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

JUL 24 1980

Parameter, Inc.
ATTN: Mr. Richard Lofy, President
13545 Watertown Plank Road
Elm Grove, WI 53122

Gentlemen:

SUBJECT: CONTRACT NO. NRC-05-80-251, Task Order No. 3

Pursuant to the pertinent provisions of this contract, I hereby authorize the expenditure of $45,000.00 of the funds currently obligated under this contract to provide technical assistance and services in the independent metallurgical analysis of cracked stud bolts from Occone Unit 3.

If you believe that the total ceiling price is inadequate for the purposes of this task order, you must so notify my within ten (10) business days after its receipt. Said notification shall contain your estimate of the required total ceiling cost. Within ten (10) business days after receipt of such notification, the Contracting Officer shall either ratify the total ceiling cost or adopt the proposed revised estimate or some combination of the two and revise or confirm the task order accordingly.

This letter, executed on behalf of the Commission, is forwarded to you in quadruplicate. Please acknowledge receipt on three (3) copies hereon and return them to me as soon as possible. The forth copy is for your retention.

Sincerely,

Kellogg V. Morton, Chief
Research Contracts Branch
Division of Contracts
Office of Administration

Enclosure: Task Order No. 3 (4)

Received:

Parameter, Inc.

(X) Agree
( ) Disagree
( ) Notification will be submitted by _____
Date

BY: Richard C. Yoh

TITLE: PRES.

DATE: 7/31/80

PARAMETER INC.
CONTRACT NO. NRC 05-80-251
TASK ORDER NO. 3

1. Scope of Work

Provide NRC-IE assistance and services in the independent metallurgical analysis of cracked stud bolts as outlined in the statement of work below.

2. Background

Duke Power Co. reported to NRC-IE on June 26, 1980 that during scheduled steam generator tubing maintenance at Oconee Unit 3, visual and ultrasonic examinations indicated cracking in 8 of the 64 stud bolts used to attach the upper and lower manway access covers on the steam generators. All studs for the manway covers will be replaced in kind.

These studs are 2-inch diameter (8 thread/inch) studs reportedly manufactured by B&W from certified SA 340 grade L-43 low alloy steel supplied by Ryerson Steel Co. and were furnished with the steam generators. Since the studs are a critical part of the reactor coolant boundary integrity, it is essential that the nature and probable cause of the cracking be determined so that appropriate steps can be taken to prevent recurrence of the problem.

3. Statement of Work

The actual laboratory analysis and evaluation shall consist of the following:

a. Photographs will be taken of the two studs in the "as received" condition to preserve physical features, especially crack areas, prior to specimen removal for other tests. If some decontamination to reduce radioactivity levels is necessary, this is to be done using appropriate methods and solvents which will not result in removal of surface deposits, characterics or otherwise damage the cracked sections for failure analysis studies.

b. Perform optical examination of the stud surfaces at suitable magnifications to determine crack initiation sites. Surface conditions and characteristics of defect sites (cracks, mechanical abuse, machining deficiencies, etc.) are to photographically recorded.

c. Perform optical metallography of selected specimen sections containing cracks. Provide evaluation of grain structure, carbide substrates, nature of cracking and other microstructure anomolies observed.

d. Based on optical metallography studies, conduct scanning electron metallography studies and EDAX analysis or representative crack areas. Provide an evaluation of the following:

(1) Characterization of fracture surfaces - initiation sites, fracture morphology with respect to fatigue, stress corrosion, stress overload, etc.

(2) Analysis of identified deposits on thread and crack surfaces, and qualitative correlation with chemical analysis of base material.

e. Perform hardness survey of crack areas and correlate to mechanical properties evaluation.

f. Perform quantitative chemical analysis of both studs by the most appropriate method to suitably characterize the stud material and determine conformance to specification limits.

g. Perform two room temperature tensile tests of each stud in accordance with applicable ASTM Standards for materials testing and determine conformance of stud mechanical properties (e.g., yield strength, ultimate strength elongation, R.A., etc.) to specification requirements.

4. Report Requirements

Upon receipt of the stud samples at the designated laboratory for analysis, the following reports are required:

a. Results of laboratory analysis and evaluation as the work progresses shall be verbally communicated to the IE Headquarters Project Officer on a weekly basis.

b. A preliminary report on the complete analysis and evaluation shall be submitted within 20 days for the Project Officer's review.

c. Forty (copies) of a written final report shall be submitted to the IE Project Officer within 45 days.

5. Special Instructions

The NRC shall reimburse the contractor as invoiced for allowable costs incurred in shipment of the stud samples to the designated laboratory for analysis.

All unconsumed portions of the studs are to be properly identified and retained by the designated laboratory, or the Contractor, for a period of three months or until advised by NRC-IE Headquarters regarding disposition.

6. Places of Performance

   a. Parameter Inc.

   b. Battelle Columbus Laboratories

   c. University of Wisconsin - Milwaukee

7. Cost Ceiling

   $45,000