

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-358/78-21

Docket No. 50-358

License No. CFP-55

Licensee: Cincinnati Gas and Electric Company
139 East 4th Street
Cincinnati, OH 45201

Facility Name: Wm H. Zimmer Nuclear Power Plant

Investigation At: Zimmer site, Moscow, Ohio and Husky Products, Inc.,
Florence, Kentucky

Investigation Conducted: September 18-22, and 28-29, 1978

Investigator: *J. E. Foster*
J. E. Foster

Inspector: *T. L. Vandell*
T. L. Vandell

F. Y. Wescott
F. Y. Wescott

Reviewed by: D. W. Hayes, Chief
Projects Section

C. E. Nohelius
C. E. Nohelius
Assistant to the Director

Investigation Summary

Investigations on September 18-22 and September 28-29, 1978 (Report No. 50-358/78-21)

Areas Inspected: Review of cable trays, pans and fittings located at the Zimmer site and at the Husky Products, Inc. plant; review of activities at the Husky Products, Inc. plant; and observation of testing activity at independent test labs. The investigations involved 143 inspector-hours by three NRC inspectors.

Results: One item of noncompliance (a deficiency) was identified in the control of special processes (welding). Details, Section III.

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INTRODUCTION

The Zimmer Unit 1 nuclear power plant, licensed to the Cincinnati Gas and Electric Company, is under construction near Moscow, Ohio. Serpent and Lundy is the Architect-engineering firm for the plant, which is being constructed by Kaiser Engineering. The facility will utilize a Boiling Water Reactor (BWR) designed by General Electric Company.

The Husky Products Division (husky) of the Burndy Corporation has supplied electrical cable pans for the Zimmer plant. These cable pans are utilized to route both safety-related and nonsafety-related electrical cables.

REASON FOR INVESTIGATION

On August 31, 1978, a copy of a letter written by Individual "A", a former Husky employee, was received at the NRC Region III (RIII) office (Exhibit I). This letter expressed concerns relative to the quality of electrical cable pans produced by Husky for use in the Zimmer and Clinton nuclear power plants, and alleged the use of weak materials and improper welding in cable pan construction. An NRC investigation was initiated into these allegations.

SUMMARY OF FACTS

Individual "A" was contacted by RIII personnel on September 8, 1978, and his concerns were discussed in general. These concerns related to the use of low strength materials and improper welding as contained in the letter attached as Exhibit I.

During September 18-20, 1978, RIII inspector visually inspected electrical cable pans at the Zimmer site, and found the welding of the pans to be acceptable. Site personnel agreed to have samples of the cable pan materials tested for material strength, and to have sections of cable pan destructively tested to determine the strength of the welds. Cable pans to be tested were then selected at random (by NRC and Utility representatives).

Cable tray samples selected were tensile tested, with the tests witnessed by an RIII inspector. All of the samples tested were found to exceed the specified yield point (test results attached as Exhibit V).

Destructive testing of welds was performed on a sample of the cable pans at the Zimmer site, also witnessed by RIII personnel. These tests indicated that the welds were of acceptable strength and size according to American Welding Society criteria.

Individual "A" was interviewed by RIII personnel. He indicated that the use of low strength material was a one-time occurrence which took place during the manufacture of cable pans for the Zimmer plant. Individual "A" stated that a shipment of steel was found to be of low strength, and the decision was made to use the shipment for "fittings" (curved sections of cable pan) only, but the shipment was not properly segregated. The shipment was inadvertently used in the production of straight sections of cable pan, he indicated.

Individual "A" was critical of the manual welding performed by Husky welders, and the welding certification program conducted by Husky. He indicated that the Husky welders had difficulty in passing the certification tests, and welded differently during the test than in production welding.

In addition, comments were received which related to work at the Clinton plant, and are covered in a separate report (IE report No. 50-461/78-06).

RIII personnel made two visits to the Husky facility in Florence, Kentucky. During plant visits, the manufacturing areas were toured, work in progress was observed, pertinent records were reviewed, and interviews were held with Husky personnel.

Records reviewed, and interviews held with Husky personnel indicated that Husky welders had been qualified as required by the American Society of Mechanical Engineers Code for Boilers and Pressure Vessels, Section IX (ASME Section IX). No information relative to the use of low strength materials could be developed.

On September 22, 1978, RIII personnel visited the Union Testing and Research Laboratory, where material samples had been tested for Husky during production of cable pans for the Zimmer plant. Records relating to all tests of material for Husky for the years 1974-1976 inclusive were reviewed. None of the test reports reflected that materials to be used in the Zimmer plant cable pans did not meet the specified yield strength requirements.

During a second visit to the Husky facility, signed statements were obtained from three Husky employees. The personnel interviewed indicated that they had no knowledge of any low strength materials being used in construction of cable pans for the Zimmer site. (See Exhibits II, III and IV).

During document review, it was found that the shielding gas and diameter of the filler material utilized for the welding process differed from the qualified welding procedure for a period of approximately four weeks. This is in nonconformance with ASME Section IX in that a variable of the welding process was changed without subsequent requalification of the welding procedure and welders.

Husky personnel stated that they would have their welding procedure qualified with the alternate shielding gas and filler material, to demonstrate that the quality of the welds was not affected by the changes in weld procedure. Later contacts with Husky personnel indicated that some manual welding had been performed prior to procedure qualification.

CONCLUSIONS

1. No evidence was developed that low strength material had been utilized in fabrication of electrical cable pans for the Zimmer plant.
2. Materials and welding for cable pans supplied by Husky to the Zimmer plant were tested and found to be acceptable.
3. Welder certification had been performed as required by Section IX of the ASME Boiler and Pressure Vessel Code.
4. Welding wire and shield gas were not as specified in the qualified welding procedure for a period in 1974. In addition, two welders performed welding without benefit of prior qualification. This is in nonconformance with 10 CFR 50, Appendix B, Criterion IX and Section IX of the ASME code. (See Details Section III).

DETAILS

Section I

Prepared by J. L. Foster
Reviewed by C. L. Norelius
Assistant to the Director

I. Personnel Contacts

Cincinnati Gas and Electric Company

L. A. Bergman, Vice President
B. E. Culver, Project Manager
K. P. Ehasz, Quality Assurance and Standards Engineer
D. C. Kramer, Quality Assurance and Standards Engineer
J. R. Schott, Station Superintendent
W. W. Schweirs, Principal Quality Assurance and Standards Engineer
W. D. Waymire, General Engineering Department

Kaiser Engineers, Inc.

B. Turner, Quality Assurance Manager

Husky Products

Fred L. Banta, Engineering R&D Manager
Don Dietrich, Tool Engineer
Clare F. Duncan, Quality Control Manager
Ronald C. Johnson, Production Foreman
Randy Pratt, Industrial Engineer
Ken Wixley, Welding Operator
Duane Ring, President
Barry Schuster, Utilities Market Manager

The William Powell Co. (Union Testing and Research Laboratory)

Steven L. Fogle, Assistant Manager of Laboratory
Edwin E. Winterfeldt, Corp. Manager of Quality Assurance

Individuals

Individuals "A" through "J"

Sargent and Lundy

M. E. Schuster

Cincinnati Post-Enquirer

Douglas Starr, Staff Reporter

Metcalf Research Associates

L. J. Fritz, Material Testing Supervisor

R. E. Davall, Testing Technician

FJS Machining Services, Inc.

J. Foster, President

2. SCOPE and CHRONOLOGY

This investigation centered on the allegations provided by Individual "A", relative to the use of low strength materials and improper welding by Husky. This report covers those allegations and inspections which pertain to the Zimmer Union 1 plant. Allegations made which pertain to the Clinton 1 plant will be reported in a separate report.

On August 31, 1978, a copy of a letter by Individual "A" was received at RIII.

On September 8, 1978, Individual "A" was contacted by RIII personnel.

During September 19-20, 1978, inspections were made at Clinton and Zimmer.

On September 20, 1978, Individual "A" was interviewed by RIII personnel.

During September 20-22, 27-29, 1978, RIII personnel visited the Husky facility.

On September 21, 1978, Individual "A" was contacted by telephone.

On September 22, 1978, RIII personnel visited the Union Test Lab.

On September 25, 1978, a second letter from Individual "A" was received at RIII (Exhibit VII).

On September 27, 1978, Individual "A" was re-interviewed by KIII personnel.

During September 27-29, KIII personnel visited the Husky facility.

On September 28, 1978, tests were performed on cable pans from the Zimmer site.

On September 29, 1978, KIII personnel visited Modern Metals and Sheet Metal.

2. Initial Contact with Individual "A"

On September 8, 1978, KIII personnel contacted Individual "A" by telephone. Individual "A" indicated that he had been the Manager of Industrial Engineering for the Husky Products Company. He stated that he had worked for the company approximately five years, but was laid off on August 4, 1978.

Individual "A"'s concerns, as delineated in his letter of August 17, 1978, were discussed in general terms.

3. Interview of Individual "A"

On September 20, 1978, Individual "A" was interviewed by KIII personnel. Individual "A" indicated that the order for cable pans for the Zimmer plant was the first contract for which Husky had to meet nuclear requirements. He stated that these requirements included a special design requiring wrap-around splice plates, and pan side rails made from material with a minimum tensile strength of 35,000 pounds per square inch.

Individual "A" stated that for the Zimmer project, Husky procured steel from the Central Steel Company or J&L steel, purchasing commercial quality steel, and then testing the steel to see that it met the minimum strength requirements. The steel supplier would take a "master" coil, and slit it into six (on the average) production coils for Husky usage. Samples would be taken from the steel when it arrived at Husky, and the shipment would be placed on hold until the results of the tests were received. Individual "A" indicated that these material tests had been performed by the Powell Valve Company test lab in Cincinnati (the Union Testing and Research Laboratory).

Individual "A" stated that it was found that commercial quality steel varied in strength, and that one shipment was found to be of low tensile strength steel. He stated that Individual "B" made the decision to use this low strength steel in "fittings" on curved sections of cable pan, where strength is not crucial, and that a memo to this effect had been written. Individual "A" stated that on approximately February 10, 1976, he found that the low tensile strength material mentioned had not been properly decreed, and had inadvertently been made into straight sections of electric cable pan.

Individual "A" indicated that he had informed Individual "D" that the low strength material had been used to manufacture cable pan, and produced a handwritten note (see Exhibit VI) which he indicated had been given to Individual "D". He also indicated that he had informed Individuals "E", "C", "G", and "I" that this had happened. He stated that this one-time occurrence had been the subject of discussion among Husky personnel for several years.

Individual "A" stated that the manual welds used to manufacture fittings were poorly done, and that the welder certification program was a "farce". He stated that welders who were to work on cable pans for the Zimmer contract were required to pass a qualification test as required by Section IX of the ASME Code. When initially tested by Gladstone Laboratories, he said, the welders could not pass the qualification test, and generally succeeded in passing the test after multiple attempts. Individual "A" stated that the welders did not perform their production welding any differently after passing the welder certification test.

Individual "A" indicated that several knowledgeable people had been critical of the welding performed by Husky welders, including Individual "J" (whose report is attached as part of Exhibit I). Individual "A" indicated that Individual "J" would have no part in training Husky welders unless they attended the full training course that his welding school provided.

Bill personnel advised Individual "A" that the technical specification for the cable pans to be used in the Zimmer plant (specification H-2199, Division 2, Section 202.1) required that the materials be of a minimum yield strength of 30,000 pounds per square inch (yield strength is usually less than tensile strength). The comment

regarding 35,000 lb/square inch tensile strength is incorrect. Individual "A" was also advised that the specification would not allow the use of low strength material for cable pan fittings.

5. Investigation at Husky Products

During September 20-22, 1978, FBI personnel visited the Husky Products facility in Florence, Kentucky.

Discussion with Husky personnel indicated that, due to the special design of cable pans for the Zimmer contract, steel rolls utilized in their construction were of unique size (7.7 and 9.3 inch wide rolls) not used for any other contract. As such, it was indicated that the 14 and 22 gauge material for the Zimmer contract could be easily traced through the receipt, testing, and manufacturing process, and such documentation could be identified by Husky Order No. 3993.

FBI personnel toured the Husky facility, observed the fabrication of sections of electrical cable pan, and inspected equipment utilized in the forming and welding processes. Storage and receipt inspection procedures were also reviewed.

Husky personnel indicated that they had no knowledge of any low strength steel being received or utilized by Husky for any contract. It was indicated that during 1974-1976, Husky purchased commercial quality steel, and then took samples from the material, which would be placed on hold until testing indicated that it met the contract requirements. Husky personnel stated that they had experienced some problems with low strength aluminum, and some steel had been returned to the vendor for roll flaws, but no 14 or 22 gauge steel had been found to be of low yield strength.

Husky personnel stated that no decision had been made to use low strength material on cable pan fittings on the Zimmer contract or any other contracts.

Husky personnel did indicate that half of one shipment of coiled steel had been returned to the vendor for coil defects known as "coil breaks". They stated that the coil breaks do not affect the strength of the material, but cause problems during manufacture, and detract from the visual appearance of finished products. Two Husky officials noted that it was possible that it was decided to use rolls with coil breaks for fittings, as the coil breaks could be cut out during the manufacturing process. However, none of the individuals interviewed recalled such a decision.

A review of the Zimmer contract file indicated that part of a shipment of 14 gauge steel for the Zimmer contract had been returned to the vendor for having "bad waves" (improper winding of the steel which would cause manufacturing problems). Additionally, a steel shipment received on February 10, 1976, was found to be .002 inches thick, and was accepted.

BIII personnel reviewed documents relative to receipt of materials, shipment of materials to the Zimmer site, production records covering Zimmer cable pans manufactured during 1976, returned shipments of roll steel, correspondence with steel vendors concerning coil breaks, discrepancy reports, and internal test records. These documents reviewed indicated that unacceptable materials had been utilized by Husky.

BIII personnel also reviewed welding procedure and welder qualification documentation.

It was found that manual welding for the Zimmer plant was performed using a Metal Inert Gas (MIG) procedure, and steel filler wire, using semi-automatic equipment. On this type of equipment, welding parameters are set on the welding machine, and the welder positions the welding gun and pulls a trigger. The equipment then operates automatically, controlling shielding gas flow, electric current, filler wire feed rate, and time of the weld. Manual welding was performed on "fittings" (curved sections of cable pan) only, with the bulk of cable pan being straight sections welded by automatic resistance welding equipment.

Welding records reviewed met the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section IX (ASME Section IX), which was imposed on Husky by its inclusion in their Quality Assurance Manual.

ASME Section IX prescribes methods and procedures to be followed for welding procedure and welder qualification. Individual "A"'s comment that the Husky welders did not qualify in the same manner as they produced welds is correct, but is in conformance with ASME requirements. Qualification was performed to a butt weld procedure, per the requirements of ASME Section IX, and production welds were spot welds.

6. Visit to Union Testing and Research Laboratory

On September 22, 1978, BIII representatives visited the Union Testing and Research Laboratory, a division of the William Powell Company.

Powell personnel indicated that they had performed material tests for Husky during the years 1974-1976, and followed the procedure of calling the company and informing them of the test results on handwritten forms, then typing the test forms and sending them to Husky for their records.

RHII personnel reviewed Powell files for Husky covering 1974-1976. All test reports reviewed indicated 14 and 22 gauge steel was tested and found to be in excess of 30,000 pounds per square inch yield strength. Typical values for such material range from 35,000 to 40,000 pounds per square inch. Records for the years 1975 and 1976 indicated one test of 16 gauge steel was tested to have 29,400 lbs square inch yield, and one sample of aluminum was tested and found to have 15,650 lbs/square inch yield strength.

Powell personnel stated that they did not recall any 14 or 22 gauge steel which they had tested which did not exceed 30,000 lbs/square inch yield strength. They indicated that this was typical of 14 and 22 gauge steel, and that steel vendors have a difficulty producing such material.

7. Contact with Individual "A"

Individual "A" was contacted by telephone by the RHII investigator on September 21, 1976, and asked to provide additional detail regarding his alleged discovery of the use of low strength material. Individual "A" stated that he had been aware of the existence of low strength material through receipt of inspection reports which had been routed through his office. He stated that some of the material was marked "return to vendor", and some of it was marked "use for fittings only - segregate". He indicated that he was in the Husky material storage area on February 10, 1976, and asked a worker where the Zimmer low strength material was stored. The worker did not know what he was talking about, Individual "A" said, and he asked the worker's supervisor the same question, with similar results. Individual "A" stated that he then advised Individual "B" of the occurrence, and wrote the note attached as Exhibit VI to Individual "D". He indicated that Individual "D" went to look into the matter, and later returned the note with a verbal comment to "forget it".

Individual "A" commented that he had not actually read the written specification for the Zimmer cable pans, but he understood that the specification required material with a minimum tensile strength of 35,000 lbs. per square inch. He was again advised of the actual specification requirements.

8. Contact with Individual "J"

Individual "J", of the Technicon School of Welding, was contacted by the RIII investigator on September 7, 1978.

Individual "J" indicated that his school utilized Gladstone Laboratories (Gladstone) to certify his welders, and that when Husky welders had difficulty passing weld certification tests, Gladstone had recommended him to Husky.

Individual "J" stated that he did not remember all of the details of his review of Husky, but he recalled that most but not all of their problems involved the welding of aluminum. He indicated that he had fewer concerns relative to steel welding. He stated that he had looked at Husky from the viewpoint of a consultant, with a view towards training their welders at his school.

Individual "J" indicated that he had not refused to train welders from Husky, but he had wanted the welders to take the entire training course which his school offered. He stated that Husky management only wanted their welders to be schooled in the two weld procedures (MIG and TIG) which they utilized. Individual "J" indicated that he did have some reservations that the older Husky welders would not benefit from training at his school.

During the discussion individual "J" indicated that he was not aware that his report had been attached to Individual "A"'s letter. He indicated that Individual "A" had not contacted him, and that he had not been in contact with the Husky company since the date of his report.

9. Interview with Individual "A" on September 27, 1978

Individual "A" was interviewed on September 27, 1978, and discussions were held on the progress of the NRC investigation.

Individual "A" was advised that no evidence of low strength material had been developed, and was requested to provide any additional information which would aid in the investigation. Individual "A" indicated that in early 1975 prior to the shipment of low strength steel which was inadvertently used for cable pans, another shipment had been tested, found to be of low strength material, and was properly returned to the vendor. He stated that he believed that the

shipment which was improperly utilized was a small shipment, possibly of six coils of steel, which was delivered during the months of December 1975 or January 1976.

Individual "A" indicated that he had also recalled an occurrence in November 1975, when Husky sent Zimmer material to Modern Welding and Sheet Metal (Modern), a specialty welding firm which did not have welders qualified to ASME Section IX at the time. Individual "A" stated that this was done because the Husky plant was on strike, and the company felt that they had to meet their contract to supply the cable pans. He stated that the order comprised over 100 pieces of equipment, of three-piece construction. He indicated his understanding that the welders for Modern were not qualified to ASME Section IX until sometime in 1976.

Individual "A" provided the RIII investigators with the name and telephone number of a former Husky employee who, it was indicated, might have some recollection of the alleged use of low strength material during manufacture of equipment for the Zimmer plant.

10. Contact with Individual "D"

Individual "D" was contacted by the RIII investigator on September 29, 1976.

Individual "D" was questioned as to his knowledge of the use of low strength materials in the fabrication of cable pans for the Zimmer plant. He stated that he did not recall the use of any low strength material on any of the Husky nuclear contracts. He indicated that he did not believe that anyone at Husky would knowingly allow such an occurrence, especially those in the Quality Control department.

The scenario of the discovery of the use of the low strength material as described by Individual "A" was discussed with Individual "D", and the note allegedly sent to him was read. Individual "D" stated that he had no recollection of any such note, and indicated that it would be unusual for him to return such a note without some kind of written comment, as he disliked verbal communications.

Individual "D" recalled occurrences where shipments of steel were found to have various problems such as excessive oil, roll problems such as ripples or twists, or were rejected because of steel thickness variations. He indicated that he also recalled the incidence of some

low strength aluminum, and steel pre-galvanized with an aluminum-zinc coating which was banned from inclusion in the Zimmer equipment.

He stated that the aluminum-zinc coated material (Galvalume) was to be made into cable pan covers, but husky personnel recognized that the 1.6% aluminum content of the coating was undesirable due to its large surface area, and a program was set up to insure that Galvalume pan covers were shipped to the Zimmer site. Individual "D" indicated that on at least one occasion, covers were inadvertently fabricated of this material, and he indicated that

11. Visit to Husky Products during September 27-29, 1978

Mill personnel visited the Husky facility during September 27-29, 1978. During this visit, documentation related to welder qualification tests, production records, material tests, deficiency reports, internal memoranda of the Industrial Engineering Section, and weld procedure qualifications were reviewed. Interviews were held with Husky personnel, and three signed statements were obtained. (See exhibits II, III and IV).

None of the documents reviewed, and none of the statements received during interviews indicated that low strength materials had been utilized during manufacture of the Zimmer plant cable pans.

Welding certification was reviewed as pertaining to welding procedure and welder qualification to Section IX of the ASME Boiler and Pressure Vessel Code. Welder qualification records and welder qualification test pieces (stored at Husky) were considered acceptable. Records indicated that welders had made several qualification attempts in many cases. This is acceptable under ASME Section IX.

During document reviews at Husky, it was found that the welding procedure for manual welding on Zimmer equipment had been qualified using carbon dioxide shielding gas and .035 inch diameter filler material, but a mixture of shielding gas and .045 inch diameter filler material had been utilized for the period of November 14 - December 3, 1974. This is in nonconformance with ASME Section IX, which required requalification of the welding procedure when these variables were changed.

12. Interview with Individual "E"

Individual "E", Husky Purchasing Agent, was interviewed by Mill personnel on September 28, 1978, at Husky.

Individual "F" stated that to his knowledge, Husky had not received nor returned any steel which did not meet the appropriate yield strength requirements. He stated that since the steel that was purchased during the manufacture of the Zimmer equipment was purchased to commercial steel specifications, and then tested, it would not have been returned if it did not meet the minimum strength requirements. No minimum strength requirements are imposed on the steel vendor when commercial grade steel is purchased.

Individual "F" stated that flat stock steel was purchased and controlled in the same fashion as roll stock steel, to commercial grade requirements, and then tested to insure that it met the yield strength requirements.

Individual "F" stated that the Central Steel Company has supplied all of the 14 gauge steel utilized for the Zimmer cable pans.

13. Visit to Modern Welding and Sheet Metal

On September 29, 1978, BIII representatives visited the Modern Welding and Sheet Metal Company.

Discussions were held with Individual "F", one of the managers for the firm. Individual "F" indicated that the majority of the work that his firm does for Husky is specialty welding of separators, junction boxes, cable bus, and aluminum welding. He indicated that to the best of his knowledge, his firm had not performed work on cable pans for Husky at any time.

Individual "F" was requested to review his files for work performed for Husky for the years 1975 and 1976, with attention to any work on electrical cable pans. Individual "F" stated that he could not find any orders concerning electrical cable pans, and the Husky identification number (3995) for the Zimmer project was not found in his review of his files.

On October 12, 1978, the BIII investigator contacted Individual "F" and requested that he again review his files, and provide the BIC with information as to any products manufactured for Husky during November, 1975. Individual "F" provided this information, and indicated that tap boxes and cable separators had been fabricated by his firm for Husky, but no work had been done on cable pans, and none of the Husky tags applied to the work had referenced the Zimmer identification number.

14. Contact with Individual "G"

Individual "A" had advised RII personnel that Individual "G" might have information concerning the use of low strength material in the Zimmer equipment. This individual was contacted by the RII investigator on October 5, 1978.

Individual "G" stated that he had been in the hospital during time period of the alleged use of low strength materials. He indicated that he had no knowledge of such an occurrence, and that he had not heard anyone at the Husky plant discuss such an occurrence while he was employed there (his employment terminated in February, 1978).

15. Contact with Individual "H"

Individual "H", an employee of Hobart Welding who had acted as a consultant to Husky on welding and welding qualification, was contacted on September 29, 1978.

Individual "H" indicated that his first contact with Husky was approximately five years ago, and that Individual "I" had been trained in the Hobart school. He stated that Husky had long been involved in welder qualification and in upgrading their welding. Individual "H" advised that five or six years ago, the Husky welders did have some welding problems, and that they did acceptable welding on the production line, but made poor qualification test pieces.

Individual "H" stated that he believed that Husky had a good program for welding qualification testing, and had used the program to "weed out" the poorer welders.

16. Discussions with Individual "A"

Several telephone discussions were held with Individual "A" concerning the findings of the investigation. Individual "A" expressed dissatisfaction with the findings of the investigation, and provided additional allegations concerning Husky.

Individual "A" stated that the Husky welders had not qualified on both the vertical and horizontal welding positions, and had performed vertical welding during cable pan manufacture.

Individual "A" indicated that he felt that the Husky welds had been required to be of pressure vessel quality. He was advised that the specification had not required welds of pressure vessel quality. Welds of pressure vessel quality require non-destructive examination

such as magnetic particle, radiographic, liquid penetrant, or ultrasonic testing, as a verification of their quality, and no such inspections were required.

Individual "A" also indicated that he felt that the company had not met all of the requirements of Code of Federal Regulations, Title 10, Part 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants (a copy of this regulation had been provided to him by KILL personnel). KILL personnel explained that all of the requirements of this regulation were imposed on utilities, but the provisions of the Husky Quality Assurance Manual were the requirements imposed on Husky after approval of the manual by utility representatives.

17. Contact with Husky Personnel

Telephone contacts with Husky personnel indicated that some cast channels had been fabricated by Modern, with the order being processed during November, 1975, and completed in later months. Husky personnel indicated that this material was for another nuclear power plant, and was fabricated prior to the particular utility's imposition of a requirement for work done by welders qualified to Section IX of the ASME Code.

Husky personnel also indicated that virtually all of their welding was done in the horizontal welding position, and they did not recall any pieces for the Zimmer contract which necessitated vertical welding.

A review of Husky welder certifications for the horizontal and vertical positions indicated that one Husky welder was not qualified in the MIG procedure vertical (3G) welding position. Welders previously indicated by Husky personnel as having produced the majority of the Manual MIG welding for the Zimmer project (at work center 35) were recorded as having been qualified in both horizontal (2G) and vertical (3G) positions. Qualification to the "3G" vertical position also qualified a welder to perform flat (1G) welding per ASME Section IX.

18. Contacts with Husky Personnel

Telephone discussions with Husky personnel on October 24, and 29, 1978, provided additional information on low strength aluminum materials.

Husky personnel indicated that aluminum materials were ordered to 6063T6 requirements, which include a minimum 30,000 lbs. per square inch yield strength (as shown by mill certificates). They stated that a shipment of the material was thought to be of low

strength, and sample test pieces sent to their test lab confirmed that the material was below requirements. Husky personnel indicated that as a result of this, the entire lot of material was returned to the vendor, and the balance of their orders with the vendor were cancelled.

Husky personnel stated that the rejections of this material occurred in October and November 1977, with the original discrepancy report being generated in September of 1977. They stated that in January 1978, representatives of the vendor visited the Husky facility and discussed the problem.

Section II

Prepared by T. L. Vandell
Reviewed by D. W. Hayes, Chief
Projects Section

1. Site Review Activities

The following Zimmer site activities were performed by the inspector relative to the allegations regarding inadequate material and welding of Husky Products, Inc. (Husky) cable trays, pans and fittings:

- a. A review was conducted of the licensee source evaluation, surveillance and auditing activities performed regarding Husky. It was established that the licensee program for vendor evaluation and auditing had been accomplished in that the Husky Quality Assurance program and welding procedures had been reviewed and approved by licensee representatives. Additionally, an audit by the licensee was performed of the implementation of the program at the Husky plant prior to start of fabrication.

In response to questioning, the inspector was informed that no source inspection of material was done prior to shipment since the material was readily amenable to inspection upon receipt at the site. It was added that the material was considered so standard and unsophisticated as to not warrant shop inspection.

- b. In review of the cable trays, pans and fittings on site, it was established that essentially all of the material has been installed and indeed have been filled with cables. During visual inspection of the installed trays no faulty or inadequate trays were identified. In discussions with the licensee representatives regarding the difficulty of visual inspection of welds now covered by galvanizing, it was concluded that testing of selected random samples of material would be a more meaningful test. Therefore, the following list of samples, randomly selected by the licensee representative and the NRC inspectors, was picked for testing by either tension pull tests (yield strength) or by weld tear testing or both.

<u>Type</u> <u>Components</u>	<u>P.O. Number</u>	<u>Stock Number</u>	<u>Tests</u>
Straight tray 18"	7070-27655	55M1-18-144	Two yields, one tear
Straight tray 24"	7070-27303	55M1-24-144	One yield, two tear

Fitting:	7070-2722	55N1-12-H30 ⁰	One yield, one tear
Straight tray 24" (from control room)	Route #1276 (P.O. unknown)	55N1-24-144	One yield, one tear
Fitting:	7070-27655	55N1-24-VI90 ⁰ -12	One yield one tear
Fitting:	7070-28009	55N1-24-VI30 ⁰ -12	One yield

*No tear test was considered necessary since the fitting had inadvertently been torn during handling and the results of those weld tears showed adequate welding.

It was further agreed that the yield strength testing would be done by an independent testing laboratory in accordance to ASTM standard E-8 Tension Testing of Metallic Materials and that the minimum strength acceptance criteria will be the S&L specification H-2199 requirement of paragraph 202.1; i.e., yield strength to be a minimum of 30,000 psi. In addition, the weld tear tests would also be done by an independent facility and that the acceptability of the welds would be judged as outlined in AWS standard C-1.1.

2. Witness of Testing

The inspector witnessed the following testing at independent laboratories of the samples previously selected at the site.

- a. Yield strength testing was conducted on September 28, 1978, at Metcut Research Associates facility. The inspector reviewed the qualifications of the operator, the calibration and adequacy of the testing machine and the QA program standards of the facility and considered them to be acceptable for the test. It was further learned that the tensile specimens had been prepared in accordance with the ASTM E-8. The results of the tests are as follows.

<u>Metcut Number</u>	<u>Site Sample Number</u>	<u>Yield Strength Pounds per Square inch</u>	<u>Ultimate Strength</u>	<u>Percent Elongation</u>
T-2 1162	1276	40,700	48,100	34.9
T-2 1163	55N112-H30 ⁰	42,600	47,800	30.7
T-2 1164	55N24VI90-12	43,100	48,900	28.3
T-2 1165	55N1-24VI 0-1	42,400	47,600	31.6
T-2 1166	55N1-24-144	42,100	44,700	33.0
T-2 1167	55N1-18-144 (No. 1)	41,200	44,200	30.4
T-2 1168	55N1-18-144 (No. 2)	41,400	44,800	33.7

As can be noted from the table above, the yield strength values were well above the minimum yield value of 30,000 psi and therefore all test samples were deemed acceptable.

- b. Also on September 28, 1972, the weld tear tests of the resistance spot welds, were witnessed by the BRC inspector at the Fab Metals Company, located in Moscow, Ohio.

A test rig had been assembled whereby the test assembly was anchored to the floor and by use of a fork lift truck the assembly was pulled apart at the welds (side panels to tray bottom welds). The test method performed adequately with the following results established.

<u>Site Sample Number</u>	<u>Number of welds in Tear Test</u>	<u>Results of Testing</u>
55M-24-144 (Site 1)	five	Acceptable welds
55M-24-144 (Site 2)	three	Acceptable welds
55M-24-144 (Site 1)	three	Acceptable welds
55 1276K 55M-24-144	three	Acceptable welds
55M-12-810 ⁰ fitting	seven	One weld had a reduced spot section, see Note 2
55M-24-190 ⁰ -12 fitting	eight	Two welds had a reduced spot, see Note 2
55M-18-144	three	Acceptable welds

Note 1: An additional test assembly, available for test in addition to the two planned to be tested, was also tested for a total of seven test assemblies tested.

Note 2: The reduced spot section welds were subsequently measured and found to be adequate per the minimum size specified in AWS C-1.1. A total of seven test assemblies were tested with a total of 32 welds being tested. All welds were determined to be adequate with three spots being evaluated as being acceptable to AWS C-1.1.

Section III

Prepared by H. M. Wescott
Reviewed by D. W. Hayes, Chief
Projects Branch

1. Review of Welding Requirements and Observation of Installed Cable Tray

The inspector reviewed selected documents and made observations of safety related cable tray and fittings, as follows:

- a. Review of Sargent and Lundy specification H-2199, dated March 16, 1973, Revised July 17, 1973, titled, "Specification for Cable Pans".
- b. Review of NEMA Standard VE1-1971 used in conjunction with the specification.
- c. Review of the Husky Products, Inc. Quality Control Manual, Section IX "Control of Special Processes", issue date December 15, 1974, revised January 15, 1975.
- d. Review of Wm H. Zimmer Unit 1 "Documentation Check Lists" (Form QAS-106).
- e. Review of certificates of compliance.
- f. Review of Galvanizing Inspection reports.
- g. Review of Wm H. Zimmer receiving inspection plans (KEL Form No. QA-8).
- h. Observations made of cable tray installed and in storage area.
- i. Participated in selection of randomly selected cable tray and fittings to be tested for minimum yield strength and weldment strength tests.

2. Review of Welding Procedures, Qualifications and Observations at Burndy/Husky

The inspector reviewed welding procedure specifications, procedure qualifications records, welder performance qualifications, and selected documents pertaining to safety related cable tray and fittings, as follows:

- a. Review of all welder qualifications.
- b. Review of Welding Procedure specification OAP-107, Welding Procedure No. 2 "Manual Gas Metal Arc Welding Process," effective date October 18, 1974, Revision No. 01.
- c. Review of OAP 104 "Procedure for Inspection of Resistance Joint Welding", effective date August 18, 1974, Revision No. 01.
- d. Review of inter-office correspondence concerning welding, that indicated OAP-107 should be requalified to reflect changes in essential variables.
- e. Discussion with management and shop personnel.
- f. Observations made in the shop area of fabrication in progress.
- g. Review of in process inspection records.

Review of a Burndy/Husky memorandum from the Husky welding engineer dated November 14, 1974, Subject "Welder Performance Qualification" indicated that a 75% argon and 25% carbon dioxide shielding gas mixture and .045 filler material was substituted for the welding grade carbon dioxide shielding gas and 0.35 filler material that was specified in QAP-107 "Manual Gas Metal Arc Welding Process", dated October 18, 1974, Revision No. 01. The memo further stated that, "The ASME Section 8 states that if this occurs, the procedure must be requalified along with the performance tests. (Section QW 281.2, QW 281.3 and QW 281.4)".

An Inter-Office letter dated December 3, 1974, stated that the argon/carbon dioxide gas mixture would be used until the supply was exhausted at which time the welding grade carbon dioxide would be used.

The argon/carbon dioxide shielding gas mixture was used for approximately four weeks with no requalification of the welding procedure specification and welders.

Husky management personnel indicated that QAP-107 would be requalified using the 75% argon and 25% gas mixture using the .045 filler material.

This is considered to be an item of noncompliance to 19 CFR, Part 30, Appendix B, Criterion 1A. (50-25878-21-0.)

Subsequent to the investigation telephone contacts with Husky personnel, by the investigation specialist established that steel TIG welding had been performed on cable tray prior to qualification of the welding procedure specification by two welders that had not qualified for the process. Husky personnel were requested to review the qualification records of the personnel who had performed the welding and inform RIII of the results of their review.

Husky personnel informed RIII of the review by telephone, and followed with written notification dated November 10, 1978. The Husky review indicated that the two welders had performed TIG welding on equipment for the Zimmer plant prior to the welding procedure qualification for the TIG process.

The steel TIG welding procedure was qualified on August 26, 1975, by one of the two welders. The second welder was qualified to the procedure on March 10, 1976. Both welders had made several steel TIG welds prior to being qualified.

These conditions were contrary to 10 CFR 50, Appendix B, Criterion IX of the ASME Code. (358/78-21-01)

Exit Interview

The inspectors and the Chief, Reactor Construction and Engineering Support Branch, met with licensee representatives noted in Details, Section 1, under Personnel Contacted, at CG&E Co. on September 22, 1978. The inspectors summarized the scope and findings of the investigation and the licensee acknowledges the findings.

Attachments: Exhibits
I through VII

August 18, 1978

Public Interest Research Group
2000 P Street N. W.
Washington, D. C. 20036

Attention: Mr. John Abbotts

Dear Mr. Abbotts:

I am writing this as a former employee of Hisky Products Inc. of Florence, Kentucky to report serious and deliberate non-conformance to 10 CFR 50 Nuclear Requirements and Engineering Specifications based on the above requirements. To make it even worse they send out notarized Certificates of Compliance with the full knowledge they are false.

In May of this year I had occasion to visit the Zinzer Nuclear Containment area and to see the various control areas and in particular to see Hisky cable trays in position and many filled with the cables.

Since this visit I have been disturbed by two aspects of Hisky's non-conformance, particularly as they relate to the safe operation of this plant after completion of construction.

These two important aspects are as follows:

1. Use of inferior and weak material completely out of specifications.
2. Trays welded by incompetent welders with every type weld defect present in every tray assembly.

The following illustrates these two aspects in more detail. They are related to the Zinzer job specifically which was the original job with the 10 CFR 50 requirements. On this job flagrant and serious non-conformance occurred and with this as a pattern it has occurred on all subsequent jobs.

MATERIAL:

All tray is designed with a load capacity which includes a safety factor. The tensile strength of the side rails largely determines this capacity. On the Zinzer job the tensile strength of the side rail material was to be in excess of 35,000 pounds. Hisky received and tested material as low as 18,000 pounds and a considerable amount in the range of 20 to 23,000 pounds. Some was rejected, some accepted on the basis it would be used for fittings where strength is not as critical.

Instead the material was not kept separate and thus many very weak side-rails were made up into long straight assemblies. After finding out that cotton mill steel varied so widely in tensile strength no more testing was done so that they could remain "unaware" of this condition. Incidentally some testing of T-6 aluminum was also performed and a wide range of tensile strength was also found. This was also ignored as above. What this adds up to is that Hisky has built a tray that will not carry the rated load even with safety factor included.

WELDING:

The Zinner job was the first job requiring the use of Certified welders in order to insure good welds. Hisky contracted with Gladstone Laboratories of Cincinnati to set up a welder certification program. They did this and then tested all the welders. Without exception they failed the tests miserably. Hisky then called in various Welding Engineers and Mr. Ind. "J" of Technicon School of Welding in Cincinnati who submitted a written report of findings. A copy of his report is attached. In general all the Weld Engineers concurred with Mr. Ind. "J" report. Mr. Ind. "J" was asked if he could or would train the welders. He refused, stating that it is very difficult, if not nearly impossible to untrain people first, then try to retrain, than it is to start fresh with a person having no prior welding knowledge or experience.

Hisky then proceeded to work on their own in crash programs in which the welders finally welded one piece which would pass a bend test. This welder then became "Certified" by Hisky. However, what is critically important is that nothing occurred to the quality of the production welds! In fact it remains to date in the same sad state as Mr. Ind. "J"'s findings dated October 30, 1974. Just a few weeks ago one welder was "tested" over 60 times before he finally made a test piece which was only marginally acceptable. Now he is a Hisky "Certified" welder!

Starting in July and continuing this month a new type of non-conformance is presently in process on the Clinton job. Fittings are being MIG spot welded contrary to specific Engineering requirements. In addition Aluminum Bronze filler rod is being used with full knowledge that aluminum is not permitted in the containment area. Even worse the position of the spot is in such a manner the weld is less than 35% effective!

Substantiation of all these charges can be accomplished thru examination of Hisky documents in relation to Material and to the Welders by the records, visual examination of the welds and by retesting the so called "Certified" welders by a competent Welding Engineer. Visual inspection of the Clinton fittings will substantiate the charges outlined.

What disturbs me even more than the actual incidents described is the fact so many top management people see nothing wrong in all these actions. So little real concern is shown to producing a truly quality product within the specifications. This should become even more particularly so when nuclear safety is directly involved.

Yours truly,

Individual "A"

Distribution as follows:

Engineering Companies that may or may not be concerned.

Esso
United Engineers and Constructors
Bechtel Corp.
Brown & Root
~~Esso~~
Sargent & Lundy
Stone & Webster
Black & Veatch

This may not be complete, however to the best of my knowledge it is.

Government Agencies:

Nuclear Regulatory Commission
Congressional Joint Atomic Energy Committee

Private Group:

Public Interest Research Group

Report of the Findings at
Husky Products Incorporated
on October 30, 1974

Submitted by:
Technichron Inc., School of Welding

It was generally found that the reason your company has had difficulty in certifying your weldors is due to the fact that while some of your men are qualified weldors, they suffer from the ills of an employee that is offering an incentive program.

In order for an employee of your company to meet his required production level, plus benefit by the incentive program it was found that their welding machines were set at maximum output allowable, which is just below the point of blowing holes in the parent metal. This condition creates improper welding methods, and instead of establishing good welding, you have a situation of blasting the metal together. These extreme amperage settings also make it necessary to use higher gas flow in order to control the arc. This has to be extremely costly to your company.

Because of the conditions that exist (welding machine settings and gas flows) it was observed that improper welding is a common occurrence at Husky Products. The welds are not structurally sound.

Aluminum Welding:

All the welds have craters and it was observed that most of these craters show the common condition known as "crater cracking". It was further observed that there were many welds that had both cracking conditions in the weld as well as the crater. These conditions are primarily caused by the extremely high amperage and gas coverage. Your weldors are running extremely hot welds due to speed and thus you have rapid cooling conditions and cracking. The high gas flows (while costly) also causes rapid cooling and thus cracking.

Generally it was observed that the weldors in your aluminum welding areas had good welding techniques however lack knowledge in setting up the proper welding conditions before welding.

These men lacked the following knowledge:

1. Setting the welding machine
2. Setting the proper gas flow
3. Balling the tungsten rather than pointing it
4. Controlling the weld to prevent craters
5. Cleaning the parent metal before welding

Steel Welding:

Four men were observed in the steel welding areas. One man had the knowledge of proper machine and gas flow settings however he lacked the welding techniques. This man was one of your oldest welders. The other three men had very little knowledge about proper settings and one of the three lacked the proper welding techniques. This man was your oldest employee in your welding department. Again it was apparent that all conditions existed to turn out maximum production.

As long as you have these conditions you will find that certifying welders is going to be extremely difficult. When observing several of the test coupons run by your welders it was found that the following conditions existed:

1. Crystallizations of the weld
2. Porosity
3. Penetration that exceeded 100%
4. Undercut
5. Warping of parent metal in the heat affected zone

All the conditions are created directly by running too high of amperage, too high of gas flows, and dirty metal.

Other Observations:

1. The using of fans in the welding areas is common practice. This condition causes the gas shield to be blown away, thus causing porosity in the welds. This is another reason for the high gas flow pressures which is costly since larger volumes of gas are used than necessary.
2. It was noted that Argon/CO² mix was being used in your M.I.G. welding operations on steel. This again is costly because CO² would be adequate for your operation. Straight CO² costs about 1/6 of what 75/25 Argon/CO² mix costs.
3. Many of your employees do not use eye protection or face protection. I'm certain you must have frequently absenteeism due to eye flash injuries.
4. No use of safety glasses in the entire plant. Welders must wear safety glasses under their welding hood. (An OSHA Standard).
5. The plant is not in compliance with OSHA Standards. This could cause extreme hardship in the future especially if you have a severe injury of one of your employees.

Suggestion:

Husky Products Inc., should consider a training program for those individuals employed in their welding department. This program should emphasize welding methods as well as welding techniques.

Any success arising from this training program is highly questionable, since proper welding methods and techniques would cut production. The present attitude in your welding department is quantity not quality. Sound certified quality welds will definitely reduce quantity, however the savings in cost of materials will most likely improve or equalize profits.

I am submitting this report with the intension of creating many constructive suggestions and have no intension to sound like I am being critical. You realized you had some concerns or you would have never contacted Technichron in the first place. Therefore, I sincerely hope that I have been of service to your company and that we may serve you again in the future.

Thank you.

Respectively Submitted

Individual "J"

Technichron School of Welding

Exhibit 1

Page 7 of 7

I, Individual "B" , make the following written voluntary statement to James Foster who has identified himself to me as an investigation specialist of the Nuclear Regulatory Commission. I understand that I do not have to make a statement and that any statement I do make may be used in legal proceedings.

I have no knowledge of low yield strength steel, below 30,000 lbs. per square inch, having been present at the Husky Products Plant nor of such material having been utilized in the production of cable pans for the Zimmer Nuclear Power Plant.

I have read the preceding statement consisting of one page and made corrections where necessary. It is a true representation.

Signed Individual "B"

Date 9-28-78

Witness James M. Witt 9/28/78

Witness James E. Foster 9/28/78

I, Individual "C" , make the following written voluntary statement to James Foster who has identified himself to me as an investigation specialist of the Nuclear Regulatory Commission. I understand that I do not have to make a statement and that any statement I do make may be used in legal proceedings.

I have no knowledge of low yield strength steel, below 30,000 lbs. per square inch, having been present at the Husky Products Plant nor of such material having been utilized in the production of cable pans for the Zimmer Nuclear Power Plant.

I have read the preceding statement consisting of one page and made corrections where necessary. It is a true representation.

Signed Individual "C" _____

Date 9-28-78 _____

Witness James E Foster 9/28/78

Witness [Signature]

I, Individual "I" make the following voluntary written statement to James L. Foster, who has identified himself to me as an Investigation Specialist of the Nuclear Regulatory Commission. I understand that I do not have to make a statement, and any statement that I do make may be used in legal proceedings. I am presently employed by Husky Products (as) an Industrial Engineer.

To the best of my knowledge, no low yield point material has ever been utilized in the manufacture of equipment for the Zimmer Nuclear Power Plant, Unit 1. I have been directly involved with the in-house welder certification program since its inception. This program has been properly conducted, and follows the provisions of ASME Section IX for welder certification. I did not object to my participation in this program, but had to become knowledgeable in welding before becoming centrally involved in the program. I feel that welder certification has been honestly conducted.

Welding procedures and welders have not been re-qualified when weld shield gas or gas mixtures have been changed. I pointed out to Individual "A" that this had not been done. After 3-4 weeks, Husky started using CO₂ gas strictly as the procedure calls for.

Exhibit IV

Page 1 of 2

Individual "1"

- 2 -

I was aware that the Aluminum-bronze MIG spot weld process had not been qualified as to process or welders. I felt that these qualifications were not necessary, as the process is similar to resistance welding in that it is semi-automatic. The welding parameters are set, and the welder only aims the welding gun.

I have read this voluntary statement, consisting of two (2) pages, and made corrections where necessary. It is a true representation.

Witness: James E. Foster 9/28/78 Signed: Individual "1"

Harvey M. Wescott 9/28/78 Date: 9/28/78

Exhibit IV

Page 2 of 2

Report No. 64-303-1

Tensile Testing of (7) _____ ^{Per} Sheet Specimens Manufactured to

Metcut Drawing-No. SSM 1 - 15 - 144

Nominal Gage Section: 0.075 x 0.375 x 0.015

Temperature: RT

Strain Rate through 0.2% Yield: 0.005 in./in./min.

Head Rate thence to Failure: 0.05 in./min.

MRAI No.	Spec. No.	U.T.S. (ksi)	.02% Y.S. (ksi)	Yield Point (ksi)	El. Eng. (%)	R.A. (%)
T-21107	SSM 1 - 15 - 144	44.4		42.0	30.4	
T-21108	SSM 1 - 15 - 144	44.2		41.2	30.0	
T-21106	SSM 1 - 24 - 144	44.7		42.0	30.0	
T-21102	SSM 1 - 24 - 144 - 1276 E	44.1		42.0	34.1	
T-21103	SSM 1 - 15 - H 30	47.4		45.0	31.7	
T-21104	SSM 1 - 24 VI - 90 - 12	47.3		45.1	31.0	
T-21105	SSM 1 - 24 VI - 30 - 12	47.0		45.0	30.6	

Notes:

Exhibit V

Page 1
of 1

C J F
Project Engineer

R C D
Laboratory Technician

2-10-76

Low tensile Zimmer
stringers mixed
in stores and
now being used
for straights!

Returned with
verbal reply
to "forget it"
2-10-76

Text: Individual "D":

2-10-76

Low tensile Zimmer
stringers mixed
in stores and
now being used
for straights!

Individual "A"

Returned with
verbal reply
to "forget it"

2-10-76.

Exhibit VI

September 22, 1978

Hisky manufactures Cable Trays to NEMA Standards as per a catalog as a commercial item. It also manufactures modifications of Standard items and specials to a customer's specifications.

Zippers were special in 4 important ways as follows.:

1. They required special wrap around splice plates with different bolt holes to strengthen the joints where 2 trays come together.
2. They specified side rail material to have a minimum tensile strength of 35,000 pounds.
3. Welding was to be Mig Welded in accordance with ASME Section 9 and to be performed by certified welders.
4. All pertinent records relative to Quality are to be retained on long term retention basis.

In respect to the welding this meant that the welds were to have a quality level equal to that required for boilers and pressure vessels. These were to be top quality welds with good fusion, structurally sound and with minimum of defects. These were to be welded by qualified welders certified as such thru testing as called out in Section 9 of ASME.

Hisky welders are competent to produce commercial type welds for an ordinary commercial product where defects and lack of fusion is acceptable. This is the type of weld done daily on our commercial work. We have Incentive Standards on this work and our welders earn from 100 to 200% day in and day out. This is the type welding described in Mr. Inc. "J's" report.

Testing of our welders established their incompetence to produce quality welds at pressure vessel standards. Hisky worked with the welders until they made one good piece which would pass a bend test. The welder is then certified and then goes right back to production making commercial type welds for Incentive which is the only type weld ever made. Outside of making this one test piece they have no production experience in this type weld. Based on their difficulty in passing the test they need considerably more training, followed with actual production experience, before they can be competent to produce a high quality type of weld.

Quality welding would greatly increase the manufacturing cost, particularly if we changed all welding to become quality type. A second alternative would be to produce quality welds when required on nuclear work and commercial quality on all other work. Hisky's decision was to certify the welders but produce only the normal commercial type welds on all work. We would tell people we weld to Section 9 of ASME with certified welders. This has never changed. We have never made any effort to produce pressure vessel quality welds.

Exhibit VII
Page 1 of 2

SEP 25 1978

This was done on the Zimmer job and was incorporated into the Quality Control Manual that Husky Welding is in conformance with ASME section 9 and the welds are made by certified welders. This is misleading in that people think that they will get quality welds. Instead everybody gets commercial quality welds made by a welder who once made one quality weld piece. On this basis Husky has secured additional nuclear work.

The top Managers of Husky are on a bonus setup. Anything that adds cost subtracts from profit which in turn reduces their bonus. To produce quality would be very expensive and would reduce their bonus. It is entirely possible the decision not to produce the specified quality welds was based entirely on the cost required to do so. The reason given to me and my people was, "that it is completely unnecessary."

Enclosure "A"

September 22, 1979