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

AUG 27 1992

Science & Engineering Associates, Inc.
SEA Plaza
ATTN: Ilene Colina
6100 Uptown Blvd., N.E.
Alberquerque, NM 87110

Dear Ms. Colina:

Subject: Contract No. NRC-04-91-066, Task Order No. 5 Entitled, "Internal Plant Examination (IPE) Reviews - Internal Events - Front End Only (Fitzpatrick)"

In accordance with Section G.9 entitled, "Task Order Procedures" of the subject contract, this letter definitizes Task Order No. 5. This effort shall be performed in accordance with the enclosed Statement of Work.

Task Order No. 5 shall be in effect from August 27, 1992 through April 26, 1993, with a total cost ceiling of $28,609.00. The amount of $26,368.00 represents the total estimated reimbursable costs and the amount of $2,241.00 represents the fixed fee.

The obligated amount of this task order is $28,609.00.

Accounting Data for Task Order No. 5 is as follows:

APPN No.: 31X0200.260
B&R No.: 260-19-25-030
FIN No.: B-5787-2
OBLIGATED AMOUNT: $28,609.00
RES IDENTIFIER: RES-C92-274

The following individuals are considered to be essential to the successful performance for work hereunder: Willard Thomas, John Darby, and Robert Clark.

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.

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

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Your contacts during the course of this task order are:

Technical Matters: John Flack
Project Officer
(301) 492-3979

Contractual Matters: Anita Hughes
Contract Administrator
(301) 492-8353

Please indicate your acceptance of this Task Order No. 5 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 Contract Administrator. You should retain the third copy for your records.

If you have any questions regarding this matter, please contact Anita Hughes, Contract Administrator, on (301) 492-8353.

Sincerely,

Mary Jo Mattia, Contracting Officer
Contract Administration Branch No. 2
Division of Contracts and
Property Management
Office of Administration

Enclosure:
As stated

ACCEPTED:

NAME: Ilene R Colina

TITLE: Ilene R. Colina

DATE: 01 September 1992

Contract NRC-04-91-066
Science & Engineering Associates

STATEMENT OF WORK
Task Order - 5

TITLE: Individual Plant Examination (IPE) Reviews, Internal Events Front-end Only, (FitzPatrick)

NRC PROJECT MANAGER: John H. Flack, RES (301-492-3979)

NRC TEAM LEADER FOR FITZPATRICK: Bill Milstead, RES (301-492-3742)

TECHNICAL MONITOR: John H. Flack, RES (301-492-3979)

PERIOD OF PERFORMANCE: August 27, 1992 - April 26, 1993

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.

The NRC staff review of IPEs involves a two step process. The first step, or "step 1" includes an NRC team examination of the IPE submittal and subsequent meetings with the licensee to understand the IPE effort. All IPE submittals will undergo a "step 1" review by the NRC staff. A second step, or "step 2" review, may be required if limitations are identified, or a better understanding of the licensee's IPE process is warranted. Contractors are expected to support the "step 2" review effort by auditing IPE documentation held at the site, and assessing limitations identified by the NRC review team members under "step 1."

OBJECTIVE

The purpose of this task order is to provide support during the

"step 2" review of the FitzPatrick IPE front-end analysis. The NRC review objective is to determine whether the licensee's IPE process met the intent of Generic Letter 88-20. The "step 2" review will involve a site visit and audit of "tier 2" information (e.g., fault trees, system notebooks, data, calculations).

WORK REQUIREMENTS AND SCHEDULE

Under this task order contract, an audit of the FitzPatrick front-end IPE analysis will be performed. The contractor will provide qualified specialists and the necessary facilities, materials, and services to the NRC staff. A NRC headquarters meeting will initiate the "step 2" review and identify areas of interest. The contractor analyst will subsequently review the IPE submittal and associated documentation, and prepare for a site visit by developing an audit plan which will be submitted to the IPE Team Leader at least three weeks prior to the site visit. The site visit will involve the audit of "tier 2" information, and include plant walk-throughs and meetings with licensee staff involved in the IPE analysis. The audit will focus on licensee identified vulnerabilities, especially those associated with decay heat removal system. The contractor will bring to the immediate attention of the review team members any potential vulnerabilities that may appear to require further analysis or evaluation, and the basis for identified concern.

For this task order, perform the following subtasks:

Subtask 1. Review and Identify Needed Information

Attend the "step 2" kick-off meeting (schedule to be determined by the NRC Project Manager). Review IPE review team "step 1" findings, specifically those associated with the front-end analysis. Review NRC questions sent to the licensee and licensee's response. Attention should be placed on any remaining issues and their significance with respect to the IPE's ability to identify vulnerabilities. During the submittal review, key on the following aspects of the licensee's IPE process:

A. General Approach

A.1 The IPE employed a viable process to confirm that the plant models represent the as-built, as-operated plant. Unique design features were appropriately assessed.

A.2 The IPE appropriately considered internal flooding as a potential contributor to core damage. (Use NUREG-1174 for review insights.)

B. Accident Sequence Delineation

B.1. The IPE identified generic/plant-specific initiators (including internal flood) and dependencies which could exist between initiating events and the associated mitigation function. Initiating events are consistent and complete with respect to other PSAs.

B.2 The IPE developed appropriate fault trees to identify and analyze front-line and support-systems important to the prevention of core damage and mitigation of fission product release.

B.3 The IPE treated dependencies (including asymmetries) among plant systems, and that dependencies within a system and between system were identified and documented in a dependency matrix form. Support systems should include as a minimum:

electrical power (AC and DC)
ESF actuation system
instrument air
HVAC
service water
component cooling water

B.4 The IPE appropriately treated common cause failures employing the beta factor method, MGL method, or sensitivity studies (see NUREG/CR-2815 or plant-specific). Common cause failures were carefully examined to reveal possible root causes of such failures and in order to determine likely fixes.

B.5 The system event trees and special event trees appear to appropriately treat the initiating events, associated success criteria, and dependencies between top events.

B.6 The IPE appeared to identify the most probable core damage sequences based on insights from other PSAs. Sequences were expanded to identify dominant contributor, i.e., specific components, plant conditions or behavior, common cause failures which could potentially contribute to plant vulnerabilities.

B.7 The IPE appropriately treated front-end and back-end dependencies:

- important sequences were not screened out
- considered containment by-pass
- considered containment isolation
- plant damage states considered reactor

system/containment system availability
- source term
- system mission times
- inventory depletion
- dual usage (spray vs. injection)

B.8 For multi-unit plant analyses, that the IPE considered initiating events affecting more than one unit, and treated systems shared between units.

C. Quantitative Process

C.1 The IPE quantitatively evaluated the impact of integrated system and component failures on plant safety. Data supports the use of mean values and licensee employed sensitivity studies to determine the impact of vital assumptions as appropriate.

C.2 The technique used to perform data analysis appears consistent with other PSAs, [note: plant specific data is expected to be used for important components and systems as identified in NUREG-1335.]

C.3 Sources of generic failure data used in the IPE are identified, and a rationale for their use provided. Data source should be reasonably consistent with data reported in NUREG-2815, Appendix C.

C.4 The IPE explicitly quantified common cause failure and identified data sources.

D. Vulnerability Evaluation

D.1 The IPE supports the licensee's definition of vulnerability with respect to core damage, and that the analysis probed beyond the system level, to train or segment level to uncover vulnerabilities. The licensee's definition provided a means by which the licensee could identify potential vulnerabilities (as so defined) and plant modifications (or safety enhancements) to eliminate or reduce the affect of vulnerabilities.

D.2 The identification of plant improvements and proposed modifications are reasonably expected to enhance plant safety.

E. Decay Heat Removal Evaluation

E.1 The IPE explicitly focused on reliability of the DHR function. IPE findings and conclusions are consistent with other PSA findings.

E.2 IPE explored the benefit of diverse means of decay heat removal, e.g. feed-and-bleed, recovery of main feedwater.

E.3 Any unique features or other means which contribute to increased DHR reliability were substantiated.

Document any identified strengths, weaknesses, obvious limitations or inconsistencies between the licensee's IPE findings and studies from similar plants. Areas needing specific attention during the site visit should be identified and forwarded to the NRC review team leader in a letter report at least three weeks prior to the site visit and audit. Identify licensee personnel that need to be contacted during the site visit, and documentation needed for audit.

Schedule Completion: Three weeks prior to site visit

Subtask 2. Perform Site Visit

The objective of the site visit is to access and review information not contained in the submittal but nevertheless required to understand the licensee's IPE process. The site visit will:

(1) audit all IPE "tier 2" information related to the front-end system analysis, i.e., fault trees, notebooks, supporting calculations, data, etc.
(2) obtain an overall physical perspective of the licensee's operational facility by performing walk-throughs, especially focusing on areas susceptible to Interfacing Loss-of-Coolant Accidents (ISLOCAs) and internal flooding,
(3) gather information and insights on weak areas identified by the NRC under "step 1",
(4) interview key analysts and site personnel that were responsible for the IPE project.

NOTE: Once at the site but prior to the start of the on-site audit, the contractor's staff is required to meet with the NRC IPE Review Team Leader and other NRC personnel involved in the IPE review. The pre-audit meeting will focus on the audit's scope and objectives, coordination of travel logistics, and preparation of site access documentation.

Schedule Completion: The site audit is expected to involve three days including travel and will be scheduled in cognizance with the NRC Plant Project Manager and the licensee. An early pre-audit meeting at the site is scheduled for the first day, followed by a two day IPE audit and closing meeting on the third day.

Subtask 3. Prepare Final Technical Report

The Contractor shall prepare a final technical report in accordance with Subsection F.7 of the basic contract and the outline provided below:

Executive Summary

Provide a one page summary of the audit process, findings, conclusions, and recommendations.

I. Introduction

- o Provide a brief overview of the licensee's IPE process in the technical area under audit and any important insights stemming from the IPE in the technical area under review.
- o Provide a brief overview of the audit process, the scope, objectives, and areas of interest.
- o Document pre-site visit activities-include meetings, information review, and preparation for site visit.
- o Document site activities including:
  - Information audited at the site - description of "tier 2" information audited,
  - Personnel interviewed and identification of individuals that provided information during the audit, include name, title and company,
  - Walk-throughs performed and general observations of facilities,
  - Describe how areas of interest discussed in the "Introduction" above were addressed during the audit.

II. Audit Findings

For each of the subtask 1 items listed above, discuss the audit's findings including any strengths or shortcoming identified in the licensee's IPE and significance with respect to the overall IPE effort. Note any inconsistencies with other PSA's. Indicate and discuss areas reported in the submittal but not supported by "tier 2" information audited at the site.

III. Audit Conclusions and Recommendations

Document the audit's conclusion with respect to the IPE meeting the intent of Generic Letter 88-20. Focus on the ability of the licensee's IPE process to identify potential vulnerabilities, and the reasonableness of licensee's actions and commitments. The report should discuss the reasonableness of any specific licensee identified

vulnerabilities and associated fixes. Characterize limitations with regard to significance.

Schedule Completion: The contractor shall provide a technical review report one month following the site audit.

REPORT REQUIREMENTS

Technical Reports

At the completion of subtask 1, provide an audit plan input to the IPE Team Leader. The plan shall include areas needing specific attention during the site visit, and licensee personnel that will need to be contacted.

At the completion of subtask 2 but prior to the audit's team exit meeting with the licensee, each contractor specialist shall provide a draft audit report input to the NRC Team Leader. The format and scope of this input shall be as provided by the NRC IPE Team Leader. Typically, this input will consist of a handwritten summary of the contractor's audit findings.

The contractor will submit to the NRC technical monitor two copies the audit report one month after the completion of the Step 2 site audit. Copies will include one hard copy and one computer diskette version (Wordperfect 5.1 or other IBM PC compatible software acceptable to the NRC IPE Team Leader) to be given to the IPE Team Leader. The report shall summarize all findings, results, and conclusions in the areas examined in the format described under Task 3. If the contractor finds that the licensee's IPE is obviously deficient in any of the areas examined, the IPE Team Leader should be notified in advance. Deficient or weak areas should be clearly documented in the audit 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.

TECHNICAL PROGRESS REPORT

The Contractor shall provide monthly progress reports in accordance with Subsection F.3 of the basic contract.

Meetings and Travel

One, one person trip to NRC Headquarters to initiate the IPE audit and obtain associated IPE, FSAR, and other supporting information.

One, one person, three day trip to the plant site to conduct the IPE audit.

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

ESTIMATED LEVEL OF EFFORT

For each IPE reviewed and audited:

Subtask 1 116 contractor hours
Subtask 2 24 contractor hours
Subtask 3 100 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 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 submittals, (2) IPE review questions and licensee's response.

Technical Direction:

The NRC Project Manager is:

John H. Flack
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-492-3979