

1. AMENDMENT/MODIFICATION NO. Two (2)      2. EFFECTIVE DATE DEC 31 1980      3. REQUISITION/PURCHASE REQUEST NO. NRR-80-118 dtd 10/24/80      4. PROJECT NO. (if applicable)

5. ISSUED BY: U.S. Nuclear Regulatory Commission  
Division of Contracts  
Washington, DC 20555

6. ADMINISTERED BY (if other than block 5):

7. CONTRACTOR NAME AND ADDRESS: XYZYX Information Corporation  
21116 Vanowen Street  
Canoga Park, CA 91303

8. AMENDMENT OF SOLICITATION NO. \_\_\_\_\_ DATED \_\_\_\_\_ (See block 9)

MODIFICATION OF CONTRACT/ORDER NO. NRC-03-80-118 DATED 2/20/80 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers  is extended.  is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning \_\_\_\_\_ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted, or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (if required)

B&R No. 20-19-10-33      FIN No. B-6872      OBLIGATE \$35,873.00

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a)  This Change Order is issued pursuant to \_\_\_\_\_  
 The Changes set forth in block 12 are made to the above numbered contract/order.

(b)  The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c)  This Supplemental Agreement is entered into pursuant to authority of mutual agreement of the parties  
 It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

This modification exercises the option to extend the contract and the contractors performance to include Task 2 at the total estimated cost of \$35,873.00, which includes \$33,216.00 in cost and \$2,657.00 fixed fee. Also Tasks 1 and 2, the period of performance and the reporting requirements are revised at no additional cost to the government. For clarification purposes, this modification contains Article I through IV in their entirety. Therefore Articles I through IV, as modified by Modification No. 1, are deleted and restated as follows below. Wherever new revisions from the basic contract and modification one appear, the verbage is identified by a broken underscore (ex:     ) and an asterick in the margin.

"ARTICLE I - STATEMENT OF WORK (For the purpose of this document, the terms "contract" and "contractor" shall be construed to mean "subcontract" and "subcontractor," respectively.)

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect

13.  CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT       CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR: \_\_\_\_\_ BY: [Signature] (Signature of person authorized to sign)

17. UNITED STATES OF AMERICA BY: [Signature] (Signature of Contracting Officer)

15. NAME AND TITLE OF SIGNER (Type or print): Robert L. Gold, Vice President      16. DATE SIGNED: 8 Dec 80

18. NAME OF CONTRACTING OFFICER (Type or print): D.J. Doughterty      19. DATE SIGNED: \_\_\_\_\_

A. Background

As part of its effort following the Three Mile Island Unit 2 accident, the NRC Bulletins and Orders Task Force has required modifications to operating procedures pertaining to emergency conditions for a number of operating reactors.<sup>1</sup> As a result of its review of these procedures, the staff has begun to question whether the procedures are optimally designed from a human factors viewpoint. In addition, the NRC Lessons Learned Task Force<sup>2</sup> has proposed that the review of emergency operating procedures should include consideration of pertinent theories of education, crisis management, and human factors as part of the underlying bases for licensing. The Lessons Learned Task Force found that the previous NRC reviews of emergency operating procedures did not specifically investigate their compatibility with design bases of the systems involved nor did they include the discipline of human factors.

B. Objective

The objective of this work effort is to obtain technical expertise in the area of human factors and man-machine interfaces engineering to assist the NRC in arriving at psychological and human factor considerations to be followed in the development of nuclear power plant operating procedures.

C. Work Requirements1. Task 1 - Review of Nuclear Power Plant Operating Procedures for Small Break Loss-of-Coolant (LOCA) Accidents.

Review and evaluate, from human factors and man-machine interface engineering considerations, the emergency operating procedures for plant operators to respond to small break loss-of-coolant accidents for the plants listed below. Identify the problem areas in the procedures and recommend improvements for each of the plants.

B&W

1. Oconee
2. Rancho Seco
3. Arkansas

CE

7. Calvert Cliffs
8. Maine Yankee
9. Palisades

Westinghouse

4. Point Beach
5. Zion
6. Surry

GE

10. Quad Cities
11. Browns Ferry
12. Oyster Creek

Note: NRC reserves the right to make substitutions to the above list at no additional cost or fixed-fee to the Government.

1/ Examples of such required modifications are addressed in the Attachments 1 and 2 to this Statement of Work.

2/ NUPEG-0585, "TMI-2 Lessons Learned Task Force Final Report," October 1979.

2. Task 2 - Development of Human Factors Considerations to be Used in Preparing Nuclear Power Operating Procedures (OPTION).

- a. This contract shall be extended to include task 2 at the unilateral option of the Government. The Contracting Officer shall provide written notice of extension to the Contractor within the period of performance specified in this contract if the Government chooses to exercise this option. Prior to issuing this notice, the Contracting Officer shall have given preliminary notice of the Government's intention to extend this contract at least thirty (30) days before the contract is to expire. (Such a preliminary notice shall not be deemed to commit the Government to extension.) The total duration of this contract including the exercise of the option stated under this Article shall not exceed 15 months. Should the Government exercise the option hereunder, all contractual terms and conditions shall apply during the option period.
- b. Prepare recommendations and guidance as to the human factors and man-machine interface engineering factors that should be used and followed when preparing nuclear power plant operating procedures for emergency conditions. All relevant human factors elements should be considered including but not limited to (1) the usability of the procedures by the operators, (2) depth & format of the procedures, (3) the nature of operator error resulting from use of the procedures, (4) other human factors considerations as addressed in documents relating to licensing of nuclear power plants, and (5) experience outside the commercial nuclear industry in the use of written procedures for crisis mitigation.
- \* c. Subtask A
- \* These recommendations shall include examples of the proper way to formulate emergency procedures, considering the above mentioned factors. From the effort in Task 1, the contractor shall categorize and depict typical procedural deficiencies which he has identified. For each potential category of deficiency, the contractor shall demonstrate methods which can be used to eliminate the deficiency. In this review, the contractor should attempt to illustrate significant deficiencies of all the items identified in his procedural checklist, formulated for Task 1, and should also attempt to denote groupings or trends in such deficiencies.
- \* d. Subtask B
- \* The contractor shall provide a short excerpt (e.g., 5 pages minimum) of a model procedure which illustrates state-of-the-art procedure formulation. The RC will provide technical guidance to the contractor as requested to aid the contractor's understanding of nuclear power plant principles.

D. Meetings and Travel

Two meetings of one-day duration in Bethesda, Md. are planned. One meeting is to be held after completion of Task 1 to discuss results and findings and to discuss the details of proceeding with Task 2; the other after submission of the draft for Task 2 to discuss staff comments. These meetings shall be conducted with representatives of the NRC and the contractor.

The contractor shall visit six nuclear power plants sites and two simulators for the purpose of discussing training and other related issues regarding the procedures. The plant selections shall be agreed upon between the NRC Project Officer and the contractor.

E. Reporting Requirements

1. Task 1-

a. Interim Reports -

Reproducible interim reports and three copies containing the preliminary study results of all plant sites based on the procedures furnished to the contractor by NRC shall be submitted prior to the NRC site reviews.

Eight reproducible draft reports containing the results of the preliminary study of the site and the review and evaluations performed during the six nuclear power site visits and two simulator visits by the contractor shall be submitted to the NRC Project Officer no later than one week subsequent to the visits.

b. Final Report -

\* The final report shall contain a summary of nine plant reviews  
\* plus recommendations for further improvements to the procedures.  
\* The final report shall also include a description of the basis  
\* for development of the recommendations called for in Task 2.  
\* The contractor shall submit a draft of the final report to the  
\* NRC Project Officer no later than January 1, 1981. The NRC  
\* Project Officer will furnish comments on the draft final  
\* report no later than January 15, 1981. A reproducible final  
\* report and ten copies, incorporating NRC's comments, shall be  
\* submitted to the NRC Project Officer, and one copy shall be  
\* submitted to the Contracting Officer no later than January 31,  
\* 1981. The final report shall be prepared in accordance with  
\* Appendix B, NRC Manual Chapter 3202.



2. Task 2 (OPTION) -

- a. A reproducible draft report and three copies containing the recommendations and the basis upon which the recommendations were developed shall be submitted to the NRC project officer no later than February 1, 1981. The NRC project officer shall furnish comments on the draft no later than February 15, 1981. A reproducible final report and ten copies incorporating NRC's comments shall be submitted to the NRC project officer no later than March 1, 1981.
  - \* February 1, 1981.
  - \* February 15, 1981.
  - \* March 1, 1981.
- b. This final report shall be prepared in accordance with Appendix B, NRC Manual Chapter 3202.

3. Monthly Business Letter -

A monthly business letter report will be submitted by the 15th of the month to the cognizant branch chief with one copy to the cognizant Assistant Director, one copy to the Technical Support Branch, ATTN: B. L. Grenier, and one copy to the Contracting Officer. These reports will contain the following information related to the accomplishment of this program.

- a. Summary of the progress and work completed during the period, including milestones reached or, if missed, an explanation provided;
- b. The amount of funds expended for manpower and computer during the period and cumulative to date;
- c. If problems are encountered or anticipated, a description of the plans for their resolution, the schedule of their implementation and their impact on the overall program; and
- d. Plans for the next reporting period.

ARTICLE II - PERIOD OF PERFORMANCE

Performance under this contract shall commence on the effective date of this contract and shall continue through March 1, 1981 at which time all work shall have been completed and all reports shall have been delivered to the NRC as required in Article I.

ARTICLE III - GOVERNMENT FURNISHED MATERIAL

- a. One copy of the twelve emergency operating procedures and a copy of NUREG-0585 shall be provided to the contractor periodically throughout the term of the contract.
- b. If the Government-furnished property, suitable for its intended use, is not so delivered to the Contractor, the Contracting Officer shall, upon timely written request made by the Contractor, and if the facts warrant such action, equitably adjust any affected provision of this contract pursuant to the procedures of the "Changes" clause hereof.

ARTICLE IV - CONSIDERATION

A. Estimated Cost, Fixed Fee And Obligation

1. It is estimated that the total cost to the Government for full performance of this contract including Task 2 will be \$94,036.00 of which the sum of \$87,071.00 represents the estimated reimbursable costs, and of which \$6,965.00 represents the fixed fee.
2. Total funds currently available for payment and allotted to this contract are \$94,036.00.

B. Indirect Costs

The contractor shall be reimbursed for labor overhead at a provisional rate of 239% applied to a base composed of salaries and wages. The Contractor's overhead costs reimbursable under this contract shall be limited to \$54,267.00. Overhead costs incurred in excess of \$54,267.00 shall be considered unallowable."