

June 14, 1978

UNITED STATES
NUCLEAR REGULATORY COMMISSION

SECY-78-310

INFORMATION REPORT

For: The Commissioners

From: Ernst Volgenau, Director
Office of Inspection and Enforcement

Thru: Executive Director for Operations *[Signature]*

Subject: PLAN FOR AN ANALYSIS OF ALTERNATIVES FOR CONDUCTING
INDEPENDENT VERIFICATION TESTING OF ENVIRONMENTALLY
QUALIFIED EQUIPMENT

Purpose: To inform the Commission of the staff's action plan.

Discussion: Background

On April 13, 1978, the Commission issued a memorandum and order to the staff that included ten directives resulting from the Union of Concerned Scientists petition dated November 4, 1977. This paper addresses Directive #5 which states:

"Provide the Commission with an analysis of alternatives (including estimates of resource requirements and potential benefits) for conducting independent verification testing of environmentally qualified equipment which is required to operate in safety systems. Alternatives to be provided for information of the Commission in one month, with the full analysis to be completed one month later."

The plan for the analysis is included in Enclosure 1.

Plan

In essence, the plan consists of analyzing the following three alternatives each representing a course of action that will provide greater NRC involvement in equipment environmental qualification than presently exists.

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- . NRC environmental test facility
- . NRC contract environmental testing to existing DOE or independent laboratories
- . NRC review and witnessing of vendor tests conducted to meet NRC requirements.

Combinations of these alternatives will be considered in search for the optimum method of monitoring and controlling the adequacy of equipment qualifications.

The concern behind this analysis is already being addressed in IE's ongoing independent verification study program with Sandia Laboratories. IE's current independent verification study is larger in scope in that it considers all viable verification options which could be carried out to independently verify that light water power reactors are designed, constructed, and operated in a safe manner. The larger study program will compare the independent verification testing of qualified equipment with all of the options through a value/impact assessment. Because of the commonality of the ultimate goals of Directive 5 and our current program and in the interest of minimizing the impact on existing staff commitments the subject indepth analysis of alternatives for conducting independent verification testing will be performed by Sandia Laboratories.

Schedule and Resources

The Directive 5 analysis will be completed and submitted to the Commission by January 15, 1979.

The estimated resources to complete the analysis include 5 man months of staff manpower and \$80,000 for the outside study contract.

The Directive 5 analysis will not impact on the current independent verification study which is scheduled for completion by April 1, 1980.

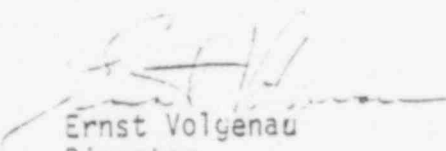
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Coordination: This paper has been concurred in by NRR, RES, and MPA.



Ernst Volgenau
Director
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Enclosure:
Plan for Analysis

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PLAN FOR ANALYSIS OF ALTERNATIVES FOR CONDUCTING INDEPENDENT VERIFICATION TESTING OF ENVIRONMENTALLY QUALIFIED EQUIPMENT

Purpose

This plan provides an approach for analyzing the alternatives for conducting independent verification testing of environmentally qualified safety-related equipment required to operate in reactor safety systems. The concern being addressed deals with the adequacy of equipment environmental qualifications performed by the industry and the NRC's method of monitoring this activity. The plan has been developed in response to Directive #5 in the Commission's April 13, 1978 memorandum and order resulting from a petition from the Union of Concerned Scientists dated November 4, 1977.

Objectives

Detailed objectives to satisfy the purpose of the plan are:

1. Define viable alternatives for conducting independent verification testing of environmentally qualified safety-related equipment,
2. Determine the resources required for each alternative,
3. Define any constraints or limitations associated with each alternative,
4. Determine the benefits of each alternative, and
5. Define a basis for evaluating and selecting the alternative or combination of alternatives that should be implemented.

Scope Decisions

In the plan definition phase the staff made several basic decisions relative to the scope of the analysis.

1. Alternatives other than complete, independent testing of all safety equipment shall be considered in the analysis.
2. The analysis shall address environmentally sensitive safety-related equipment that is located in areas potentially exposed to a harsh environment and that is required to function during or following a design basis event for safe plant shutdown or otherwise required to mitigate the consequences of an accident. By definition then, the analysis will consider safety significant electrical, instrumentation and control, and electro-mechanical equipment.
3. The analysis shall address equipment currently being supplied and installed in plants under construction and such equipment approved for use in the future.

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Alternatives

Each alternative represents a potential course of action that will provide greater NRC involvement in equipment qualifications than presently exists and consequently provide a higher confidence level in the adequacy of environmentally sensitive safety-related equipment.

1. Alternative 1 - An NRC owned and operated, environmental test facility capable of accommodating the equipment of interest.
2. Alternative 2 - NRC contract for independent verification testing of equipment with existing laboratories.
3. Alternative 3 - NRC review and witnessing of vendor tests conducted to meet NRC requirements.

Combination of the alternatives will be considered in the analysis in search of the preferred method.

Tasks

Major tasks required to complete the analysis are identified below.

1. Equipment - The environmentally sensitive equipment within the scope of the analysis will be identified by category, type/model, quantity and size. A plant study will be used as a basis for estimating the total quantity of safety significant prototypes involved.
2. Tests - An acceptable test scope for each equipment category will be defined using current standards such as IEEE 323-1974 and considering current state-of-the-art for such technical areas as accelerated aging practices.
3. Sample Size - The equipment study will identify the population of prototype safety significant equipment. This number will be considered the current backlog from which several sample sizes will be selected for analyzing the three alternatives and desirable combinations. Upon completion of the backlog a routine test rate representing the equipment modification rate will be estimated to establish the continuing work load for equipment proposed for use in future plants.

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4. Alternative 1 (NRC test facility) - An outside study contract will be used to estimate the costs involved in construction, equipping and operating a test facility capable of conducting the environmental tests in accordance with standards such as IEEE 323-1974. Estimates of facility cost will be made in two ways. The first will include a sequential test operation and contain sufficient equipment to support maximum utilization of one test chamber. In this case the test rate will be established by the facility and completion of the backlog will be dependent upon the test rate. The second way will be a parallel test operation site where the equipment will be adequate to accommodate a desired test rate.
5. Alternative 2 (NRC contracts tests) - This task will include a study of the existing testing capabilities and availability of facilities. Each facility will be characterized with respect to size and test rate limitations. The costs associated with contract preparation, monitoring and conducting tests at each facility will be determined with respect to several sample sizes.
6. Alternative 3 (NRC review and witnessing of vendor tests) - A study of the manpower and expense associated with this alternative will be estimated using several sample sizes. A subject of this alternative will address the benefits of upgrading the industry's present approach to qualification testing through a third party effort as an alternative to direct NRC tests.
7. Test Specimen Costs - An estimate of the test specimen costs will be made for Alternatives 1 and 2. These costs will include assembly costs where necessary as well as shipment costs.
8. Evaluation - This task will include identification of constraints and limitations associated with each alternative. The relative benefits of each alternative will include costs, degree of verification independence and rate of achieving the desired confidence level. A basis for a decision relative to the appropriate course of action will be provided in the form of a value/impact assesement.

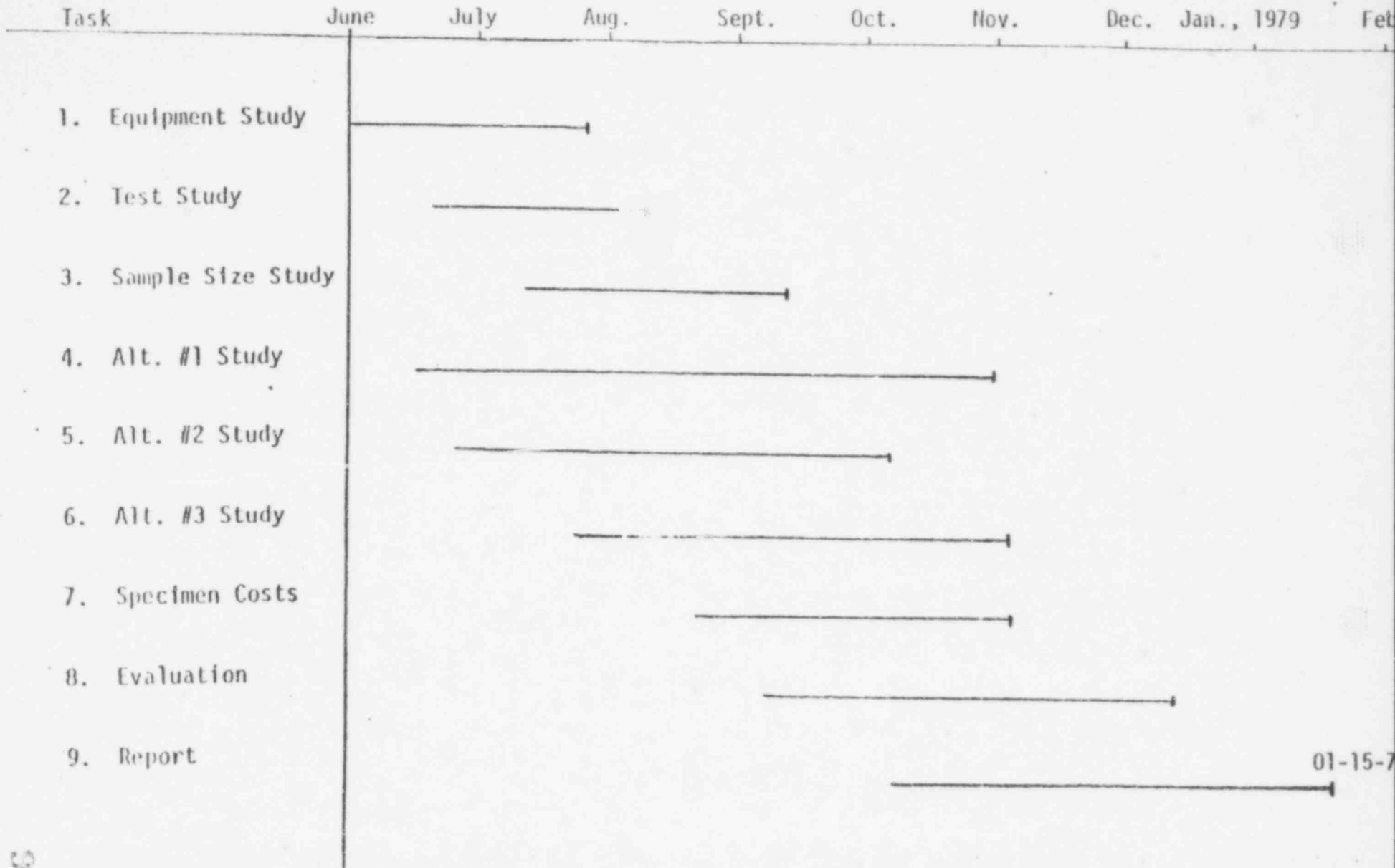
Resources

The estimated resources to complete the tasks outlined in this plan include 5 man months of IE's staff manpower and \$80,000 for the outside contract study. The IE manpower will be at the expense of delay in program improvement changes in the Licensee Contractor and Vendor Inspection Program (LCVIP). The outside contract will be funded from the 1978 and 1979 IE program support funds.

Schedule

The Directive 5 analysis will be completed by January 15, 1979. The enclosed schedule identifies planned completion dates for the intermediate tasks.

SCHEDULE



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