

OAK RIDGE NATIONAL LABORATORY

OPERATED BY

UNION CARBIDE CORPORATION

NUCLEAR DIVISION



POST OFFICE BOX X

OAK RIDGE, TENNESSEE 37830

February 8, 1971

OFFICE OF THE DIRECTOR

U.S. Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee 37830

Attention: Dr. H. M. Roth

Gentlemen:

Subject: Request by Consolidated Edison Company of New York, Inc.
for ORNL Services

On Wednesday, January 20, the Laboratory was advised by Consolidated Edison (Con Ed) Company of New York, Inc. (phone call from John J. Grob of Con Ed to Wm. B. Cottrell of ORNL) that the Indian Point No. 3 pressure vessel had been "dropped" in the process of installation at the site when the hoisting crane failed. Con Ed's prime contractor, Westinghouse, and their subcontractor, Combustion Engineering, are developing a program of inspection and analysis to ascertain the integrity of the vessel. However, in view of ORNL's nationally recognized role in the direction of the Heavy Section Steel Technology (HSST) Program, as well as of our role in coordinating related pressure vessel technology for the Commission, Con Ed felt that we were uniquely qualified to further advise them as to what should be done. Furthermore, Con Ed was anxious to have us examine the site as soon as possible since they desired early "restoration" of the vessel and impacted surfaces of the site, as needed. The extent of damage and the condition of the vessel, its supports, and related equipment were not well defined at that point. There was obvious advantage in seeing the immediate circumstances of the accident in order to fully evaluate later findings.

Recognizing the significance of the Con Ed accident to the Commission's programmatic interests, Mr. Cottrell directed three of our staff members from the HSST Program to visit the site. These staff members were Dr. Dominic Canonico (metallurgist and leader of the group), Mr. John Merkle (fracture analyst), and Mr. Robert McClung (inspection specialist). They left the following morning, January 21, and spent two half-days at the site. Their trip report covering this visit is attached hereto.

When these initial arrangements were being discussed, it was mutually agreed that Con Ed would reimburse ORNL for all travel expenses associated with the visit, and that our interest in pressure vessel technology warranted our taking ORNL time to make the trip. It was further recognized that our

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continued consultation in this matter - while of unquestionable benefit to Con Ed - would be of decreasing benefit to the Commission's pressure-vessel program, despite the relevance to it. This aspect was pointed out by Mr. Cottrell in his initial discussion with Mr. Grob, who indicated that Con Ed would be willing to reimburse us fully for future consultation services. Accordingly, we have instructed Con Ed to write to you in this regard, and it is our understanding that they plan to do so.

We found the trip to be quite rewarding in many ways with respect to our understanding of the industrial approach to pressure-vessel technology. We were supplied with photographs and drawings of the vessel, as well as with information relating to the shipment and handling of such pressure vessels which, in this instance, led to the incident. The determination of vessel impact energy from damage to the surfaces impacted and the effect on the vessel is of great programmatic interest to us, as is the comparison of existing inspection records with those yet to be obtained by Con Ed's subcontractors on this relatively thick-walled (8 5/8 in.) vessel. It was also of interest - although outside the scope of our consultation - to find out that a crane of 175-ton capacity was used to hoist the approximately 440-ton vessel and skid.

Because of the relevance of this proposed consultative service to the Commission's pressure vessel programs at ORNL, we urge that the Commission give favorable consideration to the request which Con Ed is to submit to you in the immediate future.

Sincerely yours,



Alvin M. Weinberg
Director

AMW:WBC:zt

Attachment: Letter, D. A. Canonico to W. B. Cottrell, "Visit to Indian Point Site, Buchanan, New York, to Investigate Unscheduled Descent of the Indian Point 3 Reactor Pressure Vessel," February 1, 1971

cc: S. E. Beall
D. F. Cope, OSR-ORNL
W. B. Cottrell
F. L. Culler
R. F. Hibbs
D. B. Trauger

INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

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To: W. B. Cottrell

Xc: J. E. Cunningham
 W. O. Harms
 R. W. McClung
 J. G. Merkle
 G. M. Slaughter
 J. R. Weir, Jr.
 G. D. Whitman

Subject: Visit to Indian Point Site, Buchanan, New York, to Investigate
 Unscheduled Descent of the Indian Point III Reactor Pressure
 Vessel

On January 12, 1971, the Indian Point III vessel underwent an un-scheduled descent while it was being hoisted prior to its placement in position in the pit in which it is to operate. In an ensuing conversation, Consolidated Edison (Con Ed) asked if Oak Ridge National Laboratory would review the Westinghouse (W.E.) and Combustion Engineering (C.E.) program to assess the extent of damage to the pressure vessel. Toward that end, W. B. Cottrell asked that J. G. Merkle, R. W. McClung, and I visit the Indian Point site, meet with the personnel involved, and obtain a first-hand view of the vessel and its surroundings.

We arrived at the site on Thursday, January 21. Our contact was Mr. Ed Dadson who took us in tow and served as our personal guide and question answerer. During our visit, we met a number of other people whose names, positions, and company affiliations are listed below.

Consolidated Edison

Ed Dadson, Quality Control Staff Assistant, Indian Point
 Construction
 Zeke Kravets, Senior Engineer, Mechanical Engineering
 Department, Temporary Assignment to Indian Point III
 Frank Matra, Construction Superintendent, Indian Point III
 A. C. Husband, Vice President, Construction
 George Wasilenko, Assistant Division Engineer, Mechanical
 Engineering Department

WEDCO

Don Anderson, Vice President, Indian Point III Construction
 Ed Powell, Vice President, Indian Point II Construction

*Attachment to February 8, 1971, letter from Alvin M. Weinberg to
 U.S. Atomic Energy Commission (Attention: Dr. H. M. Roth), subject:
 "Request by Consolidated Edison Company of New York, Inc., for ORNL
 Services."

Shortly after our arrival, we visited the Indian Point III site where the pressure vessel had undergone the unscheduled realignment. My first impression was one of relief; the vessel was sitting on its delivery skid and, if one did not know of the accident, he would not have been immediately aware of any "descent" of the pressure vessel ("dropped" or "fallen" seem too damning). The accident as it was described to us occurred as follows:

On January 12, the hoisting of the vessel and skid to the upright position was started. The vessel was lifted to about 85°, at which point the crane motors became overheated (apparently this is not uncommon and no one was disturbed by this occurrence) and lifting was halted. Mr. Dadson said he left the site at this point. He was back at his desk working (a distance of about 1/4 mile) when he heard a tremendous noise; he looked out of the window of the field office shack and saw papers and debris above the open-topped secondary shell which is being welded in place. (It is currently about 50 to 60 ft high.) When he arrived at the site, the pressure vessel was sitting as we saw it on January 21.

Two stories are given as causes for the rapid descent. One involves the failure of a cable; the second concerns the failure of the hoist mechanism in the crane facility.

The crane has a rated capacity of 175 tons (based on a safety factor of 3) and the vessel (with crane hook) weighs in excess of 443 tons. This same crane, however, was used to lift the identical Indian Point II reactor pressure vessel into position. Further, this crane and these same cables were recently used in the Indian Point III site to place the vertical steam generators in position. These weighed about 320 tons.

There are also contradictory stories regarding the height of the vessel at the time of failure. These stories range from about three feet to its not being off the ground. The time of descent has been certified to be between 15 and 60 sec. The Con Ed people are confident that it took at least 15 sec to return to its prone position. This is based on the fact that the personnel were able to clear the building at the time of impact.

John Merkle, Bob McClung, and I were allowed to investigate the vessel and its surrounding area. I had brought along a 35-mm camera and shot a roll of black and white film. These pictures are now available. We saw no immediately visible damage to the vessel. The control rod tubes were not touched. There is evidence that the vessel may have shifted slightly (a matter of perhaps 1 to 3 in.) on the skid. Our investigation of the area on which the vessel currently resides provided some information. First, the vessel and skid sit on 1/2-in.-thick plates that are tack welded together. These plates sit on 24-in.-deep wide-flange beams. The descent of the vessel and skid caused the webs of six beams to buckle over a distance of about 4 to 5 ft. The buckled regions were at the end of the beams near the top left area of the vessel (left when viewing into the bottom of the vessel). We could see no tack welds that were cracked. These welds were about 1 to 2 in. long. They had large crater areas and probably have a rather poor toughness at the temperature (about 30°F) that prevailed at the time of the accident. These welds occurred often over the steel floor. They were present under the vessel (between the skid runners) as well as locations quite near the vessel.

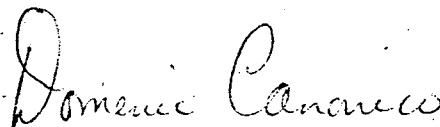
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Pieces of plywood were also available for inspection. These were in place beneath the front runners of the skid, and efforts will be made to determine the amount of deformation which they underwent. An effort will be made to correlate the plywood deformation with the loads to which it was subjected.

After our visual inspection of the site, we were given a set of Con Ed photographs for our review. These were commercial photographs of the vessel as it was being delivered, hoisted into position, and after the descent. (We were permitted to take these to our motel room that evening. We reviewed them and asked that a number of them be sent to us.)

Mr. Dadson then took us to meet Mr. Don Anderson, WEDCO Vice President for the construction of Indian Point III. While we were talking to Mr. Anderson, we were joined by Mr. Ed Powell, WEDCO Vice President for the construction of Indian Point II. We were cordially received and were offered any help we wanted from WEDCO. Mr. Anderson related his description of the accident and it was quite similar that of Mr. Dadson. (WEDCO is a subsidiary wholly owned by W.E.)

On January 22, we returned to the site and met once again with Mr. Dadson. While we were talking, Mr. A. C. Husband, Vice President of Construction for Con Ed, was visiting the site, and he stopped by to meet us and introduce himself.



D. A. Canonico
Metals and Ceramics Division

DAC:fc