PDR P1-37

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

MAR 11 1994

Scientech, Inc.
ATTN: James Meyer, Project Manager
11821 Parklawn Drive
Rockville, MD 20852

Dear Mr. Meyer:

Subject: Contract No. NRC-04-91-068, Task Order No. 25 Entitled, "Individual Plant Examination (IPE) Reviews, Internal Events, Back End Only" (Farley Units 1 & 2)

In accordance with Section G.5, Task Order Procedures, of the subject contract, this letter definitizes Task Order No. 25. This effort shall be performed in accordance with the enclosed Statement of Work.

Task Order No. 25 shall be in effect from March 14, 1994 through March 13, 1995 with a total cost ceiling of $17,443.32. The amount of $15,946.00 represents the total estimated reimbursable costs and the amount of $1,497.32 represents the fixed fee.

The obligated amount of this task order is $17,443.32.

Accounting Data for Task Order No. 25 is as follows:

APPN No.: 31X0200.460
B&R No.: 46019202300
JOB CODE: L1933
BOC No.: 252A
Obligated Amount: $17,443.32
RES Identifier: RES-C94-050

The following individuals are considered to be essential to the successful performance for work hereunder: James Meyer.

The Contractor agrees that such personnel shall not be removed from the effort under the task order without compliance with Contract Clause H.1, Key Personnel.

The issuance of this task order does not amend any terms or conditions of the subject contract.

Your contacts during the course of this task order are:

Technical Matters: John Lane, Project Officer
(301) 492-3985

Contractual Matters: Paulette Smith, Contract Administrator
(301) 492-7670

D602

Please indicate your acceptance of this Task Order No. 25 by having an official, authorized to bind your organization, execute three copies of this document in the space provided and return two copies to the above Contract Administrator. You should retain the third copy for your records.

Should you have any questions regarding the task order, please contact Paulette Smith, Contract Administrator, on (301) 492-7670.

Sincerely,

Joyce A. Fields

Joyce A. Fields, Contracting Officer
Contract Administration Branch No. 3
Division of Contracts and
Property Management
Office of Administration

Enclosure:
Statement of Work

ACCEPTED:

Marshall David
NAME

Manager, Rockville Office
TITLE

March 16, 1994
DATE

Contract NRC-04-91-068
Scientech

STATEMENT OF WORK
Task Order - 25

TITLE: Individual Plant Examination (IPE) Reviews,
Internal Events Back-End Only
(Farley Units 1 & 2)

DOCKET NUMBER: 50-348, 50-364

NRC PROJECT MANAGER: John C. Lane, RES (301-492-3985)

NRC TEAM LEADER FOR FARLEY UNITS 1 & 2: John C. Lane, RES (301-492-3985)

TECHNICAL MONITOR: John C. Lane, RES (301-492-3985)

PERIOD OF PERFORMANCE: one year

BACKGROUND:

On November 23, 1988, the NRC issued Generic Letter 88-20, "Individual Plant Examination," which stated that licensees of existing plants should perform a systematic examination (IPE) to identify any plant-specific vulnerabilities to severe accidents, and to report the results to the Commission. The purpose of the IPE is to have each utility (1) develop an overall appreciation of severe accident behavior; (2) understand the most likely severe accident sequences at its plant; (3) gain a quantitative understanding of the overall probability of core damage and radioactive material releases; and (4) reduce the overall probability of core damage and radioactive releases by modifying procedures and hardware to prevent or mitigate severe accidents. All IPE submittals will be reviewed by the NRC staff to determine if licensees met the intent of Generic Letter 88-20.

OBJECTIVE:

The purpose of this contract is to solicit contractor support in order to enhance the NRC review of licensees' IPE submittals. This contract includes the examination and evaluation of the Farley Units 1 & 2 IPE submittal, specifically with regard to the "back-end" analysis. The contractor review will be of limited scope and consist of a "submittal only" review and the licensee's response to questions raised by the staff. The "submittal only" review and gathering of associated insights will help the NRC staff determine whether the licensee's IPE process met the intent of Generic Letter 88-20, or whether a more detailed review is warranted.

By identifying the IPE's strengths and weaknesses, extracting important insights and findings, and providing a comparison to staff reviewed and accepted PSAs (e.g. NUREG-1150, PSAs identified in NUREG-1335 Appendix B), it

is expected that the NRC will be in a better position to expeditiously evaluate the licensee's IPE process. To provide support under this contract, the contractor will search for obvious errors, omissions and inconsistencies in the IPE submittal and the licensee's response to a "Request for Additional Information," (RAI) as described in the work requirements listed below.

WORK REQUIREMENTS AND SCHEDULE:

The contractor will perform a "submittal only" review of the Farley Units 1 & 2 "back-end" IPE analysis. [The review is to include only the Level II analysis. Review of Level III (consequence analysis) is beyond the scope of this contract.] The contractor shall provide the qualified specialists and the necessary facilities, materials, and services to carry out such a review. The contractor will utilize NRC review guidance documents for detail and reference, as well as other interim guidance provided by the NRC Technical Monitor. The contractor is not expected to make a plant/site visit in order to perform this review.

Subtask 1. Review and Identification of IPE Insights

Perform a back-end "submittal only" review of each IPE submittal and identify important IPE insights by completing the NRC IPE Data Summary Sheets. During the review, focus on the areas described below under "Work Requirement." The contractor will note any: (1) inconsistencies between methodology employed in the IPE submittals and other PSA studies, and (2) inconsistencies between the submittal's IPE findings and findings stemming from other PSAs (See NUREG-1335, Appendix B). Respond explicitly to each work requirement by noting important review findings including any IPE strengths and weaknesses. Appropriately characterize any shortcomings with respect to the impact on IPE conclusions. Identify and provide a justification for a Request for Additional Information (RAI).

Word Requirement 1.1. Perform a General Review of the Licensee's IPE Back-End Analytic Process

Check the following:

1.1.1 The IPE submittal is essentially complete with respect to the level of detail requested in NUREG-1335.

1.1.2 IPE employed methodology is clearly described and justified for selection. Approach is consistent with Generic Letter 88-20 Appendix 1.

1.1.3 The IPE employed a viable process to confirm that the containment and containment systems represent the as-built, as-operated plant.

1.1.4 IPE back-end had been appropriately peer-reviewed to help assure the analytic techniques were correctly applied.

Work Requirement 1.2. Review of the Containment Analysis/Characterization

Check the following:

1.2.1 The IPE analysis appropriately treated front-end and back-end dependencies, i.e., plant damage states considered reactor system/containment system availability, system mission times, inventory depletion, dual usage (spray vs. injection).

1.2.2 Classes of sequences with significant probability (those that meet the G.L. 88-20/NUREG-1335 screening criteria) were evaluated further using simplistic, but realistic, containment event trees.

1.2.3 The focus of the IPE's containment analysis was on failure modes and timing. Containment failure modes are consistent with those identified in Table 2.2 of NUREG-1335.

1.2.4 The IPE process assessed and identified contributors to containment isolation failure.

1.2.5 System/human response were integrated with the phenomenological aspects of accident progression into the containment event trees. Allowances for recovery actions were made to allow for accident management actions.

1.2.6 The IPE submittal appropriately documented radionuclide release characterization for accident sequences exceeding the Generic Letter 88-20 (or NUREG-1335) screening criteria.

Work Requirement 1.3. Review the Quantitative Nature of the Accident Progression and Containment Performance Analysis

Check the following:

1.3.1 The licensee employed a reasonable process to understand and quantify severe accident progression. The process lead to a determination of important conditional containment failure probabilities, and considered phenomenological uncertainties, either qualitative or quantitative.

1.3.2 Dominant contributors to containment failure are consistent with insights from other PSAs of similar design.

1.3.3 The IPE appropriately characterized containment performance for each of the CET end-states by assessing containment loading (either calculated or referenced).

1.3.4 The containment analysis considered the impact of severe accident environments on equipment behavior.

Work Requirement 1.4. Review the IPE Approach to Reducing the Probability of Core Damage or Fission Product Release

Check the following:

1.4.1 The IPE analysis appears to support the licensee's definition of vulnerability, and that the definition provides a means by which the identification of potential vulnerabilities (as so defined) and plant modifications (or safety enhancements) is made possible.

1.4.2 The identification of plant improvements and proposed modifications are reasonably expected to enhance plant safety.

Work Requirement 1.5. Review Licensee's Response to Containment Performance Improvement Recommendations

Check that the licensee appropriately responded to recommendations stemming from the Containment Performance Improvement (CPI) Program, i.e., that the licensee's assessment, findings, conclusions and actions (as appropriate) considered the following as a function of containment type:

BWRs (MARK I,II,III)

- o Harden vent
- o Alternative water supply for drywell spray/vessel injection
- o Enhanced reactor pressure vessel depressurization system reliability
- o Implementation of Revision 4 of the BWR Owners Group EPGs
- o Improved hydrogen igniter power supply (Mark III)

Additional for BWR (MARK III)

- o Evaluation of vulnerability to interrupted power supply to hydrogen igniters and need for improvement

PWR Ice Condenser Containments

- o Evaluation of vulnerability to interrupted power supply to hydrogen igniters and need for improvement

PWR Dry Containments

- o Evaluation of containment and equipment vulnerabilities to hydrogen combustion (local and global) and need for improvement. This would include consideration of gaseous pathways between the cavity and the upper containment volume to confirm adequate communication to promote natural circulation and recombination of combustible gases in the reactor cavity.

Work Requirement 2.0. Complete Data Sheets

A. Summarize data on the Consolidated Data Summary Sheet as described below.

CONSOLIDATED DATA SUMMARY SHEET
(INTERNAL EVENTS)

- o Conditional containment failure probability given core damage:
- o Significant PRA findings:
- o Enhanced plant hardware (implemented after 1988 PRA) containment modifications:
- o Potential containment improvements under consideration and not modeled:

B. Complete the NRC data summary sheets and note any lack of information, as appropriate. However, exclude those data entries marked "BNL Data Entry." These data will be collected by Brookhaven National Laboratory under a separate contract.

Subtask 2. Prepare Preliminary Technical Evaluation Report

Prepare a preliminary Technical Evaluation Report with the outline prescribed below.

I. Executive Summary

Provide a brief overview of the IPE review, the scope and depth as appropriate. Place emphasis on review areas identified as being important and rationale for importance, i.e., found to be important in other PSAs of similar design. Discuss any important or unique plant characteristics. Note plants with similar features and any important insights stemming from other relevant PSA studies.

II. Contractor Review Findings

Explicitly address each work requirement element listed above under Subtask 1, "Review and Identification of IPE Insights." Discuss any strength or weakness so identified and significance with respect to the overall IPE effort. Identify any additional information (in the form of questions back to the licensee) which would be important to the review effort. List these questions separately in an appendix. Indicate why the information is important for closure.

III. Overall Evaluation and Conclusion

Summarize the "submittal only" review conclusions based on the information submitted and significance of IPE strengths and weaknesses.

IV. IPE Insights, Improvements, and Commitments

Characterize important IPE findings and insights, including any significant containment characteristics or analytic assumptions that impact insights. Describe and characterize any significant enhancements implemented by the licensee, specifically in response to important insights which stem from the IPE process. Identify any licensee commitments and characterize the need to track commitments based on the impact on IPE conclusions. Also identify and characterize any potential improvements not forthcoming but perceived to be significant.

V. IPE Evaluation and Data Summary Sheets

Attach: (a) Consolidated Data Summary Sheets using the above outline, and (b) the NRC IPE data sheets.

Appendix: Questions and Comments

Provide all questions and comments which are to be discussed with the licensee. Provide rationale for comments, especially when seeking additional information.

Subtask 3. Prepare Final Technical Evaluation Report

Review the licensee's response to staff questions and comments. Update the preliminary TER developed under Subtask 2, as appropriate, based on the additional information received from the licensee. Emphasis should be placed on review areas identified under Subtask 2. Provide rationale as appropriate to support the need for any additional follow-on studies or recommendations.

Note: The contractor should be prepared to participate in telephone communications with the licensee and/or discussions with NRC review team members regarding the licensee's responses to questions and issues stemming from the preliminary TER.

REPORT REQUIREMENTS:

Technical Reports

The contractor will submit to the NRC Technical Monitor four copies of the Preliminary Technical Evaluation Report (TER) on March 31, 1994. Copies will include three hard copies and one 3.5" computer diskette version (Wordperfect 5.1 or other IBM PC compatible software acceptable to the NRC IPE Team Leader). The Preliminary TER shall summarize all findings, results, and conclusions in the areas examined in the format described under Subtask 2. If the contractor finds that the licensee's IPE is obviously deficient in any of the areas examined, the Technical Monitor should be notified in advance. Deficient or weak areas should be clearly documented in the Technical Evaluation Report. In addition, if the contractor finds that there are specific areas that need additional in-depth review, the Team Leader should be notified of the areas, and provided with the rationale for subsequent review.

The contractor will submit to the NRC Technical Monitor three copies of the Final Technical Evaluation Report (TER) two weeks after the receipt of the licensee's response to staff questions and comments. Copies will include two hard copies and one 3.5" computer diskette version (Wordperfect 5.1 or other IBM PC compatible software acceptable to the NRC IPE Team Leader). The Final TER shall update all findings, results, and conclusions in the areas examined in the format described under Subtask 2 as appropriate.

BUSINESS LETTER REPORT:

The contractor shall provide monthly progress reports in accordance with the requirements of the basic contract.

MEETINGS AND TRAVEL:

One, one person trip to NRC Headquarters to present and discuss review findings and conclusions.

ESTIMATED LEVEL OF EFFORT:

For each IPE reviewed:

Subtask 1	80 contractor hours
Subtask 2	80 contractor hours
Subtask 3	16 contractor hours

It shall be the responsibility of the contractor to assign technical staff, employees, and subcontractors who have the required educational background, experience, or combination thereof, to meet both the technical and regulatory objectives of the work specified in this SOW. The NRC will rely on representation made by the contractor concerning the qualifications of the personnel proposed for assignment to this task order including assurance that all information contained in the technical and cost proposals, including resumes and conflict of interest disclosures, is accurate and truthful.

NRC FURNISHED MATERIAL:

1. Licensee's IPE submittal.

2. Licensee's response to staff generated questions and associated information.

TECHNICAL DIRECTION:

The NRC Project Manager is:

John C. Lane
Severe Accident Issues Branch
Division of Safety Issue Resolution
U.S. NRC, Mail Stop NL/S 324
Washington, D.C. 20555
Telephone No. (301) FTS-492-3985