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April 28, 1994 52-001

BY HAND

Mr. Dennis Crutchfield
Associate Director for Advanced Reactors
and License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Crutchfield:

We understand from prior discussions that the NRC staff is currently developing a draft Environmental Assessment for the proposed rulemaking on the ABWR design certification application. In view of the staff's drafting focus on the ABWR as the lead certification application, we have prepared on GE's behalf and are enclosing for the staff's consideration a draft "Notice of Issuance of Environmental Assessment And Draft Finding of No Significant Impact", together with a supporting draft Environmental Assessment, for the ABWR design certification rulemaking. GE has previously transmitted to the staff a Technical Support Document (TSD) providing assessments of SAMDAs, severe accident prevention measures and radiological impacts from normal operation for the ABWR, in support of the treatment of those NEPA issues in the planned unitary rulemaking proceeding for ABWR design certification. (Ref: Letter from J.F. Quirk to J.N. Wilson dated August 26, 1993). While both the current and earlier submittals deal with the ABWR design certification, their contents reflect input from the other design certification applicants and from the Nuclear Energy Institute.

We are advised that the staff may wish to combine the draft Environmental Assessment and its report on the NEPA/SAMDA issues in a single issuance, and this may be an efficient way to address both matters. In any event, we share with the staff the

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desire to reach an early NRC determination on the form and content of the NEPA issuance. As the staff has recognized, given the time involved in the process of circulating its NEPA issuance for agency and public comment, there is a need to initiate that process no later than -- and preferably in advance of -- the notice of proposed rulemaking on the design certification rule. With that in mind, we stand ready to answer any staff questions on the enclosed draft and GE's TSD submittal of August 26, 1993, and we urge a meeting with the staff at an early date to facilitate an NRC determination on the form, content and timing of its NEPA issuance.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden

Encls.
cc: Dino Scaletti (w/Encl.)
Martin Malsch (w/Encl.)

DRAFT
4/27/94

UNITED STATES NUCLEAR REGULATORY COMMISSION

APPLICATION OF GENERAL ELECTRIC COMPANY FOR ISSUANCE

OF A DESIGN CERTIFICATION RULE FOR THE

ADVANCED BOILING WATER REACTOR

DOCKET NO. 52-001

NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT

AND DRAFT FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC or Commission) is considering whether to issue a design certification for the Advanced Boiling Water Reactor (ABWR) in the form of a rule amending 10 CFR Part 51 and Part 52. An environmental assessment (EA) of this proposed rule has been prepared pursuant to the National Environmental Policy Act (NEPA) and NRC's regulations in 10 CFR Part 51. Under NEPA and 10 CFR Part 51, the NRC must consider, as an integral part of its decisionmaking process on a proposed action, the expected environmental impacts of promulgating a rule and reasonable alternatives to the action. The Commission has preliminarily determined that this rule is not a major Federal action significantly affecting the quality of human environment. The Commission has therefore preliminary determined not to prepare an environmental impact statement (EIS) for this action.

IDENTIFICATION OF PROPOSED ACTION

The proposed action would amend Part 52 to certify the ABWR standard design. This amendment would enable future applications for a combined license (COL) under Part 52 or for a construction permit (CP) or operating license (OL) under 10 CFR Part 50 to reference the ABWR design certification without the need for any further regulatory review or approval of the ABWR standard design. In addition, the amendment to Part 52 would codify the Commission's conclusions that all reasonable design features have been considered to reduce the radiological impacts from normal operations and severe accidents involving plants that reference the ABWR design certification, and that further consideration of such matters (including alternative design features) shall not be performed for licensing of such plants.

SUMMARY OF ENVIRONMENTAL ASSESSMENT

No environmental impacts would result from issuance of the proposed amendment to Part 52 certifying the ABWR design. The amendment, if adopted, would codify the results of both the extensive review and approval of the ABWR design by the NRC that have preceded issuance of the proposed rule, and the results of the ensuing rulemaking proceeding, thus permitting later license applicants to reference the approved design in their applications. Nothing in the amendment, however, would authorize the construction or operation of plants of ABWR design, or the issuance of a CP, OL, or COL. Without separate NRC authorization

to construct and operate a plant of ABWR design -- itself a major federal action for which an EIS must be prepared -- no environmental impacts could be generated.

Alternatives to use of a unitary design certification rulemaking proceeding were considered. Such alternatives include resolution of environmental and safety issues in separate rulemaking proceedings, and use of licensing proceedings rather than a rulemaking proceeding. Adoption of these alternatives would not result in a reduction in the environmental impacts attributable to the ABWR. The choice of the regulatory process for review of a design should not affect the impacts resulting from use of the design.

Evaluations were performed for design alternatives to reduce the radiological impacts from normal operation and severe accidents involving plants of ABWR design as described in the documents referenced hereinafter. There are no reasonable alternatives for reducing these impacts. Non-radiological impacts of operation are largely dependent upon site-specific characteristics and design features that are outside the scope of the ABWR standard design. These non-radiological impacts, and alternatives for reducing these impacts, will be evaluated as part of the review of applications for a CP, OL, or COL for individual plants of ABWR design.

REQUEST FOR COMMENTS

The Commission is requesting comments on this draft finding of no significant impact and the associated environmental assessment. Any comments should be submitted in accordance with the procedures described in the proposed rule for design certification of the ABWR. See 59 Fed. Reg. ___ (_____, 1994).

For further details with respect to this action, see (1) ABWR Standard Safety Analysis Report, (2) [ABWR FSER], (3) letter dated August 26, 1993, from Joseph F. Quirk (GE) to NRC, attaching "Technical Support Document for Amendment to 10 CFR Part 51 Considering Severe Accidents under NEPA for Plants of ABWR Design," (4) [Environmental Survey], and (5) [Environmental Assessment]. These documents are available for public inspection at the Commission's Public Document Room, 2120 L Street, N.W., Washington, DC 20037.

DRAFT
4/27/94

Environmental Assessment

By the Office of Nuclear Reactor Regulation

of the Nuclear Regulatory Commission

Relating to Issuance of a Design Certification Rule

for the Advance Boiling Water Reactor (ABWR)

Applicant: General Electric Company

Docket No. 52-001

1.0 Introduction

1.1 Purpose and Organization

The General Electric Company (GE) has applied to the Nuclear Regulatory Commission (the Commission or NRC) for certification of its Advanced Boiling Water Reactor (ABWR) design. Certification would be accomplished in a rulemaking proceeding which would amend 10 C.F.R. Part 52 to certify the ABWR design in accordance with the procedures set forth in Part 52, Subpart B.

In fulfillment of its responsibilities under the National Environmental Policy Act (NEPA) as set forth in 10 CFR Part 51, the NRC must consider the impacts on the environment of issuing this amendment to its regulations. In particular, pursuant to § 51.21, the NRC must prepare an Environmental Assessment (EA) which forms the basis for either a Finding of No Significant Impact (FONSI) or a determination to prepare an Environmental Impact Statement (EIS). Section 51.30 requires an EA to identify: the proposed action, including a brief discussion of the need therefor; the alternatives, as required by section 102(2)(E) of NEPA; the environmental impacts of the proposed action and the alternatives as appropriate; and a list of agencies and persons consulted, with identification of sources used.

The remainder of this EA is organized as follows. Chapter 2 discusses the proposed action; Chapter 3 discusses the need for the proposed action; Chapter 4 discusses the environmental impacts from the proposed action; Chapter 5

discusses alternatives to the proposed action; and Chapter 6 presents the conclusions. Appendix A identifies the references and sources used in preparing this Environmental Assessment, and Appendix B identifies the agencies and persons consulted.

2.0 Description of Proposed Action

2.1 Introduction

In accordance with 10 CFR § 52.47(b)(1), GE's application for design certification of the ABWR provided an essentially complete nuclear power plant design, except for the designs of a limited number of systems which are dependent upon site-specific elements, such as the Ultimate Heat Sink and Circulating Water System. The application for the ABWR design certification included both a safety assessment (in the form of a Standard Safety Analysis Report (SSAR) (Ref. 1)) and an environmental evaluation (in the form of a Technical Support Document (TSD) (Ref. 2)) Because non-radiological environmental impacts are heavily dependent upon site-specific characteristics and the design features beyond the scope of the proposed design certification, GE's environmental evaluation was limited to a consideration of potential radiological impacts of normal operation and severe accidents. 1/

1/ In the context of severe accidents, impacts have been defined in terms of risk (i.e., the probability of a severe accident multiplied by the consequences of the accident).

NRC has reviewed GE's application for design certification of the ABWR, including the SSAR and TSD. The results of the safety review are documented in the Final Safety Evaluation Report (FSER) for the ABWR (Ref. 3), and the results of the environmental review are documented in the Environmental Survey (ES) for the ABWR (Ref. 4). The FSER and ES provide NRC's conclusions in support of a issuance of a design certification for the ABWR.

The proposed action which is the subject of this Environmental Assessment is issuance of an amendment to Part 52 certifying the ABWR standard design. This amendment would enable future applications for a combined license (COL) under Subpart C of Part 52 or for a construction permit (CP) or operating license (OL) under 10 C.F.R. Part 50 to reference the ABWR design certification without the need for any further regulatory review or approval of the ABWR standard design. In addition, the amendment to Part 52 would codify the Commission's conclusions that all reasonable design features have been considered to reduce the radiological impacts from normal operations and severe accidents involving plants that reference the ABWR design certification, and that further consideration of such matters (including alternative design features) shall not be performed for licensing of such plants.

Certification of the ABWR design would not constitute authorization for construction or operation of a plant, or for issuance of a CP, OL, or COL. A license applicant will be

required to describe the site-specific design of the systems that are outside the scope of the ABWR and to provide safety and environmental evaluations for these systems, including an evaluation of non-radiological environmental impacts. These environmental evaluations will take place either in licensing proceedings under Part 50 or Part 52 or in early site permit (ESP) proceedings under Part 52. The NRC will issue an EIS on these matters prior to issuance of a CP, OL, COL, or ESP, as applicable.

2.2 Description of the Design Certification for the ABWR

The design certification would consist of two tiers. Tier 1 would include a description of design features and functions that are most safety-significant for the ABWR. Tier 2 of the design certification would include a more detailed description of the design of the ABWR.

A license applicant referencing the ABWR design certification would not be able to make facility-specific changes to Tier 1 without an exemption from or amendment to the design certification rule. Such an applicant would not be able to make changes to Tier 2 except by the foregoing process or, where appropriate, through a process similar to that embodied in 10 C.F.R. § 50.59 as specified in 10 C.F.R. § 52.63(b).

Matters resolved in connection with the issuance of this amendment to Part 52 would be treated as resolved in future licensing proceedings under Part 50 and Part 52 for applicants

and licensees that reference the ABWR design certification. These matters would include the issues discussed or encompassed by the TSD and ES, e.g., the reasonableness of measures for reducing the radiological impacts of normal operation and severe accidents.

Issuance of this amendment to Part 52 would codify the results of the extensive review and approval of the ABWR design by the NRC and the results of the rulemaking proceeding on the ABWR, thus permitting later license applicants to reference the pre-approved design in their applications. However, nothing in this amendment would authorize the construction or operation of plants of ABWR design. Without separate NRC authorization to construct and operate -- which would be major federal actions for which an EIS must be prepared -- no environmental impacts will be generated.

2.3 Codification of Environmental Conclusions

2.3.1 Background Concerning NRC Regulations and Policy on Severe Accidents

The term "severe accident" refers to those events which are "beyond the substantial coverage of design basis events" and include those for which there is substantial damage to the reactor core whether or not there are serious off-site consequences. (Ref. 5). The Severe Accident Policy Statement (Ref. 5) describes the Commission's safety requirements related to severe accidents involving designs. The Safety Goal Policy

Statement (Ref. 6) sets goals and objectives for determining an acceptable level of radiological risk from severe accidents. For new reactor designs, such as the ABWR, the Commission, in satisfaction of its severe accident safety requirements, is requiring, among other things, the evaluation of design alternatives to reduce the radiological risk from a severe accident by preventing substantial core damage (i.e., preventing a severe accident) or by preventing releases from the containment in the event that substantial core damage has occurred (i.e., mitigating the impacts of a severe accident).

NEPA requires the consideration of reasonable alternatives to proposed major Federal actions significantly affecting the quality of the human environment, including alternatives to mitigate the impacts of the proposed action. In 1989, a Federal Court of Appeals determined in the Limerick case that NEPA required consideration of certain design alternatives; namely, severe accident mitigation design alternatives (SAMDAs). (Ref. 7). The court indicated that "[SAMDAs]" are, as the name suggests, possible plant design modifications that are intended not to prevent an accident, but to lessen the severity of the impact of an accident should one occur."

Subsequent to the Limerick decision, the NRC issued Supplemental Final Environmental Impact Statements (FES Supplements) for the Limerick and Comanche Peak facilities (Refs. 8 and 9), which considered whether there were any cost-effective SAMDAs that should be added to these facilities. On the basis of

the evaluations in the supplements (called "NEPA/SAMDA evaluations"), NRC determined that further modifications would not be cost-effective and were not necessary in order to satisfy the mandates of NEPA.

In recognition of the Limerick decision, the Commission is requiring consideration in each design certification rulemaking proceeding of whether, pursuant to NEPA, there are cost-effective SAMDAs which should be included in a new reactor design to reduce severe accident environmental risk. While this consideration could be done later on a facility-specific basis for each CP, OL, or COL application, the Commission has decided that maintenance of design standardization will be enhanced if this is done on a generic basis for each standard design in conjunction with design certification. (Ref. 10).

The court's decision in Limerick did not pertain to alternatives for preventing severe accidents. Nevertheless, in a recent rulemaking involving license renewal, the NRC addressed design alternatives to prevent severe accidents, as well as mitigate them. (Ref. 11). In doing so, the NRC exercised its discretion to make the scope of the NRC's environmental review of severe accidents under NEPA co-extensive with the scope of the NRC's safety review of severe accidents under the Commission's Severe Accident Policy Statement for the purpose of license renewal. In order to enhance design stability and standardization for the ABWR, the NRC has similarly performed an

environmental review of preventive and mitigative design alternatives for severe accidents.

Finally, the NRC has had long-standing requirements to consider the radiological impacts from normal operation. These include requirements related to safety (e.g., 10 C.F.R. Part 50, Appendix I) and requirements related to environmental protection under NEPA (e.g., NUREG-0099, §§ 10.7 and 10.8 (Ref. 12)). The principle of standardization also supports a decision to resolve, as part of design certification, environmental issues that relate to the radiological impacts of normal operation.

2.3.2 Environmental Reviews and Conclusions for the ABWR

Chapter 19 of the ABWR SSAR demonstrates how the ABWR design satisfies the Commission's severe accident safety requirements and guidance. It also addresses the Commission's safety goals and objectives. In particular, Chapter 19 identifies the dominant severe accident sequences for the ABWR design and the associated source terms; describes modifications that have been made to the ABWR design, based on the results of the Probabilistic Risk Assessment (PRA), to prevent or mitigate severe accidents and thereby reduce the risk of a severe accident; and provides the bases for concluding that all reasonable steps have been taken to reduce the chances of occurrences of a severe accident involving substantial damage to the reactor core and to mitigate the consequences of such an accident should one occur, and consequently, that further

modifications to the ABWR design to reduce severe accident risk are not warranted. Similarly, Chapter 12 of the SSAR documents how the ABWR design complies with 10 C.F.R. Part 50, Appendix I, which requires design provisions to keep radiological releases due to normal operation as low as is reasonably achievable (ALARA).

GE has also prepared a Technical Support Document for plants of ABWR design. The TSD draws heavily from Chapters 12 and 19 of the ABWR SSAR, and follows the format of the Limerick and Comanche Peak FES Supplements. The analysis in the TSD provides the basis for concluding that there are no reasonable measures for reducing the radiological impacts from normal operation and severe accidents for plants of ABWR design.

The NRC has reviewed the SSAR and the TSD for the ABWR, and the results of its review of radiological issues under NEPA are documented in the FSER and ES. The proposed amendment to Part 52 would codify resolution of these radiological issues under NEPA for plants of ABWR design and would make clear that no further NEPA consideration need be given to these radiological issues (either related to normal operation or severe accidents) in licensing a plant of ABWR design. Specifically, the proposed amendment to Part 52 would codify the results of a NEPA evaluation of radiological issues, and would provide that:

(1) For the ABWR design all reasonable steps have been considered to reduce the probability of occurrence of a severe

accident involving substantial damage to the core and to mitigate the consequences of such an accident should one occur;

(2) No cost-effective severe accident design features for the ABWR design have been identified that would further prevent or mitigate the consequences of a severe accident involving substantial damage to the core;

(3) No further evaluation of severe accidents for the ABWR design, including alternatives for preventing or mitigating the consequences of severe accidents, shall be performed in any environmental report, environmental assessment, environmental impact statement or other environmental analysis prepared in connection with issuance of a combined license for a nuclear power plant referencing a ABWR design certification; and

(4) All reasonable steps have been taken to reduce the radiological environmental impacts from normal reactor operation of the ABWR, including expected operational occurrences, to as low as reasonably achievable, and that further evaluation of alternatives for reducing such impacts is not required in any environmental report, environmental assessment, environmental impact statement or other environmental analysis prepared in connection with issuance of a license for a nuclear power plant referencing the ABWR design certification rule.

The amendment to Part 52 would be applicable to all plants referencing the ABWR design certification. Consequently, any applicant for a CP, OL, or COL to build or operate a plant of ABWR design, in preparing its environmental report in support of

its application, and the NRC Staff in preparing an environmental impact statement in connection with issuance of CP, OL, or COL therefore, would not have to give further NEPA consideration to reducing the radiological impacts of normal operation or severe accidents.

3.0 Need for Proposed Action

Since the early 1970s, the NRC and its predecessor, the AEC, have sought nuclear power plant standardization. (Ref. 13). Certification of the ABWR design furthers the Commission's goal. Certification would codify the resolution of all design safety and certain environmental issues generic to all ABWR plants built in accordance with the ABWR design certification.

Certification is a critical element in achieving the standardization benefits the industry and the Commission are seeking. For industry, design standardization holds the prospect of significant cost and efficiency benefits, as well as reliability and safety advantages. For the NRC, standardization would conserve safety resources, facilitate the application of safety experience to multiple plants, and enable the NRC to deal rapidly and more uniformly with technical problems disclosed during facility operations. All parties would benefit from the early resolution of technical and environmental issues and the regulatory stability provided by design certification. Finally, the design certification for the ABWR incorporates a number of

significant improvements which will be of benefit to the public health and safety and the environment.

Resolution of environmental issues related to the radiological impacts of normal operation and severe accidents would further the goals and benefits of standardization. Deferral of resolution of these issues to subsequent licensing proceedings for individual plants would be inconsistent with standardization, because deferral of issues to individual licensing proceeding could possibly result in different design resolutions from proceeding to proceeding.

4.0 Environmental Impacts of Proposed Action

No environmental impacts would result from issuance of the proposed amendment to Part 52. The amendment, if adopted, would codify the results of the extensive review and approval of the ABWR design by the NRC that will have preceded issuance of the proposed rule, and the results of the ensuing rulemaking proceeding, thus permitting later license applicants to reference the approved design in their applications. Nothing in the amendments, however, would authorize the construction or operation of plants of ABWR design. Without separate NRC authorization to construct and operate a plant of ABWR design -- itself a major federal action for which an EIS must be prepared -- no environmental impacts could be generated.

5.0 Alternatives

5.1 Alternatives to this Rulemaking Proceeding

As alternatives to the proposed amendment to Part 52, NRC has evaluated two alternatives:

-- custom plant environmental review as part of a CP, OL, or COL proceeding (custom licensing proceedings);

-- certification of ABWR design in one rulemaking and closure of radiological issues under NEPA for the ABWR design in a separate rulemaking proceeding (bifurcated rulemaking).

In particular, NRC has considered whether the environmental impacts of an ABWR plant would be greater under either of the two alternatives than from a unitary rulemaking proceeding that would resolve both safety and environmental at the same time.

There should be no differences in the environmental impacts of a plant of ABWR design caused by utilization of a unitary rulemaking proceeding rather than custom licensing proceedings or bifurcated rulemaking. Regardless of whether a nuclear power plant design undergoes review as part of design certification or in a licensing proceeding or in bifurcated rulemaking, the same regulatory requirements regarding protection of the public health and safety and the environment must be met. Because the technical requirements for a design are the same regardless of the process utilized for review and approval of the design, the process itself would not affect the impacts resulting from use of the design.

5.2 Design Alternatives

Both GE and the NRC have evaluated design alternatives for reducing the radiological impacts from normal operation and severe accidents involving plants of ABWR design. These evaluations are documented in GE's Technical Support Document and the NRC's Environmental Survey. As is discussed more fully in these documents, (1) for the ABWR design all reasonable steps have been considered to reduce the probability of occurrence of a severe accident involving substantial damage to the core and to mitigate the consequences of such an accident should one occur; (2) no cost-effective severe accident design features for the ABWR design have been identified that would further prevent or mitigate the consequences of a severe accident involving substantial damage to the core; and (3) all reasonable steps have been taken to reduce the radiological environmental impacts from normal reactor operation of the ABWR, including expected operational occurrences, to as low as reasonably achievable.

Non-radiological impacts of operation are largely dependent upon site-specific characteristics and design features that are outside the scope of the ABWR standard design. These impacts, and alternatives for reducing these impacts, will be evaluated as part of the review of applications for a CP, OL, or COL for individual plants of ABWR design.

6.0 Finding of No Significant Impact

From the foregoing environmental assessment, the NRC has concluded that no radiological or non-radiological impacts will result from issuance of the proposed amendment to Part 52 certifying the ABWR design, because design certification itself will not authorize design or construction of a nuclear plant. Alternatives to use of a unitary rulemaking proceeding to resolve ABWR design issues would not result in any reduction in the environmental impacts of plants of ABWR design, because the technical requirements applicable to the ABWR are the same regardless of the process utilized for review and approval of the ABWR design. Finally, there are no reasonable design alternatives for reducing the radiological impacts from normal operation and severe accidents involving the ABWR, and non-radiological impacts and alternatives for reducing those impacts will be considered in individual licensing proceedings for plants of ABWR design. Therefore, the NRC has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement for the proposed amendment certifying the ABWR design.

APPENDIX A

References

1. ABWR Standard Safety Analysis Report

2. Letter dated August 26, 1994, from Joseph F. Quirk (GE) to NRC, attaching "Technical Support Document for Amendment to 10 CFR Part 51 Considering Severe Accidents under NEPA for Plants of ABWR Design".

3. [FSER]

4. [Environmental Survey]

5. Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants (50 Fed. Reg. 32,138 (August 8, 1985)).

6. Safety Goals for the Operations of Nuclear Power Plants; Policy Statement (51 Fed. Reg. 30,028 (August 21, 1986)).

7. Limerick Ecology Action v. NRC, 869 F.2d (3rd Cir. 1989).

8. Supplement to NUREG-0974, "Final Environmental Statement Related to the Operation of Limerick Generating Station, Units 1 and 2": NRC Staff Evaluation of Severe Accident Mitigation Design Alternatives for Limerick (August 1989).

9. Supplement to NUREG-0775, "Final Environmental Statement Related to the Operation of Comanche Peak Steam Electric Station, Units 1 and 2": NRC Staff Evaluation of Severe Accident Mitigation Design Alternative for Comanche Peak (October 1989).

10. SECY-91-229, "Severe Accident Mitigation Design Alternatives for Certified Standard Design" (July 31, 1991); Staff Requirements Memorandum dated October 25, 1991, on SECY-91-229.

11. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (August 1991).

12. NUREG-0099, "Preparation of Environmental Reports for Nuclear Power Stations" (July 1976).

13. 10 C.F.R. Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors"; Statements of Consideration for Proposed and Final Rules, published in 53 Fed. Reg. 32,060 (Aug. 23, 1988) and 54 Fed. Reg. 15,372 (Apr. 18, 1989), respectively.

APPENDIX B

List of Agencies and Persons Contacts

[To Be Provided By NRC]