UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

0001

19 DEC 1986

Docket No. 50-443

Public Service of New Hampshire
ATTN: Mr. Robert J. Harrison
President and Chief Executive Officer
P. O. Box 330
Manchester, New Hampshire 03105

Gentlemen:

Subject: Special Inspection No. 50-443/86-52

This refers to the special team inspection conducted by Mr. Jacque P. Durr of this office on November 3-14 and 19-21, 1986 and to the discussions of our findings held by Mr. Durr with Messrs. W. B. Derrickson and W. P. Johnson at the conclusion of the inspection. The inspection was of activities authorized by NRC License No. NPF-56 at the Seabrook Station, Unit No. 1, Seabrook, New Hampshire.

The inspection independently examined allegations related to construction activities and management controls at Seabrook Site that were provided to the NRC from several sources. The inspection consisted of interviews with personnel, reviews of quality records, examinations of equipment and independent tests. The conclusions of the inspection team are presented in the Executive Summary at the beginning of this report.

No reply to this letter is required. Your cooperation with us in this matter is appreciated.

Sincerely,

Stewart D. Ebneter

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Division of Reactor Safety

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 86-52

Docket No. 50-443

License No. NPF-56 Priority Category C

Licensee: New Hampshire Yankee

Facility Name: Seabrook Unit 1

Inspection At: Seabrook, New Hampshire

Inspection Conducted: Nov. 3 - 14, and Nov. 18 - 21, 1986

Inspectors:

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R. J. Paolino, Lead Reactor Engineer, EB, DRS — 12/17/86 date

H. Gray, Lead Reactor Engineer, EB, DRS — 12/17/86 date

P. S. Koltay, Sr. Resident Inspector, IP#3 — 12/17/86 date

R. J. Bailey, Physical Security Inspector, DRSS — 12/17/86 date

R. W. Winters, Reactor Engineer, QAS, DRS — 12/17/86 date

Team Leader:

Jacque P. Durr, Chief, Engineering Branch, DRS — 12/17/86 date

Approved by:

Stewart D. Ebneter, Director, Division of Reactor Safety — 12/17/86 date

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# EXECUTIVE SUMMARY

## BACKGROUND

The Nuclear Regulatory Commission (NRC), Region I Office, contacted the Employees Legal Project (ELP), a nonprofit organization, on August 4, 1986, regarding allegations of questionable construction practices at New England nuclear power plants. The NRC became aware in the May-July 1986 time frame of the ELP and their efforts to gather previous nuclear power plant employee concerns. Subsequently, the NRC acquired an unsigned letter to Governor Dukakis of the Commonwealth of Massachusetts from the ELP, dated September 12, 1986, containing two anonymous affidavits and thirty-five allegations related to plant construction and management controls at the Seabrook facility. Further contact with the ELP resulted in ten additional allegations.

Throughout the contacts with ELP, the NRC requested to be put into direct contact with the allegers without success. However, two of the allegers made public statements to the press and issued signed affidavits containing their concerns. The NRC attended the press conference and acquired the allegers names and addresses for future contact. These affidavits were not from the same sources as those provided in the Governor Dukakis letter.

The several allegation sources were reviewed by the NRC and each allegation was listed separately, although it may have resulted in duplicate allegations. This was done to preclude any issues from being overlooked. This resulted in sixty-one separate allegations. The allegations were grouped into seven categories as follows: concrete, piping and welding, painting, procedures and training, security and drugs, electrical, and management. Where similar or duplicate allegations have been identified, they are grouped and addressed together in the report.

## INSPECTION TEAM

An interdisciplinary inspection team was established to investigate the allegations. Engineering disciplines of the team members correlated directly with the technical concern identified in the allegations. Each engineering inspector had extensive experience in at least one technical discipline and was thoroughly familiar with the NRC program of inspection. Disciplines represented on the team were electrical, mechanical, metallurgical, and civil engineering. These technical disciplines were supplemented by members experienced in fire protection, security, quality assurance, and plant operations. The team leader was a middle manager, Engineering Branch Chief, with extensive nuclear plant construction experience. The team members were authorized to expend whatever resources were required to resolve the issues. The inspection team arrived at the Seabrook plant on November 3, 1986.

## INSPECTION METHOD

The inspection method was to review the allegation, determine the alleger's basic concern, and restate the allegation where more detail was needed to focus on the technical issue perceived by the NRC. Based on the specificity of information supplied by the alleger, the alleged condition was related to specific plant areas. In those cases where specifics were lacking, i.e. the allegation was in general, broad terms, the team interviewed ELP and allegers to obtain more details. In most cases, the alleger did not provide further details.

Plant hardware was inspected and independent tests performed where possible to evaluate the allegation. In some cases the previous record of inspection had documented the allegation and in these cases the record was reviewed and corrective actions verified. Interviews were conducted of allegers and plant staff to aid in the inspection. The bases for any conclusions are derived from an inspection of the actual item or area if known and accessible, previous NRC inspections of the issue, established engineering knowledge and quality assurance records.

## SUMMARY AND CONCLUSION

The total number of allegations identified was sixty-one; this was reduced to forty-seven when duplicates were combined. The inspection, in many instances, disclosed that previous knowledge of the alleged condition was identified by the NRC or the licensee and documented in quality assurance records, NRC inspection reports or formal correspondence between the licensee and the NRC. Thirteen of the allegations were substantiated in that the statement made by the alleger was accurate; however, eleven of these allegations were previously identified by the NRC or the licensee and were appropriately dispositioned by engineering. The remainder of the allegations could not be substantiated but, in all cases, even if the event had occurred there would have been no nuclear safety significance. Within the scope of this inspection, no nuclear safety significant issues or violations were identified.

# 1. INTRODUCTION

## 1.1 PERSONS CONTACTED

New Hampshire Yankee

R. Cyr, Maintenance Manager
W. Daley, Licensing Manager
W. Derrickson, Senior Vice President
W. DiProfio, Assistant Station Manager
R. Ferrell, Licensing Coordinator
I. Fugenbaum, Executive Assistant to Sr. V.P.
W. Johnson, Vice President, Quality Programs
D. McLain, Production Services Manager
D. Moody, Station Manager
T. Murphy, I&C Supervisor
D. Perkins, Licensing Engineer
T. Pucko, Senior Licensing Engineer, Regulatory Services
C. Roberts, Security and Computer Services Manager
J. Tefft, Project Engineer, Regulatory Services
W. Temple, Licensing Coordinator
C. Vincent, QC Supervisor
L. Walsh, Operations Manager
N. Wiggins, Training Manager

Yankee Atomic Electric Co.

G. F. McDonald, QA Manager
S. B. Sadosky, EAR Program Manager

Employee Allegation Resolution Program

A. Fasano, Investigator
W. Gagnon, Investigator

U. S. Nuclear Regulatory Commission

A. C. Cerne, Senior Resident Inspector
D. Ruscitto, Resident Inspector

The above listed personnel attended one or both exit interviews conducted on November 7 and 14, 1986. Other licensee personnel were contacted as the inspection interfaced with their area.

## 1.2 BACKGROUND

During the May - July 1986 time period, the NRC became aware of The Employee's Legal Project(ELP), a nonprofit organization, which is designed to receive safety concerns of current and former employees of New England nuclear power plants. On August 4, 1986, the NRC formally contacted the Employee's Legal Project and solicited any safety allegations concerning nuclear power plants under the NRC's jurisdiction.

The NRC came into possession of an unsigned letter, dated September 12, 1986, from the Employee's Legal Project to Governor Dukakis of the Commonwealth of Massachusetts, containing two unidentified affidavits and 35 allegations of wrongdoing at the Seabrook Nuclear Power Station. The NRC responded to the Governor Dukakis letter with a telephone call on September 23, 1986 and a letter,dated September 24,1986 to The Employee's Legal Project requesting any additional information. In these contacts, the NRC requested Employee's Legal Project assistance in making direct contact with the allegers.The Employee's Legal Project responded by letter, dated September 25, 1986. In this response, it was stated that all allegers refused to meet with the NRC directly. Further, the ELP transmitted 10 additional allegations also relating to the Seabrook Nuclear Power Plant.

The NRC transmitted the forty-five allegations to Public Service of New Hampshire, the licensee of the facility, and requested that they perform an investigation. Independently, the NRC formulated plans to assemble an inspection team to address the allegations. Subsequent to the foregoing ELP contacts, two of the allegers provided affidavits and media interviews which raised the number of allegations to sixty. Some of these additional allegations were duplicates of the previous forty-five but originated from a different source and were treated as separate issues to insure that all allegations were addressed.

During the course of the inspection, the NRC contacted the ELP and the identified allegers and conducted formal interviews in order to gather as much detailed information as possible. The interview results increased the number of allegations to sixty-one. Subsequent to the inspection on-site, the ELP sent a letter to the NRC inspection team leader, dated November 10, 1986, containing clarifications to allegations 1, 2, 3, 18, 19 and 22. These clarifications were evaluated, inspected, as appropriate, and factored into the inspection findings.

## 1.3 REPORT ORGANIZATION

The sixty-one allegations generally were categorized into seven areas: concrete, piping and welding, painting, procedures and training, security and drugs, electrical, and management. The NRC formed a team consisting of a team leader and six specialist inspectors with qualifications in electrical, metallurgical, quality assurance, security, civil and operations engineering to address the allegations. The team arrived onsite at the Seabrook Nuclear Power Plant on November 3, 1986.

The inspection focused on any general or specific actions that the licensee had previously taken to address these allegations; any previous actions by the NRC during the course of its normal inspection program; and any direct inspection or examinations that could be performed after the fact by the inspection team. It is important to note at the time of the inspection the major systems, structures and components of the facility were completed, and most major contractors have demobilized and left the site. The only major contractor remaining on-site is United Engineers and Constructors, the architect-engineer, which has significantly reduced its staff size. This means that most of the people that had first hand knowledge of the events discussed in this report are no longer readily available at the site. The inspection team's charter was to address the allegations resulting from the ELP letters, the affidavits, and any allegations resulting from interviews directly connected with the inspection.

Further, the licensee has announced the cancellation of Unit No. 2; thus, the inspection focused on Unit No. 1 and the implications resulting from Unit No. 2 allegations as they might relate to Unit No. 1.

The allegations are numbered one through sixty-one and are sequenced in the order in which they were recieved. Where there are duplicate or similar allegations, they are grouped together. The report is structured such that the allegation is presented as it was received from the alleger, the allegation is restated, as necessary, to better define or clarify the problem or concern as it is understood by the NRC; details resulting from the inspection are provided and then a conclusion based on the facts is stated. The allegation conclusions are presented according to whether they are substantiated, true, as stated, or unsubstantiated, any part or all of the allegation is not borne out by the facts. Those that are substantiated are then evaluated for any significant impact on nuclear safety.

## 1.4 QUALITY ASSURANCE HISTORY

As a prelude to the resolution of the allegations, it appears to be appropriate to describe the Quality Assurance Program that has been in place since the beginning of construction at the Seabrook Nuclear Station. Many of the allegations appear to have been made without the knowledge of the comprehensive procedures for assuming quality that have been in-place during construction and are continuing today.

Public Service of New Hampshire was required to have a quality assurance program outlined, approved and in place before construction began. This approval was granted by the Nuclear Regulatory Commission only after a thorough review. The program was presented in the Preliminary Safety Analysis Report which was submitted with the application for a permit to construct the plant.

The program outlined and implemented was a three tier system in which first level quality control inspections were provided by the organization performing the work. The organizational structure was required to be such that the quality control group was independent of the group doing the work. The second and third levels were performed by the Yankee Atomic Electric Company in the form of surveillances and audits. These surveillances and audits were and are performed on suppliers, fabricators and constructors of safety related equipment and structures.

## 1.5 NRC INSPECTION PROGRAM

Overlaid on this system is the Nuclear Regulatory Commission's inspection program wherein resident inspectors and regional based technical specialists perform inspections and audits of all licensee safety related activities. To date, the NRC has expended over 20,000 inspection hours at the Seabrook site verifying that the construction meets established requirements. Further, there are other organizatons that provide inspection and audits during the construction and startup phases such as the American Society of Mechanical Engineers' Authorized Nuclear Inspector for the piping systems and the containment to insure that the plant meets the national codes.

The inspection programs do not end with the construction phase. During the preoperational and actual plant startup phases, additional tests are performed to assure that the equipment functions as designed. Each system is tested to demonstrate that it meets performance specifications. These tests are run on individual systems and, in some cases, as integrated systems where they must function together.

After the preoperational tests are performed, the startup testing program demonstrates that the plant will respond to a known set of transients for which it has been designed. All of these tests have established acceptance criteria which must be met. These tests are reviewed and monitored by the NRC to assure the program is working as required.

Throughout the construction and the preoperational phase, the NRC performed special inspections designed to focus on known critical aspects of the project. These inspections included a Region I Construction Assessment Team, June 1982; an Inspection and Enforcement Integrated Design Inspection, November 1983; an Inspection and

Enforcement Construction Appraisal Team, April 1984; a Region I Construction Team Inspection, June 1985; a Region I Independent Measurements Inspection, July 1985; a Region I As-Built Team Inspection, March 1986; and a Region I Technical Specification Inspection, May 1986. These inspections were designed to examine the programmatic aspects as well as the actual installation of equipment.

Fundamental to all of this is the NRC inspection program which examines all aspects of the licensee's construction organization and practices. Examples of the NRC's efforts in this area are discussed below as they relate to the allegations.

Several of the allegation conclusions are supported by the fact that NRC inspectors interface directly with licensee's staff, the contractors and subcontractor personnel. This includes the craftsmen performing the work. During these interfaces, the inspector discusses the technical aspects of the ongoing task including any concerns the craftsman may have with the construction practices. The NRC has been informed of allegations by craftsmen on several occasions at this and other nuclear power plants. Interviews are an integral part of the inspection process and occur in almost every inspection. Inspection reports that provide examples of interviews are presented in Table 1.

The NRC performed in excess of twenty-six inspections directed toward the welding process application, including training and qualification, in the nuclear piping and structural welding areas. See Table 2 for a listing of sample reports. Welding inspections have also been performed on the Heating, Ventilation and Air Conditioning, pipe supports, electrical cable trays and non-nuclear components. These inspections have included evaluation of the nondestructive examination (NDE) methods used, appearance of welds by visual examination and documentation of weld acceptance. Confirmation of the effectiveness of contractor NDE has been verified by independent NRC examinations using the Mobile Nondestructive Examination Van employing radiography, magnetic particle, ultrasonic and other examination methods.

In general, welding and NDE activities were found to be conducted in accordance with applicable codes and specifications. Where problems have been identified by the NRC, these have been tracked until completion of the corrective actions. A review of a sample of the NRC inspection reports indicates that thousands of individual field observations have been made over the life of the construction.

During the construction of the Seabrook facility, the NRC has consistently been concerned with the training and qualification of personnel performing safety related work. The nuclear standards and regulations provide for the training and qualification of welders to the American Society of Mechanical Engineers, Section IX, nondestructive examination inspectors to the Society of Nondestructive Testing practice SNT-TC-1A and other inspectors to the American National

Standards Institute N45.2.6. Other training is performed that assures the technical aspects of construction are satisfied, although it is not specifically prescribed by codes; examples of this are the cable splicing and termination and concrete expansion anchor installation instructions given. The NRC inspects these training and qualification programs and examples of inspection reports that reflect this are presented in Table 6.

The electrical inspection program reviewed the procedures, design specifications, personnel qualifications, and installation and inspection criteria. In conjunction with this, the installation of equipment was observed to assure that the established procedures were being implemented. The observation phase of the program included the witnessing of terminations, cable splices, cable pulling operations and proper routing. The routing inspections also included the verification of the cable support system. Examples of these inspection are presented in Table 3.

In the area of civil/structural work, the NRC has performed in-excess of forty (40) inspection starting in 1976 with geotechnical/foundation work to concrete and other structural work. These inspections focused on the clarity, technical adequacy, and quality assurance aspects of the controlling specification and procedure of the work to include witnessing on-going work, inspection of completed work, and review and examination of records generated by quality control to document conformance to the requirements. Most of these inspections were unannounced, that is the licensee and/or contractor personnel did not know of the impending inspection by the NRC until the arrival of NRC inspectors on site. Examples of inspection reports showing areas of inspection and their focus are presented in Table 4.

As the plant is built, the NRC continuously monitors the progress and selects completed portions for as-built verification. This includes comparison of the as-built system with the Final Safety Analysis Report, drawings and other requirements and commitments to assure accuracy. Several inspections were made of the as-built condition of systems, one of which was a team effort devoted to this alone. Table 5 contains a listing of inspection reports that address as-built inspections.

All of this inspection is designed to assure that any single error in design or installation will not prevent the design safety features from performing as intended. Incorporated into the design features of the plant are concepts of defense-in-depth and redundancy.

TABLE 1

EXAMPLES OF NRC INTERVIEWS
AT SEABROOK POWER STATION

| INSPECTION REPORT NO. | DATE | REMARKS |
|---|---|---|
| 80-03 | 2/26-28/80 | Electrical |
| 84-10 | 6/26 - 8/24/84 | Containment, Reactor Vessel |
| 84-13 | 8/27 - 10/26/84 | Welding |
| 85-01 | 2/11 - 4/5/85 | Piping and Electrical |
| 85-07 | 3/11-15/85 | Heating and Ventilation |
| 85-09 | 4/8-24/85 | Preoperational Testing |
| 85-10 | 4/15-19/85 | Welding |
| 86-15 | 3/14-19/86 | Containment Leak Rate Testing |
| 86-21 | 3/31 - 4/4/86 | Electrical |
| 86-23 | 4/14-18/86 | Training |
| 86-34 | 6/24 - 7/7/86 | Bolting, Health Physics |
| 86-45 | 8/18-22/86 | Electrical |
| 86-46 | 7/8 - 9/15/86 | Startup Testing, Fireproofing |

TABLE 2

WELDING AND NDE INSPECTIONS ON
NUCLEAR AND STRUCTURAL WELDING

| INSPECTION REPORT | INSPECTION DATE | REMARKS |
|---|---|---|
| 78-07 | 4/24 - 4/28/78 | Containment Liner Welding and NDE |
| 78-08 | 5/22 - 5/25/78 | Containment Liner Welding and NDE |
| 78-09 | 6/26 - 6/28/78 | Containment Steel, Welding, NDE, Qualifications |
| 80-03 | 2/26 - 2/28/80 | Stainless Steel Welding, Stud Welding - One Violation |
| 80-04 | 4/14 - 4/17/80 | Pipe Welding Controls, Overcheck of Shop Welds |
| 80-11 | 9/16 - 9/19/80 | Three Violations - Resolved |
| 81-08 | 6/29 - 7/24/81 | Pipe and Pipe Supports Including NSSS, RPV Safe Ends |
| 81-12 | 10/5 - 11/16/81 | Pipe Installation, Programmatic QA Inspection |
| 81-13 | 11/3 - 11/6/81 | Machine Welding (GTAW) |
| 81-14 | 11/17/81 - 1/8/82 | Pipe Installation, QC and NDE, Interviews |
| 82-03 | 3/23 - 5/3/86 | Reactor Coolant Pipe Welding, NDE, Pipe Weld Repair Program |
| 82-06 | 6/21 - 7/2/82 | Two Violations Resolved (NRC-NDE Van Insp) |
| 82-10 | 8/24 - 9/30/82 | Pipe and Pipe Support Welding, Interviews, NDE |
| 83-01 | 1/17 - 1/21/8 | End Return Welds (Boxing), Pipe Support Welding |
| 83-06 | 4/11 - 5/23/83 | Pipe, Pipe Support and Electrical Raceway Installation |
| 83-07 | 5/23 - 5/27/83 | Vessel Internals - Violations - Resolved Struct Steel |
| 83-09 | 5/24 - 7/1/83 | Piping and Pipe Supports, QC Inspector Harassment Interviews |
| 83-12 | 8/8 - 8/12/83 | Violation - UT Procedural Problem - Resolved |
| 83-13 | 7/11 - 8/26/83 | RCPB Installation, Instrument Tubing, Pipe Supports |
| 83-17 | 10/17 - 12/5/83 | Containment - Penetrations and Leak Chase, Piping and Supports |
| 83-22 | 12/6/83 - 1/20/84 | Small Bore Piping, NDE Qualifications |
| 84-07 | 4/23/ - 5/25/84 | Hardware and Documentation is per Requirements |
| 84-12 | 8/13 - 8/31/84 | Allegation Inspection - Welding, Piping, Valves, NCR Control |
| 84-17 | 10/29 - 12/17/84 | Interviews of Crafts, RPV, Piping Walkdown |
| 84-16 | 10/29 - 11/2/84 | RPV Nozzle Repair, Pipe and Pipe Support Welding |
| 85-15 | 6/3 - 6/14/85 | Special Construction Inspection, Management, Welding and QA |
| 85-19 | 7/15-7/26/85 | No Violations (NRC-NDE Van Insp) |

TABLE 3

ELECTRICAL INSPECTIONS

| INSPECTION REPORT NO. | DATE | REMARKS |
|---|---|---|
| 50-443/79-10 | December 11-13, 1979 | Installation procedures require safety related cables installed in raceways. |
| 50-443/82-03 | March 23 - May 3, 1982 | Discusses the qualification and flame retardant characteristics of Class IE cables. |
| 50-443/82-11 | September 20-24, 1982 | Verified by inspection that safety-related cables are installed in raceways. |
| 50-443/83-03 | February 22-25, 1983 | Reviewed the cable pulling program (CASP) and verified that safety-related cables were in the specified raceways as required by the CASP. Also verified cable terminations were made per specification requirements. |
| 50-443/83-05 | March 2 - April 8, 1983 | Verified that Class IE cables were in seismically installed raceways and that cable pulls were per procedures. |
| 50-443/86-36 | June 16-20, 1986 | Allegation 18 - A review of the HVAC re-work was verified by the inspector and the operational testing of the system reviewed. |
| 50-443/86-37 | May 10-17 & June 9-13,86 | Preoperational testing of the HVAC system was verified by NRC witnessing. |
| 50-443/86-46 | July 8 - September 15,86 | As built verification of the enclosure air handling and PAB air handling system. |

TABLE 4

EXAMPLES OF NRC
CIVIL/STRUCTURAL INSPECTIONS

| INSPECTION REPORT NO. | DATE | REMARKS |
|---|---|---|
| 76-02 | 7/14-15/76 | QA plan for Construction |
| 76-03 | 8/2-4/76 | Concrete Quality Control, Qualification of Concrete Test Lab. |
| 76-06 | 12/13-15/76 | Interview craft personnel, Cadweld procedure. |
| 77-03 | 7/6-8/77 | Qualification of concrete lab, control of concrete. |
| 77-06 | 8/26/77 | Craft interview, concrete fill, test lab inspection, groundwater control. |
| 77-07 | 10/3-4/77 | Control of concrete, test lab. |
| 77-10 | 12/5-9/77 | QA/QC for concrete, rebar, batch plant, test lab. Sampling of rebar. |
| 78-02 | 2/14-17/78 | Concrete test lab inspection, observation of rebar installation inside containment in reactor cavity. Fill concrete. Qualification of cadweld splicing process - equipment and crews. Qualification of concrete testing and inspection personnel. Waterproofing of containment foundation. |
| 78-05 | 3/20-24/78 | Observation of Unit 1 containment basement placement. (Placement #1-CPS-3A; 4000 psi Mix) |
| 78-07 | 4/24-28/78 | Record review for foundation concrete. |
| 78-08 | 5/22-25/78 | Observation of concrete placements. (placement #1TB-41B; ITB-27B; CN-E7d; ITB-41) |
| 78-10 | 7/10-14/78 | Observation of containment concrete (1300 cy of 4000 psi concrete in reactor pit structure); Installation of Rebars and cadwelds in containment basement. Resolution of concrete lab conformance to ASTM E-329 (78-02-04) |

TABLE 4 (Cont)

| INSPECTION REPORT NO. | DATE | REMARKS |
|---|---|---|
| 78-13 | 9/5-8/78 | Concrete aggregate tests, interview craft personnel. |
| 78-15 | 11/6-9/78 | Observation of containment structural concrete - QA/QC, preplacement, placement, post placement inspection and curing of previously placed concrete (placement #1-CM-7A; 4000 psi mix) |
| 79-01 | 1/15-18/79 | Containment Concrete placement observation records. (Placement #1-CI-1) |
| 79-02 | 1/24-25/79 | Investigation of frozen concrete joint. |
| 79-03 | 2/12-15/79 | Training of site personnel. (Professionally produced film) |
| 79-07 | 8/13-16/79 | NOV - Void area in excess of maximum allowed. (79-07-02)<br>NOV - Lack of approved repair procedure for concrete (major repairs). (79-07-03) |
| 79-09 | 11/13-16/79 | NOV - Failure to prescribe corrective action for rebar installation before concrete placement. (79-09-01) |
| 80-01 | 1/22-25/80 | (Drug Indictments) Observation of cadweld splicing of rebars in Containment Building exterior walls; Observations of placement preparation circulating water pump house walls; observations of cold weather curing of concrete. |
| 80-04 | 4/14-17/80 | Review of cadweld significant deficiency 50.55(e) |
| 80-06 | 5/19/80 - 6/27/80 | Observation of concrete base mat placement for Unit 2 containment. |
| 80-12 | 10/13/80 - 11/21/80 | Allegation Investigation of Site Concrete Lab for conformance to ASTM and ANSI standards. Concrete Batch Plant inspection. |
| 80-13 | 11/24/80 - 12/31/80 | Containment concrete placement (cutting of 1000 rebars at Elv. +25.0) |

TABLE 4 (Cont.)

| INSPECTION REPORT NO. | DATE | REMARKS |
|---|---|---|
| 81-04 | 3/12/81 | SALP - no change in concrete inspection program. |
| 81-12 | 10/5/81 - 11/16/81 | Concrete placement preparation, cadweld splicing, containment liner and concrete interfacing. |
| 82-03 | 3/23/82 - 5/3/82 | Cadwelding of rebars, corrective action on groundwater leakage. |
| 82-04 | 5/4-14/82<br>6/1-18/82 | Concerns regarding concrete repair (allegation on concrete sand) |
| 82-07 | 6/14-17/82 | Observations of concrete construction of containment review of corrective actions plan for control of groundwater seepage through concrete cracks. |
| 82-09 | 8/24-27/82 | Review of procedures and observation of work in containment concrete preparation, placements, and curing. |
| 83-07 | 5/23-27/83 | Review of documentation of containment dome concrete. |
| 84-07 | 4/23/84 - 5/4/84<br>5/14-25/85 | Construction Appraisal Team Inspection Concrete Activity (Report Section IV) |
| 84-12 | 8/13-17/84<br>8/27-31/84 | Team Inspection to resolve allegations. Cracks in concrete wall; interviews with craft personnel. |
| 86-43 | | |

TABLE 5

EXAMPLES OF NRC AS-BUILT INSPECTIONS

| INSPECTION | DATE | REMARKS |
|---|---|---|
| 85-09 | 4/8 - 5/24/85 | RHR, EFW, Steam Generator |
| 85-15 | 6/3-14/85 | Safety injection, RHR, HVAC |
| 86-43 | 7/7-11/86 | Cable trays and supports |
| 86-46 | 7/8 - 9/15/86 | RHR, CVS, RCS and others |

TABLE 6

NRC INSPECTIONS OF TRAINING

| INSPECTION REPORT | DATE | REMARKS |
|---|---|---|
| 79-08 | 9/4 - 7/79 | Quality Assurance |
| 79-09 | 11/13 - 16/79 | Concrete Placement |
| 79-10 | 12/11 - 13/79 | Quality Assurance, Welding |
| 82-06 | 6/19/82 | Nondestructive Examination |
| 83-12 | 8/8 - 12/83 | Instrumentation, Mechanical, Nondestructive Examination |
| 84-07 | 4/23 - 5/4/84 | Electrical, Mechanical |
| 84-16 | 10/29 - 11/2/84 | Mechanical, Welding |
| 85-07 | 3/11 - 15/85 | Mechanical |
| 85-11 | 4/29 - 5/3/85 | Electrical |
| 85-19 | 7/15-26/85 | Nondestructive Examination |
| 86-15 | 3/4-19/86 | Startup Mechanical |
| 86-23 | 4/14-18/86 | Non Licensed - I&C, Electrical, Mechanical |

## 2.0 ALLEGATIONS

1. "Cement was poured in below freezing temperature (contrary to product recommendation designed to produce proper solidification and strength)."

### NRC UNDERSTANDING OF THE ALLEGATIONS

NRCs understanding of this allegation is that during cold weather, one placement of concrete in the containment wall was done where the construction joint, top surface from a previous placement, was frozen due to inadequate heating of the enclosure provided for cold weather construction protection. Additional information provided by the alleger to the NRC, indicated that it happened on the night shift in the containment building. Also, the allegation was regarding frozen concrete on which fresh concrete was deposited rather than freezing weather conditions.

### DETAILS

The NRC inspector interviewed the Site Quality Assurance Manager and Supervisors to determine their knowledge and understanding of site QA procedures during concrete construction; examined the construction schedule and associated QC documentation for the construction of Unit-1 containment structure; and reviewed prior NRC-Inspection Reports and other correspondence to determine the history of containment concrete and its quality. Because the allegation did not provide a specific year or period, the NRC reviewed the chronological construction schedule for the Unit 1 containment structure beginning on 9-1-77 through 4-14-83. The concrete placements carried out in cold weather months were selected for detailed record review. Out of a total of seventy-seven (77) major and minor concrete placements (pours) during this period, sixteen placements were identified to have been performed during the months of November through March of 1980 - 1983. It was determined by these records that none of the sixteen placements were started on the second shift; moreover, only four of the placements were started when the ambient temperature was below freezing. The previously placed concrete temperature in every case was above freezing levels. These temperatures were recorded by quality control inspectors using calibrated thermometers; calibration of which was traceable to National Bureau Standard (NBS). More importantly, in addition to temperature measurements, construction joints are inspected for surface preparation, water and ice, and general cleanliness and preparation.

The inspector determined by review of NRC Inspection Report (IR-50-443/79-02) that a similar allegation had been brought to the NRCs attention by a telephone call on January 23, 1979. The NRC investigated the concern, and concluded that the concern was not substantiated. This conclusion was based on the following:

"The inspector examined batch plant, quality control and placement records and examined all concrete placements that had been performed at the site on January 23, 1979. The placement were:

Unit No. 1 Administration Building Stack Foundation, Placement A3B, Elevation 21 ft., 61 cubic yards, started 12:40 PM, completed 2:30 PM.

Unit No. 1 Condenser Pads, C Bay North, Placement 1TPM-8D, 5 cubic yards, started 2:30 PM, completed 3:30 PM.

The inspector also interviewed construction supervision, quality control and quality assurance personnel involved in the January 23, 1979 placements. Each of these persons was found to be fully familiar with the details of their placements, including the steps taken to remove the small patches of ice that had formed over the previously placed concrete, the use of space heaters in the placement areas prior to placement, the use of portable propane torches to dry surface water remaining on the previously placed concrete, and the measurement by quality control personnel of the concrete surfaces prior to placement, to assure that minimum placement temperatures were exceeded."

Starting from 1976 through 1984, the NRC has performed 35 inspections/investigations in the area of containment concrete and penetrations to verify the licensee's conformance to specifications, codes, and standards. Observation of on-going work was an integral part of these inspections, the NRC monitored and witnessed many of the safety-related concrete placements. (See Table 4.0).

Furthermore, the overall functional capability and the safety of the containment structure is tested by the NRC required Structural Integrity Test (SIT). The NRC has witnessed the test, and has evaluated the results. If there was a deficiency in a construction joint, it is expected that the deficiency would show-up during the SIT. The expansion of containment due to pressurization induces cracks in the concrete which are mapped and documented. Any deficient joint is the most likely place for crack development. No such indications were noted during the SIT.

The inspector visually examined some construction joints in this inspection, and did not find any spalling of surface concrete, any cracks visible to the unaided eye, voids, or any evidence of foreign material embedded in the joint to indicate unacceptable joint preparation.

CONCLUSION

Based on the summation of NRC inspections, the relatively small number of cold weather concrete placements, a review of quality records, and the successful completion of the structural integrity test, it is determined the containment is struturally sound and there is no evidence of inadequate construction joints. This allegation was not substantiated.

## 2.2 ALLEGATION

"Cement which was tested and rejected as an improper mixture by a safety inspector was subsequently poured."

## NRC UNDERSTANDING OF THE ALLEGATIONS

Based on further amplification from the alleger, it is understood that this occurrence was alleged to have happened on the third shift during a concrete placement in the containment structure.

In the November 10, 1986 letter to the NRC, ELP provided additional information as follows:

"Allegation #2: Concrete rejected by an inspector was poured anyway.

When: November - December 1977 or January - February 1978.

Where: Containment of Unit II; could not be more specific.

Why concrete was rejected: It did not meet specifications. A woman in white hard hat had a sample can, put something like a probe in it, rejected it, then left."

## DETAILS

The containment structure is built with a 4000 psi nominal strength concrete mix. A total of approximately 11500 cubic yards of concrete have been used in the base mat, the shell, and the dome of the structure. One batch of concrete which is nominally 10 cubic yards, is a very insignificant part of the structure (approximately 0.00087 of the total). Also, if the process of placement of concrete by pumping is taken into consideration, this batch is placed over a wide area and mixed with previous and subsequent batches by thorough internal vibration. The primary purpose of all the process controls and field testing of concrete is to insure production of generally uniform concrete of desired characteristics. However, concrete being a hardened mass of hetrogeneous material is subject to the influence of numerous variables. Consistent concrete of acceptable quality is produced and placed, if proper control is maintained, test results are properly interpreted, and limitations are considered.

To evaluate an isolated instance of a batch of concrete which does not meet the strict acceptance criterion, the following statement in the American Concrete Institute standard, ACI 214-65, must be considered:

> "Proper control is achieved by the use of satisfactory materials, properly mixing these materials....., and good practices in transporting, placing, curing, and protecting the fresh concrete."

> "Whenever practicable, conclusions on strength of concrete should be derived from a pattern of tests from which the characteristics and uniformity of the concrete can be more accurately estimated. To place too much reliance on too few tests may result in erroneous conclusions." (emphasis added)

The quality of structural concrete in the Unit 1 containment structure has been inspected, and the test records of the concrete have been reviewed by the NRC periodically throughout the construction phase. These inspections have been documented in 14 NRC Inspection Reports (78-01; 78-05; 78-10; 78-15, 79-02; 79-09; 80-01; 81-12; 82-03; 82-07; 82-09; 82-13; 84-12; and 85-07)

There are several checks of concrete quality; one at the batch plant, one at the point of placement and a final strength test (compressive test cylinders). The cylinders are stored to properly cure the concrete for a specified period of time and then loaded in compression and the failure strength measured by an independent contractor. The strength of the cylinder test is a direct correlation to the quality of the concrete and produces an independent check.

The NRC inspector reviewed the compression test records for containment concrete during this inspection. These records were generated and submitted to the licensee by Pittsburg Testing Laboratory, an independent testing contractor. The records indicated an average strength of approximately 5000 psi, which is 25% higher than the nominal design strength. Also, there is a latitude in the acceptance standards for fresh concrete with regard to air content, slump, and temperature. Isolated minor deviations in these properties do not affect the serviceability of concrete. A wide range of tolerance in the acceptance value for these properties is allowed in concrete specifications.

The NRC was unable to determine the significance of the action by the woman in the white hard hat. Normally, concrete acceptance requires a set of tests specified by project specifications and the Division 2 of the ASME code. The tests include slump, air content, and temperature for every 50 CFT, and in addition a minimum of two sets (two 6" X 12" cylinders each set) of compression test specimens for every 100 CFT of concrete placed. The inspector/technician is also required to record the rejection on the batch ticket and/or acceptance form. All acceptance, rejection, or other disposition of the concrete must be recorded on the batch ticket that accompanies the batch of concrete. The batch ticket is the primary vehicle to account for the production, use, and rejection of concrete. Therefore, if the concrete was truly tested by the "woman in white hard hat", and she was a QC inspector, she must perform the full set of tests, i.e. air-content, slump and temperature; and if the batch is rejected it must be recorded on the batch ticket, and the ticket returned to the batch plant. The batch plant inspector must review and account for all concrete produced and its disposition through the use of batch tickets.

The inspector reviewed concrete batch tickets in conjunction with the cold weather concrete placement record review. No instance of rejected concrete being placed was identified. The NRC has reviewed batch tickets for many placement in safety related structures during prior inspections (see table 4.0).

CONCLUSION

This allegation can not be substantiated. It is unlikely that an occurrence of this nature can happen because of the multiple inspection and audits. In addition, actual test samples of concrete by an independent lab verified that the age hardened concrete exceeds design strength by an average of approximately 25%.

3. ALLEGATION

"Empty beer cans and bottles were discarded in the wet cement by workers drinking on the job, potentially creating air pockets and affecting the integrity of the containment."

NRC UNDERSTANDING OF THE ALLEGATION

The allegation as understood by the NRC is that empty containers (cans and bottles) were discarded into the fresh concrete during concrete placement.

DETAILS

The NRC reviewed the licensee's alcohol detection/prevention program and other related documentation. The licensee instituted controls to prevent the use of alcohol on the Seabrook site. Futhermore, NRC has monitored/witnessed many of the safety-related concrete placement directly in containment and other structures. These inspections did not disclose any instance of discarding of cans/bottles in concrete. The NRC has also periodically reviewed the concrete placement inspection records generated by the site QA/QC organization. These records also did not indicate any instance of foreign materials in concrete. The licensee concrete placement QA program required more than one placement QC inspector to monitor the placement. On larger placements, six to eight QC inspectors monitored the placement. It seems likely that if containers were being discarded into the concrete, the QC inspectors would notice this problem. Additionally, engineers and construction supervisors were also present to monitor and direct the placement operations. None of these technical and supervisory personnel reported any such incident.

In spite of the unlikely event that large numbers of containers were being thrown into the concrete, it is possible that some isolated instance of this act could have happened. To determine the safety significance of such an occurrence, the NRC evaluated the response of the containment during the Structural Integrity Test (SIT) under 115% design pressure. No unusual response and/or cracks were noticed; the crack patterns developed on the wall were mapped and compared with the predicted crack growth. It was consistent; indicating no unusual concentration of voids or imperfections within the wall of the containment shell and dome.

The NRC also evaluated the likelihood of any void created by these containers, and its effect on the integrity of the containment. Any metallic container on the surface of concrete or dropping with the stream of fresh concrete would not survive the impact of concrete placement drop (5 ft); because the density (unit weight) of concrete in the containment structure is approximately 145 pounds per cubic foot; therefore, a can is likely to be flattened leaving no measurable void. The glass bottles, which are more likely to survive the impact, may remain intact creating the possibility of a void. However, any one bottle can only create approximately a 12 fluid ounce void at one place (approximately 0.00125 CFT). Assuming 500 containers embedded in the shell, and 40%

of these (200 bottles) to be glass bottles, a total void of approximately 2.5 CFT is created. The volume of this void approximately equals the volume of one pipe penetration of 12" diameter pipe through the containment wall. The conservativeness of design, properties of the concrete-mix used, and the response of the structure in the SIT provide additional confidence in the safety of containment.

The inspector further noted that no foreign materials had been observed embedded in concrete in the containment wall or dome after form removal. The inspector, therefore, determined that the integrity of the Unit 1 containment structure is unimpaired.

CONCLUSION

This allegation can not be substantiated. The probability of a large void in the containment structure due to any adverse conditions, including cans or bottles, is very low due to quality control and supervisory activities during placement. A small void has been shown to be insignificant. The integrity of the structure and the lack of significant voids, are demonstrated by the successful structural integrity test.

4. and 17. ALLEGATION

4. Superficial patches were applied to major cracks in the containment (resulting from improperly cured cement ).

17. There were cracks in the cement of the equipment vault which were leaking water and cracks in the inside containment dome between the inside and outside domes which were just patched over. It is my understanding that patching on hardened cement does not last very long.

NRC UNDERSTANDING OF THE ALLEGATIONS

4. The NRCs understanding of this allegation was that due to inadequate curing of concrete placed in the containment structure, cracks developed in the concrete and these cracks were only superficially patched. The repairs, therefore, were inadequate.

17. This allegation refers to two related conditions: 1) there are cracks in concrete in the equipment vault and containment dome; and 2) water seeps through the cracks in the equipment vault.

DETAILS

The NRC has been aware of concrete cracks in structures at the Seabrook Station through its routine inspections and, in some cases, by allegations brought to NRCs attention by individuals. These cracks have been examined and evaluated by the NRC from the very early stages of construction. The licensee's actions to evaluate and repair cracks in concrete have also been reviewed and found adequate by the NRC.

Cracks in concrete are a common phenomenon recognized and addressed by all concrete codes, standards, and specification. The most common cause for surface cracks in concrete is due to shrinkage. The exposed surface of any concrete structural member is not considered as part of the structural design basis of the member. The structural portions of a slab, beam or wall extends from the center of the main rebar on one face to the center of the main rebar at the opposite face. The additional thickness of the concrete is provided as a cover on all exposed faces of the member to provide corrosion protection to the reinforcing bars. Furthermore, in the design of concrete structures, concrete is not assumed to resist any tensile stress; it is only designed for compressive loads. Cracks, by definition, are separations of material caused by tensile stress (pulling apart). The tensile stress is resisted by the reinforcing bars in the member; therefore, superficial surface cracks in concrete are not a structural concern.

Pursuant to the current allegation, the licensee again reviewed/investigated this concern through his Employee Allegation Resolution (EAR) program office. The EAR program investigation similarly concluded that concrete repairs on the project were performed properly and were verified to meet engineering requirements. No inadequacy in either the repair procedures or their implementation was identified.

Cracks in concrete and seepage of water through them have been identified, examined and evaluated by the NRC at this project in several structures. The results of these inspections are documented in NRC Inspection Reports (50-443/82-03, 82-07, 84-12 and 86-43). The NRC Inspection Report number 82-03 documents leakage of water through concrete cracks in the diesel generator building; report number 82-07 documents water leakage in the RHR-equipment vault; and report 84-12 documents extensive inspection and evaluation of concrete cracks and repairs in the waste processing building.

During this inspection, the inspector visually examined some concrete repairs performed to repair cracks in the containment wall and equipment vault for evidence of unacceptable workmanship or any degradation, i.e. excessive surface moisture, mineral deposits, joint cracks/shrinkage, and/or a hollow sound indicating separation of patches from sound concrete. The examined repairs did not indicate any of these conditions. The inspector, therefore, concluded that the concrete repair procedure and repairs were acceptable. (Photo nos. 1 & 2)

The repair of concrete is described in the American Concrete Institute's specification ACI 301-72, "Specification for Structural Concrete for Buildings", Section 9.0. The inspector reviewed pertinent documents and determined that the repairs to concrete were acceptable. It met the requirements of the Architect-Engineer's (AE's) specification and the governing design and construction codes, i.e. ACI, and ASME, Section III, Division 2.

CONCLUSION

The allegation regarding cracks and water leakage was substantiated. Cracks in concrete are expected to occur and are permissible if they do not affect the integrity of the structure. The inspector concluded that the wall had hairline cracks, and some of them leaked groundwater through them. However, the repairs effected were in accordance with applicable codes, accepted industry practice, and approved construction techniques.

The allegation that repairs to cracks were "superficial" was not substantiated. The effected repairs were technically adequate, and met the requirements of national codes and standards.

**PHOTO NO. 1,** CONCRETE REPAIRS IN THE EQUIPMENT VAULT ELEVATION (-25') (REF. ALLEGATION NO. 4)

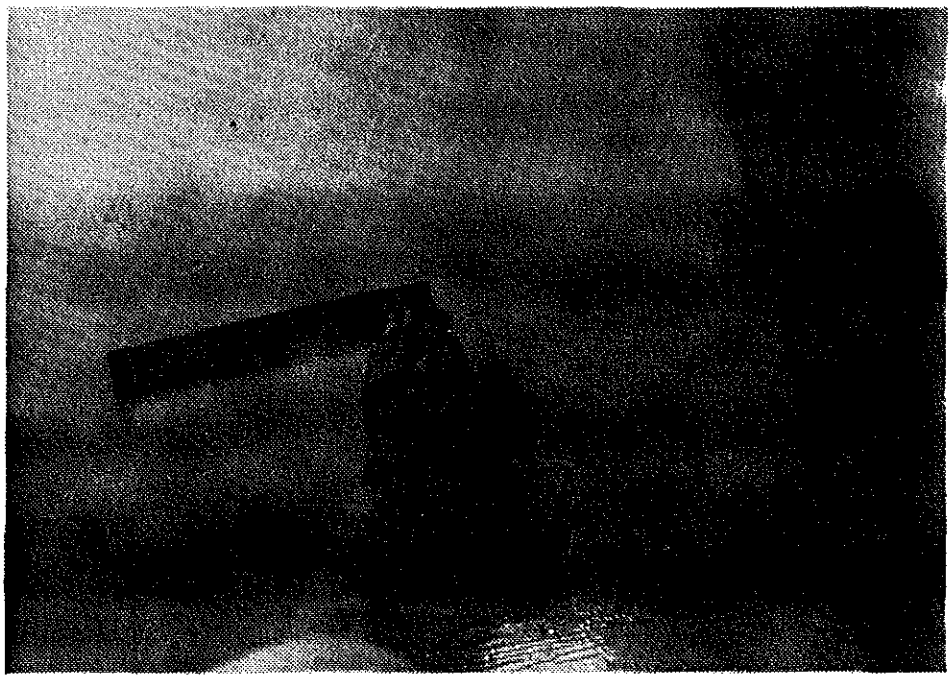


**PHOTO NO. 2,** CONCRETE REPAIRS IN CONTAINMENT ELEVATION 0' (REF. ALLEGATION NO. 4)

5. ALLEGATION

"Steel rods designed to support the containment walls were improperly severed at the second story level of the reactor to simplify the construction process."

NRC UNDERSTANDING OF THE ALLEGATION

As understood by NRC, the allegation pertains to the containment structure reinforcing bars (rebars) that were cut at 2' above the final slab elevation of 25'-0". These dowels represented the vertical rebar for the seven foot shield wall around the pressurizer and four steam generator openings.

DETAILS

The rebars in question were reinforcement for the shield wall around the steam generators and the pressurizer inside the containment. These walls are not structural members nor do they contribute to the safety function of containment structures. The walls are designed and constructed to provide radiation shielding to personnel inside the containment during outages and maintenance operations.

The NRC was aware of rebar cutting to facilitate the setup of the concrete system during construction inside the containment. The licensee cut approximately 1000 rebars at about 2' above the final slab elevation (25'). The approval of this cutting operation included the engineering decision to install cadweld splices at the cut dowels to extend the rebar curtain again at a later date. The NRC inspection report 80-13 documented this particular cutting of rebars described in the allegation. The above concerns were reviewed and evaluated by the
NRC. The original design of the shield wall provided for lap splicing of rebar. The Architech-Engineer's Engineering Change Authorization (ECA 01/0619B) replaced the lap splices with cadweld splices. The NRC examined the technical adequacy of this design change, and determined that the design change was acceptable, because cadweld splicing would return the cut dowels to a condition equal to the original design. "Cadweld" splices are stronger than the rebar itself. The NRC concluded that this design change does not affect the safety of containment.

CONCLUSION

The statement that the rebars were cut is substantiated. However, the cut dowels were spliced by the "cadweld" process which is an acceptable way of joining rebar.

6. 49. and 50. ALLEGATION

6. "The volume of the water from the fire sprinkler system is not adequate because the pipes are partially clogged from sitting for several years with water in them. When the fire sprinkler system was tested, it was only checked for pressure not for volume."

49. "Pipes in the fire protection system were dangerously clogged because they sat for years with water in them.

The pipes are so clogged that they could not carry enough water to put out the fire."

50. "While performing preventive maintenance on the batteries to the emergency diesel pump, testing was being done on the system at the fire pump house. The testing was for sediment in the pipe.

The testing involved tapping of the main pipe for the sprinkler system. The test ran for 24 hours a day.

After the ground thawed out, the workers began to remove and replace the pipes coming out of the fire pump house.

...A pipefitter showed me one of the elbows that had been removed. The elbow was approximately 12" and it contained sediment which was clogging the sprinkler system. This pipe was so clogged with hardened sediment that there remained a hole of only about 4 inches in diameter or 3/4 clogged."

DETAILS

The NRC inspector reviewed these three allegations which question the ability of the Fire Protection System to carry an adequate supply of water to the plant sprinkler systems.

The inspector reviewed NRC inspection reports 50-443/85-06 and 50-443/86-32 that are directed toward Fire Main Loop Installations and the Fire Protection/ Prevention Program and noted that conditions that prevent delivery of water at sprinkler locations were not identified. During inspection 86-32, the inspector verified a surveillance and testing program for fire protection equipment was established. Procedures for maintenance, inspection and testing of fire protection equipment were reviewed and found to be adequate.

To establish the present condition of the Fire Protection (FP) System, the inspector observed Fire Hydrant Testing, Sprinkler System Testing and examined screens as removed from two locations in the fire protection piping. Further, documentation of detailed cleaning packages for eleven Fire Protection Systems and the General Test Procedure GT-C-01, Revision 11 for flushing, and the YAEC-SQC Inspection Report Q-02-03-01 for QC inspection of disassembly, cleaning and reassembly of fire pump house piping (Work Requests FP 841 and IIL #FP-1037) was reviewed. These reviews verified that quality control inspections and operational tests were established and performed.

The NRC inspector interviewed the Insurance Representative to confirm that 100% of the Fire Protection System is as-built inspected and functionally tested for insurance purposes in addition to previous plant startup, cleaning and surveillance testing. The functional testing of each fire sprinkler system and fire hydrant test is witnessed by the American Nuclear Insurers representative, the Director of Technical Review. The American Nuclear Insurers memorandum, dated October 22, 1986, as reviewed by the NRC, documents the preparation and execution of test procedures for Fire Protection Systems M, U, V, W, WA and WB.

On November 4, 1986, the NRC observed the Insurance Tests for systems "P" and "I"; the Electrical Transformer 2" Drain Tests for UAT-1X-2B, GSU-1X-1B, RAT-1X-3A, UAT-1X-2A, UAT-1X-1C and GSU-1X-2A; and the Hydrant #1 (1-FP-V-0316) Flow Test. The expected pressure and water volume flow characteristics were achieved with no evidence of line blockage noted. The water flow that was visible during the inspector's test at the far end of sprinkler loops was slightly discolored but not indicative of significant sediment or pipe clogging. Water flow from the Hydrant Test was measured to be a total of 1753 gallons per minute from two nozzles at 147 psi. The stream through a 1 3/4" nozzle reached beyond 200' from the nozzle. All water flowing from the hydrant was clear. An examination of the Fire Pump House two diesel engine driven pumps and one electric driven pump was made by the NRC inspector. The Fire Pump House is kept locked when not attended, critical valves are chained and locked in the required (open or closed) position.

Chlorination of the Fire System Water which was initiated in October 1983 was noted to be in progress. This chlorination was initiated as a measure to prevent microbiological induced corrosion (MIC) in the unlined portions of the FP system piping. In conjunction with the FP system chlorination, piping in the Fire Pump House was disassembled to remove MIC deposits and reassembled. Evidence of the success of the chlorination and pipe cleaning work was noted during observation of system test water clarity and the clean condition of system strainers at the input to the containment building FP system and at the most remote portion of the FP system piping, the Service Water Chlorination Building. The present water source for the Fire Protection System is the Seabrook area public water supply (potable water).

The NRC inspector reviewed the following drawings and compared them to documentation of testing and flushing of the Fire Protection System.

9763-F-604058 - Fire Pump House Piping Plan
9763-F-604068 - Yard Fire Protection Piping Diagram
9763-F-604146 - Fire Protection System Standpipe Diagrams

In summary, the inspector found that some MIC had occurred in Fire Pump House piping, but corrosion products had been removed with further growth prevented by chlorination. As-built FP piping reviews and testing have confirmed sufficient flow volume and pressure capability to be present in the Fire Protection Piping Systems.

CONCLUSION

Field observation of system testing and examination of a sample of system strainers by the inspector did not show a significant problem with sedimentation in Fire Protection (FP) piping system. Prior FP piping system problems (Fire Pump House Microbiological Induced Corrosion (MIC)) have been identified and corrected by the licensee. Allegations number 6, 49 and 50 were not found to have plant safety-related significance. The FP piping outside the fire pump house is concrete lined piping and could give the impression of being partially clogged with hardened sediment. The allegations are not substantiated.

7. ALLEGATION

"When the service water lines were tested, some of the inside cement coating broke off. This system cools essential parts of the plant and must be debris-free. The only parts of the lines replaced were the elbows where the greatest friction occurs."

NRC UNDERSTANDING OF THE ALLEGATION

During interviews with the alleger and the Employees' Legal Project (ELP), no additional details were provided about the service water (SW) cement lined piping concerns. To establish the likelihood of a safety-related problem with SW piping, the typical SW cement lined piping installation and inspection sequence and the resolution of SW line coating deficiencies were reviewed.

DETAILS

The NRC has received allegations related to this subject in the past. The NRC performed a detailed inspection of the service water pipe concrete as detailed in Inspection Report No. 50-443/84-12. The following quotations from the NRC inspection outline the scope and findings relative to cement lined SW piping:

> "For cement-lined service water (SW) pipe, the staff reviewed records and drawings, interviewed engineering and supervisory personnel and observed concrete lining inside piping. The staff entered the 42" pipe and visually inspected approximately 40 linear feet. The SW pipe is classified as safety-related ASME Class 3, Seismic.
>
> The inspection was conducted to determine the conditions and controls applicable to pipe cold springing, to establish if the lining cracked during pipe fitup or welding, and how cracking would be identified such that repair could be initiated. Interviews and records review were concentrated toward service water piping in the area between the diesel generator building and the waste processing building. The staff visually inspected accessible interior and exterior portions of the SW pipe in several areas...
>
> The staff found that it is unlikely that the cement lining would have been subjected to sufficient forces to cause significant cracking by cold springing the pipe during installation. Should cracking by this mechanism have occurred, it would have been identified during work operations including QC inspections conducted in the pipe after welding and those cracks exceeding the 1/32" criteria would be repaired.
>
> The inspector entered the 42 inch diameter line 2-SW-1825 thru the opening for SW valve V-46 and observed the cement lining and junctions at weld seams for approximately 40 feet. The lining did contain hairline cracks although these were of a width much less than the 1/32" acceptance criteria in paragraph 3.4.3.10.6 of Specification 248-2. The lining at weld joints was noted to be smooth and merged with the pipe lining."

The NRC inspector, during this current inspection (443/86-52), to resolve allegation number 7, reviewed the following documentation regarding the service water piping lining problems, corrective actions and continuing inspection programs.

--CDR 85-00-13 dated 8/20/85 - SW polyurethane insert detachment

-- PSNH Letter SBN-1198, dated September 18,1986 "Service Water System Lining Inspection"

-- PSNH Letter SBN-1001, dated April 10,1986 "Final 10CFR50.55(e) Report: Service Water System Spool Linings, Pipe Inserts and Valve Liner/Seats (CDR 85-00-13)"

-- PSNH Letter SBN-874, dated September 18, 1985, "Interim 10CFR50.55(e) Report: Service Water System Spool Linings, Pipe Inserts and Valve Liner/Seats", J. DeVincentis to R. W. Starostecki

-- PSNH Letter SBN-923, dated January 13, 1986, "Interim 10CFR50.55(e) Report: Service Water System Spool Linings, Pipe Inserts and Valve Liner/Seats", J. DeVincentis to R. W. Starostecki

-- PSNH Memorandum dated 3/27/85 "Summary of Service Water Cement Lined Piping Concerns and IRT Recommendations"

-- NCR 7035-4481

The NRC inspector reviewed the licensee memorandum, dated 3/27/85, which states that the STD operation of the Service Water System to date has included a pre-fill inspection, filling, flushing and 200 as well as 700 hr. teardowns for internal visual inspections. Upon initial operation, pre-heat-exchanger strainer debris contained considerable grouting compound fragments as well as other miscellaneous material. Recent debris still contains grouting compound fragments but in negligible amounts.

NRC inspection was also directed toward the lined service water pipe system during observations and reviews made during resolution of CDR 85-00-13. This CDR is closed in NRC inspection report 50-443/86-47. The NRC inspector reviewed licensee status reports on the implementation of corrective action in progress and periodically checked field rework activities including grit blasting, pipe and valve relining, and QC inspection of Belzona lining thicknesses by spark-testing techniques. YAEC QA surveillance inspection reports of the SW modifications were reviewed to confirm compliance to UE&C procedure FPP-13, "Application of Belzona Coatings to Interior Surfaces". The inspector also reviewed an Employee Allegation Resolution (EAR) file which addressed a concern regarding Belzona material curing times and the minimum purge time between metal washings after grit blasting.

Additionally, an inspector witnessed reinspections in March and September, 1986 of the Belzona liner material after operation of the SW system. At both times, the piping in the proximity of service water valve SW-V-15 was checked because of the heavy cavitation expected downstream of that valve due to the design flow condition during periods of SW dump to the cooling tower basin. This particular operation is needed for basin deicing in the winter months. The inspector noted no evidence of Belzona lining deterioration, even where lining pits had been repaired during earlier rework activities.

In letters to Region I dated September 18 and October 15, 1986, the licensee addressed the recent SW lining reinspection and its results and committed to another internal inspection after the first refueling outage. The inspector evaluated all licensee rework, analyses, and reinspections and verified the conduct of appropriate corrective action with adequate QA/QC coverage.

The NRC inspector by review of the existing NRC inspection reports and licensee documentation established that the primary corrective action for service water piping internal coating problems was to repair or replace the coating. The above documentation indicates that while problems were identified with portions of the concrete and polyurethane lining of SW piping, these problems were evaluated and corrective actions implemented.

CONCLUSION

The portion of the allegation that some concrete coating was found detached from the SW piping during testing was substantiated. This condition and related SW pipe lining problems have been previously identified and resolved by the licensee and reviewed by the NRC. The presence of safety related plant problems as implied by the balance of the allegation was not substantiated.

8. ALLEGATION

"When the Service Water System was turned on for testing a valve was accidently left closed. A geyser of 750,000 gallons of salt water flooded the equipment vault building."

NRC UNDERSTANDING OF THE ALLEGATIONS

What was the source, magnitude and effect of the service water (SW) discharge on the contents of the equipment vault building and were steps taken to examine affected components, remove salt water deposits and to prevent recurrence.

DETAILS

The station Incident Report (SIR) 0009, dated 6/27/86, states "On 5-27-86 service water was discharged from the SW overflow line, flooding the outside area between the PAB Building and D/G Building. Some of the seawater was washed over into the North Vault stairwell wetting all piping, instrumentation, electrical equipment, conduit, insulation, etc. with saltwater. Reference attached sheets for incident report, affected areas and corrective actions taken."

The SIR 0009 time log indicates the SW overflow alarm initiated at 0932 hours and both service water pumps were shut down at 0936 hours for an overflow duration pump time of four minutes. The licensee, under Work Request 86-002088 provided for investigation and identification of all items wetted by seawater in the North Vault Building. Corrective actions included washdown with demineralized water and verification of effectiveness by chemical analysis. Electrical components and instrumentation were included in the post cleanup inspection. Refer to photograph number 3 showing the SW overflow outside the PAB.

The above incident was caused by the automatic alignment of Service Water (SW) during an abnormal operational alignment. As a result of this and a previous incident, a logic change was made to the valve control circuit to prevent recurrence. During this incident, seawater entered the North equipment vault. All wetted insulation was removed from equipment and piping, the effected equipment and piping was washed with demineralized water and a chloride swipe test was performed. All wetted insulation was either washed and swiped, as stated above, or replaced. All electrical equipment was dried and tested to ensure proper operation.

The NRC inspector evaluated the event duration, pump capability, overflow location and area drains to establish the magnitude of water flow into the equipment vault.

The SW overflow event of 5/27/86 with two 10,500 gpm SW pumps operating in the overflow mode for four minutes is estimated to be 84,000 gallons of discharge. The SW overflow is located outside of the Primary Auxiliary Building and away from the equipment vault building entrance. A 32" x 50" rectangular drain is located between the SW overflow and the doors leading to the equipment vault door. Due to the distance from the SW overflow to the equipment vault door, the unimpeded flow route away from ground drains and elevation differences the inspector concluded that only a small portion of the SW overflow water would have entered the equipment vault.

The inspector reviewed documentation of the SW overflow event including Work Order 86-W-002088 verifying that cleanup activities and subsequent inspections had been performed. The NRC inspector examined components including, piping and wiring in the Equipment Vault Building for evidence of salt deposits and corrosion effects from residual saltwater. No concerns were identified. One trace of white substance that appeared to be leachate from concrete at elevation minus 61 was submitted for chemical analysis. This substance was confirmed to be boric acid. The chloride salt content of this material was less than 0.01%, and is considered to not be an indication of seawater presence in the building.

In summary, while the Service Water System overflow line was shown to have flooded the area outside the equipment vault, only a minor amount of saltwater compared to the stated volume of 750,000 gallons entered the equipment vault. Corrective action including washdown, examination and testing of components was controlled by work order and involved engineering, operations and maintenance.

CONCLUSION

The portion of the allegation indicating that the service water overflow did release saltwater during testing on 5-27-86 was substantiated. However, the quantity of water passing through the overflow was estimated by the NRC inspector to be significantly less than 750,000 gallons. The NRC inspection of the affected area did not reveal any evidence of water damage or degraded equipment.

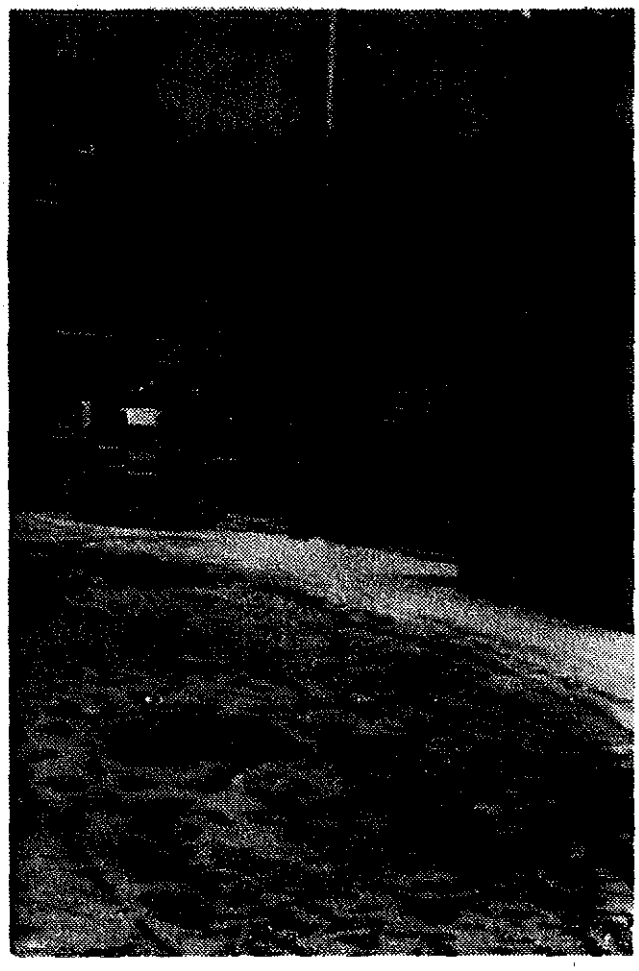


**PHOTO NO. 3,** VIEW OF SERVICE WATER OVERFLOW DISCHARGE PIPE AND SURROUNDING AREA (REG. ALLEGATION NO. ROUNDING AREA (REF. ALLEGATION NO. 8)

9. ALLEGATION

"Paint is crucial to the plants safe operation in keeping dust down and so radiation can be easily washed away. The paint on the floor of the containment is peeling".

NRC UNDERSTANDING OF THE ALLEGATION

As understood by NRC, this allegation was a concern with bubbling and peeling of paint on the containment building floor.

DETAILS

The NRC inspector examined all floor paint from elevation - 25' to +25', and did not find any bubbling or peeling of paint anywhere on the containment floor. The inspector, however, observed that in some areas of the floor on elevation +25' original paint had been reworked. (Photo No. 4)

Paint peeling can be caused either by surface moisture or lack of adhesion; the most common cause of paint bubbling is moisture on the substrate. The lack of adhesion may stem from many causes, e.g. chemical incompatibility, insufficiently cleaned surfaces and/or poor paint application practices. However, any of these problems are very quick to appear on the painted surface during the first few months after the application. The inspector also determined that there were some problems with paint adhesion on the containment floor which were identified, evaluated and dispositioned by engineering. This process is documented on Nonconformance Reports (NCR) 59/5463A and 59/5463B. A test program of the "Elcometer Adhesion Test" for the suspect area was implemented, and a repair procedure on the basis of the test results was developed. The procedure included removal of questionable coated surfaces, rotopeening the exposed concrete and reapplication of new sealer, and then coat the area with approved paint.

The NRC inspector visually examined the repaired areas to determine any evidence of coating failure, i.e. peeling, flaking and/or bubbling of paint in these areas. There was no visual evidence of coating failure in either the repaired areas or the areas with original coatings. The original coating application and the repaired areas appeared adequate. No other problem of bubbling or peeling of paint inside the containment has been reported after the repairs were effected in the summer of 1986.

The NRC inspector reviewed quality control records, test data, and nonconformance reports related to coating inspections. During this review, the inspector noted that approximately 4% of the total coatings inside containment deviated from one or more of the acceptance criteria:

- Surface preparation could not meet the standards of class 1 preparation due to inaccessibility of the area.

- Small equipment supplied by other vendors that came with coatings/paints applied from the suppliers.

- Installed piping in component cooling water system.

Any area determined to fall within the above categories was identified and inventoried on a log maintained by QC titled as "The Unqualified Coatings Log". The licensee is currently evaluating the effect of these deviations from the coating criteria. The resolution will be reviewed by the NRC.

The inspector also reviewed NRC independent examination and measurements of coatings inside the containment performed in August, 1984. This confirmatory inspection was performed with a Zormco 2002 paint thickness gauge, and dry film thickness (DFT) was measured in addition to a general visual examination for workmanship. This examination indicated that, on the average, the DFT was in the 15 to 25 MILS range, and the workmanship was adequate (IR 50-443/84-12).

Furthermore, the painting and coating inside the containment is not safety related to the extent that it does not contribute to the safe operation or safe shutdown of the reactor. The only safety implication of the paint is that peeling and flaking paint, if extensive, could clog the sump grating, thereby affecting the suction of the containment spray recirculation. The main purpose of the paint is to make decontamination easier in case of any radioactive spill.

CONCLUSION

The allegation is not substantiated. No bubbling and/or peeling of floor paint in the reactor building is evident at the present time. Some paint peeling had occurred in the past, but adequate repairs have been accomplished.

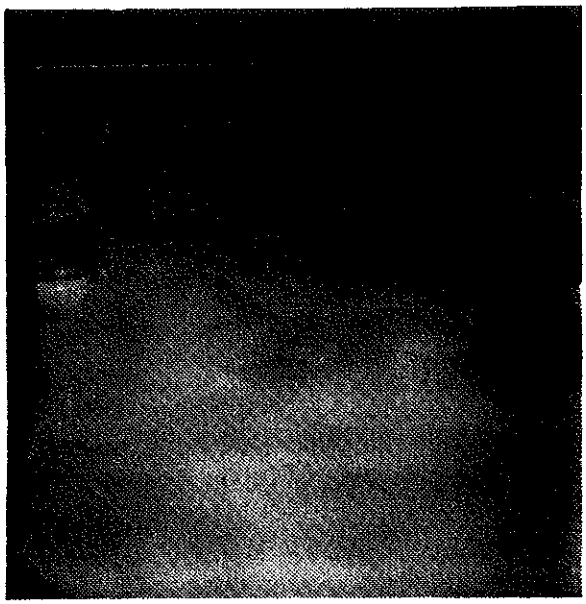


**PHOTO NO. 4,** EXAMPLE OF PAINT TOUCH-UP ( REF. ALLEGATION NO. 9)

10. AND 35. ALLEGATIONS

10. No training records exist before April, 1985, preventing assessment or verification of training and orientation process.

35. People being trained, retrained and left untrained because of inadequate tracking systems.

NRC UNDERSTANDING OF THE ALLEGATIONS

10. No training records exist prior to April 1985, preventing assessment or verification of training and orientation processes.

35. Some employees were trained, some were given the same training more than once and some employees did not have any training.

DETAILS

The NRC inspector selected and reviewed training records generated by Pullman Power Corporation, Fischbach-Boulos-Manzi-NH, and Perini Power Constructors, Inc. covering the period from February 1979 through November 1982. These records were generated by the respective companies and the records reviewed covered such topics as Superintendents Indoctrination, Quality Assurance Manual Review, Project Rules, Hilti Installation, Inspector Indoctrination and Receiving Inspection. The inspector determined that for the balance of plant the contractors were not required to retain training records for their employees. Contracts which included installation of balance of plant equipment were the turbine generator by General Electric, the intake and discharge tunnels by Morrison-Knudsen, and the main condenser by Union Boiler. In the case of these contractors, if qualifications and training were required to perform certain operations, e.g. welding or nondestructive examinations, such qualifications were established and documented and records are available.

Yankee Nuclear Services Division conducted eleven audits that included training on seven contractors during the period from May 1978 to December 1981. In addition United Engineers and Constructors (UE&C), Reliability and Quality Assurance Department conducted ten internal audits on UE&C training activities during the period from July 1974 to October 1985. No significant deficiencies were found during these audits.

The NRC inspected training and qualification programs as a routine part of the inspection program during the construction phase. Typical reports that discuss inspection of training are 50-443/79-10, 79-03, 82-06 and 84-16; other reports are listed in Table 6. The inspection of training programs was supplemented by direct interviews of craftsmen, engineers and quality assurance personnel to determine their knowledge and understanding of the technical requirements.

The quality of the training programs was ultimately reflected in the quality of the equipment installations. The quality of equipment installation was extensively examined by the NRC.

The Construction Site Training Group was established in April 1984 to coordinate site training previously performed by each contractor. This Group was subsequently transferred to the General and Speciality Training Department in April 1985. Records generated by the contractors have been stored in the document control center. In the existing system, tracking is initiated either when an employee is hired or when the individual receives General Employee Training (GET) required for access to the protected area. In addition, all station staff employees are requested to verify their training record annually. The inspector determined that some employees records are not maintained in this system. These employees are those that were working at the site prior to establishment of the present systems of record tracking and have not received GET.

CONCLUSION

The allegation that training records did not exist before April 1985 was not substantiated. A review of existing files confirmed that training records do exist for the period before April 1985. In those cases where an employee's position requires admission to the protected area or qualification to specific requirements, the records are stored in the licensee's document control system. The adequacy of the tracking system for control of training and qualification for safety related activities was inspected throughout construction by the NRC as exemplified in the details of allegations 12 and 27. The inspector determined that training and qualification records exist for personnel who worked on safety related contracts prior to April 1985.

11. ALLEGATION

"Extensive written procedures and instructions were used as a primary training tool, although some workers were illiterate and many foreign engineers were not fluent in English."

NRC UNDERSTANDING OF THE ALLEGATION

1. Those individuals who have difficulty in reading and comprehension were unable to absorb the training when written material was used as a training aid.

2. Foreign engineers not fluent in English had difficulty with training when written procedures were used as training aids.

DETAILS

The inspector discussed the hiring practices for United Engineers and Constructors with the site personnel manager who had been at the construction site since 1976. The personnel manager described the system used to screen professional engineers which included interviews with the personnel department, departmental and supervisory staff; completion of application forms, and verification of education. The personnel manager confirmed that foreign born professionals were employed but believed the employment process would have screened out persons with significant fluency problems. Further, the employer utilizes an employee performance appraisal system which would also identify unacceptable performance. During construction, employees committing repetitive errors are soon singled out and some form of corrective action applied. If the communication problem was severe, it would be reflected in unacceptable work and be detected by the multiple checks and counterchecks.

Nonprofessional employees were required to complete an application and interview with supervision to assure their acceptability.

NRC inspectors interviewed both professional and craft personnel during the routine course of inspections including foreign nationals. The interviews were focused on the individuals understanding and knowledge of the technical content of the procedures, specifications and drawings utilized for construction. Thirteen examples of NRC inspection reports that discuss interviews of engineer and crafts personnel are listed in Table 1 of section 1. No instances of fluency or literacy problems were identified.

CONCLUSION

This allegation was not substantiated.

12. and 27. ALLEGATION

12. "Workers with no previous experience were trained "on the spot" in delicate techniques to perform critical welding (and other reports allege that although all welds should be tested, many are inaccessible)."

27. "Improperly trained welders welding on the job site."

NRC UNDERSTANDING OF THE ALLEGATIONS

1. Welders with minimum or no experience were hired to perform welding on safety-related systems.

2. Subsequent to the welding operation but prior to testing, the location of the joint may become inaccessible due to the installation of other equipment.

DETAILS

The NRC inspector reviewed the Pullman Power Products Procedure II-8 for Welder Performance Qualification and the General Welding Standard GWS-III to confirm that Welder Qualifications are required to be done per the ASME Code Section IX for piping and pipe supports and that limited access welds are required to be evaluated to determine if special methods are required to perform the weld.

The inspector determined that a training program was established by the licensee in cooperation with Local 131 of the United Association of Plumbers and Steamfitters Union. This training was carried out off site. Upon completion of the training, individuals were brought to the site for familiarization and qualification testing. During this qualification and testing period, the worker was given time to become familiar with the specific equipment to be used for the qualification test and then required to weld the test coupon. This test coupon welding included requirements for the materials used, electrodes used, position of the coupon and other variables required by the codes and specifications. In cases where the individual would be required to make joints with limited access, a test with limited access was performed.

Also, when a weld would become inaccessible due to subsequent installation of other equipment, inspections were scheduled and performed prior to the joint becoming inaccessible.

The welder training and qualification activity at Seabrook has been reviewed numerous times during construction. The stringent nature of the qualification process is indicated by a Qualification Test fail rate of approximately 70%. As an example, inspection results as reported in NRC IR 50-443/82-06 in the area of Welder Training and Qualification are quoted below:

"6.3.1 Welder Training and Performance Qualification

The NRC Inspector reviewed the welder performance procedures used by P-H for welders qualified on-site and off-site to insure that welding is accomplished by qualified personnel. A detailed analysis was made of the controls exercised in the maintenance of identification during welding and evaluation of the test assemblies. The NRC Inspector attended a typical indoctrination course where a recently qualified welder is instructed to understand those portions of the Field Weld Process Sheet and the Weld Rod Stores Requisition applicable to the welder. The welder is instructed in the Pullman Power Products PH001, dated 12/15/81, "Instructions for Welders."

A review was made of the P-H 6/21/82 Qualified Welder List which indicated that 95 of the current 364 welders were qualified by welding test assemblies off-site under P-H QC Supervision. All, except 3, welded P-H Standard Welding Test SWT #1. Welders qualified off-site were trained and tested at UA Welding Schools at Seabrook, N.H.; Cleveland, Ohio; Terre Haute, Indiana; or Pasco, Washington.

All of the Seabrook, N.H., test assemblies were radiographed by P-H at the Seabrook Site. The disposition sheets for the RT are maintained with the ASME PQR document.

Currently (since 6/82), welders qualified off site are photographed by the P-H QC Welding Inspector supervising the welding and the photographs are referred to at time of employment at the Seabrook Site."

Welders are given indoctrination on the site's General Welding Specifications as well as Welding Procedure Specifications. The WPS is the procedure to which the welder will test. Each welder testing signs an affidavit that he has read and understands the GWS and WPS. These affidavits are maintained in each welder's qualification record.

When in the field, each time a welder draws weld rod, he is issued a rod can. On the can is a copy of the heat sheet which tells him the rod size, heat settings and other specific information pertinent to the proper welding technique. Other information or questions a welder may have are directed to the foreman and welding supervisor in the area.

In excess of twenty six NRC inspections have included attention toward welding process application in the nuclear and structural welding areas. A practice of "on the spot" training of inexperienced workers to perform critical welding was not identified. These NRC inspections include 78-07, 78-08, 78-09, 80-03, 80-04, 80-08, 80-11, 81-08, 81-12, 81-13, 82-03, 82-06, 82-10, 83-01, 83-02, 83-06, 83-07, 83-09, 83-13, 83-17, 83-22, 84-07, 84-12, 84-16, 84-17 and 85-19.

The NRC Nondestructive Testing (NDE) Van has performed over 592 independent examinations of welds at Seabrook on several occasions including inspections 82-06, 84-12 and 85-19. Approximately 145 pipe welds were selected by the NRC and examined by radiographic (RT), ultrasonic (UT), magnetic particle (MT) or liquid penetrant testing (PT) methods. During these inspections and the construction assessment team inspection (84-07), numerous welds were selected for visual examination. Also, radiographs taken by the licensee were reviewed and compared to NRC radiographs. Interviews have been performed with craft welders and fitters in the field and at welder qualification stations during many NRC inspections relating to piping and welding. Those workmen and foremen interviewed expressed an understanding of the requirements for proper component fitup, welding, use of work related documents and recordkeeping as necessary for completion of the work task in progress.

The quality level of welding examined and testing by the NRC during field inspections indicates the selection and use of properly trained and qualified welders. Except where prevented by design constraints and properly documented, welds picked for independent NRC examination have been found accessible.

In the area of limited access welds, the inspector reviewed the UE&C memorandum (SB-LD-F-4643) dated September 29, 1986. This memorandum summarizes the welder selection process and welder training guidelines where conditions require special training of supplemental nondestructive examination of a weld.

On the topic of having welds made inaccessible prior to testing, the same memorandum provides the result of the UE&C evaluation regarding testing of inaccessible welds. This evaluation found that ASME Section III pipe welds have all been inspected and documented in accordance with the requirements of the code. However, the memorandum states:

> "In the conventional portion of the plant there have been rare instances where embedded or buried piping lacked a welding program's documented evidence of a visual weld inspection but was deemed acceptable due to the test programs' Hydrostatic Test Report. The Hydrostatic Test Report documented the pressure test for these welds during which each weld is visually examined. The Hydrostatic Test Report is the only documentation required by the Code which governs fabrication and construction."

The American Society of Mechanical Engineers Code (ASME) Section III is a required national design, fabrication and erection code for pressure vessels and piping used in nuclear power plants. Part of the requirements that must be met by the licensee is the inspection and testing of welds. This activity is monitored by a third party, independent inspector who must sign off the nuclear power systems before they have the code stamp affixed. Each weld within a piping system must have all required examinations and tests before the code stamp is applied. Therefore, welds which are made inaccessible due the advance of construction are closely tracked to assure they meet the code program. The NRC reviewed this program, an example is presented in Inspection Report 50-443/85-29, and found it acceptable.

Further, the ASME Code, Section XI, for in-service inspection, also required by the NRC, specifies that, where possible, welds be made accessible for in service examinations.

In summary, the present and past NRC inspections have established the presence of adequate welder training and qualification programs at the Seabrook site and the effectiveness of welds qualification is evidenced by the quality and acceptability of the welds.

CONCLUSION

The allegation was not substantiated.

13. and 21. ALLEGATIONS

13. On-the-job drug and alcohol abuse of epidemic proportions was reported by contact after contact. Cocaine was cited as the drug of choice.

21. Any kind of drug there is was available there. People did cocaine on the cable trays.

ALLEGATION AS UNDERSTOOD BY THE NRC

Professional and nonprofessional workers extensively used drugs at the plant site.

DETAILS

The inspectors interviewed Seabrook managers, reviewed records related to personnel actions/complaints and inspected plant areas to verify drug/alcohol program commitments were met. The Seabrook Station contractor has had a policy since early 1976 that prohibited the use of drugs and alcohol on the site. This policy was documented in job rules and promulgated to the construction forces in diverse and multiple means to assure the forces were aware of the prohibition. New employees received orientation in the site job rules which included the drug/alcohol policy. The policy was posted at the "brass alley" entry ways to site areas, and notices of drug/alcohol policy were distributed in pay checks. The right of Seabrook to search for alcohol, drugs, and firearms was visibly painted in large letters on billboards at the site boundary roadways. These were observed during NRC inspections.

Early preventive measures by Seabrook to detect the use of alcohol and drugs on site included supervisory controls and quality assurance audits. These were supplemented later by undercover surveillance in cooperation with the New Hampshire State Police and the Rockingham County Sheriff's Department in 1979. Although lunch box searches (openings) of construction personnel were made at the brass alley routinely, these were intensified in the form of personnel and vehicle searches beginning in 1980.

To provide an anonymous, harrassment-free environment to encourage construction/plant staff to report drug/alcohol abuse and other safety concerns the licensee established the Employee Allegations Resolution (EAR) program in 1985. This was an independent contractor run program with confidentiality for all participants. All allegations were independently investigated and resolved; protection of the individual's identity was preserved.

The licensee's programs did identify some drug activities on site, one of which resulted in 12 laborers and other non-nuclear craftsmen being indicted for drug sale, use and possesion in 1980. Another example of the effectiveness of the substance abuse program was the use of trained dogs to detect drugs. The use of dogs to sniff out drugs was introduced in 1981. The patrol "sniffer" dogs did identify a car with drug remains (marijuana butts) in it parked in the construction parking lot in December 1982. The employee was discharged.

The NRC has over the years observed work habits on the construction site which included worker performance. In addition to observation of work activities, NRC inspectors interviewed craft workers during onsite inspection and observed their condition in addition to checking their knowledge of procedures and work activities. The NRC, when it becomes aware of undesirable practices such as drug/alcohol, notified the industry via an Information Notice. In 1982, the NRC issued IE Information Notice 82-05: Increasing Frequency of Drug-Related Incidents. This notice was sent to all construction permit holders and licensees including Seabrook, and provided early notification of NRC concern about drug use. Additionally, in 1982, the NRC published NUREG-0903 titled Survey of Industry and Government Programs To Combat Drug and Alcohol Abuse. This documents the results of an NRC initiative to assess industry and government programs related to drug and alcohol abuse. It also discusses the early NRC approach (1982) to establishment of an NRC fitness for duty rule. The publication of NUREG/CR-3196, titled Drug and Alcohol Abuse: The Bases for Employee Assistance Programs in the Nuclear Utility Industry, in 1983 further documents the NRC concern about drug/alcohol abuse and provides data useful for regulatory planning and rule making. More recently, the NRC has promoted a vigorous industry wide fitness-for-duty program which is being implemented by the nuclear utilities.

The NRC has interviewed craft and q-c inspectors in the field environment at Seabrook extensively during the Construction of the plant. These interviews were conducted on all shifts at various times to assure a cross section of workers were represented. These interviews provided the opportunity for NRC inspectors to observe worker behavior first hand and identify any aberrant actions such as that induced by alcoholic or drug substances. NRC inspections are unannounced and performed in a random manner throughout the plant which further assures the probability of detecting unauthorized substance use. Many recorded examples of these interviews are documented in Table 1 of this report.

Continued use of unauthorized substances which impair an individuals ability to perform would result in unsatisfactory and rejected work. Repetitive nonconformances are documented in the quality assurance nonconformance reporting system (QA NCR). The NRC inspection program reviews the NCR and QA programs specifically for this aspect to detect repetitive NCRs and trends of poor workmanship and requires licensee corrective action which could be retraining of the individual or discharge/removal from the job.

The NRC has periodically reviewed Seabrook actions in relation to their drug/alcohol program. This included an inspection of the Seabrook undercover drug surveillance and is reported in NRC Inspection Report 50-443/80-01, a portion of which is reproduced below:

"Preliminary Inquiry - Seabrook Drug Indictments

During this inspection, the inspector conducted inquiries into any impact the recent arrests of construction workers on drug charges may have had on safety-related construction at Seabrook. He interviewed management personnel and the foremen of twelve of the indicted individuals and examined Project Rule 7, the violation of which led to the discharge of these individuals.

Nine of these twelve workers were employed as laborers whose work function could be categorized as that of a "tender", performing various tasks under the direction of or meeting the supply needs of other craftsmen (e.g. - carpenters or masons). The other three workers were carpenters involved in the fabrication and erection of concrete formwork. In either case, all of the work performed by these individuals had been checked both in process and at subsequent construction stages by supervisory and related craft personnel (e.g. - surveyors), and any safety-related work had additionally received quality assurance inspection. The interviews with the foremen disclosed no specific problems regarding the work performance of any of these twelve individuals.

The inspector also verified that employment at Seabrook Station for the subject personnel had been terminated as of either January 10 or 11, 1980 and that records indicate the only work performed for their employer, Perini Power Constructors, at Seabrook was correctly represented by their stated occupations. Various licensee and contractor management personnel were interviewed concerning the events surrounding these indictments and the impact upon construction activities.

No items of noncompliance or concerns about the quality of construction, as related to this drug inquiry, were identified. This finding was substantiated by separate, but complementary inquiry conducted by an NRC investigation specialist, the results of which are detailed below..."

As a result of the NRC report described previously (NUREG-0903) and in conjunction with IN 82-05, the NRC conducted an on-site survey of the Seabrook drug and alcohol abuse programs on March 9, 1983 at the site.

In 1984 a private organization titled Nuclear Safety Hotline (NSH) distributed a flyer in the local Seabrook area requesting that any Seabrook employee who had a concern about safety, or any issues that could affect safety, at Seabrook should contact them. They would assure that the issue was presented to the proper authorities and that the individual's identity would be protected. The NRC promptly notified the NSH by letter, dated July 5, 1984, that the NRC had a responsibility in the resolution of issues and specifically requested that all safety related issues be forwarded to NRC for evaluation for their safety significance. No reply was received from this 1984 request.

The NRC inspectors during this inspection interviewed the manager and staff of the independent-contractor run EAR program and reviewed records and files EAR Drug Investigation. The program appears to be functioning adequately and investigations are sufficiently in depth to assure resolution of issues.

Selected personnel files, representing examples of persons accused of substance abuse, were reviewed by the NRC inspector to determine the nature of investigations performed by the licensee. Discussions were held with management-supervisory staff regarding the decision process used to determine the impact on inspection, equipment installation or design and the need for rework or reinspection. The basic policy was that if the accused person's work was independently reviewed, inspected or reinspected then no further actions were warranted. If, however, the accused person's work was not independently reviewed or inspected during the normal work process, then reinspection/review would be directed.

Efforts to gather more specific information from the allegers regarding any safety impact on the construction of the facility were unsuccessful. Because of the quality assurance program, NRC inspections and outside agency audits and inspections, there is a high degree of assurance that safety significant equipment deficiencies do not exist at the Seabrook Station.

CONCLUSION

This allegation, as understood by the NRC, was not substantiated to the degree stated by alleger. However, there was some indication of substance abuse, and the licensee enhanced his basic drug and alcohol abuse control program to identify and minimize the effects of substance abuse. There are no identified equipment deficiencies resulting from this allegation.

The licensee took appropriate correction actions where instances of drug or alcohol abuse were identified. Both the licensee and the NRC recognized the potential threat cause by employees involved in substance abuse and took steps to alert management, contractors and individuals.

14. 30. 31. and 60. ALLEGATIONS

14. Engineers and tradespeople routinely worked 18 to 20 hour shifts.

30. Have worked 18 to 20 hour shifts.

31. Have seen engineers, technicians, and craftspeople working 18 to 20 hour shifts.

60. Work on site was chronically behind schedule, resulting in management depending on extensive overtime to meet deadlines.

NRC UNDERSTANDING OF THE ALLEGATIONS

All of the foregoing allegations imply that the routine use of overtime was not conducive to quality work. The allegers could not give any names, places or dates to which this overtime work referred. More importantly, they could not provide any instances were this practice resulted in improper work or adverse equipment or safety conditions.

DETAILS

All of the major subcontractors have demobilized and left the site. It appears that the allegations were made for the construction forces and not the current operating staff. Attempts to establish the amounts of overtime for individual contractors were unsuccessful, but a review of the overtime records for the current startup engineering group confirms that they have employed significant use of overtime for some people. However, the extensive use of overtime, in itself, does not mean that improper work was performed.

Interviews with the allegers did not reveal any situations where specific equipment or processes were identified as suffering from this practice.

The overtime for the plant operating staff is limited by the facility Technical Specification, paragraph 6.2.2.e which invokes Generic Letter No. 82-12. The Generic Letter prescribes the amount of overtime that an operator can incur in any 24, 48 and 72 hour period.

CONCLUSION

The allegation was substantiated from the fact that existing records for certain activities do indicate the use of extensive overtime. However, it could not be established that this resulted in any improper work or degraded equipment.

15. ALLEGATION

"The company has been having some painters do quality control checks on other painters' work. By federal law, those who do quality control must be organizationally independent; members of the same union checking each others work does not meet this criteria."

NRC UNDERSTANDING OF THE ALLEGATION

As understood by the NRC, the alleger is concerned about the independence of painting monitors, painters who reviewed and examined other painters work after repair/touch-up painting on steel components and supports.

DETAILS

The NRC inspector reviewed the licensee's quality assurance program as applied to the painting/coating activities. The inspector determined that sufficient controls existed to assure conformance to the technical requirement specified in the coating specification and procedures. In section 6.0 of procedures IP-103, Structural Steel Coating, and IP-104, for concrete coatings detailed inspection and surveillance requirements were established. The inspector found that the requirements were clearly stated, and were adequate to assure painting/coating quality commensurate with its safety significance. Criterion II of 10 CFR 50, Appendix B requires: "The quality assurance program shall provide control over activities affecting the quality of the identified structures, systems, and components, to an extent consistent with their importance to safety." (emphasis added) Moreover, to enhance the efficiency of coating application, and reduce the instances of rework due to quality control inspection, the licensee implemented a program of "Paint Monitors" in which experienced craftsmen reviewed the work of other craftsmen before final QC inspection and acceptance. This review and examination was in addition to the Quality Control inspection and did not replace it.

The inspector reviewed the painting/coating, procedure to determine the inspection requirements, acceptance criteria, and the procedures conformance to applicable national standards (American National Standards Institute ANSI N101.1 and N101.4). The inspector determined that subsection 6.1.1 of IP-104, and subsection 6.1 of IP-103 specifically and clearly established QC "Hold-Points" which must be inspected and released by quality control before further work could proceed. These hold points had been designated by engineers to meet the intent of engineering requirements of the coating design.

The inspector verified in this inspection that designated forms to document these QC inspections had been completed by QA personnel before the work was accepted. Section 7.0 of the coating procedures (IP-103, & 104) clearly instructs QC personnel of the requirement of documentation and filing of the required report form; "Daily Inspection Report - Level I Coating".

Paragraph 7.3 of IP-103 requires the QC Engineer to do a surveillance of the areas being worked for repairs. The surveillance includes atmospheric conditions, surface preparations, applications and curing. Surveillances were normally done two times per shift.

Quality of coatings is also dependent on environmental conditions during application, such as temperature and relative humidity. As an additional control to assure quality coatings, "Weather Stations" had been established inside containment on the -26', 0' and 25' levels. These stations were clock driven, 7 day recorders of wet and dry bulb temperatures. They had been placed in areas where the coldest temperatures were expected (near stair wells). The stations were calibrated every 6 months. From the the recorded information, QC and the foreman calculated dew point and relative humidity. Metal temperature was obtained by a hand-held thermometer. Training had been conducted for the foremen, and they were provided with dew point and relative humidity tables.

The requirement of independence of inspection organization and inspectors pertains to the final verification of the work to meet the technical requirements and the attendant acceptance criteria. It is not intended to replace the responsibility and/or normal in-process verification of the quality of work of the craftsmen. These reviews and examination functions are variously performed by experienced craftsmen, foremen, general foremen, superintendents, and construction engineers. The very intent of these actions is to assure production of "quality" work which will be inspected and accepted by an independent inspection organization. The verification and acceptance inspection does not substitute, and/or relieve the construction organization of its responsibility to verify the quality of its work before final inspection and acceptance, although it is carried out in an informal manner.

At Seabrook, this self-verification and in-processes control was up-graded and to some extent formalized by construction to minimize unacceptable work, and exercise better control over the painting/coating operations. It did not substitute or in any way degrade the formal inspection and/or final acceptance of work by Quality Control inspectors.

CONCLUSION

Paint monitor painters did review and examine other painters works, but the implication that they were engaged in formal quality control is not substantiated.

By review of specifications, construction procedures, inspection records, and a visual examination of the completed work, the inspector determined that the paints/coatings applied and accepted, met the acceptance criteria and national code. It appears that the paint monitor program did enhance the quality of coating operations, because the incidence of rejection by QC was minimized and the paint repairs in the summer of 1986 were expedited.

16. ALLEGATION

"Workers report personal harassment subsequent to causing safety complaints."

NRC UNDERSTANDING OF THE ALLEGATIONS

Workers that identify safety concerns at the plant and report them were routinely harassed.

DETAILS

The Code of Federal Regulations, 10 CFR 50.7 very clearly provides protection to employees who identify violations of the Act and report them to the NRC. The provisions of 10 CFR 50.7 must be posted in prominent areas throughout the facility so that all workers are aware of its provisions and can avail themselves of it. The existence of this protection is often incorporated into the General Employee Training.

The NRC regulations and initiatives make it easy for site personnel to report harassment to the NRC. The regulation is required to be posted in conspicuous places at Seabrook station so all employees can see it. The posting contains the Region I telephone number and states collect calls will be accepted. The NRC also posts the Resident Inspector phone number and photograph at the site to further assure easy identification of him and make NRC access easier. The NRC also makes itself available to the plant workers through interviews which are performed in the field in conjunction with the inspection. Examples of these interviews are discussed in allegation No. 11 and Table No. 1.

The alleger did not give any further details than stated above. However, a review of licensee and NRC records shows that on several occasions reports of harassment and intimidation were made by the Seabrook construction staff. In all of the cases that were reported, only one resulted in harassment and intimidation being confirmed. This was identified and investigated by the licensee. The investigations appeared to be thorough and involved interviews of the affected parties and their co-workers.

Allegations of harassment and intimidation also were made to the NRC and formally investigated. (Reference Investigation Report No. 50-443/1-83-001 and 50-444/1-83-007; Inspection Report 50-443/83-09 and 50-444/83-08 and other internal memoranda) None of these were ever confirmed. Generally, the issues that were involved dealt with the supervisor and subordinate relationship wherein the confrontation situation was not skillfully dealt with by the supervisor. An inexperienced supervisor may crossover the fine line between directing a subordinate and intimidation or the employee may perceive the encounter to be intimidation. There is no evidence to indicate that any of the documented reports of harassment or intimidation have resulted in equipment deficiencies.

CONCLUSION

This allegation as understood by NRC was not substantiated. However, one case of harassment was confirmed.

18. ALLEGATIONS

"Rebar, wire, pieces of steel and other debris was thrown into an electric generator on the second floor of the north side of the equipment vault."

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger states that rebar, wire, pieces of steel and other debris were thrown into an electric generator on the second floor of the north side of the equipment vault.

DETAILS

The NRC inspector examined the equipment vault noting that there is no electrical generator installed. However, the NRC inspector did see equipment which could have been mistaken for an electrical generator. There is an air handling unit (photo no. 5) on the upper level of the equipment vault and a safety injection pump motor housing (photo no. 6) on the second floor of the equipment vault which approximates the size and configuration provided by the alleger.

Both Units were in operation, having successfully gone through the preoperational testing program. Phase 1 of this program requires confirmation of the correct installation, verification of control wiring and determination of functional capability of the equipment. In addition, the equipment has been placed on the licensee's preventative maintenance program to ensure operability.

The NRC inspector examined the above equipment and all areas of the equipment vault, noting that all areas and equipment are clean and free of any debris. The inspector noted that access to the equipment vault is limited to authorized personnel only and that control is by card key and surveillance by security personnel.

CONCLUSION

There is no evidence or presence of dirt or debris in the equipment vault area or equipment, the allegation was not substantiated.

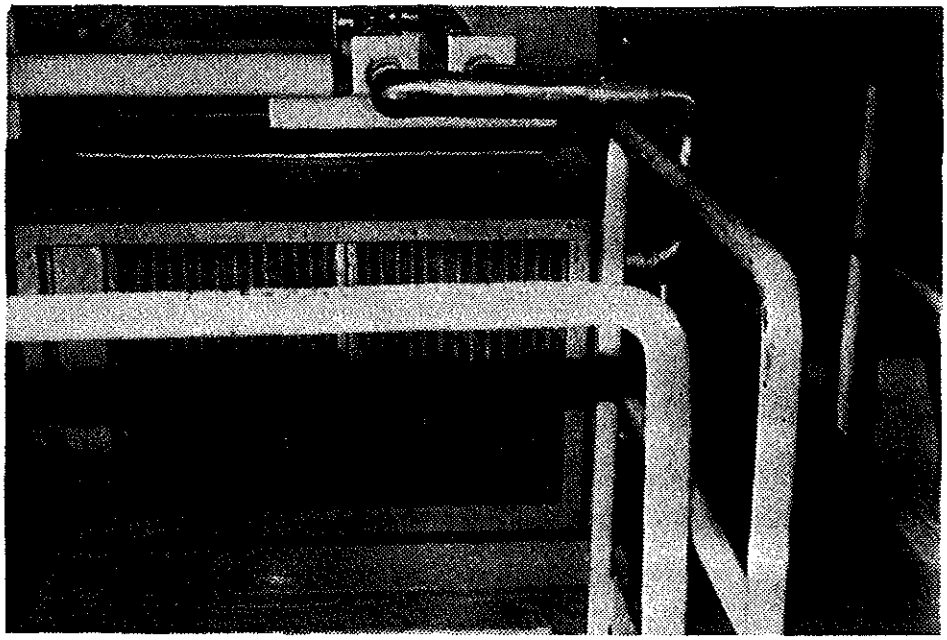


**PHOTO NO. 5,** AIR HANDLING UNIT (REF. ALLEGATION NO. 18)

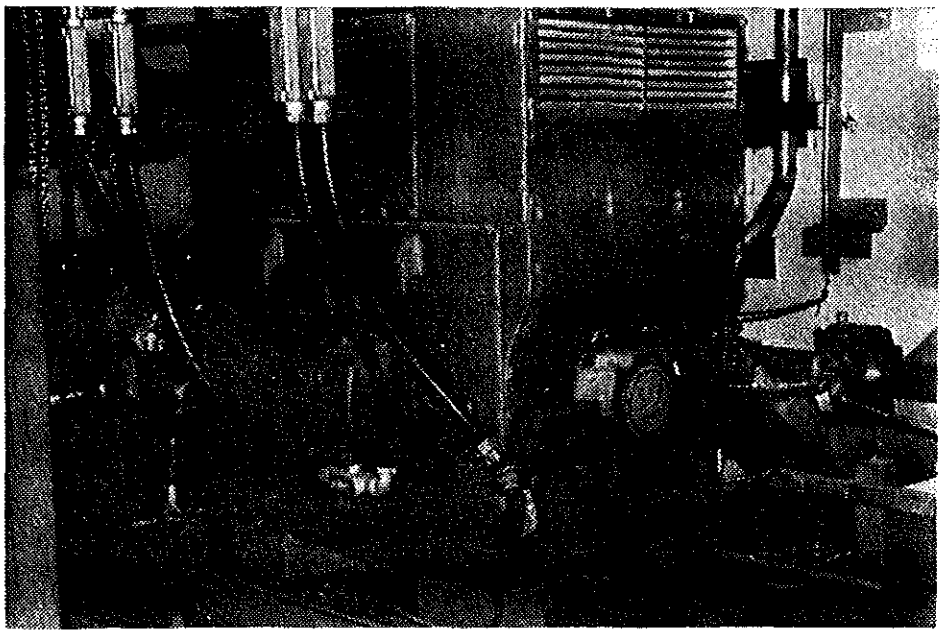


**PHOTO NO. 6,** SAFETY INJECTION PUMP MOTOR HOUSING (REF. ALLEGATION NO. 18)

19. ALLEGATION

"A lit cigarette fell into a four inch conduit full of wires and cable and caught fire. Four or five gallons of water poured down the pipe finally put the fire out. Incident was never reported."

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger states that wires and cable in a four inch conduit caught fire from a burning cigarette which fell into the conduit. Four of five gallons of water were required to put out the fire. The incident was not reported.

DETAILS

Specific details as to the cable and conduit at which this occurrence took place were not available.

The NRC inspector examined areas of the PAB building (photo no. 7 and photo no. 8) that closely resemble areas described by the alleger in a sketch attached to the November 10, 1986 response to the NRC questions of November 5, 1986 by the Project Coordinator of the Employees Legal Project. The NRC inspector found no evidence of a fire in any of the areas examined.

Qualification documents and test reports reviewed by the NRC inspector indicate all cables installed at the Seabrook site are qualified to the IEEE Standard 383-1974 for flame testing and the harsh environment specified in IEEE-323. Test reports from the cable manufacturer certify that the cable is flame retardant and will not propagate or sustain a fire. The cable manufacuturer's data does indicate that the cable will burn when subjected to an external flame and high temperature greater than 750°F for five minutes or more.

The NRC inspector conducted tests to determine the temperature of a smoldering cigarette. A calibrated pocket thermometer, Seral No. PH-13476 was used to record the temperature of the burning cigarette. Several readings were taken of the burning cigarette immediately after puffing on the cigarette, the recorded temperature did not exceed 740°F. The cigarette paper burned completely at 451°F so that it was no longer available to support combustion. Tests on the effects of ventilation on cigarette combustion by British-American Tobacco Co. LTD indicates that the cigarette temperature with forced air ventilation can go as high as 950°F. However, upon removing the air supply the temperature drops to below 600°F in less than 1 second upon removal of puff. The report states that the maximum surface temperature occurs 1.5 to 1.6 seconds after the puff starts.

It is highly unlikely that the cable would catch fire from a cigarette, and even more unlikely that a sustained combustion would results. If you assume water was poured into the conduit as a precautionary measure, then the affect of water on the cable jacket must be considered. Qualification specifications require the cable jacket be water resistant.

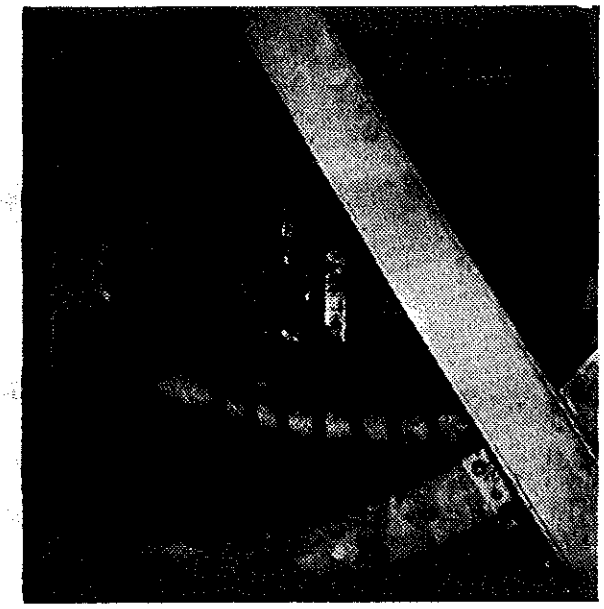
If a fire had occurred, the cable jacket and insulation would have been damaged sufficiently that the cable characteristics would be degraded. This would have been discovered during preoperational testing.

CONCLUSION

The allegation could not be substantiated.

Since the cigarette requires ventilation to achieve the higher temperatures required to ignite the cable, a cigarette discarded into a conduit is not hot enough to ignite the cable or to sustain a fire and:

- All cables used at the Seabrook site have been qualified to meet the flame test requirements of the IEEE Standard 383-1974 and the harsh environment specified in IEEE Std 323.
- Water thrown on the cables would have no effect on the cable since all cables are functionally tested immersed in water.
- The cabling in the plant was preoperationally tested.



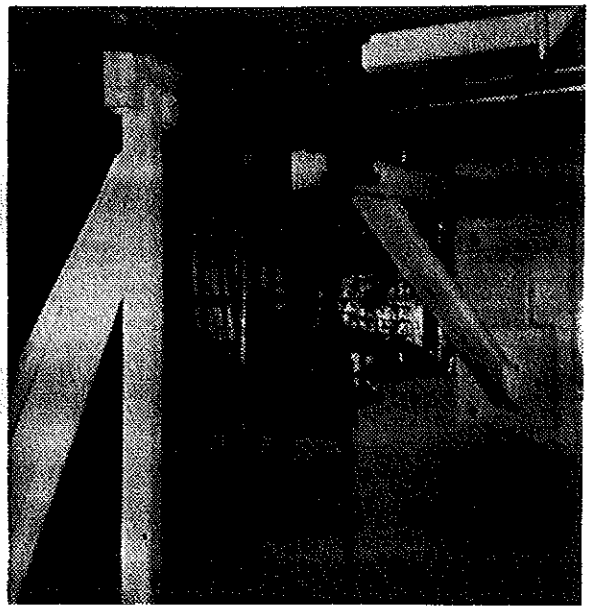


**PHOTO NO. 7,** CONDUITS AND J-BOX AT ELEVATION 7'-0" IN THE PRIMARY AUXILIARY BUILDING (REF. ALLEGATION 19)

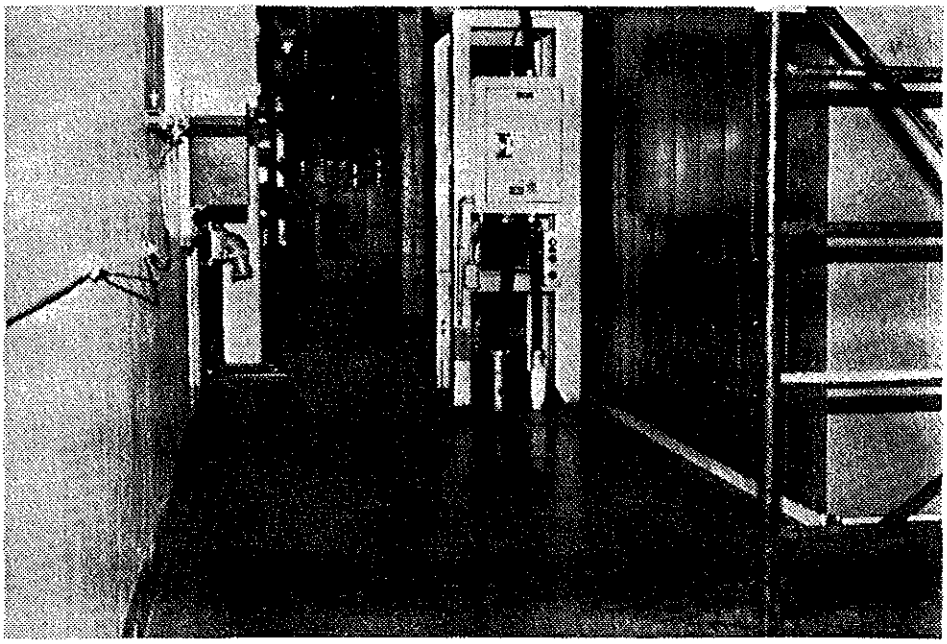


**PHOTO NO. 8,** PRIMARY AUXILIARY BUILDING ELEVATION 25' - 0' (REF. ALLEGATION NO. 19)

20. ALLEGATION

People doing checks for startup did their checkoffs very carelessly.

NRC UNDERSTANDING OF THE ALLEGATION

Verification of system component identification was performed in a manner that could lead to erroneous information. Clarifying information obtained during an interview indicated that individuals assigned to verify tagging of components in a system requested assistance in reading tag numbers for components in hard to reach places when another individual was in the immediate vicinity of the tagged component.

DETAILS

The objective of the tagging verification prior to start up testing was to verify that the components in the system were ready for testing. After the tag identification was established the information was checked by entering the equipment numbers into the computer tracking system to determine if there were outstanding Nonconformance Reports (NCR) or Engineering Change Authorizations (ECA) that must be cleared before the test. If erroneous information was gathered from the field verification of the tagging, this information would be identified when the computer failed to locate the component in the data bank. In such cases, another field verification of the component number would be required. The objective of the start up tests is to assure systems will operate as designed prior to plant operations.

The NRC has been closely following the preoperational and startup test programs as they are performed at Seabrook. From October 1985 through March 1986 preoperational testing has been the subject of approximately 38 inspections. Documentation of some of these inspections may be found in Inspection Reports 50-443/85-30, 85-31, 85-13, 86-37, 85-08.

NRC inspectors have witnessed numerous walkdowns of safety and nonsafety related systems during the system turnover and preoperational testing phase of the project. A few of these systems include CL-M-1, Chlorination System/ Mechanical, nonsafety related; SWA-M-1, Service Water Pumphouse Ventilation/ Mechanical, safety related; CL-I-1 Chlorination System/Instrumentation, nonsafety related; Component Cooling Water System, safety related; and the CVCS Thermal Regeneration Demineralizer, nonsafety related. NRC inspectors used as built drawings in their walkdowns which were verified to be the latest revision. Findings resulting from these walkdowns were documented and corrected.

NRC inspectors witnessed many tests such as the cold hydrostatic test of the Reactor Coolant System including the reactor coolant piping, the reactor coolant pump housings, the primary side of the steam generators, the pressurizer and associated instrumentation tubing. Typically during the witnessing of

these tests the inspector verifies the test will meet the established requirements, reviews the test procedures, verifies the system line ups, and assures the test is performed as planned and the test results valid. This test was also witnessed by the Authorized Nuclear Inspector (insurer) and at the conclusion the results were accepted by both the NRC and the Authorized Nuclear Inspector.

During the inspections performed for preoperational and startup testing, there was not an excessive number of exceptions taken to the various tests indicating the procedures used for system verification, test planning and test performance were adequate.

CONCLUSION

This allegation could not be substantiated. Based on the large number of inspections performed by the NRC during preoperational and start up testing of the plant, the inspector determined that the objective of the tests is being achieved i.e. assurance that the plant will operate as designed. Due to the structure of the system, if erroneous information was gathered, it would have been detected and corrected.

22. ALLEGATION

"Security there was very slack. To see if the security system worked, someone put gunpowder in their pocket and mixed up a paste and rubbed it on their pants, then stood right against the machine which detects those things. It did not go off."

NRC UNDERSTANDING OF CONCERN

The alleger states the explosive detector will not detect gunpowder.

DETAILS

The inspector evaluated the Ion Track Instruments (ITI) explosive detector, used by the licensee for access controls through interviews with licensee representatives and the manufacturer. Further discussion on the capabilities and effectiveness of this model explosive detector and its use at Seabrook are considered Safeguards Information as defined in 10CFR73.21, and will not be discussed in detail.

The licensee developed a security program that was approved by the NRC and the use of an explosive detector represents one facet of personnel access control that is part of that program. Other facets of personnel access control include the use of the initial employment application, background investigation, psychological testing, metal detection, trained guard observation and the badge issue procedure. Each of these facets are satisfied prior to the issuance of unescorted access to the designated protected and vital areas. There are other facets which are employed to further aid in the detection and prevention of harmful devices.

The inspector verified that as of this inspection, personnel access control is developed as described above. In addition, the licensee strictly controls the right and need for personnel to have unescorted access to designated protected and vital areas. Supervisors are also trained to detect and report aberrant behavior.

The NRC approved the Seabrook Nuclear Generating Station Physical Security Plan for fuel implementation on October 17,1986. Portions of that plan contain the procedures for providing positive access control to protected and vital areas.

CONCLUSION

Due to safeguard implications, NRC cannot comment on the validity of this allegation. However, the inspector determined that the licensee was in compliance with the NRC approved Physical Security Plan and its procedures.

23. ALLEGATION

Guards would smoke in the doorway of the area where the fuel is held with both the doors open. Much of the time, the back door of that area was held open with a block of wood.

NRC UNDERSTANDING OF CONCERN

Security guards were smoking in the doorway of the new fuel storage area. The doors to this area were blocked open.

DETAILS

The inspector determined through direct interviews with security supervision that guards were authorized to smoke while assigned access control and surveillance duties at the fuel storage building (FSB). They were instructed to smoke in the doorway of hallway leading to the front access control point to the FSB if they wanted to smoke. The doors to the FSB were to remain closed unless authorization or opening was granted by designated plant officials.

The inspector reviewed the Security Activities Log for the period May through October 1986. A random sample of entries in those logs indicated that the opening of doors to the FSB was controlled as required (See excerpted entries from log, below). In addition, these logs reflected comments concerning when the area surrounding the FSB was patrolled. This patrol was in addition to the surveillance provided by the assigned security guard at the FSB.

SHIFT COMMANDER

SECURITY ACTIVITIES LOG

| TIME OPENED | CLOSED | DATE | AUTHORIZING OFFICIAL | REASON |
|---|---|---|---|---|
| 12:45PM | 13:31PM | 5-6-86 | Merrill/Rx Eng | Fuel truck entry |
| 11:01AM | 11:01AM | 5-10/86 | Gurney/Rx Eng | Run welding leads into the FSB |
| 09:21AM | 09:21AM | 5-12-86 | Gurney/Rx Eng | Run welding leads into the FSB |
| 16:09PM | 16:12PM | 6-2-86 | Couture/Eng Supv | Delivery of fuel rods by truck |
| 11:09PM | - | 6-17-86 | Messina/Sec Supv | Doors opened for maintenance |
| 11:31PM | - | 9-5-86 | St Pierre/Opr Supervisor | Auxiliary operator entry |

| | | | | |
|---|---|---|---|---|
| 10:53AM | - | 9-8-86 | Kline/Eng Mgr | One door opened for entry of an electrician |
| 18:25PM | - | 9-9-86 | Sukeforth/Control room | Roll up door opened for maintenance |
| 09:51AM | 10:00AM | 9-10-86 | Couture/Eng Supv | Replace ceiling light bulbs |
| 08:05AM | 08-43AM | 9-11-86 | Couture/Eng Supv | Replace ceiling light bulbs |
| 10:19AM | - | 10-2-86 | Clark/Control RM | Bring scafolding through the door |
| 13:31PM | - | 10-10-86 | Couture/Eng Supv | Equipment entry |
| 10:15AM | - | 10-17-86 | Couture/Eng Supv | Removing equipment |

The inspector determined from a review of records and personal interviews, that the doors to the FSB were opened at times, however, the openings were authorized by plant officials who were so designated. This practice was in accordance with established procedures. The inspector could not determine whether the doors to the FSB were blocked open, but for some of the reasons cited above, doors could have been blocked open to allow the entry of welding leads, etc. The inspector found no indication of violations of the NRC approved Physical Security Plan for the Protection of New Fuel.

CONCLUSION

The allegation was substantiated. Guards were permitted to smoke outside of the doorway to the new fuel storage area. This posed no hazard to the new fuel. Operational needs in the new fuel storage area may have required the back door to be open at times, however, surveillance of the new fuel was a responsibility of the posted security guards who were on post 24 hours per day.

24. ALLEGATION

"Implementation of the TP10 procedure. This procedure enables Nonconformance Reports to be written without the NRC's knowledge saving valuable steps of inspection (saving the company money)."

NRC UNDERSTANDING OF THE ALLEGATION

Nonconformance Reports that were written as a result of positioning deficiencies encountered during installation of attachments to embedded plates were dispositioned without Nuclear Regulatory Commission approval.

DETAILS

The purpose of the procedure TP-10 "Technical Procedure for Location of Attachments to Embedded Plates" is to define the location requirements for attachment of structural members welded to embedded plates. Procedure TP-10 specifies the tolerances for the location of a member to be attached to an embedded plate e.g. a pipe support. Installation drawings specify the location tolerances for the support on the pipe. When both sets of tolerances could not be met, an Engineering Change Authorization (ECA) was generated to resolve the condition. If the support was installed and either tolerance requirement not met, a Nonconformance Report (NCR) was generated and processed in accordance with established procedures. During verification of the as-built conditions, the actual location of the attachment on both ends was determined and recorded. Using the as-built dimensions, the stress calculations were verified. If, as a result of this verification, an attachment had to be moved, an NCR was generated to authorize the movement.

The NRC has performed at least twelve inspections to verify the as built conditions of the plant. These include 50-443/84-07, 84-20, 85-09, 85-20, 85-31, 86-41, and 86-43. During these inspections minor problems were found and have been corrected. Except as required by 10 CFR 50.55e, nonconforming conditions are not required to be reported to the NRC. The rule provides for NRC's notification for significant construction deficiencies that, if uncorrected, could affect the operation of the plant. Reportable significant deficiencies include a breakdown in the quality assurance program; deficient final design; a deficiency in construction that requires extensive evaluation and rework; and deviations from the performance specification for equipment and structures.

Control of nonconformances is part of the Quality Assurance Program. NCRs are required to be written and processed in accordance with this program, evaluated and corrective action taken if necessary. The NRC has performed numerous inspections of the licensee's Quality Assurance program since the inception of the project including one specifically evaluating the nonconformance program

for design changes (50-443/85-15). In this report both the ECA and the NCR programs were evaluated. Deficiencies were identified and were subsequently corrected. However, it was determined that there was no significant effect on the plant safety as a result of these findings. In addition, nonconformances are tracked to determine if there are trends indicating generic problems. This trending enables the licensee to determine root causes of recurring problems.

CONCLUSION

The allegation was not substantiated. The NRC has performed inspections as described above and no procedures permitting deviations from reporting requirements were identified. Further, nonconforming conditions are not required to be reported to the NRC excepted as provided for by 10 CFR 50.55e.

25. ALLEGATION

"Safety related construction procedures written in ambiguous, hard to interpret language in order to make conformance to them up to the reader and his or her interpretation."

NRC UNDERSTANDING OF THE CONCERN:

In many cases construction procedures were written that contained specific technical language that was difficult for non-technically trained individuals to interpret.

DETAILS

Nuclear safety related procedures are mandated by the Code of Federal Regulations, 10 CFR 50, Appendix B, for all structures, systems and components important to safety. The NRC devotes significant amounts of inspection time to procedure review to assure compliance with national codes, standards and regulations. Reviews of procedures are a normal part of NRC inspections, some reports containing these reviews are 50-443/76-02, 77-10, 79-06, 81-07, 83-02, 83-09, 85-11, and 86-11. The NRC formal inspection program requires that these reviews be made by the NRC inspectors.

As discussed in allegation No. 11, the NRC has interviewed a large number of crafts, engineers and quality control personnel to determine their knowledge and understanding of procedures.

Procedures are written in precise technical language for the discipline involved to assure all areas are covered, to assist in uniformity by a large work force and to avoid misinterpretation. All procedures used for safety related construction and installation were reviewed by the engineering and quality organizations prior to implementation or after revision. Further, experienced supervisory and engineering personnel were available in the work place and a formal process existed for clarification of procedures or interpretation of technical requirements.

CONCLUSION

Based on the number of NRC inspections in which procedures were reviewed by NRC inspectors, this allegation could not be substantiated.

26. ALLEGATION

"Procedures written to allow conditions to exist that are unsafe, but since a procedure has been written to cover the given condition that makes it acceptable."

NRC UNDERSTANDING OF THE ALLEGATION

Equipment was installed incorrectly relative to the procedure, but once it was installed the procedure was rewritten to reflect the installation. This clarification was obtained from the ELP during an interview on November 4, 1986.

DETAILS

If procedures were not followed this resulted in a deviation or nonconforming condition. Such conditions were evaluated in accordance with the requirements of the Quality Assurance Program and, if required, the initial procedure revised, an Engineering Change Authorization written, or disposition made by an NCR. In any of these cases, an engineering evaluation of the situation was made to assure the installation, as actually performed, met code, regulatory and design requirements.

Procedures must meet code, regulatory and design requirements. They may be appropriately revised to provide clarification or additional technical requirements or for other reasons when the procedure as written is not viable. Procedures are reviewed and approved by quality assurance, engineering, and construction to assure they meet these commitments. When cases of unanticipated interferences prevent installation of equipment as originally planned, drawings were revised to provide alternate methods of installation. These alternate drawings are reviewed by the same organizations that reviewed the original drawings prior to use to assure compliance to requirements and to assure the alternate installation will provide satisfactory performance.

The NRC reviews procedures, drawings and revisions to these documents as a part of their inspections. These reviews include the technical content of the documents as well as the applicability of the appropriate codes, standards and regulations and the qualifications of the individuals preparing, reviewing and approving the documents. A few of the inspections where this was done include 50-443/76-02, 77-10, 78-01, 79-06, 80-01, 82-03, 83-14, 85-15, 85-06, 85-14, and 86-11.

CONCLUSION

Based on the on-going effort by the NRC in reviewing procedures and inspecting the work done in using these procedures, and the rigorously controlled systems provided by the licensee to control procedural changes, this allegation could not be substantiated.

28. ALLEGATION

Improperly trained electricians.

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger states that electricians are not properly trained.

DETAILS

NRC inspector discussions with electrical craftsmen indicate that electricians, welders, pipe fitters, carpenters and other tradesmen are hired through a Union Hall. To become a member of a Union Hall, one must apply and be accepted in the apprentice training program. Individuals meeting the minimum educational requirements must then successfully complete the 2-4 year apprenticeship and pass the written examinations to qualify for the journeymans card. This card signifies qualificaiton in the selected trade and availability for work assignments through the Union Hall. The Union Hall also supplies apprentices who perform non-technical tasks such as clean-up, tenders for qualified journeymen and other laborous tasks for which the use of fully qualified electrical journeyman would underutilize his technical skills. The NRC inspector verified that individuals are given site specific indoctrination and assigned to perform work to the level of expertise required by the job assignment. Qualification is documented by training records filed for each individual.

CONCLUSION

The allegation was not substantiated. All safety related work requiring skilled craftsmen is performed by qualified electrical journeymen. Quality control performs in-process and final inspection to ensure quality workmanship and compliance with NRC requirements and licensee commitments through drawings, instructions and procedures.

29. ALLEGATION

"Trainers/engineers give classes inadequately to groups within their organizations."

NRC UNDERSTANDING OF THE ALLEGATION

Training sessions within organizations are informal and do not include all of the functions of that organization.

DETAILS

The NRC inspector examined the licensee's training practices to determine the possible basis for the allegation. Training sessions presented by individual organizations are, in addition to the formal sessions presented by the General and Specialty Training Department, typically in the form of tool box meetings, some on-the-job and that given by supervisors. These sessions are given by supervisory or staff personnel who do not possess sophisticated training skills. In addition, this supplemental informal training is done without the benefit of lesson plans and usually in small groups. The purpose of these sessions is generally to identify minor changes in procedures or job rules or to strengthen group knowledge in a specific area.

There are special cases where an experienced person was hired who was fully qualified. In these cases, the individuals training and work experience were documented during the hiring process, but the individual had to demonstrate his qualification. Examples of these are welders and nondestructive examiners.

Training of welders was done off site, and qualification testing done on site. During qualification testing, time was allowed the individual to set up their equipment and practice. This was not intended as a training program.

Nondestructive examination personnel were tested to assure their qualifications met the code and standard requirements, the individual's experience record was verified to assure adherence to the requirements. Again this was not intended to be training because qualification was based on prior experience, education and training as required by the specifications.

The NRC examined the formal training programs to assure that code, standard and regulatory requirements were met. Examples of these kinds of inspections are documented in NRC Inspection Reports Nos. 50-443/85-07, 85-11, 85-15, 85-19, 86-15 and 86-23.

CONCLUSION

The NRC has reviewed records of individual training and qualification throughout the construction of the plant including training programs provided by the licensee and contractors. Formal training and qualifications were found acceptable. This allegation could not be substantiated.

32. and 57. ALLEGATION

32. "Tracking of blueprints an impossibility."

57. "Drawing revision control was ineffective."

NRC UNDERSTANDING OF THE ALLEGATION

The alleger was doing as-built inspection on the fire protection system in the turbine building when he saw a workman using the same drawing as the one he was working to and noticed that the workman's drawing was Revision F and his was Revision J.

The alleger was also concerned that changes in the fire protection system were not reflected in the General Arrangement drawings.

Tracking of drawing revisions was difficult and revision control was ineffective.

DETAILS

The NRC has performed several inspections on the drawing and revision control system during the construction of the plant. Some of the NRC inspections where drawing and document control were addressed include 50-443/83-02, 84-07, 85-15, and 85-29. In these inspections, one violation was found, corrected by the licensee, and the correction reinspected and accepted. Further, the NRC has made many formal and informal as-built verification inspections of piping and equipment installations. These inspections verify the accuracy of the latest approved revision of the drawing with the actual installation.

During construction each contractor was responsible for the initiation, revision, and distribution of their drawings. As a result, there were several systems of drawing control in use on the site. All of the systems used for safety related document control were audited by both the licensee and the prime contractor, United Engineers and Constructors Incorporated.

Most revisions made to drawings do not affect the entire drawing, so the revision the workman had could have been correct for the portion of the drawing being used. The purpose of the as-built inspection is to verify that the system was installed as designed and to provide accurate drawings of the system as it exists. As contractors complete their projects, drawings are turned over to the licensee, audited, changes required noted, and placed under the licensee's document control system to be updated later, if necessary.

During this inspection, the NRC inspectors selected drawings for equipment and piping which were compared to the installations such as those described in allegations Nos. 6, 48, 51, 52, 54 and 55. In addition, the NRC has performed many inspections which verified as-built conditions. This is discussed in the Details of allegation No. 24 and Table 5 of this report.

CONCLUSION

These allegations could not be substantiated. The NRC has reviewed drawings and documents as a routine part of inspections since the project was started. Isolated cases of outdated drawings were found during these inspections and in each case the situation was corrected. The inspectors did not identify any nonconforming conditions relative to plant drawings during this inspection.

33. 34. 47. 59. and 60. ALLEGATIONS

33. "Battling and sabotage between different contractors."

34. "Contractors engineering and constructing jobs improperly in order to prolong the job."

47. "Write nonconformances in such a way as to put as little blame on Pullman-Higgins as possible. I was specifically directed to try to avoid listing craft error or poor workmanship as cause of nonconformance of a pipe."

59. "The relationship between Pullman-Higgins and United Engineers and Constructors frequently appeared to be adversarial rather than cooperative. Disagreement between some P-H and UE&C personnel over procedures and responsibilities was in my opinion detrimental to job performance on both sides, as much effort appeared to be oriented by both toward defending themselves from possible criticism. While working for P-H, I was told by my supervisor to write nonconformance reports in such a way as to put as little blame on P-H as possible. I was specifically directed to try to avoid listing craft error or poor workmanship as a cause of nonconformance, as this would tend to indicate poor performance by P-H."

"This conflict was also manifested in partisan graffiti throughout the plant, and satirical documents circulated among the engineering staff."

60. "UE&C was commonly believed to be using the Seabrook project to provide work for engineering staff idled from other projects. At various times I met one person from the Cherry Hill , N.J. office; one from a nuclear project in North carolina; at least two from the WPPS project in Washington State; and a number of people from the Badger Division of Raytheon, UE&C's parent company. All were there because they had no other work available within the company. The UE&C staff grew so large that an office building had to be leased off-site to accomodate some of them."

"The perception that UE&C intended to take over the job responsibilities from P-H in order to keep their own employees busy was a further source of friction between UE&C and P-H staff. After I left P-H, UE&C did in fact take over as-built inspection,document control, and drafting responsibilities from P-H and I was told later took over all instrumentation and control systems work from Johnson Control. I would estimate that the UE&C staff at the site increased by up to 30% when the WPPS project was shut down."

NRC UNDERSTANDING OF THE ALLEGATIONS

33. Based on an interview with the Employees Legal Project, the allegation does not mean sabotage in the sense of causing equipment damage but impugning of the the contractor's reputations. The allegation is directed specifically to the United Engineers and Constructors and Pullman-Higgins relationship.

34. The statement essentially alleges that work was done intentionally wrong to extend the contract time.

47.and 59. The source of allegaton number 47. was the Newburyport Daily News article of October 20,1986, which was later restated in more detail in an affidavit supplied to the NRC by the alleger.

The allegation deals with an adversarial relationship between the construction manager, United Engineers and Constructors, and the piping contractor, Pullman-Higgins. As a result of this relationship, instructions were given to inspectors to write nonconformance reports in a manner that would obscure the root causes of deficiencies.

60. The allegation again deals with the adversarial relationship between the construction manager, UE&C, and the piping contractor, Pullman-Higgins as previously described in allegations 33,47, and 59. Additional causes of this adversarial relationship are the replacement of Pullamn-Higgins personnel with UE&C personnel from other constructions sites that were no longer in the construction phase.

DETAILS

The construction organization for the Seabrook project was based on a construction manager concept. United Engineers and Constructors (UE&C) was contracted as the construction manager. As the constructon manager, UE&C subcontracted the various tasks such as electrical, piping, and structural work. Pullman-Higgins (P-H) was awarded the piping subcontract.

In the early 1980s, significant concerns with P-H's job performance were identified by the NRC. These concerns were primarily with design control and the use of construction practices which were in conflict with UE&C specifications. These NRC concerns and licensee corrective actions are documented in the Systematic Assessment of Licensee Performance Reports, inspection reports and licensee/NRC management meetings for the period 1982-1984.

These NRC concerns were translated into corrective actions by the licensee through the UE&C and P-H interface. The corrective actions took the form of organizational and procedural changes which ultimately led to increased licensee and UE&C control of P-H activities. The UE&C and P-H interactions resulting from these changes apparently gave the impression , if not in fact, of an adversarial relationship. This could not be substantiated due to the fact that Pullaman-Higgins has demobilized and is no longer on site. However, the job performance problem and the quality of work resulting from these changes were monitored very closely by the NRC.

In an interview with one of the allegers, it was disclosed that the P-H and UE&C relationship did not result in equipment deficiencies but made the work environment mentally more difficult. This was futher reflected in his allegation regarding the writing of nonconformances and not citing craft error and workmanship as the cause of the deficiency. The alleger stated that this was to make Pullman - Higgins "look better." He was unable to cite any instances where this compromised equipment operability.

The allegation regarding the contractors engineering and constructing the work in order to prolong the contract was discussed with the alleger; the concern expressed was that it caused the cost of the project to increase. There was no specific information that would indicate that equipment had been adversely affected by these actions. Plant cost is beyond the scope of this inspection.

CONCLUSION

The foregoing allegations could not be fully substantiated. However, no safety related equipment deficiencies could be identified as a result of these allegations.

36. ALLEGATION

"Quality Assurance and Quality Control slipped the last few years; there was no QA or QC on third shift, and none for cement on second shift."

NRC UNDERSTANDING OF THE ALLEGATION

Quality Assurance and Quality Control have not been as conspicuous on second and third shifts as construction neared completion.

DETAILS

The NRC very closely monitored the licensee's Quality Assurance Program throughout the construction of the plant. The NRC has maintained a full time resident inspector on the site since May, 1980 and a second resident inspector was assigned in 1982. These resident inspectors are in addition to the specialist inspectors that visit the plant on periodic scheduled, but unannounced, inspections. The licensee's quality assurance program is also submitted to the NRC annually for review if any revisions have been made in the previous year. During this review any reductions in commitments are carefully evaluated to determine if they meet the requirements of 10 CFR 50, Appendix B, and other codes and specifications committed to by the licensee. Some NRC inspections of the liicensee's QA program include 50-443/74-01, 78-03, 81-12, 84-07, 84-13, and 85-15.

The Quality Assurance and Quality Control inspection force is directly related to the number of craft workers at the plant and the amount of safety related work in progress. As the construction was nearing completion, the number of craft employees and the degree of safety related work, particularly in concrete, was very small. Therefore, there was no need for a large number of QA/QC inspectors in that area.

The inspector reviewed logs of concrete and grout placement during the two year period ending in August, 1986. From this log, it was noted that in less than ten cases did placement of concrete or grout require second shift work to complete the placement. Surveillance of completed concrete and grouting for temperature and humidity conditions has been performed as required by manufactures recommendations, or procedures. In many cases, this surveillance was performed by using recording temperature indicators and daily observation of the humidity conditions of the curing material where no individual was required to be present during the second and third shifts. If conditions were noted that were not as required, a Nonconformance Report was written and disposition made in accordance with established procedures.

CONCLUSION

Based on the continuing inspections of the licensee's quality assurance program this allegation could not be substantiated.

37. ALLEGATION

"There was cheating on literacy tests, others took literacy tests for people who were illiterate. Literacy tests were given toward the end of construction as an excuse to lay people off."

NRC UNDERSTANDING OF THE ALLEGATION

This is a three part allegation interpreted as follows:

1. General Employee Training (GET) and the required examinations associated with this training have been interpreted by the alleger as a literacy test used as an excuse to lay people off.

2. There was cheating on the examination given as part of the General Employee Training (GET) program required for access to the protected area.

3. One individual took GET for another.

DETAILS

The inspector discussed literacy testing with the training manager and was informed the licensee has never given literacy tests. Near the end of construction prior to establishing the protected area, GET with written examinations was given as a requirement of the NRC license to operate the plant. Initiation of the training was delayed until immediately prior to establishment of the protected area to allow more convenient access to the plant during final construction by personnel performing the finishing work on the plant in this area.

GET is always culminated with an examination to verify the employees understanding of the topical areas and to provide feedback to training. As part of this examination, the class is monitored by a proctor. In an isolated case, one employee had been given a GET examination paper by another employee. This employee was using the previous examination when he took the test. The test proctor observed this cheating and as a result both the employee caught cheating and the employee who gave him the test were laid off.

Since inception, measures that require positive identification of individuals receiving GET training have been employed. These measures include the use of photo identification prior to receiving the training, personal interviews, and background checks. The inspector was satisfied that identification requirements for employees receiving GET were satisfactory.

CONCLUSION

Based on the examinations made by the inspector, this allegation could not substantiated on a general basis.

38. ALLEGATION

Paint thinner was accidentally spilled on electrical cables.

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger stated that paint thinner was accidentally spilled on electrical cables, and is concerned the thinner could be detrimental to the cable insulation. No specific area or system was identified.

DETAILS

Because of painting activities throughout the plant, paint, containing paint thinners, was inadvertently being spilled on electric cables. Site engineering was aware of and had evaluated instances of paint splatters or spills onto plant cables during the April-November 1985 time period. In each of these cases, it was established either by inspection of the affected cables, or by a test program conducted by Franklin Institute that the cable jackets or insulation were not damaged, and the cables were not adversely affected. The spills in the plant which have been evaluated have included paint which contains thinners of the types used on-site, and which would have been involved in any thinner spills that occurred.

A Deficiency Report (85-48D) has been identified, dated 7/18/86 regarding a phosphoric acid spill involving cables going to electrical penetration nodes H02, H41, H15, H20 & H55. Additional items affected are cables in tray Nos. 93VILB, 92 MIKV and the tray themselves. Disposition involved cleaning of the Tri-Sodium Phosphate residue from the cables with an approved cleaner, chlorothene, also a paint thinner and visual inspection of cable for signs of deterioration. The trays and other affected metal components were cleaned and retouched with galvanox coating. Engineering visually inspected the repairs and determined that they were acceptable.

The NRC inspector conducted additional tests on November 3-4, 1986. Sample cables of the type used in safety-related systems were exposed to applications of several types of paint thinners used on site as a test. The following thinners were used to wet the cable outer protective jacket:

a) Keeler & Long #4093 (Epoxy thinner)
b) Keeler & Long #3100 (Kolorane thinner)
c) Keeler & Long #1638 (thinner)
d) Keeler & Long #3700 (Kolor-Poxy thinner)
e) Wisconsin Protective coating #71 (thinner)
f) Gates Engineering #N-450-1 (Neoprene thinner cleaner)

Samples of safety-related cables used on site were wetted with each of the above noted cleaners. All thinners evaporated immediately following application. Following evaporation, the glossy surface of all cables became dull. The NRC inspector examined the cables for surface deterioration; no damage was evident. The thinners did not penetrate the cable outer protective jacket.

CONCLUSION

This allegation was substantiated.

The NRC test results indicate that paint thinners used on site have no detrimental affect when spilled on electrical cable jackets. Site engineering was aware of spills that occurred during the period April to November 1985, confirming the allegation of paint thinner spills on cables. However, based on the above results and the test program conducted by the Franklin Institute Laboratory, spilling of the paint thinners has no adverse affect on the cable.

39. ALLEGATION

"Electrical cables along the outer walls of the containment gave off sparks starting little fires. An electrician said this was because the cables had been there too long with people walking on them, wearing them down."

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger stated that cables along the outer containment wall and lying on floor gave off sparks causing minor fires.

DETAILS

The NRC inspector determined that normal construction practice is to run temporary cables to provide power to operate tools and welding equipment used in construction/fabrication activities. These wires or cables are hung on the wall, across trays and some times are laid on the floor. This practice is still in effect as evidenced in photos nos. 9 & 10 taken on November 20, 1986. Discussions by the NRC inspector with licensee personnel confirmed that fires have resulted in temporary cable when the insulation is worn through or stepped on to expose a current carrying conductor. Craftsmen are continually reminded of the hazards imposed by improper practices and care in handling temporary cable. The subject was discussed frequently at the Weekly Tool Box meetings. The hazard is that fires from these sources could damage safety related equipment. Usual construction practices to lessen the threat of fires is to employ training and awareness, flame retardant lumber, and fire extinguishers.

The above practice relates to temporary cable installation which as the name implies will be removed after construction or test. Permanent plant cables, both safety related and non safety related, are routed in permanent raceways. The site electrical installation procedure no. 9763-006-48-2 requires that all safety-related cables be routed in cable trays or conduits. Quality Control inspectors are present to inspect the cleanliness and to insure that the trays/conduits are free of debris before each cable pull. All safety-related cables are in protective enclosures such as tray/conduit. Cables are checked electrically and given a walkdown visual inspection for surface damage during construction and at turnover. Finally, preoperational testing is performed to verify functional operability of each system.

Quality Control is involved in all aspects of cable installation, termination and functional testing of safety-related cable.

CONCLUSION

The allegation is substantiated for temporary cable; however, there is no evidence to indicate that these instances involved safety related cables.

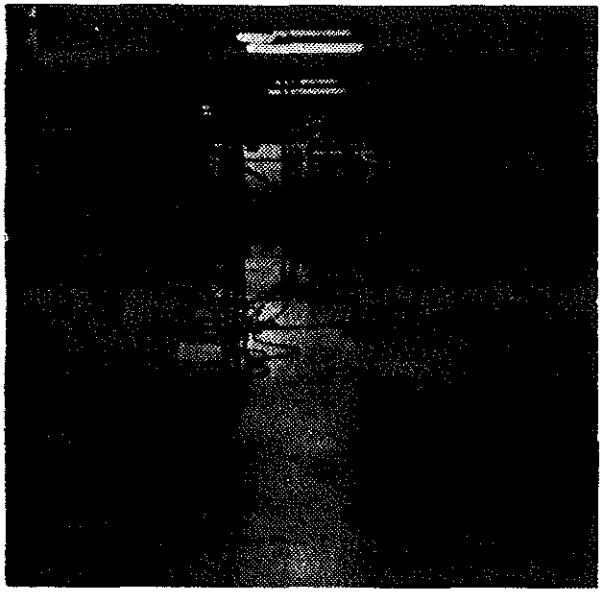


**PHOTO NO. 9,** WELDING AND TEMPORARY POWER CABLES ON THE FLOOR ( REF. ALLEGATION NO. 39)

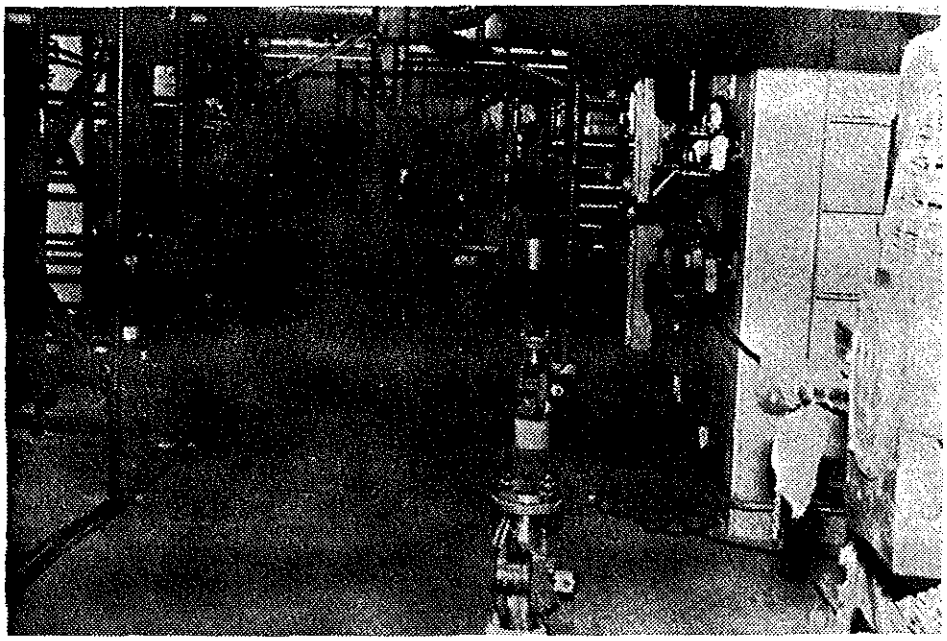


**PHOTO NO. 10,** TEMPORARY WELDING AND POWER CABLES ON THE FLOOR (REF. ALLEGATION NO. 39)

40. & 46. ALLEGATION

40. "One of the main pipes from the reactor to the turbine building did not fit so workers had to use a comealong to make the connection."

46. ALLEGATION

"Cold pulling to align pipes."

NRC UNDERSTANDING OF ALLEGATION

The alleger restates a well documented licensee identified cold pull incident. A comealong was used in the fitup operation for a main steam line final closure weld. Allegation No. 46 while general in nature, is addressed by the licensee's corrective actions to No. 40. Cold pulling of pipe is also discussed in allegations number 7 and 55.

SUPPORTING DETAILS

Piping and pipe supports are a significant portion of the plant installation work and have been inspected by the NRC on a continuing basis throughout construction. The NRC inspections 443/84-12, 84-13 and 85-25 discuss NRC observations, reviews and findings in the area of cold pulling of pipes.

There are two major piping systems connecting the turbine generator building with the containment (reactor) building; four feed water lines and four main steam lines. The inspector determined that the subject incident was identified by a licensee contractor and documented in Nonconformance Report (NCR) No. B0749, dated August 10, 1982.

The licensee found that a misalignment greater than permitted by the piping erection specification existed prior to the fitup of the Main Steam Piping (Line MS-4007-01-B1-30) field welds F0105 'A' and F0106 'B'. Subsequently, the licensee determined that the contractor was not fully cognizant of the details of Specification No. 9763-006-248-51 which required that no mechanical means could be used to move pipe more than 1/8 inch off its centerline position. A Final Report (SBN 869) dated September 10, 1985 for Construction Deficiency Report, CDR-82-00-13, submitted to the NRC which described the deficiency and detailed the corrective actions, including:

1. An evaluation of 70 ASME, Section III, Class 2 and 3 piping systems verified that the supports/restaints were installed after the final closure weld thus assuring that the effects of cold pull that may have been introduced were minimal.

2. The cold pull identified on the nonconformance report was corrected by refitting the line.

3. Applicable welding installation and inspection procedures were revised to preclude recurrence.

The above corrective actions were in place by January 1983. Subsequent inspections in this area by the licensee and NRC inspectors did not identify any additional discrepancies. NRC inspection 85-25 completed a final review and concluded that the licensee's corrective actions were effective.

CONCLUSION

The allegation was substantiated. The subject allegation addressed a single instance of cold pull of piping. The incident, originally identified by supervision, is well documented and resulted in a comprehensive evaluation of systems installed prior to the event to assure that previously installed piping was not adversely affected.

41. ALLEGATION

"Security was poor. Unauthorized people regularly had access to restricted areas."

NRC UNDERSTANDING OF CONCERN

The alleger stated that unauthorized people regularly had access to restricted areas. Restricted areas, meaning those areas of the plant where construction had been completed and were prepared for turnover for start-up testing. Unauthorized people were those who could not immediately produce a valid work request to a responding security guard.

DETAILS

The inspector reviewed the incident and event reports submitted by security personnel for the period May 1 through October 30,1986. The results of this review are as follows:

| MONTH | COMMENTS |
|---|---|
| May 1986 | There were 12 events in which security patrols observed unsecured doors; locking mechanism taped to prevent locking or doors blocked open with wooden wedges. |
| June 1986 | There were 14 events during the month of June. On 3 events, security received an intrusion alarm and a patrol responded and discovered unsecured doors. On 11 events, security patrols observed unsecured doors, locking mechanized taped to prevent locking or defective locks. |
| July 1986 | There were 8 events during the month of July 1986. On 2 events, security received an alarm and a patrol responded and discovered an unsecured door. On 6 events, security patrols observed unsecured doors, defective locks or doors blocked open for wires and pipes. |
| August 1986 | There were 5 events in which security patrols discovered unsecured doors or doors being blocked open. |

| | |
|---|---|
| September 1986 | There were 5 events in September 1986. On 3 events, security received an alarm and a patrol responded and discovered unsecured doors. On 2 events, security patrols observed unsecured doors. |
| October 1986 | There were 4 events in October 1986. On 3 events security received an alarm and a patrol responded and discovered an employee had created the alarm. On 1 event, an unalarmed door was found unsecured. |

The licensee stated that during the construction phase of the plant, the access controls that were implemented throughout the plant were imposed as a result of safety or construction concerns. Access control as defined in the approved physical security plan was not required during the construction of the plant.

The inspector verified that the licensee had implemented the NRC approved physical security plan as of October 17, 1986. At that time, unescorted access to protected and vital areas was positively controlled. During this inspection, the inspector observed that the security force is providing positive access control to protected and vital areas. All personnel granted unescorted access have received a background investigation, a psychological test and general site education.

The NRC approved the Seabrook Nuclear Generating Station Physical Security Plan for full implementation on October 17,1986. Portions of that plan contain procedures for providing positive access control to protected and vital areas.

The inspector determined that the licensee was in compliance with the NRC approved physical security plan and its procedures.

CONCLUSION

The allegation was substantiated. Based on an interview with the alleger, the period of concern is the spring of 1985 to the spring of 1986. The physical security plan, however, the official security plan for regulatory compliance, was not implemented until October 17,1986.

42. ALLEGATION

Three thousand pound cement was used at Seabrook whereas at other nuclear plants 5000 pound cement was used because 3000 pound was not thought to be strong enough.

NRC UNDERSTANDING OF THE ALLEGATIONS

The allegation as understood by the NRC is that the reference is made to concrete rather that cement; and 3000 pound and 5000 pound refers to the nominal strength of the mix-design of concrete which is measured in the units of pound per square inch (psi). Furthermore, because the alleger is concerned about the safety of the nuclear plant, his concern is related to concrete design in safety-related structures.

DETAILS

The 10 CFR 50, Appendix A, "General Design Criteria" (GDC-50) establishes requirements for containment design. Every licensee must satisfy these design requirements for a nuclear power plant. The Preliminary and Final Safety Analysis Reports (PSAR and FSAR) have been reviewed by the NRC, and Safety Evaluation Reports (SERs) have been issued.

The inspector reviewed the FSAR for the Seabrook Station, and noted that the containment design has been reviewed by the NRC and that the licensee was committed to design the containment in accordance with the ASME Code. Section III, Division 2, Subsection CC, Article CC-3000 of the Code establishes methods for containment design. The inspector also noted that a nominal 4000 psi mix-design concrete was the basis of the containment analysis in the FSARs and the NRC SER.

By review of specifications, placement records and construction drawings the NRC inspector determined that the concrete used in containment and other safety-related structures was a 4000 psi mix-design minimum. The mix was designed in accordance with American Concrete Institute (ACI) standard ACI 211.1-7A. The concrete as mixed in the on-site batch plant and delivered to placements was sampled at the point of delivery and tested for strength (see allegation 2) The results indicate that the average actual strength of the minimum 4000 psi mix-design was in excess of 5000 psi. The test cylinders of the concrete used in containment structures indicated a strength distribution range from approximately 4400 psi to 6000 psi for twenty eight day tests.

The NRC has also independently performed nondestructive tests (impact hammer; windsor probe) of the concrete used in safety-related structures. These tests indicate an average value of approximately 7200 psi. (IR 50-443/84-12)

The nominal strength of a concrete mix-design whether 3000, 4000, 5000 or even 6000 psi does not inherently make a structure "strong enough" or weak. The minimum nominal strength is used in designing (sizing) a structural member of an optimum size to withstand the design loads. With proper design and adequate size of any structure, a 3000 psi mix concrete is as serviceable as 6000 psi mix concrete. However, other considerations such as pump placement, durability, forming and ease of placement, and radiation shielding may dictate the choice of a mix-design rather than just strength. In a given structural size, however, a higher strength mix will provide a higher strength structural member. The Seabrook design is for 4000 psi, and tests show that actual average strength to be approximately 5000 psi.

CONCLUSION

This allegation is not substantiated. The concrete mix used for safety-related structures, especially containment is of a nominal 4000 psi design. The safety margin is more than adequate. The independent measurements by NRC show that actual average strength to be considerably higher than 4000 psi.

43. ALLEGATION

"The reactor was filthy compared to other nuclear plants under construction where a dust free environment was maintained. At Seabrook there were wooden ladders and debris in the reactor. Compared to other nuclear plants, general practices at Seabrook were slovenly, shoddy.

NRC UNDERSTANDING OF THE ALLEGATION

In comparison to other nuclear power plants under construction, housekeeping practices at Seabrook in and around the installed reactor vessel were poor.

DETAILS

During the construction of the facility, the NRC identified housekeeping deficiencies which were characterized as an area of concern but "not to a severe degree". This was reported in the Systematic Assessment of Licensee Performance Reports for the periods of July 1983 through January 1984 and January 1985 through March 1986. NRC Inspection report 50-443/84-18 formed a basis for this conclusion wherein it cited "empty spray cans, loose hardware, stripped cable insulation and other debris." The NRC resident inspectors were aware of this problem and monitored the licensee's activities in this area.

The inspector toured the plant during this inspection noting plant cleanliness at this point in time. The areas are painted and debris free; no construction dirt is evident. In areas where post construction activities are in progress, the areas are maintained and clean.

During various phases of construction prior to 1985, equipment required to facilitate work on the reactor coolant system, specifically wooden ladders, were placed in the reactor vessel; this practice is not uncommon. During the first quarter of 1985, the reactor coolant system piping and the reactor vessel were cleaned in accordance with Flushing Procedures 1-RC-F-4 and 1-RC-F-5. Upon completion of the cleaning program in March 1985, with the exception for periods of related testing and inspections, the reactor vessel remained sealed with a fire resistant polycover.

Final cleaning of the reactor vessel consisting of manual cleaning per procedure GT-C-02 to a final surface cleanliness level of Grade 'B' was accomplished on July 19, 1986. Procedure GT-C-01 Revision 11, includes system cleanliness classifications with Grade 'B' identified as the most stringent level, specified for the reactor vessel.

CONCLUSION

This allegation was substantiated.

During certain phases of the construction period, equipment and possible debris may have been found in the reactor vessel. However, flushing operations and manual wipe down of the vessel and visual examination indicated that the required levels of cleanliness were achieved and subsequently maintained throughout the period leading up to fueling activities.

44. ALLEGATION

"Improper welds were performed by untrained welders. Wrap-around welds were used when return welds were called for; return welds prevent the "keyhole" from breaking under stress."

NRC UNDERSTANDING OF THE ALLEGATIONS

The first portion of this allegation relates to the use of untrained welders and is addressed in the finding for allegation Number 12. The second portion of the allegation questions the difference between a wrap-around weld and a return weld on AWS structures and ASME Code, Section III, NF pipe support welding.

DETAILS

The American Welding Society (AWS) standard for welding terms and definitions defines an "end return" to be a non-standard term for "boxing" which is "the continuation of a fillet weld around a corner of a member as an extension of the principal weld". The term "wrap-around weld" is not defined in the AWS standard for weld terms. Therefore, the NRC inspector determined the Seabrook site requirements for end return (or boxed) welds. This includes the AWS definition; the ASME Code Section III, interpretation III-1-86-10 end return requirement of NF components; the UE&C drawing 9763-M-805943S, Sheet 2C, Note 6 requiring return welds where practical, and ECA 25-0372B. The basic requirement is that fillet welds shall be end returned for 1/2" minimum or 2 times the fillet size where geometry permits.

The NRC inspector examined a sample of approximately 100 welds in each of the containment and PAB areas to establish the presence of end return welds where required. All welds examined were properly "end returned".

A similar allegation was investigated by the NRC in 1983 and is quoted below from the inspection Report 50-443/83-01, Part 4e.

> "e. The NRC inspector reviewed the return end (or boxing) requirements of ASME Section III, NF and AWS D1.1 and discussed the technical intent of these requirements with the NRR-ASME Section III, NF representative and the AWS Staff expert on D1.1. The function of the return end welds is to prevent premature tearing of the ends of fillet welds under ultimate failure conditions (as discussed in paragraph 8.8.6 of the Commentary Section of the 1980 D1.1 document.) The loading conditions may negate the technical requirements for many return end welds. The 2X minimum length requirement is secondary in technical importance to the existence of the weld end corner closure. UE&C did not initially recognize the return end weld requirement in their specifications and Engineering Change Authorization (ECA) 250372A was written on February 27,1981 to address this question based on a Request for Information (RFI) initiated by YAEC. The ECA required that inspection be made of all P-H field welds and shop welds and additional weld be added if required. All future field welds are to

be made with return welds (where applicable). The licensee indicated that consideration may be given to an engineering evaluation calling for return end repair welds on an "as required" basis based on loading conditions (directions) rather than 100% of all fillet welds on supports identified by the subject ECA. This could minimize additional quality problems associated with repair welding.

The technical significance of the above areas of concern of hanger fabrication has been addressed in this inspection report by inspections conducted without direct or indirect reference to the existence of the allegation. The inspection indicated that some of these areas were under review prior to the time of the allegation. As a result of ECA 250372A (dated February 27,1981) resulting from an RFI initiated by the licensee, all support fillet welds are required to be reinsepcted for return end welds."

The AWS term "keyhole" refers to a welding procedure where a through hole at the leading edge of the molten metal is developed and fills in behind the hole as the weld arc progresses. Keyhole welding is associated with gas tungsten arc and plasma arc welding but is not applicable to shielded metal arc fillet welding.

CONCLUSION

The allegation was not substantiated.

45. ALLEGATION

"Bottles of Argon used for welding were contaminated with moisture but were used anyway."

NRC UNDERSTANDING OF THE ALLEGATIONS

How is the moisture content of Argon gas for weld shielding controlled? If Argon contaminated with moisture was used would a welder see any resulting problems?

DETAILS

All Argon purchased for welding use at Seabrook Station is certified to be 99.995% pure Argon. Argon has been purchased in bottle and bulk form and, is used as a shielding and purging medium for the Gas Tungsten Arc Welding (GTAW) process. There never has been a problem with the bottled gas but there have been instances where problems occurred with the bulk system. The welder(s) would recognize the problem due to the change in welding characteristics, stop work and notify a welding supervisor. The affected portion(s) of the bulk supply system would be taken out of service until the problem was found and corrected. The welder(s) would remove the affected weld, switch over to bottled gas, and complete the welding assignment. Most of the problems found were aspirating hose connections.

The NRC inspector was aware that if moisture contaminated Argon gas is used in the gas shielded Tungsten Arc Welding (GTAW) of stainless steel and carbon or low alloy steels, weld metal porosity may occur. The NRC inspector reviewed the purchase order and Argon gas analysis reports to determine if the maximum moisture level of Argon gas was specified and controlled. The effects of moisture on the GTAW Tungsten electrode, visibility of resulting porosity, weld technique of verifying weld integrity by looking at GTAW root passs welds and involvement of supervision and weld engineering in resolving weld porosity problems were considered.

The inspector reviewed the statement of analysis for Argon Welding Grade Gas dated November 29, 1977 which specifies a minimum purity of 99.996% Argon with a maximum dew point of -76 F, and a typical analysis of 99.9989% purity with a dew point of -90 F. Test results of welding grade shielding gases were reviewed, confirming a combination of high purity and low dew point. The inspector concluded that the weld gas supplier (also a supplier of medical gas) did control and check weld gas purity and moisture content to levels consistent with quality GTAW, porosity free welding.

Field procedure FWP-18 part 5.2.5.1, C and the P-H General Weld Standard GS-111 Part 4.2 require the use of oxygen analyzers to check the adequacy of Argon gas backing purge for GTAW root pass welding. While this analyzer does not measure moisture content, it does provide another field check on Argon gas purity besides observations made by welders during welding and observations of completed weld layers by welders, QC inspectors, supervision and NDE technicians.

Previous NRC weld inspections of both welder qualification and production welding have not identified GTAW Argon gas, moisture induced porosity as a significant contributor to weld metal defects. Where a problem with GTAW shielding gas has been observed, the problem is usually found in the delivery system such as a bad gas lens, loose gas line fitting or damaged gas hose. The resulting weld process problems in these cases are generally immediately obvious.

In addition, the NRC performed independent weld examinations using the Nondestructive Examination Van on three occasions (6/82, 8/84 and 7/85). The inspections employed radiography, magnetic particle, liquid penetrant and visual examinations of welds. Any widespread porosity problems would have been identified using these techniques.

CONCLUSION

This allegation was not substantiated.

48. ALLEGATION

"...in a number of locations throughout the plant, the primary and backup feedwater systems were supported by a single structure."

"...it appears the plant is vulnerable to total failure of feedwater and emergency feedwater systems in some accident situations."

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger is concerned that a single failure of an Emergency Feed Water (EFW) component will result in the loss of the EFW system. Also, the failure of a main steam line or main feedwater line in the area of the EFW pump house and Condensate Storage Tank (CST) can also result in the loss of the EFW system.

DETAILS

The inspector reviewed the requirements of the Standard Review Plan 10.4.9, Auxiliary Feedwater System, Final Safety Assessment Report (FSAR) Section 3.5, Missile Protection, and section 6.8 Emergency Feedwater System, and NUREG-0896, Safety Evaluation Report for Seabrook Station, Section 6.8.

The inspector verified that the NRC has completed an in depth review of all design and operational aspects of the EFW system. The review determined that all components and associated piping are housed in seismic Category I structures, with the exception of suction piping that is routed underground between the CST and the pump house. Within the seismic Category I structures, equipment and piping are supported by seismic Category I restraints.

High energy lines of the main steam and feedwater systems are also supported by seismic Category I structures, preventing adverse impact upon the EFW system.

The seismic Categoy I concrete structure surrounding the CST, will contain adequate water to cool down the plant should the steel tank fail. Redundant emergency feedwater pumps are located in a seismic Categoy I pump house. There are no barriers between the pumps; however, an analysis conducted in response to an NRC request for additional information, RAI 410.8, was completed by the licensee in August 1982 and included in Section 3.5 of the FSAR. The analysis concludes that a missile generated by the turbine driven pump is not a credible event, allowing the two pumps to be located in the same area.

CONCLUSION

This allegation could not be substantiated. Although it is true that the emergency feedwater system is supported by a single structure in a number of location, these structures are designed to withstand natural occurring events and pose no threat to the piping system.

51. ALLEGATION

"Control building air conditioning system refrigerant lines (CBA) lack separation; no physical barrier between them."

NRC UNDERSTANDING OF THE ALLEGATION

Redundant trains of the control room air conditioning system are located in the same room and are, therefore, subject to common mode failure.

DETAILS

Air conditioning (cooling) in the control building is limited to the control room complex and it is comprised of two independent systems.

a) control room - safety-related
b) computer room - non-safety-related

The inspector reviewed the system drawings and examined the installed piping and equipment. The control room air conditioning system consists of two redundant trains of 100% capacity each. Power supply to each train is an independent emergency source. Electrical cable seperation criteria meet the requirements of Regulatory Guide 1.75.

All equipment associated with the control room air conditioning system is housed in seismic Category I structures designed to withstand safe shutdown earthquake and postulated tornado missiles. Cooling system components including fan dampers and associated equipment duct work are ANSI Safety Class 3, Seismic Category I. This system has been evaluated by the NRC staff in accordance with Section 9.4.1 of the Standard Review Plan (SRP). The staff determined that the system is in conformance with applicable General Design Criteria.

No specific criteria exist for the segregation of refrigerant lines of the redundant air conditioning systems. However, all piping is seismically supported to assure system reliability during and after seismic events. Independent verifications of the as-built conditions of the subject system has been conducted by the licensee's contractor and the NRC, as documented in NRC report No.86-12.

The computer room air conditioning system consists of a self-contained single unit housed in its entirety inside the computer room. This unit is not safety-related.

CONCLUSION

This allegation is substantiated. However, there are no requirements to meet specific separation criteria for refrigerant lines. The existing system design has been reviewed by the NRC and does not degrade plant safety.

52. ALLEGATION

The emergency feedwater system is supplied from a single tank, which also serves as condensate storage for the main steam feedwater system.

NRC UNDERSTANDING OF THE ALLEGATIONS

Additional clarifications by the alleger: On Nov. 5,1986, during a personal interview, the alleger clarified his concern as it appeared in the October 21,1986 affidavit.

It is the inspector's understanding of the alleger's concerns that an adequate source of water supply to the emergency feedwater system cannot be assured for two reasons:

a) condensate water storage tank level is not controlled
b) other systems taking suction from the Condensate Storage Tank (CST) can drain the tank leaving an inadequate supply to the Emergency Feedwater Pump (EFP) during an emergency.

DETAILS

The licensee's Technical Specification (T.S.) which is part of the operating license, Section 3.7.13, requires that a minimum of 212,000 gallons of water be contained in the CST; and the concrete CST enclosure is capable of retaining 212,000 gallons of water. This minimum water volume is sufficient to cool the reactor coolant system to less than 350°F, when the residual heat removal (RHR) system can be placed into operation. At this point, the emergency feedwater system is no longer required. The condensate storage tank level is continuously monitored in the control room and a low tank level alarm, at 240,000 gallon alerts the operators to take corrective action. If the above requirements cannot be met, for a period of 4 hours , the plant must be in hot shutdown within the following 12 hours.

The inspector reviewed Section 9.2.63 of the FSAR, Condensate Storage Facility Safety Evaluation, in conjunction with Figure No 10.4-4, Sheet 1. The lowest elevation of non-nuclear safety pipe is at 44' - 4 3/8"; the EFP suction pipes are at 23' 11", assuring a 20' 5" reserve of this 42 ft.diameter tank for emergency feedwater of 212,000 gallons. There are six (6) nozzle penetrations into the CST within the elevation reserved for EFP. Five are associated with EFW pump and condensate pump recirculation, and tank level instrumentation. One suction line at elevation 25'-3" is associated with the Startup Feedwater pump. This line is isolated by valve No. CO-142, which is normally locked shut. The above connections and all associated piping are nuclear grade seismic Category I, and are protected by missile shields.

CONCLUSION

This allegation is not substantiated. The system design and administrative controls insure a reliable water supply during emergencies.

53. ALLEGATION

"Control room is protected by an automatic water sprinkler system, thus exposing the electronics to disruption by water."

Fire protection systems throughout the plant consists of an automatic water sprinkler system, water fire hoses and hand-held fire extinguishers. This is the only fire protection equipment installed in the control room, thus exposing electronically operated control systems to the threat of disruption due to water infiltration when sprinklers are activated. Computerized equipment is not customarily sealed against liquids due to the need for ventilation to maintain a constant temperature.

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger states that the control room is protected only by an automatic water suppression system. Use of this system to put a fire out in the control room can cause disruption of electrical equipment exposed to the water spray.

DETAILS

The control room cabinets and consoles are subject to damage from two distinct fire hazards.

a) Fire originating within a cabinet or console
b) Exposure fire involving combustibles in the general room area

The NRC inspector examined the fire detection in the control room complex and verified it is protected by ionization detectors. Manual hose stations are located outside the control room near the stairwells. Halon and dry chemical hand-held extinguishers are located in the control room. Control room equipment is not provided with pedestals and floor drains are not provided. However, these features are not required as the hose stations and standpipes are located outside the control room and up to 4 inches of flooding can be tolerated without damage to any safety-related equipment. Drainage is maintained through the open door to the turbine building or the stairwells to the outdoors. Nozzles for the manual hose station are chosen to minimize physical damage to the electrical equipment and satisfy electrical safety.

The NRC has imposed extensive requirements for fire protection through 10 CFR 50.48 and Appendix R. The licensee's fire protection program was reviewed by the NRC and is documented in a Safety Evaluation Report dated March 1983. Further, a team inspection verified the implementation of the safe shutdown aspects of this fire protection program. This is documented in Inspection Report 50-443/86-03.

In addition the control room is manned on a 24 hour basis so that any fire in the area would be immediately detected and extinguished.

The plant computer does not perform any safety function and the failure of the computer will not prevent the safe and orderly shutdown of the plant. The plant computer room is a portion of the control room complex but is separated from the main control room by three hour rated fire walls. Automatic fire detectors with a fixed Halon 1301 system is provided in the computer room. Portable fire extinguishers are not provided.

CONCLUSION

The control room does not have an automatic water suppression system. The primary fire protection consists of portable Class "C", appropriate for fighting electricl fires, fire extinguishers with the standpipe and hose station as the back-up system.

This allegation was not susbstantiated.

54. ALLEGATION

"Parts of CBA system were constructed without design drawings."

NRC UNDERSTANDING OF THE ALLEGATIONS

The installation of the air conditioning system lines was completed without the use of drawings. The original installation consisted of 2 and 3 inch diameter steel piping which was subsequently replaced with 3/4 inch diameter copper tubing.

Additional clarification by the alleger: On Nov. 1,1986 during a personal interview the alleger clarified his concern as it appeared in the October 21, 1986 affidavit. The alleger stated that his concerns address the air conditioning system of the Control Building Air Handling (CBA) equipment.

DETAILS

The allegation was inspected inconjunction with allegation No. 51 wherein the inspector reviewed the drawings and installation of the system.

The inspector determined that detailed drawings of the subject system have been issued and are designated as United Engineers & Constructor (UE&C) drawings 4019600 through 4019618. System modification dates and applicable construction details appear on each drawing. As-built walkdowns of the system have been completed using the subject drawings.

Licensee's specification No.9763-006-248-1, Shop Fabrication of Pipe requires that refrigeration piping be installed in accordance with ANSI B31.5, Field Supplied Refrigeration Piping. In accordance with the code, all piping associated with the system is rigid copper piping. Steel piping is not used in any part of the system.

CONCLUSION

This allegation could not be substantiated.

55. ALLEGATION

The allegations about turbine building equipment and piping are summarized below:

a. Condensate traps in horizontal pipe runs
b. Uneven support loading under heat exchangers
c. Prohibited work practices used thoughout the system
d. Weld identification procedures not carried out
e. B 31.1 as-built inspection program was cancelled because it was too costly and unnecessary
f. Cold pulling pipe

The allegation stated:

"Turbine exhaust piping was installed with several reverse slopes, and runs out of plumb and skewed. Some misalignments at pipe welds were evident. I believe this to be due in large part to inaccurate fabrication of the condenser shells in which the piping was installed. Some of the heat exchangers in the condensers were also installed out of level.

On one occasion I saw a crew attempting to force a pipe spool into location by use of a chainfall. This practice, known as cold pulling or cold springing, is normally prohibited by the construction specifications. The presence in other locations of blocking similar to what was used by this crew, and apparent fitup problems throughout the piping suggest that this may have been done in other places in the system. In my work with documentation for the exhaust piping, I found no reference to any authorization for piping to be cold pulled into alignment.

All field welds were required to be stenciled by the welder with his identification symbol and the field weld number. In numerous instances I found unmarked welds, and in some cases, incorrectly identified welds. Many of these had substantial surface rust, indicating that the work had been done some time ago. Identification marks were inscribed on these welds after I brought them to the craft supervisor's attention."

I was told by a co-worker that the original contractor for the condensers and associated piping had been dropped when the system was partially completed, and the job reassigned to Pullman-Higgins.

In my judgement these potential problem areas exist in the turbine exhaust system and condenser piping:

*Condenser traps in horizontal pipe runs.
*Uneven support loading under heat exhangers. In operation they are to be approximately half filled with water. Those that are out of level will not match the weight distribution for which the supports were designed.
*Prohibited work practices may have been used to an unknown degree throughout the system.
*Identification procedures created to insure weld quality do not appear to have been correctly carried out.

I wrote up a large number of nonconformance reports on piping in this system. I do not know how they were dispositioned. This was the last system I worked on under Pullman-Higgins. When I returned to the site in July 1983, I was told that the as-built inspection program for ANSI B31.1 piping had been cancelled at that time because it was both too costly and unnecessary."

ALLEGATIONS AS UNDERSTOOD BY THE NRC

No clarification of the allegations was necessary.

DETAILS

The systems described in the allegation are not nuclear safety-related and are not governed by regulations. However, the NRC is concerned about the general quality of all plant systems to avoid equipment failures and challenges to safety systems. The inspector examined the installed condition of various feedwater heaters including FW-E-26B by column 10 and runs of horizontal piping. Horizontal runs of steam piping of significant length were noted to be sloped toward drain piping taps. Feedwater heaters were found to be installed level in accordance with the high pressure and low pressure feedwater heater installation instructions (IL 1370-1388 and 1370-1386) (Photos Nos. 11 & 12). The feedwater heater supports are as shown on drawings 4618D39 and 4618D38. The turbine exhaust lines from both steam driven turbine feedwater (FWP) pumps were observed to be installed with a slope toward the condenser in accordance with drawing 9763-F-2024. The nearby steam extraction lines (which exit the condenser near the turbine FWP exhaust line entrance to the condenser) were observed to slope down from the condenser in accordance with Drawing 1-EX-4125-01. This condition of two lines penetrating the condenser with opposite slope would present the appearance of reverse slopes, however system design requires the as installed slope conditions.

Cold pulling of pipe is discussed in allegations #7, #40 and #46, however one cold pulling incident did occur on Field Weld F0105 Spool E2937-1982 in the turbine building as reported in the NCR 7035-B0749, dated 8/10/82. The NCR disposition provided for removal of the Comealong to establish the amount of cold pulling and provided for refitup of the weld without cold pull. The disposition was verified as complete on 6/20/83. This NCR illustrated that excess cold pull of pipe was prohibited, workers were aware of the requirement and the need to implement the requirement.

Weld identification is a means of providing traceability from the actual pipe weld to drawings, procurement documents and quality records. It can be accomplished if the as built pipe correlates with the drawings and construction records. In the area of weld identification to ANSI B31.1, the inspector noted the requirement for weld joint and welder identifications to be recorded on the appropriate weld process sheets, which are traceable to the applicable weld. For turbine building piping, the stenciling of pipe welds with the weld and welder symbols is supplementary information but not a regulatory requirement, and has no safety significance.

The as-built inspection program for ANSI B31.1 piping is not an NRC requirement for non-safety-related piping. The information generated by a detailed as-built B31.1 non-safety-related piping program would be entirely for the benefit of the licensee. The cancellation of the as-built B31.1 program in view of existing drawings, NCRs and installation records is justifiable. This decision has no effect on safety-related equipment integrity.

For the main steam (MS) and feedwater lines (FW) an as-built inspection was performed including those sections of these lines in the turbine building. This inspection was conducted by the licensee under the Piping and Pipe Support Close Out Task Team (PAPSCOTT) reconciliation program. As of September 16,1986, the MS and FW lines including lines 4600 and 4601 were shown to be installed per the applicable design drawings. The licensee's investigation results, dated October 24,1986, concerning the as-built inspection of MS and FW lines reported in File E-86-102-3(15) was reviewed by the inspector.

CONCLUSION

This allegation was not substantiated. During investigation of the allegation, all items inspected by the NRC were found to be installed in accordance with design drawings and equipment manuals. While it is true that the B31.1 as-built program was cancelled, the B31.1 code conformance was met by installation practices and procedures. No safety-related equipment deficiencies could be identified as a result of these allegations.

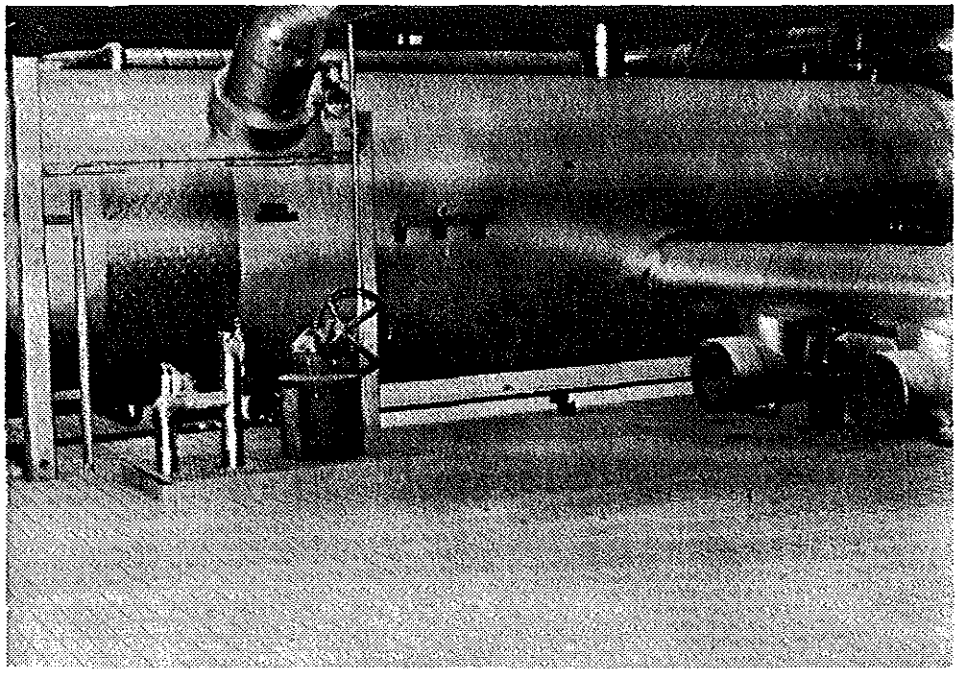


**PHOTO NO. 11,** FEEDWATER HEATER BEING CHECKED FOR LEVEL INSTALLATION (REF. ALLEGATION NO. 55)

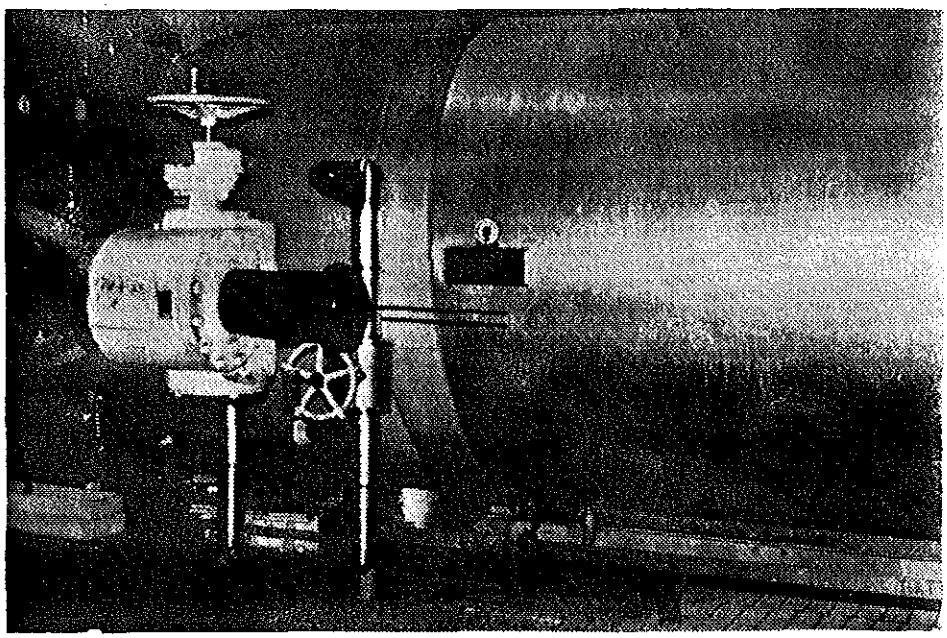


**PHOTO NO. 12,** FEEDWATER HEATER BEING CHECKED FOR LEVEL INSTALLATION (REF. ALLEGATION NO. 55)

56. ALLEGATION

"Original drawings are required to be kept in fire proof storage. This requirement was frequently violated. A fire in the Johnson Controls trailer resulted in the loss of several drawings."

NRC UNDERSTANDING OF THE ALLEGATION

The requirement for fireproof storage of records was violated on site, specifically by Johnson Controls International; thereby, destroying important quality records and drawings.

DETAILS

The fire in the Johnson Controls trailer occurred in December 1982 as they were moving into a new trailer complex. Both the licensee fire brigade and the Seabrook Fire Department made efforts to prevent the loss of records. Partially as a result of these efforts, no records were burned; however, some received smoke damage.

The requirements for records storage include provision for duplicate and separate storage facilities as a means of protecting records from fire and other loss. Johnson Controls maintained a duplicate storage for "original/copies" of drawings at a second location on the site at the time of the fire. When the records and drawings required for the work performed by Johnson Controls were turned over at the completion of the contract, the audit of those records did not disclose missing drawings or illegible records caused by fire damage.

The inspector reviewed a representative sample of the records turned over by Johnson Controls and determined that these records were legible after microfilming.

CONCLUSION

This allegation as understood by NRC was not substantiated. Although, there was fire damage to the JCI facility, no permanent loss of records was sustained.

58. ALLEGATION

"Training of new hires was of uneven quality."

"Training provided to new hires was of uneven quality. That provided by Pullman-Higgins was implicitly acknowledged by staff and students to be oriented toward passing everybody. Students were permitted to sleep through classes. Instruction at times consisted of being told what questions would be asked, and what the answers were. Testing was minimal and usually done with open books. I do not recall that any testing was done by Pullman-Higgins in the area of construction standards and practices. I failed to learn that cold springing of pipe in the turbine exhaust system which I observed was a prohibited practice; consequently I did not report it."

NRC UNDERSTANDING OF THE ALLEGATION

Orientation of newly hired employees was inadequate for specific positions and designed to assure all employees were accepted. The alleger was formally interviewed on November 5, 1986, the obtain additional clarification of his concerns.

DETAILS

The inspector determined through interviews with the training supervisor that Construction Orientation was to provide newly hired employees with the basic requirements for working on the site. It included such things as safety rules so the employee would not become a hazard to themselves or others, actions that could result in disciplinary action, locations of restricted areas and other information. It should be recognized that training did vary with the type of job assignment and from contractor to contractor depending on the technical levels involved.

The course of instruction was administrative in context and was not a measure of technical skill. As discussed in allegation nos. 10, 11, 12, 28 and 29 the NRC extensively inspected formal training related to engineer, inspector and craft qualification to perform job related tasks.

During a formal interview with the NRC, it was acknowledged by the alleger that he received the appropriate specification to which he would be working, given time in the office to read and understand its contents, and a period of on-the-job training under supervision before he was allowed to independently inspect work.

CONCLUSION

This allegation could not be substantiated. Construction orientation was performed by various contractors prior to initiation of the General and Specialty Training Department. Each contractor presented the information they believed was necessary for their employees to know. Due to the various projects on site this information varied both from content and presentation. However, the training was administrative in nature and not related to job skills which were verified by employment checks, union halls, and qualification tests.

61. ALLEGATION

"Fire Protection system was triggered in the control building and wires in the trenches in the floor got wet.

NRC UNDERSTANDING OF THE ALLEGATIONS

The alleger stated that cables were wetted when the fire protection system was set off in the control building.

DETAILS

The NRC inspector reviewed FSAR layout drawings of the control building and determined that the control building houses the control room, computer room, north/south mechanical equipment room and the cable spreading room. The cable spreading room is the only area in the control building that is provided with a zoned deluge valve fire protection system. This automatic sprinkler system provides fire protection for cable trays except for solid bottom trays with covers in the cable spreading room, cable chases, electrical tunnels, penetrations outside of containment and elevation 25'-0" of the primary auxiliary building.

The NRC inspector reviewed APCSB 9.5-1, Appendix A, which evaluated the fire protection systems and the automatic water suppression system in the cable spreading room. No other area of the control building is provided with automatic water suppression. Since the alleger has not identified any specific area, referencing only the control building, it is assumed the alleger is referring to the cable spreading room water suppression system. The NRC inspector interviewed the fire protection coordinator who indicated that there have been no reports or indications that the automatic water suppression system in the cable spreading room had been tripped.

Assuming that there was a trip and the cable had been exposed to water, material qualification documents for all safety-related cable used at Seabrook indicate the cable is qualified for service in a harsh environment, including submergence in water.

CONCLUSION

The allegation was not substantiated.

SUMMARY AND CONCLUSIONS

The inspection team identified sixty-one allegations which were ultimately combined into forty-seven different issues. None of the allegations were determined to present a nuclear safety concern. Most of the substantiated issues were previously identified and do not represent equipment deficiencies.

Of the forty-seven issues that were inspected, thirteen were substantiated in that the statement made by the alleger was accurate. However, eleven of the thirteen were previously identified either by the NRC or the licensee and were documented in licensee quality assurance records, NRC inspection reports, or formal correspondence between the licensee and the NRC, and received the appropriate engineering review and disposition.

The two issues that have been classified as substantiated and not previously identified are one dealing with contractor adversarial relationships and the other dealing with cleanliness in the reactor. The contractor adversarial relationship was, to some extent, known by the NRC due the corrective actions that were applied to the subcontractor to rectify the inadequate performance problems. This was conservatively classified as not previously known because of the manner in which the NRC perceived the problem, not as one involving an adversarial relationship but one of inadequate performance. The relationship aspect of the issue resulted from the identification of the performance problem.

The second issue, dealing with cleanliness in the reactor, although confirmed to be true, was a conscious decision approved by the licensee's engineering staff. The practice of providing a lower standard of cleanliness during heavy construction in the reactor, and then performing a final cleaning to acceptable standards may be different from other nuclear power plants, but it was an acceptable method.

The allegations that were substantiated were valid observations that "something was wrong" at that time in the plant construction when they were made. This is supported by the fact that thirteen of the allegations were substantiated and that the record indicates that substantial effort was expended to correct the condition. However, the allegers were unable to acquire all of the facts surrounding the issue and could not be expected to have knowledge of the corrective actions that subsequently took place.

APPENDIX A

RESUMES

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Title: Lead Reactor Engineer

Education: Bachelor of Science in CE, University of Missouri, Rolla, Mo.
Master of Science in CE, University of Missouri, Rolla, Mo.
BWR Technology, USNRC
PWR Technology, USNRC
Welding Technology & Nuclear Code, USNRC
NDE Technology & Nuclear Code, USNRC
Electrical Technology & Nuclear Code, USNRC
Concrete Technical & Nuclear Code, Portland Cement Assoc. Chicago, IL/USNRC
Registered Professional Engineer

Experience:

USNRC 1985 - present: Member of technical staff engaged in inspection, analysis, and evaluation of nuclear plant operating systems and maintenance specialist in nuclear structures, supports, and fluid systems.

1982-1985: Senior Resident Inspector for construction at a two unit BWR. Responsible for resident inspection in construction and preoperational tests.

1978-1982: Member of regional technical staff engaged in inspection, analysis, and evaluation of nuclear power plant systems under construction, especially, concrete and steel construction; modification of operating plant systems, and plant maintenance.

1976-1978: Duration and Management of Quality Assurance program at a 1000 MW PWR plant under construction.

1963-1976: Various assignments in structural design of concrete structures and pavements; technical and site feasibility studies; geotechnical engineering, concrete and structural quality control; and project cost and scheduling controls at project and/or staff engineer level.

Over 18 years of Design, Construction, and Inspection experience in nuclear industry.

Name: Edwin H. Gray
Organization: U.S. Nuclear Regulatory Commission
Region I, Materials and Processes Section
Engineering Branch

Title: Lead Reactor Engineer

Education: B.S. Metallurgical Engineering - Drexel University, 1963

Experience: (Nuclear Industry - 20 years)

1982-Present Member of NRC technical staff responsible for performing periodic inspections and related investigation of power, test and research reactor facilities during construction, testing, startup and operational phases.

1980-1982 Leighton Industries - Quality Assurance Director - Responsible for QA, QC Program, welding and metallurgy activities. ASME and Section I, IV, VIII, PP.

1978-1980 Foster Wheeler - Manager Dansville Welding Laboratory (NY) Manage Lab Functions of procedure qualification, services to manufacturing plant in areas of welding and materials ASME Section I, VIII, IX, MIL Specs

1970-1978 Foster Wheeler - Weld Applications Engineer - Oversee welding applications at Mountaintop Plant (PA) Products - FFTF & CRBRP IHX, Valves, Etc. and ASME Section I, VIII boilers and heat exchangers.

1963-1970 Chicago Bridge, Welding/Materials Engineer - Lab/Production coverage on ASME Section III vessels, Hydorcrackers, misc. other welded products.

Special Qualifications: Registered Professional Engineer - Penna.
Certified Welding Inspector - AWS
ASNT TC - 1a Level III - RT

Name: Peter S. Koltay
Organization: U. S. Nuclear Regulatory Commission
Region I, Division of Reactor Projects

Title: Senior Resident Inspector

Education: B.S. Engineering Sciences
Registered Professional Engineer
Member of Society of Fire Protection Engineers

Experience: 12 years of nuclear industry experience.

1981-Present NRC Resident Inspector and Senior Resident Inspector. Responsible for accomplishing the NRC Light Water Inspector Program at an operating pressurized water reactor facility. Conduct detailed inspections of such areas as system surveillance, maintenance, major system modifications, inservice inspections, fire protection refueling and outage activities, radiation protection and quality assurance.

1978-1981 Reactor Inspector, performed inspections of fire protection plan at nuclear power plants; evaluated the adequacy of fire protection system design.

1975-1978 Senior Engineer, responsible for incorporating fire protection requirements of 10 CFR 50, App. A, Criterion 3, and those of Branch Technical Position 9.5-1, into the design and construction of nuclear generating stations, including Waterford 3, Lucy Unit 2, WPPSS Units 3/5, and Shearon Harris Units 1 through 4. Provided pertinent input on the interior design of safety-related structures, layout of safety-related equipment, routing of Class IE electrical cables and separation of redundant protection channels.

Ralph J. Paolino

Organization: U. S. Nuclear Regulatory Commission
Region I, Plant Systems Section, Engineering Branch

Title: Lead Reactor Engineer

Education: University of Pittsburgh
Electrical Engineering - 3 years
Nuclear Engineering - 1 year

Experience: (Nuclear Industry - 22 years):

1975-Present Member of technical staff responsible for performing periodic inspections and related investigation of power, test and research reactor facilities during construction, testing, startup and operational phases, to: ascertain conformity with design and other criteria; observe as to the adequacy of licensee's controls and provisions for overall operational safety; evaluate management, organization control, procedures and practices of licensees and the effect on, or their relations to, the safety of operations; and observe as to the status of compliance of licensees with license provisions, rules, orders and regulations of the commission; and verify compliance with construction industry codes and standards.

1972-1975 Corporate Staff I&C Consultant/Senior Staff Engineer for Architech Engineer. Responsible for the direction/development and resolution of generic/specfic issues, establishing corporate policy regarding specific design, standards and specifications applicable to I&C systems and safety related processes for nuclear generating plants.

1964-1972 Special Products Manager - Medical Electronics firm. Responsible for the direction, development and fabrication of process control equipment utilizing radiation monitoring techniques including effluent and process radiation monitors for nuclear generating facilities.

# RESUME

Robert W. Winters

| | |
|---|---|
| Organization: | U. S. Nuclear Regulatory Commission<br>Region I, Quality Assurance Section, Operations Branch |
| Title: | Reactor Engineer |
| Education: | Bachelor Metallurgical Engineering<br>Rensselaer Polytechnic Institute |
| Experience: | (Nuclear Industry - 13 Years) |
| 1985-Present | Member of the NRC technical staff responsible for performing periodic inspections and related investigation of power generating facilities during construction, testing, startup and operational phases, to ascertain conformity with design and other criteria; evaluate licensee management controls procedures and practices as applied quality assurance. |
| 1973-1985 | Quality Assurance Specialist/Supervisor for nuclear equipment manufacturer and installer. Responsible for quality assurance programs, auditing performance, welding procedures and performance, vendor evaluation, and overall quality performance during installations. Provided technical guidance to installation projects in processes and welding. Interfaced with licensees, regulatory bodies and industry standards groups. |
| 1951-1973 | Various positions in aerospace, steel manufacturing, non ferrous materials manufacturing, materials fabrication and testing, and quality assurance. |

## APPENDIX B

## DOCUMENTS REVIEWED

UE&C Letter #SBU-98678, dated March 31, 1986, to
R. J. DeLoach, YNSD Project Manager

Nonconformance Report:
Nos. 59-5463; 57-5068;

In-Process Inspection Report
IR # P-106

Station Operating Procedure IP-104, "Level I Coating of Concrete Surfaces", Rev. 1 through 4

Pittsburg Testing Laboratory, "Statistical Analysis-Concrete Compression Test Data" 1977-1986

American Concrete Institute Standards:
ACI-211; ACI-214; ACI-301; ACI-318

Containment Concrete Placement Records:

| Placement Number | Date |
|---|---|
| 1-CS-1E-1 | 11/19/80 |
| 1-CS-1F-1 | 11/25/80 |
| 1-CS-1K-3 | 11/20/81 |
| 1-CS-1K-3A | 12/15/81 |
| 1-CS-1LM-3 | 12/18/81 |
| 1-CS-1NO-3 | 01/06/82 |
| 1-CS-1PQ-3 | 01/28/82 |
| 1-CS-1RS-3 | 02/10/82 |
| 1-CS-1TU-3 | 02/24/82 |
| 1-CS-1V-3 | 03/04/82 |
| 1-CS-1W-3 | 03/10/82 |
| 1-CS-1FTC-1 | 02/25/83 |
| 1-CS-1FTC-2 | 03/02/83 |
| 1-CS-1FTC-3 | 03/04/83 |
| 1-CS-1FTC-4 | 03/08/83 |
| 1-CS-1FTC-5 | 03/10/83 |

Qualification of Flame Retardant Cable

-- Anaconda Certified Test Report No. 81-338-2-1

-- Cable Specification No. 9763-006-113-18

-- Franklin Institute Research Laboratory Report No. F-C4836-2 dated January 1, 1978 and No. F-C4969 dated July 1978 with attachment No. 80282

-- Okonite Cable Code No. 13136H
Receipt Inspection Report (RIR) No. 13199
Reel NO. 24, 2/C #2

-- Anoconda Cable Code No. ABGM
RIR No. 11272
Reel No. 44, 2/C AWG 19/22
Purchase Order No. 113-17

-- Okonite Cable Code No. CCGD
RIR No. 3731,
Reel No. 6, 3/C 250 MCM
Purchase Order No. 113-3

-- Flame Test per IPCEA Publication S-66-524
Part 6, Paragraph 6-12b

-- IEEE std 336-1871 requirement for inspection of cables and raceways.

NRC INSPECTION REPORTS

50-443/82-08
50-443/82-12
50-443/82-16
50-443/83-04
50-443/83-13
50-443/83-17
50-443/83-22
50-443/85-05
50-443/85-12
50-443/85-15
50-443/85-20
50-443/85-30
50-443/86-15
50-443/86-19

Systematic Assessment of Licensee Performance - February 19, 1985
Systematic Assessment of Licensee Performance - May 14, 1986

PROCEDURES

| | |
|---|---|
| FGCP-1 | Development and Preparation of ASME Field Construction Procedures. |
| TP-10 | Technical Procedure for Location of Attachments to Embedded Plates |
| ASP-3 | Nonconformances |
| QA-15 | Nonconforming Materials, Parts, or Components |
| | Fire Protection Plan (10 CFR 50 Appendix R) |

CORRESPONDENCE

Letter Public Service Company of New Hampshire to US Nuclear Regulatory Commission dated December 2, 1982, referencing Inspection 50-443/82-12

Fire Department report of the Johnson Controls Incorporated fire on December 22, 1982.

RECORDS

QA Record Document Review Checklist - Johnson Controls Incorporated 10/13/82

QA Record Document Review Checklist - Johnson Controls Incorporated 11/30/83

Training Record - Classroom Lecture and Hands On Workshop, Raychem High Voltage Kits, 8,3,84

RECORDS (Continued)

Training Records - Pullman Power Corporation, individual records August 1982.

Training Records - Fischbach-Boulos-Manzi-NH - Individual records - February, 1979 to January, 1983

Training Records - Perini Power Constructors, Inc. - November, 1981

# BRIEF EXPLANATION OF SEABROOK DRUG AND ALCOHOL PROGRAM

**NOTE:**

The following is being provided in response to your request for additional information regarding the Seabrook Anti-Drug and Alcohol Abuse Program. It should be noted that some of the information being provided herein is based on our investigations to date and has not been finalized. This may be updated as additional information is reviewed in connection with NHY's response to a request for information by Representative Edward J. Markey.

## Discussion

Seabrook Station's policy regarding alcohol and drug abuse was not established because of any perceived problem at Seabrook but rather because NHY recognized at the inception of construction (i.e. July, 1976) that drug and alcohol abuse are problems of national proportion and that the potential for those types of activities might exist within the Seabrook Station workforce. To that end, throughout the construction of the plant at Seabrook, NHY had in effect measures designed to deter the use of controlled substances and to detect their presence on site. However, given the magnitude of a project such as Seabrook, where in excess of 20,000 workers of varying trades labored for over eleven years, notwithstanding vigorous efforts to bar these substances, there were incidents involving alcohol and controlled substances, such as marijuana.

As such incidents occurred, management escalated the measures to detect and deter usage of drugs and alcohol. A chronological outline of the measures taken is provided in Attachment A. It should be noted that measures were, of course, supplemented by a full scale quality assurance program to ensure the integrity of plant safety, so that any work by any employee involving plant safety has been and will continue to be subject to multi-layered review.

The existing drug and alcohol program consists of several major features that include, but are not limited to, the following: search of personnel and vehicles entering and leaving the site (begun in 1980), use of dogs to search vehicles, buildings and site-related areas (begun in 1981), and drug screening of site personnel (begun in 1986). These steps are clarified in the security procedures designed to prevent the entry of drugs or alcohol into the protected area and to identify drug and alcohol abusers. NHY feels the drug prevention program has been effective and is one of the best in the industry. Where our security program has uncovered instances of drug and alcohol possession and has identified users, appropriate measures have been taken to strengthen the program and deal with the individuals in question.

The NHY "Fitness for Duty Policy" (Directive 10.0), "Use of Controlled Drugs" (Directive 10.1), and "Use of Alcoholic Beverages" (Directive 10.2) clearly state the corporate policy that drugs and alcohol have no place at the work site and will not be tolerated by NHY (part of Attachment B). This effort has been ongoing and will continue to improve since Seabrook Station is committed to implementing the Industry Sponsored Fitness For Duty Standards and has worked and will continue to work with INPO, EEI, and NUMARC on the issues.

The length to which NHY has gone to stop drug abuse at Seabrook is evidenced in the April-December 1979 NHY initiated undercover operation that was performed with the full cooperation of the New Hampshire State Police and the Rockingham's County Sheriff's Department. As a result of this, 12 people were indicted for drug sale, use, and possession on January 10, 1980 (Reference NRC Combined Inspection Report 40-443/80-01; 50-444/80-01)

In regard to your question regarding details of NHY's drug/alcohol rehabilitation program, we offer the following. As indicated in Attachment A, shortly after July, 1976 a voluntary program was started to offer workers assistance through personal counseling. In the spring of 1979, that voluntary Employee Assistance Program was recognized by Seabrook Station Management for site employees (manual and non-manual). In 1983, NHY also implemented an EAP for NHY employees. These EAP programs were established to ensure anyone who wanted help would receive it. EAP and Station Management handle each case independently, but when personnel seek help, they receive it through these programs. Under the NHY EAP, NHY personnel are removed from duty and not allowed to return to duty until they have successfully passed chemical screening testing. This program is clarified in New Hampshire Yankee Directives 10.3 and 10.4 provided as Attachment B.

Finally, regarding your request for more details regarding the identified incidents of drug/alcohol usage we offer the following. As you requested, provided in Attachments C and D are the "drug/alcohol use" summaries of NHY investigations by record type. In Attachments C and D, we have also attempted to identify the source of our information as well as the breakdowns by craft or trade.

The number of documented cases of workers in non-manual positions or "sensitive" positions being involved or terminated are very few (the breakdown by craft can be seen in Attachment C). An isolated example is the QA Inspector working for NHY for a period of 2 months until he was detected by chemical screening. In this case, the QA manager ordered a reinspection of the individual's work by qualified QA inspectors. Since Seabrook Station has an extensive system of checks and balances in place to ensure that all work on the Project is independently checked and verified several times, the work of any one individual cannot compromise the Quality Assurance System or the quality of construction. In this regard it should be noted that to date no personnel directly employed by NHY (Operators, Maintenance Services, Engineering Services, etc.) have failed the chemical screening testing.

Conclusion

In conclusion, it can be seen that an aggressive Security program has been and continues to be in place to detect and prevent drug and alcohol abuse to the greatest extent practical. Individuals who seek help get it and those who violate the Seabrook Station drug and alcohol policy, including the Fitness For Duty Policy are terminated. This policy is not new and Project rules are in place and well-known. Furthermore, when one takes into consideration the number of workmen at Seabrook from 1976 to present (i.e. over 20,000 personnel), NHY does not believe that the figures represented in Attachment C substantiate the allegations set forth by ELP nor do they reflect a compromise in the quality of construction.

ATTACHMENT A

BRIEF CHRONOLOGICAL LOG OF SEABROOK DRUG/ALCOHOL ACTIVITIES

| | |
|---|---|
| July 14th, 1976 | Project Rule #7 issued which prohibited the use of drugs and alcohol at Seabrook Station. A volunteer program based on Alcoholics Anonymous principles started shortly afterward. |
| Spring of 1979 | Employee Assistance Program (EAP) recognized by Seabrook Station management for helping employees with drug/alcohol problems |
| 1980 | Vehicle/personnel search program implemented for anyone entering Seabrook Station |
| May, 1981 | Training of Supervision on EAP (including foremen) |
| September, 1981 | Construction Management began putting greater emphasis on the EAP program for use by employees |
| December, 1981 | Implemented use of dogs to perform random drug searches at the Station |
| 1983 | NHY Employee Assistance Program established specifically for NHY personnel |
| January, 1985 | Employee Allegations Resolution Office established |
| March, 1986 | Fitness For Duty Policy established which included chemical screening, observation and training |

# FOR INFORMATION ONLY

ATTACHMENT B

New Hampshire Yankee

DIRECTIVE # 10.0
FITNESS FOR DUTY POLICY

EFFECTIVE
03/03/86

PURPOSE: To provide the NHY Fitness for Duty Policy. The NHY Fitness for Duty Program is contained in the Station Security Manual.

SCOPE: This Directive applies to all NHY personnel, contractors, or visitors (e.g., inspection agencies) who are on the property that is controlled by NHY and known as Seabrook Station.

POLICY SUMMARY: NHY is committed to providing a safe work environment that protects the health and safety of employees and the public. The operation of a nuclear plant requires that employees be trustworthy and meet strict job performance standards. Public and regulatory agency confidence in NHY's ability to fulfill its responsibilities also depends on meeting such standards. Personnel performing functions related to the construction and operation of facilities at Seabrook Station must be physically and mentally fit to safely and efficiently perform their assigned functions.

---------- REQUIREMENTS ----------

GENERAL INFORMATION:

1. All personnel at Seabrook Station shall adhere to the NHY Fitness for Duty Policy.

2. Violation of the Policy will result in denial of access to the Protected Area, and may result in disciplinary action up to and including termination of employment or denial of access to Seabrook Station.

3. All personnel entering Seabrook Station shall be subject to personal searches, vehicle searches and chemical screening.

USE OF DRUGS: Personnel entering Seabrook Station shall comply with Directive #10.1, Use of Controlled Drugs.

USE OF ALCOHOL: Personnel entering Seabrook Station shall comply with Directive #10.2, Use of Alcohol.

CONTINUAL BEHAVIOR OBSERVATION: NHY supervisory personnel shall receive initial and continuing training in Behavior Observation in order to determine the continual reliability of personnel who are authorized unescorted access to the Protected Area.

EMPLOYEE ASSISTANCE: NHY will provide confidential assistance to NHY personnel in dealing with drug and alcohol problems that may adversely affect job performance, in accordance with Directive #10.4, Employee Assistance Program.

Participation in the Employee Assistance Program does not preclude administrative action as a result of violating the Fitness for Duty Policy.

New Hampshire
Yankee

**ADMINISTRATIVE ACTION:** The appropriate Vice President or Director is responsible for taking administrative action, in accordance with Directive #10.3, against personnel who violate the Fitness for Duty Policy.

**ACCESS TO THE PROTECTED AREA:**

1. The Station Manager shall determine who is allowed access to the Protected Area.

2. Effective May 1, 1986, all personnel, prior to being authorized unescorted access to the Protected Area, shall successfully complete a chemical screening in accordance with the NHY Fitness for Duty Program.

**PROGRAM RESPONSIBILITY:** The Vice President - Nuclear Production is responsible for:

- implementation of the Fitness for Duty Program, and
- ensuring that all NHY supervisory personnel receive initial and continuing training in Behavior Observation.

E. A. Brown, President and CEO

2/25/86
Date

New Hampshire Yankee

DIRECTIVE #10.1

USE OF CONTROLLED DRUGS

EFFECTIVE 03/03/86

**PURPOSE:** To provide the NHY policy regarding the use, possession, or sale of controlled drugs.

**SCOPE:** This Directive applies to all NHY personnel, contractors or visitors who are on the property that is controlled by NHY and known as Seabrook Station.

**POLICY:** The illegal sale, use or possession of any controlled drug by an NHY employee, contractor or visitor while either at Seabrook Station or in an NHY vehicle or while assigned to NHY duty shall be cause for termination of employment or denial of access to Seabrook Station.

The sale of any controlled drug by an NHY employee or contractor while off-duty shall be cause for suspension or termination of employment or denial of access to Seabrook Station.

The illegal use of a controlled drug by an NHY employee or contractor while off-duty (other than any drug legally prescribed for use by the individual) may be cause for suspension or termination of employment or denial of access to Seabrook Station if such use could reasonably be expected to adversely affect:

1. the individual's job performance, or
2. public or regulatory confidence in NHY to effectively carry out its public service responsibilities.

DEFINITION: The following shall be considered to be controlled drugs:

1. Amphetamines
2. Hallucinogenic/psychotropic drugs
3. Heroin and morphine-based drugs
4. Barbiturates
5. Cannabis-based drugs (e.g., marijuana, hashish, THC)
6. Cocaine
7. Other controlled stimulants or depressants
8. Prescription drugs
9. Any drug for which the use, possession or sale is considered to be a violation of criminal law.

PRESCRIBED DRUGS: An employee using a drug that has been prescribed by a licensed physician for personal use shall report the use of that drug to his immediate supervisor if such a drug might reasonably be expected to impair that employee's ability to perform any duties of the job to which assigned.

SEARCH AND SCREENING: All personnel entering Seabrook Station may be subject to personal search, vehicle search and chemical screening. The refusal to participate in such search and screening shall be grounds for denying access and for suspension or termination of employment.

Personnel who require unescorted access to the Protected Area shall successfully complete a chemical screening prior to being authorized such access.

Law enforcement officials will be notified whenever illegal drugs are found at Seabrook Station.

EMPLOYEE ASSISTANCE: NHY will provide confidential assistance to NHY personnel in dealing with drug problems that may adversely affect job performance, in accordance with Directive #10.4, Employee Assistance Program.

OTHER CONSIDERATIONS: Supervisors are responsible for enforcing this policy and for reporting to other appropriate levels of supervision any activities that are prohibited herein.

E. A. Brown, President and CEO

2/25/86
Date

FOR INFORMATION ONLY

New Hampshire Yankee

DIRECTIVE #10.2
USE OF ALCOHOLIC BEVERAGES

EFFECTIVE 03/03/86

PURPOSE: To provide the NHY Policy regarding the use, possession, or sale of alcoholic beverages.

SCOPE: This Directive applies to all NHY personnel, contractors, or visitors who are on the property that is controlled by NHY and known as Seabrook Station.

POLICY: The sale, use, or possession of an alcoholic beverage by an NHY employee, contractor or visitor while either at Seabrook Station or in an NHY vehicle or while assigned to NHY duty at Seabrook Station shall be cause for suspension or termination of employment, or denial of access to Seabrook Station.

The use of an alcoholic beverage by an NHY employee or contractor while off-duty may be cause for suspension or termination of employment or denial of access to Seabrook Station if such use could reasonably be expected to adversely affect:

1. the individual's job performance, or
2. public or regulatory confidence in NHY to effectively carry out its public service responsibilities.

DEFINITION: The following shall be considered alcoholic beverages:

1. Distilled and rectified spirits
2. Wines
3. Fermented and malt liquors and ciders
4. Beer, lager beer, ale, porter, stout
5. Any other liquid containing one percent or more of alcohol by volume and not more than six percent of alcohol by volume at 60° Fahrenheit.

EMPLOYEE ASSISTANCE: NHY will provide confidential assistance to NHY personnel in dealing with alcohol problems that may adversely affect job performance in accordance with Directive #10.4, Employee Assistance Program.

SEARCH AND SCREENING: All personnel entering Seabrook Station shall be subject to personal search, vehicle search and chemical screening. The refusal to participate in such search and screening shall be grounds for denying access and for suspension or termination of employment.

Personnel who request unescorted access to the Protected Area shall successfully complete a chemical screening prior to being authorized such access.

OTHER CONSIDERATIONS: Supervisors are responsible for enforcing this policy and for reporting to other appropriate levels of supervision any activities that are prohibited herein.

E. A. Brown, President and CEO

2/25/86
Date

FOR INFORMATION ONLY

New Hampshire Yankee

DIRECTIVE #10.3
FITNESS FOR DUTY: ADMINISTRATIVE ACTION

EFFECTIVE 03/03/86

PURPOSE: To provide the NHY Policy concerning the Administrative Actions that will be taken when an individual violates the Fitness for Duty Policy.

SCOPE: This Directive applies to all NHY personnel, contractors or visitors who are on the property that is controlled by NHY and known as Seabrook Station.

TESTING: Drug testing shall be performed during all pre-employment and annual physicals and prior to the granting of unescorted access to the Protected Area.

Drug testing may be performed randomly on any individual at Seabrook Station in accordance with the Fitness for Duty Program.

Drug or alcohol testing may be performed for cause anytime an individual is suspected of being under the influence of alcohol or involved with illegal drugs.

Individuals have the right to refuse to submit to drug or alcohol testing. Refusal to take either a drug or alcohol test shall result in the same Administrative Action as a test failure.

- Drug Testing - A positive drug confirmation requires that both an Enzyme Multiplied Immunoassay Technique (EMIT) test and a Gas Chromotography/Mass Spectroscopy (GS/MS) test confirm a value that exceeds the Fitness for Duty Program limits provided in the Station Security Manual.

- Alcohol Testing - A positive alcohol confirmation requires that a blood analysis confirms a value that exceeds the Fitness for Duty Program limits provided in the Station Security Manual.

ACTION: 1. Sale, Use or Possession of Alcohol or Drugs at Seabrook Station

Visitors who sell, use or possess alcohol or drugs shall be immediately escorted from Seabrook Station.

When a NHY or contractor employee sells, uses or possesses alcohol or drugs at Seabrook Station, the appropriate Vice President/Director shall immediately:

- suspend a NHY employee without pay, or

- inform the senior contractor personnel on site to remove the contractor employee from Seabrook Station.

ACTION: 2. Pre-Employment Testing

Any individual showing positive on a drug or alcohol test shall not be hired by NHY or by contractors.

3. Initial, Periodic, Random or "For Cause" Drug or Alcohol Testing

(These actions are illustrated in Figure 1)

When any individual fails a drug or alcohol test, the appropriate Vice President/Director shall immediately:

- suspend a NHY employee without pay, or
- inform the senior contractor personnel on site to remove the contractor employee from to Seabrook Station.

4. NHY Employees

NHY employees violating the NHY Use of Alcohol Policy shall be referred to the Employee Assistance Program and may be returned to duty at the discretion of the appropriate Vice President/Director.

NHY employees who fail the drug testing shall be referred to the Employee Assistance Program and shall undergo retesting within 7 days of the suspension and, if necessary, at 14 and 21 days. An individual passing the tests at one of these intervals may return to work at the discretion of the appropriate Vice President/Director with the knowledge that a 3 year random drug testing program will be imposed. Failure of the tests at the 7, 14, and 21 day intervals shall be cause for termination of employment at the discretion of the appropriate Vice President or Director.

A second violation of the Fitness for Duty Policy shall result in termination of employment.

5. Contractor Employees

A contractor employee who violates the NHY Use of Alcohol Policy may return to work at the discretion of the appropriate Vice President/Director after a 30 day suspension.

A contractor employee who violates the NHY Use of Controlled Drugs Policy may return to work at the discretion of the appropriate Vice President/Director after a 30 day suspension and satisfactory completion of the drug testing. Such individuals will be subject to a 3 year random drug testing program.

A second violation of the Fitness for Duty Policy will result in the individual being denied access to Seabrook Station.

E. A. Brown, President and CEO

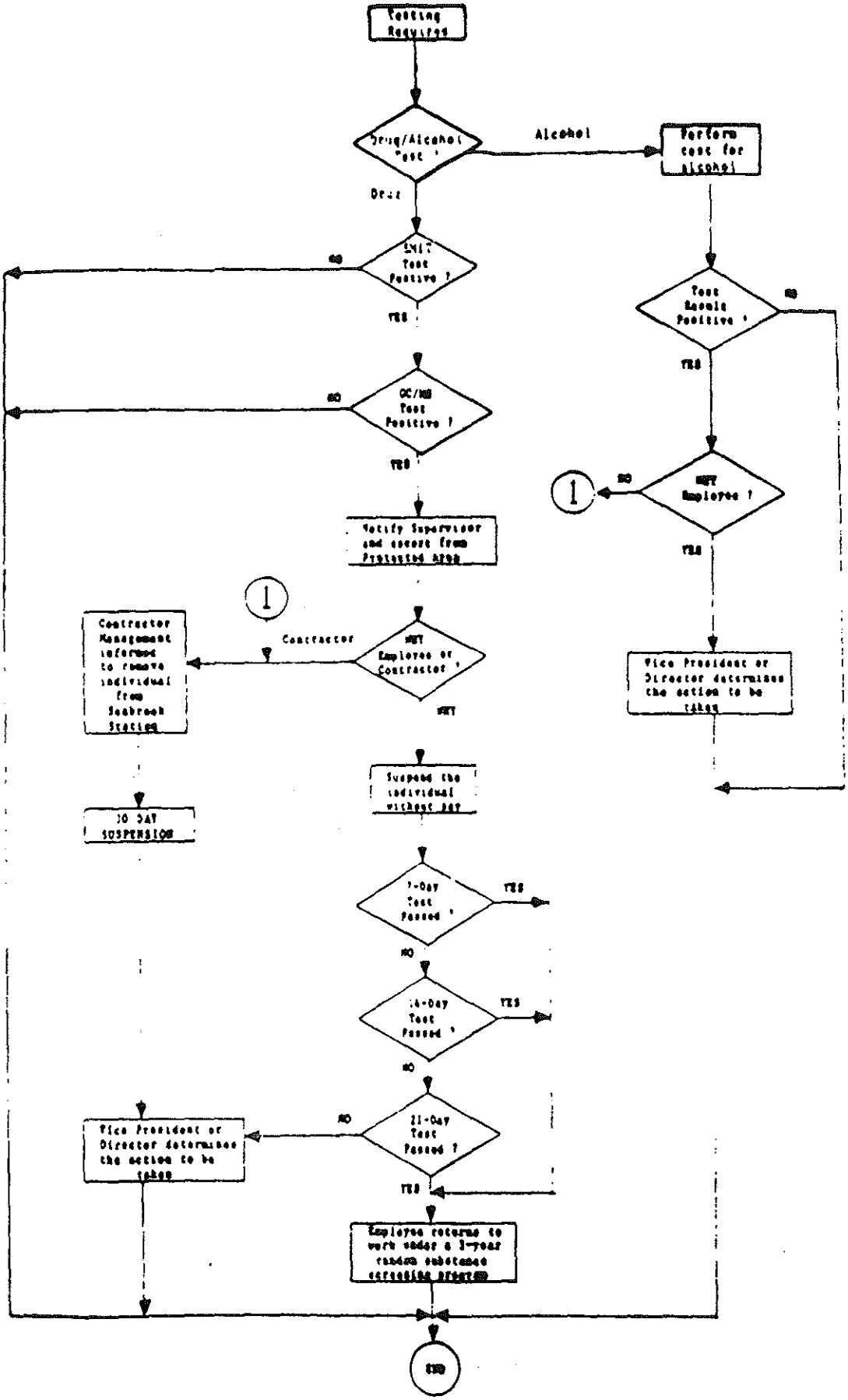
2/25/86
Date

New Hampshire Yankee

DIRECTIVE #10.3
FITNESS FOR DUTY: ADMINISTRATIVE ACTION

EFFECTIVE
03/03/86

FIGURE 1



FOR INFORMATION ONLY

New Hampshire Yankee

DIRECTIVE #10.4

**EMPLOYEE ASSISTANCE PROGRAM**

**EFFECTIVE**
03/03/86

**PURPOSE:** **To establish the NHY Employee Assistance Program and inform employees of the help that it can provide in resolving personal problems.**

**SCOPE:** **The Employee Assistance Program is committed to helping any employee of NHY or a member of an NHY employee's immediate family who desires help in dealing with:**

- **emotional or mental distress,**
- **alcohol or drug problems,**
- **marital or family difficulties, and**
- **financial or other personal problems.**

PARTICIPATION: Participation in the Employee Assistance Program is voluntary. All requests and referrals are held in strict confidence. An employee's job security and opportunities for promotion are not jeopardized by these requests and referrals.

Employees who are having difficulties coping with a personal problem or troubled situation are encouraged to use this program.

The Employee Assistance Program provides initial problem assessment and subsequent referral to appropriate counseling and professional services. Locations and time of appointments will be made in accordance with the employee's schedule and needs.

When the employee health care program does not cover the service, employees will be referred, whenever possible, to services that can be paid for on a sliding fee scale.

NHY employees may make an appointment with the Employee Assistance Program Administrator by calling 83-2565 or 622-3842. The latter phone number can accomodate a confidential message 24 hours a day.

RESPONSIBILITY: The Director of Managemment Control is responsible for ensuring that all NHY employees are made aware of the Employee Assistance Program and to periodically evaluate the Program to ensure that it is responsive to employee needs.

E. A. Brown, President and CEO

2/25/86
Date

ATTACHMENT C

## Types Of Personnel And Medical Records

## Reviewed And Statistics Associated Thereof

| | Total Records Reviewed | Records That Contain References To Drugs Or Alcohol |
|---|---|---|
| 1. UE&C files on manual employees (craftsmen) that were determined ineligible for rehire covering the period 1978 thru 1983. Although only UE&C subcontractors hired craftsmen during this period, the files encompass the total population of craftsmen determined ineligible for rehire based on circumstances of termination through end of 1983. | 716 | 117 |
| 2. UE&C files on terminated manual employees covering the period 1984 to present. At the start of this time period, all subcontractors to UE&C were eliminated and UE&C assumed the hiring, payroll and records responsibilities | 6800 (includes "rampdowns" in site craftsmen) | 26 |

NOTE: Record types 1 and 2 above include all manual labor used on the site from 1978 to present with the exception of lump sum contracts labor, which although small in terms of overall numbers, could not be estimated in the time available.

| | | |
|---|---|---|
| 3. 1986 chemical screening process failures which resulted in denial of access to Unit 1 protected areas | 5300 | 136 |
| 4. UE&C non-manual files (supervisors, QA/QC personnel, engineers, etc.) covering the period since onset of site work (7/14/76) thru present. These files do not include non-manuals associated with UE&C subcontractors for the 1976 through 1983 time period. Those records are the property of the various subcontractors and are not available to NHY. | 3400 (includes "rampdowns" in site workforce) | 10 (1 rehabilitated and rehired) |

## Types Of Personnel And Medical Records

## Reviewed And Statistics Associated Thereof

| | Total Records Reviewed | Records That Contain References To Drugs Or Alcohol |
|---|---|---|
| 5. Medical records associated with Workman's Compensation Claim files covering the time period of 1976 thru present. This review encompassed all individuals that reported to the site (UE&C) first-aid station and were referred to any off-site medical practice or facility. UE&C handled all non-PSNH Workman's Compensation related insurance carrier claims throughout this period. | 10,607 | 44 |

NOTE: Further broken down the 44 Workman's Compensation case files, that involved mention of drugs or alcohol, many of which are unsubstantiated by objective medical testing, appear as follows:

| | | |
|---|---|---|
| a.) | Exeter Area Hospital Emergency Room Reports | 8 |
| | (Note: These are the 8 instances referred to by Mr. E. A. Brown on 11/7/86 and represent the full extent of NHY investigation as of that date.) | |
| b.) | Notes, by various attending physicians in Workman's Compensation Follow-Up Reports | 5 |
| c.) | Exeter Clinic progress reports same day as site-related injury | 3 |
| d.) | Exeter Clinic progress reports one or more days after the site-related injury | 4 |
| e.) | Notes in UE&C investigation reports (UE&C conducted a backup investigation for all 10,607 Workman's Compensation Claims) | 7 |
| f.) | Individuals terminated due to events unassociated with the on-going and incomplete Workman's Compensation Claim (all for violation of Project Rule #7) | 3 |
| g.) | Records of testimony: New Hampshire Department Of Labor Decisions | 3 |

## Types Of Personnel And Medical Records

## Reviewed And Statistics Associated Thereof

| | Total Records Reviewed | Records That Contain References To Drugs Or Alcohol |
|---|---|---|
| h.) Notes made by attending physicians that made reference to the injured employee's previous medical history which, although not directly related to the injury, established historical reference | | 11 |
| Total Workman's Compensation Files That Involved Mention Of Drug Or Alcohol | | 44 |

The 44 case files conservatively represent less than 0.25% of the total on-site workforce (greater than 20,000 individuals) over the 1976 to present time frame.

$$\left[ \frac{44}{20,000} \times 100 = 0.22\% \right]$$

ATTACHMENT D

Craft/Trade Breakdown

A. Ineligible for Rehire files

| | |
|---|---|
| Painters | 1 |
| Carpenters | 22 |
| Laborers | 32 |
| Iron Workers | 32 |
| Pipe fitters | 15 |
| Electricians | 9 |
| Machine Operators | 4 |
| Truck Drivers | 2 |
| Total | 117 |

B. UE&C Manual Workers Termination

| | |
|---|---|
| Painters | 4 |
| Carpenters | 4 |
| Laborers | 5 |
| Iron Workers | 2 |
| Pipe fitters | 5 |
| Insulators | 3 |
| Electricians | 1 |
| Welders | 1 |
| Surveyors | 1 |
| Total | 26 |

C. UE&C Non-Manual Terminations

| | |
|---|---|
| Clerical | 3 |
| Safety | 1 |
| Drafter | 1 |
| QA Engineer | 2 |
| Craft Supv. | 1 |
| Engineer* | 2 |
| Total | 10 |

* 1 office Engineer underwent rehabilitation and was rehired.