



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

SEP 6 1988

MEMORANDUM FOR: Victor Stello, Jr.
Executive Director for Operations

FROM: Sharon R. Connelly, Director
Office of Inspector and Auditor

SUBJECT: IDENTIFICATION OF A POSSIBLE SAFETY ISSUE AT ARKANSAS 2

It has recently come to the attention of this office that there may be a previously unidentified safety issue at the Arkansas Unit 2 facility. This matter concerns the use of the ferritic stainless steel E-Brite in a heat exchange unit fabricated by Allegheny Ludlum Steel Corporation.

Concerns about the use of the E-Brite material were originally brought to the attention of the NRC in 1986. A response letter (Attachment 1) was sent to the allegor from Eilis W. Merschoff, Chief, Reactive Inspection Section, Vendor Program Branch, Division of Quality Assurance, Vendor and Technical Training Center Programs, Office of Inspection and Enforcement, dated November 3, 1986 regarding the concerns (Allegation No. RIV-86-A-06). It indicated that "an inspection of the BOC Group (formerly Airco Vacuum Metal) located in Murray Hill, New Providence, New Jersey, was performed in September 1986 by the Office of Inspection and Enforcement." Enclosed with the letter was a copy of the inspection report (No. 99901063/86-01) dated October 9, 1986. "The purpose of this inspection was to review records pertaining to E-Brite 26-1 metal manufactured by Airco Vacuum Metals (currently the BOC Group) to determine if any of the material was shipped to nuclear power plants in the 1970s as was stated in an allegation."

The report indicated that the inspector (J. Conway) met with the allegor in August 1986 "to gather information pertaining to the allegation involving E-Brite 26-1 material produced by AVM at their Berkely, [sic] California facility. The allegation is that E-Brite 26-1 is a defective material because it cannot be welded, and its ductile to brittle transition temperature cannot be controlled thus making its use in nuclear reactors extremely hazardous. The allegor believes that E-Brite 26-1 material is in a number of domestic nuclear power plants."

An extensive number of customer names and shipping records (1970-1977) were noted as being reviewed. "None of the orders referenced code case 1505 for ASME Section III 'Nuclear Power Plant Components' requirements. Based upon the review of records at the BOC Group's facilities in Murray Hill, New Providence, New Jersey and discussions with Mr. Kies, it was determined that AVM did not supply E-Brite 26-1 material to a nuclear facility. Accordingly, the allegation pertaining to the use of E-Brite 26-1 items in a domestic nuclear power plant cannot be substantiated."

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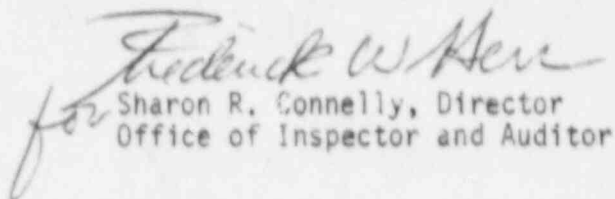
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However, E. O. Woolridge, MEB/DE/RES in a memorandum (Attachment 2) to C. Z. Serpan, Jr., Chief, MEB/DE/RES dated February 5, 1988 stated that on February 4, 1988, he

attended a presentation made by Allegheny Ludlum (AL) on the ferritic stainless steel E-Brite. AL has owned the patent rights on this alloy since 1978.

The only known nuclear application of this alloy is in tubing for a heat exchange in Arkansas Unit 2.

It does not appear that a determination was made in the original inspection report concerning the substance of the allegation, only its use in nuclear facilities as a basis for proceeding further. Accordingly, this matter is being referred to you for any further action you may deem appropriate.


for Sharon R. Connelly, Director
Office of Inspector and Auditor

Attachments:
As stated



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

ATTACHMENT N^o 6
NOLAN / LOGAN (NRC
SHEET 1 OF 5

November 3, 1986

Docket No. 99901063/86-01

Hadco & Associates, Inc.
ATTN: Mr. Harold L. Nolan
President
1914 Elmhurst Drive
Arlington, Texas 76012

SUBJECT: ALLEGATION NO. RIV-86-A-06

Gentlemen:

Based on your concerns directed to the Region IV office of the Nuclear Regulatory Commission in July 1986, an inspection of the BOC Group (formerly Airco Vacuum Metals) located in Murray Hill, New Providence, New Jersey, was performed in September 1986 by the Office of Inspection and Enforcement.

A copy of the Vendor Program Branch inspection report (No. 99901053/86-01) is enclosed for your information.

Sincerely,

Ellis W. Merschoff, Chief
Reactive Inspection Section
Vendor Program Branch
Division of Quality Assurance, Vendor,
and Technical Training Center Programs
Office of Inspection and Enforcement

Enclosure:
Inspection Report 99901063/86-01

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ATTACHMENT 1

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ORGANIZATION: THE BOC GROUP, INCORPORATED
 MURRAY HILL, NEW PROVIDENCE, NEW JERSEY.

REPORT NO.: 99901063/86-01	INSPECTION DATES: 09/08-09/86	INSPECTION ON-SITE HOURS: 13
<p>CORRESPONDENCE ADDRESS: The BOC Group, Incorporated ATTN: Mr. Frederick K. Kies Director, Technical Resources 100 Mountain Avenue Murray Hill, New Providence, New Jersey 07974</p> <p>ORGANIZATIONAL CONTACT: Mr. Frederick K. Kies TELEPHONE NUMBER: (201) 464-8100</p>		
<p>NUCLEAR INDUSTRY ACTIVITY: None.</p>		
<p>ASSIGNED INSPECTOR: <u>J. T. Conway</u> 10-9-86 J. Conway, Reactive Inspection Section (RIS) Date</p> <p>APPROVED BY: <u>J. T. Conway</u> 10-9-86 W. Merschhoff, Chief, RIS, Vendor Program Branch Date</p>		
<p>INSPECTION BASES AND SCOPE:</p> <p>A. <u>BASES</u>: 10 CFR Part 50, Appendix B.</p> <p>B. <u>SCOPE</u>: The purpose of this inspection was to review records pertaining to E-Brite 26-1 metal manufactured by Airco Vacuum Metals (currently The BOC Group) to determine if any of the material was shipped to nuclear power plants in the 1970s as was stated in an allegation.</p>		
<p>PLANT SITE APPLICABILITY: Not identified.</p>		

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A. <u>VIOLATIONS:</u> None.		
B. <u>NONCONFORMANCES:</u> None.		
C. <u>UNRESOLVED ITEMS:</u> None.		
D. <u>OTHER FINDINGS AND COMMENTS:</u> 1. <u>Allegation</u> <p>In June 1986, the NRC RIV office was notified of an allegation contained in a June 11, 1986 letter to President Reagan in which the allegor expressed knowledge that defective material was used in nuclear power plants in the United States. In July 1985, the allegor delivered to the NRC RIV office a "Partial Data File Regarding Defective E-Brite 26-1 Materials." The file which consisted of copies of test reports generated by or for Air Reduction Company (AIRCO) was reviewed by the NRC inspector from the Vendor Program Branch (VPB). The reports covered a time period from 1970 through 1976 when AIRCO Vacuum Metals (AVM), a division of AIRCO, was developing the alloy designated "E-Brite 26-1."</p> <p>In August 1986, the NRC inspector met with the allegor to gather information pertaining to the allegation involving E-Brite 26-1 material produced by AVM at their Berkely, California facility. The allegation is that E-Brite 26-1 is a defective material because it cannot be welded, and its ductile to brittle transition temperature cannot be controlled thus making its use in nuclear reactors extremely hazardous. The allegor believes that E-Brite 26-1 material is in a number of domestic nuclear power plants.</p> <p>On August 26, 1986, the NRC inspector contacted Mr. Frederick Kies, the Director of Technical Resources for The BOC Group located in Murray Hill, New Providence, New Jersey. Mr Kies, who was involved with the development of E-Brite 26-1 at AVM, stated that The BOC Group purchased AIRCO in 1978. In the 1970s, AVM developed a high purity ferritic stainless steel produced by the electron beam refining process and received a patent on the alloy which was called E-Brite 26-1. At their Berkely, California facility, AVM melted and cast</p>		

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ingots, and the finished products (e.g., strip, tubing, forgings, etc.) were fabricated by vendors. In 1978, AVM went out of business and sold the patent rights for E-Brite 26-1 to Allegheny Ludlum. The records pertaining to the production of E-Brite 26-1 by AVM have been retained at The BOC Group's facility in Murray Hill, New Providence, New Jersey.

At The BOC Group's facility in New Jersey, the NRC inspector reviewed 6 Monthly Sales Reports (MSR) and customer lists relating to E-Brite 26-1 for 1976. The MSR identified invoice no., customer, product, quantity, and price. A product summary on each MSR indicated that the products sold included strip, tube, bar, plate, pipe, fittings, fasteners, and forgings. The customer lists showed that approximately 400 companies had purchased E-Brite 26-1 material from AVM in 1976. The names of the companies and their locations could not be identified as nuclear customers.

Approximately 2900 shipping records (1970-50, 1971-50, 1972-205, 1973-300, 1974-340, 1975-530, 1976-830, and 1977-600) for E-Brite 26-1 were reviewed. The Notice of Shipment (NS) document contained information similar to that in a Certificate of Conformance. The NS described the product including referenced standards and heat numbers; and identified the quantity, customer, invoice number, shipper, and the shipment source, date, and destination. In 1970, all the orders reviewed were for slabs, ingots or pieces of strip which were shipped to steel companies, research companies, or engineering departments of other companies for development purposes. The majority of the orders in 1971 reflected this same product pattern, but the product line began to expand in 1972. None of the orders in 1970, 1971, and 1972 referenced a standard or specification (i.e., only "E-Brite 26-1" was identified). In 1973, orders began to reference "grade XM-27" under ASTM specifications (e.g., A268 for tubing and A240 for plate, sheet, and strip).

It was noted that finished items were shipped to customers from either AVM warehouses in Leetsdale or Glenwillard, Pennsylvania, consignee's (e.g., R. J. Gallagher, P. A. Frasse) facilities, or directly from a fabricator's facility. The following are typical items shipped from a fabricator's or consignee's facility on an AVM purchase order: tubing (Damascus Tube and Teledyne), strip (Universal Cyclops and Superior Steel), plate (G.O. Carlson), fittings (Raymond Brass and Sun Weld Fitting), fasteners (Raymond Brass), forgings (Western Forge & Flange), pipe (C. A. Roberts, R. J. Gallagher and P. A. Frasse and bar/rod (Blairsville and Latrobe Steel).

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ASME Code Cases 1496 and 1505 permitted the use of E-Brite 26-1 products - sheet, strip, and plate (SA-290), bar (SA-479), and seamless and welded tube (SA-268) - in the construction of Section VIII and Section III components, respectively. Both these code cases were approved in 1971. Of the approximate 2800 shipping records reviewed from 1972 through 1977, only 9 orders referenced code case 1496 for ASME Section VIII "Pressure Vessels" requirements.

The Section VIII orders included the following: In October 1974, plate (A-240) was sold to P. A. Frasse and shipped to Sybron Corporation in Elyria, Ohio on invoice no. 4396. Tubing was sold to P. A. Frasse and shipped to Union Carbide in Institute, West Virginia in February 1975. In April 1975, tubing was sent to Camden Alloy Fabricators in Camden, New Jersey, and a flanged/dished head was sent to Dupont in Deepwater, New Jersey on invoice nos. 4898 and 4870, respectively. Invoice nos. 5286 and 5295 covered bar-shipped to Lenape Forge in West Chester, Pennsylvania and forgings shipped to Allied Chemical in Geismar, Louisiana, respectively, in September 1975. Welded tubing (A-268) was shipped on invoice no. 5680 to Union Carbide in Institute, West Virginia in December 1975. In March 1976, a forging was delivered to Allied Chemical and forgings (SA182 and SA240) were sold to P. A. Frasse and delivered to Hampshire Chemical in Nashua, New Hampshire on invoice no. 7049 in November 1976. The 9 customers noted above cannot be identified as nuclear customers.

None of the orders referenced code case 1505 for ASME Section III "Nuclear Power Plant Components" requirements. Based upon the review of records at The BOC Group's facility in Murray Hill, New Providence, New Jersey and discussions with Mr. Kies, it was determined that AVM did not supply E-Brite 26-1 material to a nuclear facility. Accordingly, the allegation pertaining to the use of E-Brite 26-1 items in a domestic nuclear power plant cannot be substantiated.

2. Persons Contacted

Frederick Kies