The coating applicator shall provide a sufficient number of suitable wet-film thickness (WFT) gages so that his personnel may periodically check the thickness of work being applied. The coating inspection agency shall use only gages of the type used with similar WFT gages.

6.5 The coating applicator shall furnish his personnel with a sufficient number of properly calibrated magnetic gages, or other devices approved at the site meeting, for doing the T. Proper calibration of these gages shall be maintained throughout the course of the coating work.

6.6 The coating inspection agency shall furnish its personnel with identical properly calibrated gages and shall maintain proper calibration of these gages throughout the time of the coating work.

6.7 Mutually acceptable certified calibration charts shall be used by both the coating applicator and the coating inspection agency in order to ensure proper and equal results.

6.8 The accepted method of determining film thickness on non-ferrous substrates shall be the DFT measurement. The DFT measurement shall be used for quality purposes only. A setting of the gages for the DFT measurement shall be furnished over the blast cleaned and/or painted surface of the work where the coating work and inspection will be performed.

6.9 The coating inspection agency shall also furnish holiday detectors, scratch gages, and other special inspection equipment according to the agreement reached at the site meeting.

6.10 For concrete and other nonmagnetic substrates, the wet and dry film thickness shall be determined as specified in Section 7 of ANSI N59. Scratch gages may also be used.

6.6 Alternate Proposal:

Coating inspection equipment will be only recognized industry standards.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

6.7 Deviations and Immediate Actions:

6.7.1 Uncorrected deviations from the project specifications shall be reported by the coating inspector to the owner or his representative for appropriate action.

6.7.2 The extent of acceptable or rejectable deviations shall be determined by the work and the normal industry practices.

6.7 Alternate Proposal:

All deviations are reviewed and dispositioned by General Electric's responsible engineering functions acting as the owner's agent.



REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

6. Deviations and Remedial Actions:

6.7.1 Uncorrected deviations from the project specification shall be reported by the coating inspector to the owner or his representative for appropriate action.

6.7.2 The extent of acceptable or rejectable deviations shall also be fully reviewed and agreed to during the site meeting. Correction of deviations or defective work may require that the following typical remedial actions be taken:

6.7.2.1 Major runs or spots shall not be acceptable. If any do occur, they shall be removed, by suitable means, to the bare substrate or to the previously acceptable coat, and then the area shall be recoated. Minor runs or spots that do not affect film quality and/or coating performance may be permissible.

6.7.2.2 Slips and damaged areas shall not be acceptable. Acceptance criteria for holidays shall be as defined in the project specification for various film thicknesses, with the requirements of NACE T-010 as a guide. If any of these deviations or any defective work does occur, as detected visually or by a holiday detector, the defective areas shall be removed, by suitable means, to the bare substrate or to the previously acceptable coat and shall then be recoated.

6.7.2.3 In addition to visual and instrumental inspection of coating work, the owner or his representative and/or the coating inspector shall have the right to periodically remove test areas of coating work shown in the project specification to check coating-system thickness, coating adhesion to substrate, condition of the substrate, etc. It is recommended that the project specification define the approximate extent of this type of inspection. If the results of a number of these test areas indicate unsuitable substrate preparation, condition of substrate or coating interface adhesion, etc., the owner or his representative may then extend the percentage of test areas as required. Any deviations or defective work detected by these tests shall be remedied to the complete satisfaction of the owner.

6. Quality Assurance Documentation:

6.8.1 A written daily coating inspection record shall be submitted by the coating inspection agency. (See Sample Form 5, Section 7.)

6.8.2 Any significant deviations or defective work and recommended corrective action shall be recorded by the coating inspection agency on a coating exception record. (See Sample Form 9, Section 7.)

6.8.3 Acceptance records shall be prepared by the coating inspection agency for approval by the owner. (See Sample Form 10, Section 7.)

6.7 Alternate Proposal:

All deviations are reviewed and dispositioned by General Electric's responsible engineering functions acting as the owner's agent.

6.8 Comments:

Not applicable to the NSSS vendor; addresses site work only.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

7. QUALITY-ASSURANCE DOCUMENTATION

7.1 Purpose and Scope:

7.1.1 Sufficient quality assurance records and documents shall be maintained to furnish evidence of compliance with the specified Quality Assurance Procedures.

7.1.2 The scope includes:

7.1.2.1 Quality Documentation

7. Alternate Proposal:

QUALITY-ASSURANCE DOCUMENTATION - GE specifications, vendor coating procedures, certificates of coating product identity and GE Product Quality Certifications are maintained and/or supplied to the owner in accordance with the overall documented Quality Assurance

the recommended corrective action shall be recorded by the coating inspection agency on a coating inspection record. (See Sample Form 9, section 7.)

7.3.3 Acceptance records shall be prepared by the coating inspection agency for approval by the owner. (See Sample Form 9, section 7.)

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

7. QUALITY-ASSURANCE DOCUMENTATION

7.1 Purpose and Scope.

7.1.1 Sufficient quality assurance records and documents shall be maintained to furnish evidence of compliance with the specified Quality Assurance Procedures.

7.1.2 The scope includes:

7.1.2.1 List of Documentation.

7.1.2.2 Maintenance of Documentation.

7.2 Sample List of Documentation Forms. The records and documents listed in 7.4 through 7.5, and included in this standard, are suggested sample forms which comprise the documentation required for quality assurance. Alternative forms may be used if they provide at least the same degree of documentation.

7.3 Maintenance of Documentation.

7.3.1 Copies of all the listed documentation shall be maintained by the owner or his representative as an integral part of the Quality Assurance Program, as defined in the project specification.

7.3.2 Each of the other parties to the coating work shall also maintain copies of that portion of the documentation applicable to his respective part of the work. These copies shall be maintained for a minimum of five years after completion of the coating work unless otherwise specified in the project specification.

7.3.3 Distribution of documentation shall be specified in the project specification, and appropriate distribution shall be shown on each form.

Record or Document	Sample Form No.	Reference to this standard
7.4 Coating Manufacturer		
7.4.1 Coating Materials—Manufacturer's Product Identity Certification Record	1	3.2.1
7.5 Coating Installer		
7.5.1 Coating Materials—Shipping and Receiving Record	2A	3.4.1
7.5.2 Coating Materials—Warehousing Record	2B	3.4.1

(Continued on page 17)

7. Alternate Proposal:

QUALITY-ASSURANCE DOCUMENTATION - GE specifications, Vendor coating procedures, certificates of coating product identity and GE Product Quality Certifications are maintained and/or supplied to the owner in accordance with the overall documented GE Quality Assurance Program.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

7.6 Coating Apparatus  
7.6.1 Coating Materials



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON D. C. 20555

FIN 049-77

CC: MD Gilbert  
WJ D'Ardenne  
RJ Purillo  
SM Smith

FEB 1 1977

RECEIVED  
FEB - 7 1977  
G. C. SHERWOOD

Docket Nos. NIN 50-531  
and NIN 50-550

General Electric Company  
ATTN: Dr. Glenn G. Sherwood, Manager  
Safety and Licensing Section  
Nuclear Energy Division  
175 Curtner Avenue  
San Jose, California 95114

Gentlemen:

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO REGULATORY  
GUIDE 1.54

We have reviewed the General Electric Company letter dated July 13, 1976 (I. Stuart to D. Skovholt) which describes proposed exceptions to Regulatory Guide 1.54. Our comments are listed below:

1. Alternate proposal 1.2.4 in its present form is not detailed enough to be acceptable. In Standard Review Plan 6.1.2, it is stated that coating system used inside the containment is acceptable if:
  - a) It meets Regulatory Guide 1.54 or equivalent; or, the area covered with the system is a negligible fraction of the containment interior surfaces.
  - b) No adverse interactions with engineered safety features are likely as a result of materials released by radiation decomposition or chemical reaction of the coating system in the containment post-accident environment.

In order for the staff to evaluate the possible effects of non-qualified coating materials in the containment area, it is necessary to know that the quantity involved is less than 100 kilograms. If it exceeds 100 kilograms then the staff needs to know the general location in the containment and the chemical composition or type of coating. When calculating the total weight of non-qualified coating materials, only those components exposed to a 10X environment should be considered also non-qualified coating material that is completely enclosed in a protective enclosure; i.e., insulation material should not be considered

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General Electric Company

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2. Alternate proposal 6.3 needs to be expanded to include the requirement for qualifying inspectors upon the basis of experience and completion of the schooling specified in paragraph 6.3 of the Standard. If the alternate proposal is merely intended to state that GE's inspectors are being trained to meet the qualification requirements of the Standard (6.3), then this should be clearly stated. If different qualification requirements are proposed, these should be specified in detail.
3. Alternate proposal 6.6 is not acceptable in that it does not describe the equipment to be used. The proposal should be modified to either include or reference the equipment identified in GE specification PS0YPI23 Revision 3. This specification references SSIC-PA-2 which should be reviewed for acceptability.

All other alternate proposals or comments are acceptable to the staff.

Sincerely,



S. A. Varney, Chief  
Light Water Reactors  
Branch No. 4  
Division of Project Management

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# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, 175 CURTISS AVE., SAN JOSE, CALIFORNIA 95125  
NC 676, Ext. 5010

February 8, 1977

Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: S. A. Varga, Chief  
Light Water Reactors Branch No. 4  
Division of Project Management

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO  
REGULATORY GUIDE 1.54

Your letter of February 1, 1977 provides NRC staff comments on General Electric Company's proposed exceptions to Regulatory Guide 1.54 previously transmitted to D. Skovholt from I. Stuart on July 13, 1976. Your letter requests additional information pertaining to positions contained in Sections 1.2.4, 6.3 and 6.6. All other alternate positions contained in the July 13 letter are acceptable to the NRC staff.

This letter provides revised positions for Sections 1.2.4, 6.3 and 6.6 that have been discussed with members of the NRC staff and thus provides the basis for generic resolution of this matter.

Regarding Section 1.2.4, the General Electric Company will provide by April 29, 1977 additional information regarding the quantity of unqualified coating materials for NSSS equipment located within the containment. If appropriate, information regarding the general location within the containment and the chemical composition or type of protective coating will also be identified. Since the amount of unqualified coating material is felt to be significantly small, General Electric believes that no adverse interactions with engineered safety features will occur as a result of materials released by radiation decomposition or chemical reaction of the protective coating due to the postulated post accident environment.

NUCLEAR ENERGY

SYSTEMS DIVISION

BWR PROJECTS DEPARTMENT

RFN-055-77

Letter No. 781-022-77

Docket Nos. STN 50-531  
STN 50-550

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GENERAL ELECTRIC

Office of Nuclear Reactor Regulation  
Page 2  
January 8, 1977

Regarding Section 6.3, GE revises the alternate position to read:

"General Electric-QC personnel are being sent to industry coating schools to further educate them in inspection techniques and inspection instrumentation. This is a continuing program. Successful completion of the schooling serves as a basis for inspector qualification."

Regarding Section 6.6, General Electric is in compliance with this section and thus deletes comments for this section.

Sincerely,

*for* *Glenn G. Sherwood*  
Glenn G. Sherwood, Manager  
Safety and Licensing

GGs:SWS:esc/BI, 83

cc: W. R. Shelton  
W. Kane (RSC)  
J. F. Quirk  
L. S. Gifford (GE-BETH)

GENERAL

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# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, 175 CURTISS AVE., SAN JOSE, CALIFORNIA 95125  
RC 676, Ext. 5040

April 18, 1977

Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: S. A. Varga, Chief  
Light Water Reactors Branch No. 4  
Division of Project Management

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO  
REGULATORY GUIDE 1.54

- Reference:
1. Letter from G. G. Sherwood to S. A. Varga, dated February 8, 1977, same subject.
  2. Letter from I. F. Stuart to D. J. Skovholt, dated July 13, 1976, same subject

As a followup to our letter of February 1977 (Ref. 1), attached is additional information regarding the quantity of unqualified coating materials for NSSS equipment located within the containment. The amount of unqualified coating material is shown to be negligible; thus, no adverse interactions with engineered safety features will occur as a result of materials released by radiation decomposition or chemical reaction of the protective coating due to the postulated post accident environment.

The General Electric Company believes the above information in conjunction with the information contained in References 1 and 2 fully addresses NRC considerations and establishes an adequate basis for acceptance of the GE alternate position of Regulatory Guide 1.54.

Very truly yours,

*Glenn G. Sherwood*  
Glenn G. Sherwood, Manager  
Safety and Licensing

CGS:daj/B7

Attachment

cc: W. F. Kane (RM)  
I. S. Gifford

NUCLEAR ENERGY

SYSTEMS DIVISION

NRC PROJECTS DEPARTMENT

WH-155-77

Letter No. 761-02-77

Docket Nos. STN 50-531  
SII 50-550

bcc: W. R. Shelton  
D. C. Ditmore  
J. F. Quirk  
K. A. Probstle  
Sr. Section Chief

ENERGY  
DIVISION

PROJECTS DEPARTMENT

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No. 781-02-77

Nos. STN 50-531  
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cc: **306** P. Shelton  
C. Diltmore  
F. Quirk  
A. Probstle  
Subsection 1,rs.

ATTACHMENT

<u>Equipment Description</u>	<u>Unqualified Paint Weight, lbs.</u>
Reactor Recirc System	
Hydraulic Power Unit	6.94
CRD Hydraulic System	
Hydraulic Control Units	6.0
Valves	0.74
Standby Liquid Control System	
Test Tank (Legs)	0.09
Heaters (Junction Boxes)	0.05
Refueling Equipment	
Refueling Platform	4.3
Auxiliary Platform	1.73
Inclined Fuel Transfer System	
Winch	0.42
Reactor Water Cleanup System	
Reactor Water Sample Station	0.37
RWCU-Filter/Demineralizer System	
Valves	1.88

daj/88



# GENERAL ELECTRIC

NUCLEAR ENERGY

SYSTEMS DIVISION

BWR PROJECTS DEPARTMENT

GENERAL ELECTRIC COMPANY, 175 CURTISS AVENUE, SAN JOSE, CALIFORNIA 95125  
MAIL CODE 635 PHONE (408) 297-3000 TWX No. 910-325-0110

Letter No. 780-264-76

July 17, 1976

Office of Nuclear Reactor Regulation  
ATTN: Mr. D.J. Skovholt, Assistant Director  
Quality Assurance and Operations  
Division of Project Management  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUBJECT: GENERAL ELECTRIC COMPANY'S ALTERNATE POSITION TO THE USNRC  
REGULATORY GUIDE 1.54, "QUALITY ASSURANCE REQUIREMENTS FOR  
PROTECTIVE COATINGS APPLIED TO WATER-COOLED NUCLEAR POWER  
PLANTS", JUNE 1973

Dear Mr. Skovholt:

General Electric as a nuclear steam supply system vendor has had broad quality assurance programs in place for many years in its own manufacturing facilities, as well as outside equipment vendors' facilities. Since the issuance of Regulatory Guide 1.54, which imposes all the requirements of ANSI N101.4, these same GE quality assurance programs have been broadened to include the engineering requirements for qualified coatings on NSSS equipment as outlined in the GE process specifications (copies attached) and the reporting of these quality control checks in the already existing GE Product Quality Certification forms (copies attached). These GE process specifications fully describe the requirements for cleanliness of the substrate, the degree of blast as well as the blast profile, application and curing in accordance with the paint manufacturer's recommended procedures, the dry film thickness and the requirement for certifications from the paint manufacturer for each batch of paint used by the equipment manufacturer.

The General Electric Company considers its adaptation of the controls for coating class 1 equipment (equipment located within the containment facility), as implemented at our manufacturing facilities (both GE and equipment vendor), to be an adequate basis for complying with the pertinent quality assurance requirements of 10 CFR 50, Appendix B. These controls as established by General Electric's Quality Assurance Programs are represented in the attached General Electric Alternate Position to the USNRC Regulatory Guide 1.54. The GE Alternate Position is applicable to NSSS equipment for the General Electric BWR/6 design. Since the NRC Regulatory Guide 1.54 involves the requirements of ANSI N101.4 - 1972 in total, this review follows the text of that document. General Electric will be in compliance with those sections of ANSI N101.4 - 1972 not specifically referenced in the following pages:

D.J. Skovholt

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REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

1.2.2.1 Class I service level applies to those systems and components of nuclear facilities which are essential (1) to prevent postulated accidents which could affect the public health and safety or (2) to mitigate the consequences of these accidents. The quality assurance for Class I service level shall conform to the requirements of this standard.

1.2.2.1 Alternate Proposal:

Class I service level applies to equipment installed within the containment structure and for which a potential pathway for coating debris to the emergency cooling water pools exist. The quality assurance for Class I service level shall conform to the requirements of this standard and the acceptable alternates as enumerated herein.

Rationale:

Equipment function is secondary to location with regard to coating failures. For example, failure of a coating on ECCS equipment located outside the containment facility or located inside the containment facility for which there is no pathway for coating debris to the emergency-cooling water pools, does not jeopardize that equipment's function. Coating failure on equipment in the containment facility, for which there is a pathway for coating debris to get into the emergency-cooling water pools, regardless of function, has the possibility of jeopardizing the availability of these water supplies.

1.2.2.2 Class II service level applies to those systems and components of nuclear facilities which are essential to the attainment of the intended normal operating performance. The quality assurance and/or documentation for Class II service level is not mandatory and shall be used only to the extent required by the project specification.

1.2.2.2 Alternate Proposal:

For all equipment not classified as Class I in 1.2.2.1 compliance with this standard is not mandatory and shall be used only to the extent required by the equipment specification.

Rationale:

Same as 1.2.2.1.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

1.2.4 Because of the impracticability of imposing all the requirements of this standard on certain specific items (requiring only a small quantity of coating material), the

1.2.4 Alternate Proposal:

Because of the impracticability of imposing all of the requirements of this standard on certain

coating a powder, and the coating inspection agency. This program shall also include qualification criteria and individual Quality Assurance Programs which meet the requirements stated in 2.3.2 through 2.3.5.

coating inspection agency" likewise is our own Quality Control personnel, both in our own manufacturing facilities and at our outside equipment vendors' shops.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.2 Qualification Criteria. The qualifications of the coating materials, the coating manufacturer, the coating applicator, and the coating inspection agency shall be evaluated by the owner or his representative on the basis of the criteria stated in Sections 2.3.3 through 2.3.5.

2.3.2 Alternate Proposal:

Evaluation of these criteria by GE is to the extent as listed below for the individual requirements.

2.3.3.1 All coating materials shall meet the applicable requirements of ANSI N59 and ANSI N101.2 to the extent defined in the project specification.

2.3.3.1 Alternate Proposal:

Coating materials are selected on the basis of applicable requirements of ANSI N512 and N101.2 for EMB/6 criteria. GE will respond to special Project specifications as appropriate.

2.3.3.2 The coating manufacturer shall furnish a Quality Assurance Program which shall describe his current practices for quality control of the specified coatings.

2.3.3.2 Comment:

Not directly applicable to the NSSS vendor. (See paragraph 3.2. comment.)

2.3.3.3 The coating manufacturer shall furnish a description of his technical and field service capabilities.

2.3.3.3 Comment:

Not directly applicable to the NSSS vendors.

2.3.3.4 The coating manufacturer shall furnish application procedures for each coating system on each substrate for each method of application as covered by the project specification. This shall include the maximum and minimum ambient conditions at which application can be properly made.

2.3.3.4 Comment:

Not directly applicable to the NSSS vendors. However, GE reviews vendors' coating procedures against the coating manufacturers' application recommendations.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

2.3.3.5 The coating manufacturer shall furnish a description

2.3.3.5

REGULATORY POSITION  
(TEXT OF ANS1 N101.4-1972)

GE ALTERNATE OR COMMENT

2.5 *Conditions of Work.* To ensure that the purpose of this standard and the requirements of the project specification are met, it is essential to comply with the following conditions of work:

2.5.1 During the bid period for the coating work and also before the awarding of the contract, all parties to the coating bid or the coating contract should understand the conditions of work in the shop and/or in the field including all interface relationships and responsibilities. (This understanding may be achieved by a meeting of bidders at the project site during the bid period.)

2.5.2 Before the start of the coating work in the shop and/or in the field, there shall be a shop meeting and a site meeting as required by the owner or his representative of the owner, coating manufacturer, coating contractor, and coating inspection agency or their representatives.

2.5.2.1 At this meeting, an agreement shall be made as to the interpretation of standards of acceptance or rejection of the coating work. Each phase of the work, such as receipt and storage of coating materials, equipment to be used, preparation of substrates and/or previously painted surfaces, application of each coat of the coating system, degree and extent of inspection, etc., shall be specifically reviewed.

2.5.2.2 Also at this meeting a field demonstration of surface preparation and coating application shall be conducted and an agreement shall be reached regarding conformance with the project specification.

2.5.2.3 The agreement reached at the site shall be prepared in a quality control document by the owner or his representative and shall constitute the basis for inspection by the coating inspection agency and for acceptance or rejection of each phase of the coating work.

2.5 Comment:

Since the NSSS supplier is not normally involved in the contract negotiations between the owner or his representative and the site applicator, this section is not applicable to the NSSS suppliers. Response to special project specification requirements by the owner would be through the owner-NSSS supplier contract.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

3.3.2 The owner or his representative shall maintain a materials-control program to ensure the identity of the coating material as received and as applied. (See Section 5.)

3.3.3 The application of all items of a materials control program to ensure the identity of the coating materials as received and as applied, to ensure that the coating materials have not been adulterated or diluted in any manner from the coating manufacturer's written recommendations, and to assure that no materials which have exceeded their recommended shelf life are applied without authorization by the owner or his representative. (See Section 5 and Sample Parts C and G, Section 7.)

3.4 Labeling of Materials. Each container shall be labeled with the product designation. The label or container shall bear a batch number or other factory marking, permanently affixed, showing the individual lot or batch designation. If the batch number or other factory marking does not incorporate the date of manufacture, the date shall appear separately on the label or container.

3.5 Sample Retention. Retained batch samples from products finished for the work shall be kept by the coating manufacturer for the stated shelf life but no longer than two years from date of manufacture.

3.3.2 and 3 Alternate Proposal:

GE's Quality Assurance Program requires our own manufacturing facilities and our vendors to establish and maintain an adequate materials control program. Periodic scheduled audits of these programs are performed.

3.4 Comment:

Not directly applicable to NSSS vendors. Applicable to the coating manufacturer and verified during GE audit of the coating manufacturer.

3.5 Comment:

Not applicable to the NSSS vendors. Applicable to the coating manufacturer and verified during GE audit of the coating manufacturer.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

3.6 Performance Verification of Shopman for Field-applied Coatings Systems.

3.6 Alternate Proposal:

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

4.1 Conformance with the Specified Requirements.

4.1.1 The surface preparation of substrates or of previously painted and cured shall conform to the applicable requirements of ANSIS 9.1 and/or ANSI N101.2 and to the requirements of the project specification.

4.1.2 Surface preparation directed to the requirements of ANSI N101.2, which stipulate that any concrete curing agents or hardeners or pigments shall be compatible with subsequent painting systems. If a material is in the typical listing of release contained shall be included for all concrete surfaces in Uncoated Areas Area even though the surface is not to be painted. This shall be the responsibility of the contractor who performs the concrete work and shall be supplied to the owner or his representative (for example, see 1.4, Item 1, Section 7.)

4.1.3 The project specification shall include requirements for all substrates, including previous painted surfaces, to be treated. These requirements shall include and shall be in accordance with the following:

4.2.1 Maximum surface moisture of steel substrates.

4.2.2 Condition of concrete substrates, such as laitance, surface laitance, curing compounds, or other deleterious matter.

4.2.3 Surface condition of concrete substrates and the time interval required.

4.2.4 Condition of steel substrates, such as pickling treatment of steel substrates to be used.

4.2.5 Atmospheric conditions to be used.

4.2.6 Surface temperature of substrates.

4.2 Alternate Proposal:

Requirements for surface preparation of substrates are contained in the coating specifications applied to the equipment and is limited to steel substrates. Since CM's coatings are all shop applied, quality assurance programs cover cleanliness, degree of blast, blast profile and dry film thickness.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

OR ALTERNATE OR COMMENT

4.3 Control of moisture on surface of steel substrates.

4.3 Comments:

Purpose and Scope.

5.1.1 This system defines the quality-assurance requirements necessary for compliance with this standard in a manner consistent with the design-performance requirements of the contract documents.

5.1.2 The scope includes:

- 5.1.2.1 Application Procedures.
- 5.1.2.2 Qualification of Personnel.
- 5.1.2.3 Quality-assurance Documentation.

Application Procedures.

5.2.1 The coating applicator shall submit written application procedures for applying each coating system on each surface of each previously coated surface.

5.2.2 These application procedures shall be approved by the coating applicator, the coating manufacturer, and the owner or his representative.

5.2.3 These application procedures shall provide information as follows:

- 5.2.3.1 Qualification of application personnel.
- 5.2.3.2 Receiving, storing, handling, and dispensing of coating materials.
- 5.2.3.3 Application equipment.
- 5.2.3.4 Application parameters, such as environmental conditions, regulation of equipment, ventilation, heat, viscosity, viscosity control, thickness control, and solvent evaporation such as curing and environmental factors.
- 5.2.3.5 Field preparation of coating material, such as blending, activating, and other pertinent factors.
- 5.2.3.6 Health, safety, fire, and all other applicable requirements.

5.2.3.7 Instruments, and their proper use, for regulation of humidity, temperature, viscosity, and wet film thickness, for detecting holidays, etc.

5.2.3.8 All application personnel shall be in accordance with the coating applicator's procedures.

Quality-assurance Documentation.

5.3.1 Receiving, storing, handling, and dispensing of coating materials shall be appropriately reported. (See Part 1.2.4, 2.8 and 3. Section 7.)

5.3.2 Qualification of personnel shall be properly reported. (See Sample Form 4C, Section 7.)

5.3.3 The coating applicator shall report daily on the work performed for each area of work. This report shall be verified by the owner or his representative.

b. Comment:

APPLICATION OF COATING SYSTEMS - This section is not directly applicable to the NSSS vendors as it addresses the site coating Applicator and his response to the Project Specification in relation to the Applicator's written application procedures, qualification of personnel and quality-assurance documentation. Again, GE will respond appropriately to the Project Specification when its requirements are different from our standard procedures for NSSS equipment as outlined herein.

REGULATORY POSITION

(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT6.2 Qualification of Coating Inspection Personnel

6.2.1 In addition to the requirements of 2.1, the Quality Assurance Program as initiated by the coating inspection agency shall include the requirements for qualifying the inspectors, as well as the specific specifications of a coating inspector assigned to the work. These qualifications shall include, but not be limited to, inspector experience for work at comparable scope with generic coating systems similar to those used for the work in question.

6.2.2 As an additional quality assurance measure, the owner may require that before starting work, each assigned coating inspector undergo a training course with the materials to be used for the coating work. The project specification shall state whether this training is required.

6.4 Scope of Inspection

6.4.1 The site agreement, as stated in 2.5.2.3, shall be a basis for inspection of the coating work.

6.4.2 Inspection shall be implemented for all phases of coating work, in the shop and/or in the field, as specified in Section 7 of ANSI N50.

6.4.3 The coating manufacturer shall be accorded access to the coating work, in the shop and/or in the field, for the purpose of advising the owner or his representative, the coating contractor, and the coating inspection agency on all aspects of the coating work.

5 Dry-Film Thickness (DFT) of Coatings. The specified minimum thickness of each coat and of the coating system shall be the thickness at the thinnest part of each coat and of the coating system. The maximum thickness may also be critical and therefore shall not exceed that agreed to by the owner and the coating manufacturer.

6.3 Alternate Proposal:

GE-QC personnel are being sent to industry coating schools to further educate them in inspection techniques and inspection instrumentation. This is a continuing program.

6.4 Alternate Proposal:

Scope of inspection will be those requirements enumerated in the GE process specifications.

6.5 Alternate Proposal:

The test method used for checking dry-film thickness will be SSPC-PA2 and this is a requirement of the GE process specifications.

REGULATORY POSITION

(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT



REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

6.7 Deviations and Remedial Actions:

6.7.1 Uncorrected deviations from the project specifications shall be reported by the coating inspector to the owner or his representative for appropriate action.

6.7.2 The extent of acceptable or rejectable deviations and/or defective work, and the remedial action required, shall also be fully reviewed and approved during the site meeting. Correction of deviations or defective work may require that the following typical remedial actions be taken:

6.7.2.1 Major runs or says shall not be acceptable. If any do occur, they shall be removed, by suitable means, to the bare substrate or to the previously acceptable coating, and the area shall be recoated. Minor runs or says that do not affect film quality and/or coating performance may be permissible.

6.7.2.2 Skips and damaged areas shall not be acceptable. Acceptance criteria for holidays shall be as defined in the project specification for various film thicknesses, with the requirements of NACE T417 as a guide. If any of these deviations or nondefective work does occur, as detected visually or by a holiday detector, the defective area shall be removed, by suitable means, to the bare substrate or to the previously acceptable coating and shall then be recoated.

6.7.2.3 In addition to visual and instrumental inspection of coating work, the owner or his representative shall require the coating inspector shall have the right to periodically remove test areas of coating work down to the bare substrate to check coating-system thickness, coating adhesion to the substrate, condition of the substrate, etc. It is recommended that the project specification define the approximate extent of this type of inspection. If the results of a number of test areas indicate unsuitable substrate preparation, loss of substrate or coating material adhesion, etc., the owner or his representative may then extend the percentage of test areas as required. Any deviations or defective work identified by these tests shall be remedied to the complete satisfaction of the owner.

6.8 Quality Assurance Documentation:

6.8.1 A written daily coating-inspection record shall be maintained by the coating-inspection agency. (See Sample Form 8, Section 7.)

6.8.2 Any significant deviations or defective work and the recommended corrective action shall be recorded by the coating-inspection agency on a coating-inspection record. (See Sample Form 9, Section 7.)

6.8.3 Acceptance records shall be prepared by the coating-inspection agency for approval by the owner. (See Sample Form 10, Section 7.)

6.7 Alternate Proposal:

All deviations are reviewed and dispositioned by General Electric's responsible engineering functions acting as the owner's agent.

6.8 Comment:

Not applicable to the HSSS vendor; addresses site work only.

REGULATORY POSITION  
(TEXT OF ANSI N101.4-1972)

GE ALTERNATE OR COMMENT

7. QUALITY ASSURANCE DOCUMENTATION

7.1 Purpose and Scope:

7.1.1 Sufficient quality-assurance records and documents shall be maintained to furnish evidence of compliance with the specified Quality Assurance Procedures.

7.1.2 The scope includes:

7.1.2.1 Documents in a

7. Alternate Proposal:

QUALITY-ASSURANCE DOCUMENTATION - GE specifications, vendor coating procedures, certificates of coating product identity and GE Product Quality Certifications are maintained and/or supplied to the owner in accordance with the overall documented Quality Assurance



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

WUN 049-77

CC: WD Gilbert  
LH D'Ardenne  
RJ Morillo  
SW Smith

FEB 7 1977

RECEIVED  
FEB - 7 1977  
G. G. SHERWOOD

Letter Nos. SIN 50-531  
and SIN 50-550

General Electric Company  
ATTN: Dr. Glenn G. Sherwood, Manager  
Safety and Licensing Section  
Nuclear Energy Division  
175 Curtner Avenue  
San Jose, California 95114

Gentlemen:

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO REGULATORY  
GUIDE 1.54

We have reviewed the General Electric Company letter dated July 13, 1976  
(I. Stuart to D. Skovholt) which describes proposed exceptions to  
Regulatory Guide 1.54. Our comments are listed below:

1. Alternate proposal 1.2.4 in its present form is not detailed enough  
to be acceptable. In Standard Review Plan 6.1.2, it is stated that  
coating system used inside the containment is acceptable if:
  - a) It meets Regulatory Guide 1.54 or equivalent; or, the area  
covered with the system is a negligible fraction of the  
containment interior surfaces.
  - b) No adverse interactions with engineered safety features are  
likely as a result of materials released by radiation decom-  
position or chemical reaction of the coating system in the  
containment post-accident environment.

In order for the staff to evaluate the possible effects of non-qualified  
coating materials in the containment area, it is necessary to know that  
the quantity involved is less than 100 kilograms. If it exceeds 100  
kilograms then the staff needs to know the general location in the con-  
tainment and the chemical composition or type of coating. When calcu-  
lating the total weight of non-qualified coating materials, only those  
components exposed to a LOCA environment should be considered also non-  
qualified coating material that is completely enclosed in a protective  
enclosure; i.e., insulation material should not be considered.

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- 2. Alternate proposal 6.3 needs to be expanded to include the requirement for qualifying inspectors on the basis of experience and completion of the schooling specified in paragraph 6.3 of the Standard. If the alternate proposal is merely intended to state that GE's inspectors are being trained to meet the qualification requirements of the Standard (6.3), then this should be clearly stated. If different qualification requirements are proposed, these should be specified in detail.
- 3. Alternate proposal 6.6 is not acceptable in that it does not describe the equipment to be used. The proposal should be modified to either include or reference the equipment identified in GE specification P-00P123 Revision 3. This specification references SAC-PA-2 which should be reviewed for acceptability.

All other alternate proposals or comments are acceptable to the staff.

Sincerely,

*S. A. Vais*  
S. A. Vais, Chief  
Light Water Reactors  
Branch No. 4  
Division of Project Management

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, 175 CURTISS AVE., SAN JOSE, CALIFORNIA 95125  
HC 676, Ext. 5010

NUCLEAR ENERGY

SYSTEMS DIVISION

BWR PROJECTS DEPARTMENT

MFN-055-77

Letter No. 781-022-77

February 8, 1977

Docket Nos. STN 50-531  
STN 50-550

Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: S. A. Varga, Chief  
Light Water Reactors Branch No. 4  
Division of Project Management

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO  
REGULATORY GUIDE 1.54

Your letter of February 1, 1977 provides NRC staff comments on General Electric Company's proposed exceptions to Regulatory Guide 1.54 previously transmitted to D. Skovholt from I. Stuart on July 13, 1976. Your letter requests additional information pertaining to positions contained in Sections 1.2.4, 6.3 and 6.6. All other alternate positions contained in the July 13 letter are acceptable to the NRC staff.

This letter provides revised positions for Sections 1.2.4, 6.3 and 6.6 that have been discussed with members of the NRC staff and thus provides the basis for generic resolution of this matter.

Regarding Section 1.2.4, the General Electric Company will provide by April 29, 1977 additional information regarding the quantity of unqualified coating materials for NSSS equipment located within the containment. If appropriate, information regarding the general location within the containment and the chemical composition or type of protective coating will also be identified. Since the amount of unqualified coating material is felt to be significantly small, General Electric believes that no adverse interactions with engineered safety features will occur as a result of materials released by radiation decomposition or chemical reaction of the protective coating due to the postulated post accident environment.

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NUCLEAR ENERGY  
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GENERAL ELECTRIC

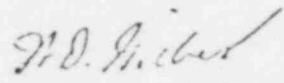
Office of Nuclear Reactor Regulation  
Page 2  
January 8, 1977

Regarding Section 6.3, GE revises the alternate position to read:

"General Electric-QC personnel are being sent to industry coating schools to further educate them in inspection techniques and inspection instrumentation. This is a continuing program. Successful completion of the schooling serves as a basis for inspector qualification."

Regarding Section 6.6, General Electric is in compliance with this section and thus deletes comments for this section.

Sincerely,

*for*   
Glenn G. Sherwood, Manager  
Safety and Licensing

GGs:SWs:csc/81, 83

cc: W. R. Shelton  
W. Kane (NRC)  
J. F. Quirk  
L. S. Gifford (GE-BETH)

GENERAL

*for*

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, 175 CURTISS AVE., SAN JOSE, CALIFORNIA 95125  
RC 676, Ext. 5040

April 18, 1977

Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: S. A. Varga, Chief  
Light Water Reactors Branch No. 4  
Division of Project Management

SUBJECT: GENERAL ELECTRIC COMPANY PROPOSED EXCEPTIONS TO  
REGULATORY GUIDE 1.54

- Reference:
1. Letter from G. G. Sherwood to S. A. Varga, dated February 8, 1977, same subject.
  2. Letter from I. F. Stuart to D. J. Skovholt, dated July 13, 1976, same subject

As a followup to our letter of February 1977 (Ref. 1), attached is additional information regarding the quantity of unqualified coating materials for NSSS equipment located within the containment. The amount of unqualified coating material is shown to be negligible; thus, no adverse interactions with engineered safety features will occur as a result of materials released by radiation decomposition or chemical reaction of the protective coating due to the postulated post accident environment.

The General Electric Company believes the above information in conjunction with the information contained in References 1 and 2 fully addresses NRC considerations and establishes an adequate basis for acceptance of the GE alternate position of Regulatory Guide 1.54.

Very truly yours,

*Glenn G. Sherwood*  
Glenn G. Sherwood, Manager  
Safety and Licensing

GGG:daj/87

Attachment

cc: W. F. Kane (NRs)  
I. S. Gifford

NUCLEAR ENERGY

SYSTEMS DIVISION

ENR PROJECTS DEPARTMENT

NRN-155-77

Letter No. 701-02-77

Docket Nos. SIN 50-531  
SIN 50-550

cc: W. R. Shelton  
D. C. Nitrore  
J. F. Quirk  
W. A. Probstle  
S. [unclear]

ENERGY  
PROJECTS DEPARTMENT

-77  
No. 781-02-77

Nos. SIN 50-531  
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W. R. Shelton  
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S&L Subsection Pers.

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...TACH...

Equipment Description

Unqualified Paint  
Weight, lbs.

Reactor Recirc System

Hydraulic Power Unit

6.94

CRD Hydraulic System

Hydraulic Control Units

6.0

Valves

0.74

Standby Liquid Control System

Test Tank (Legs)

0.09

Heaters (Junction Boxes)

0.05

Refueling Equipment

Refueling Platform

4.3

Auxiliary Platform

1.73

Inclined Fuel Transfer System

Winch

0.42

Reactor Water Cleanup System

Reactor Water Sample Station

0.37

RWCU-Filter/Demineralizer System

Valves

1.88

daj/88

EXHIBIT I

John S. Wiley

Professional Qualifications

My present job in the General Electric Nuclear Energy Division is Manager of the Chemical and Radiological Methods Unit. This unit has the responsibility for several BWR requirements documents including water quality, cleaning and sampling. I have been employed in the Nuclear Energy Division since 1965 and have been a Unit Manager since 1971.

My education resulted in BS, MS and PhD degrees in Chemical Engineering from Iowa State University; the last degree was granted in 1954. Following graduation I served as a Nuclear Research Officer in the US Air Force and attended the Oak Ridge School of Reactor Technology, graduating in 1957. After a year's work at Glenn L. Martin I accepted employment with Combustion Engineering, and was employed as a staff engineer responsible for the thermal-hydraulic design of several power reactors.

I am a registered Professional Engineer in Florida (Chemical Engineering) and California (Nuclear Engineering).



## EXHIBIT II

William R. Shelton

### Professional Qualifications

I am a Senior Engineer in the Materials Application group of the Nuclear Power Systems Engineering Department at General Electric. I am Program Manager for all materials specifications and setting the technical criteria for materials used in the nuclear steam supply systems and for those materials that are allowed to contact austenitic stainless steels both during manufacture and also installation.

I received an Electrical Engineering degree in 1944 from Oregon State University and have taken advanced degree work in Metallurgical Engineering at Rensselaer Polytechnic Institute.

From 1944 to 1947 I was on the GE test program and other programs for graduate engineers. From 1947 until 1955 I was in materials engineering work at the GE Schenectady Materials and Processes Laboratory. From 1955 to 1968 I was in the GE Corporate, staff engineering division having responsibility for all corporate specifications for steels, reactive and refractory metals and doing consulting work in that area.

Since 1968 I have been in materials engineering for the Nuclear Engineering Division. I have served on many national committees such as the USA National Committee for the International Standardization of Steel, was chairman of the American National Standards Institute Committee B32, served on the American Society for Testing and Materials Committee, A1 and A10 on steels, B10 on reactive and refractory metals and most recently ASTM D33 on coatings for Nuclear and Power Generation Facilities.