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JUN 1 1984

Mr. Gregory J. Ogeka, Chief
Administrative Branch
Brookhaven Department of Energy
Building 464
Upton, New York 11973

Dear Mr. Ogeka:

SUBJECT: FIN A3500 - TASK ORDER 004

This is authorization for the Brookhaven National Laboratory to accomplish the work of the enclosed Task Order. The material to be tested was shipped directly to Brookhaven National Laboratory by Duke Power Company. Verbal authorization to commence work on Phase I of this Task Order upon receipt of the material was provided to Mr. C. J. Czajkoski, BNL, by Mr. J. J. Blake, Region II Task Supervisor, on April 27, 1984.

Terms and conditions for this work are described in the FIN A3500 Statement of Work. If you have any questions about this work, please contact Mr. G. L. Troup on FTS 242-5595.

Thank you for your assistance.

Sincerely,

(Original signed by AFGibson)

John A. Olshinski, Director
Division of Reactor Safety

Enclosure:
FIN A3500 - Task Order 004

cc w/encl:
R. W. Barber, HQ-DOE
R. H. Bauer, CHOO-DOE
A. J. Romano, BNL
H. C. Grahn, BNL

bcc w/encl:
T. N. Loy, RII
G. L. Troup, RII
A. R. Herdt, RII
J. J. Blake, RII

RII
GLTroup:ph
05/31/84

RII
J.J. Blake
06/1/85

RII
A. Herdt
06/1/84

JUN 1 1984

FIN A3500

TASK ORDER 004

METALLURGICAL ANALYSIS

OF

STAINLESS STEEL SOCKET WELDS

CATAWBA UNIT 1

(50-413)

SIGNED BY TROUP

5/31/84

G. L. Troup
Project Manager

Date

TASK SUPERVISOR

Mr. Jerome J. Blake, Section Chief, Materials and Mechanical Section, Division of Reactor Safety (telephone FTS 242-5539) is the designated Task Supervisor for this Task Order. Mr. Nick Economos, Metallurgical Engineer (telephone FTS 242-5580) is the alternate contact for technical matters.

BACKGROUND

Welding procedures for stainless steel socket welds include an interpass temperature requirement that the weld area be allowed to cool below a specified temperature, generally 350°F, between weld passes. If the interpass temperature control is not adhered to and the welds are made almost continuously, increased sensitization of the weld area could occur. After the oxide film is removed from the weld area, improperly welded sockets may not be distinguishable from properly welded sockets by visual or nondestructive examination. In order to conduct independent inspections of socket welds in situ, a nondestructive metallographic examination method is required which will indicate if excessive heating occurred during welding, as evidenced by sensitization of the materials adjacent to the weld.

Four sets of welds were fabricated using different pipe sizes and fittings (such as 2 inch, schedule 160 pipe with a 6000 lb. fitting). Each set consisted of a fitting welded in accordance with the welding procedure (i.e., with interpass temperature control) and a fitting welded without controls. The eight sample fittings were cut in half for metallurgical analysis. Half of each fitting was given to the NRC for examination; these samples were sent to BNL for metallographic examination. The other half of each fitting was retained by the fabricator for independent testing and examination.

OBJECTIVE

The objective of this task is to assess the potential damage done to stainless steel socket weld connections by overheating during welding, determine if the socket weld sample sets can be used as standards for in situ nondestructive metallographic examination of socket welds, and provide assistance to the NRC during inspection of socket weld connections at the Catawba site, if an acceptable in situ examination method can be developed.

WORK REQUIREMENTS

Work on this task will be divided into two phases:

PHASE I

Four sets of stainless steel socket weld samples were provided for this test. One sample from each set represents approved welding technique and the other represents the same welding parameters with no interpass temperature controls.

Work to be performed is:

- (1) Metallographically examine cross sections cut from each sample to assess the degree of sensitization and relative size of weld heat affected zone.
- (2) Using various nondestructive metallographic techniques (such as oxalic acid electropolishing per ASTM A-262) examine the outside surfaces of the sample sets to determine if metallographic differences exist between the samples in each set. The objective of this phase is to establish, if possible, an examination method which can be used in the field on suspect welds to determine if excessive heating occurred during fabrication.

PHASE II

After a suitable examination technique is established, an on-site examination will be performed on approximately 12-15 welds for indications of improper welding technique. Welds to be examined will be designated by the task supervisor (or his designee).

REPORTING REQUIREMENTS

Business letter reports covering project status and financial costs shall be submitted in accordance with the statement of work. For accounting purposes, the docket number for Catawba Unit 1 is 50-413.

The results of the analysis performed and any conclusions concerning the examination shall be documented in a letter report to the task supervisor. Six sets of any photographs taken as part of the analyses shall be provided to the task supervisor.

TRAVEL

The Phase II examination will require a one week trip to the Catawba site, near Rock Hill, South Carolina, for one person. This trip will be in the company of the task supervisor or his designee.

A two-day trip for one individual to Atlanta may be required to discuss the results. Information concerning the meeting will be provided by the task supervisor.

COST CEILING

In accordance with the statement of work.

SIGNED BY TROUP

G. L. Troup
Project Manager

5/31/84

Date