CONSTRUCTION PROJECT EVALUATION

OF MILLSTONE STATION 3

(OBSERVATIONS)

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December 21, 1982

MANAGEMENT ANALYSIS COMPANY

TABLE OF CONTENTS

OBSERVATION
OF
AREA I, II AND III MEETINGS

I. SCOPE

Observe Area I, II and III weekly meetings held at Stone & Webster (S&W) Site Construction Office Conference Room.

II. OBSERVATION

A. Area I Meeting - Chaired by the Chief Construction Engineer for Area I. Cognizant NUSCO individual and SWEC General Superintendent of Construction were present.

1. Expediting updated delivery dates of Boston-purchased and site-purchased materials and equipment. The Chief Construction Engineer was questioned regarding expediting on promised delivery date slippage of certain items. Expediting stated they would visit problem vendors.

2. Engineering updated Boston and site outstanding engineering items. An asterisk was placed by each item that needed immediate attention. These items are now getting appropriate attention.

3. A very good detailed review and update of the schedule was reported by the discipline superintendents.

4. Quantities and cost were reviewed by the Cost Department. Discipline supervisors discussed some activities where possible mischarges occurred. Cost Department is not receiving time cards to keep the cost report to date.

B. Area II Meeting - Included representatives of S&W and NUSCO, and served mostly as an interface between Area II supervision, Site Engineering, Cost and Planning and client.

1. Assistant Superintendent for Area II was not able to attend and the meeting was chaired by the area engineer. The General Superintendent of Construction was present.

2. The minutes for the previous meeting, provided the participants in advance, served as the agenda.

3. The meeting followed the previous minutes except in a few cases of missing or late participants.

4. Participants came in and left the meeting in an orderly fashion.

5. Participants automatically gave their presentations in the order of the minutes with very little prompting from the chair.

C. Area III Meeting - Area Superintendent and General Superintendent of Construction were present for the entire meeting. No one representing the client appeared to be present.

1. The meeting proceeded smoothly working through an established routine. Critical areas in purchasing and engineering were addressed by personnel from those departments.

2. The area superintendent assigned specific responsibilities and actions.

3. The subcontractor personnel present (T.V.S. and NEVCO) were fully cognizant of their responsible areas.

4. The meeting lasted approximately one hour.

5. The piping supervisor was not available for the meeting and the area superintendent did not appear to have detailed knowledge of piping activities.

III. CONCLUSION

The meetings were all conducted in a very orderly manner with all participants well prepared.

OBSERVATION
OF
ELECTRIC CABLE SCHEDULE INFORMATION SYSTEM

I. SCOPE

To understand how the Electric Cable Schedule Information System (ECSIS) and Construction are integrated.

II. OBSERVATION

A. ECSIS is a computer-based tool that determines the routing, size and quantity of raceway and determines the routing of cables.

B. The hard copy output is a series of reports that list raceway, equipment and cables in any format that the user may require. In addition, ECSIS generates raceway tickets, cable pull tickets and conductor termination sheets.

C. The tickets and sheets provide information to construction, provide management a means of tracking construction and provide a means of integrating construction and Field Quality Control (FQC).

D. The tickets are printed in Boston and sent to the site ticket coordinator.

E. The areas request that tickets be released.

F. The site ticket coordinator releases the white copy and two others to construction and the yellow copy to FQC.

G. FQC files their yellow copy.

H. After construction has completed the work, the signed white copy is returned to the site ticket coordinator who then sends the white copy to FQC.

I. After FQC completes their inspection, FQC returns the signed white copy to the site ticket coordinator.

J. Each time the site ticket coordinator receives the white ticket, the status of either the raceway, cable or termination is updated on the computer. For example: issued to construction, installed, installed and inspected. The ECSIS reports are issued weekly.

K. ECSIS does not get involved with hangers.

III. CONCLUSION

ECSIS is an excellent vehicle for keeping track of raceway, cable and termination information. Two very valuable aspects of ECSIS are the status column and the weekly reports.

OBSERVATION OF CONCRETE PLACEMENT

I. SCOPE

Observe concrete being placed in the waste disposal building, concrete placement No. C-9032 south wall elevation 24'-6 to 43'-6 (19'-0 lift).

II. OBSERVATION

A. Preplacement inspections of rebar, embedments and formwork were made by the cognizant engineers and FQC. Each of the engineers/QC inspectors signed the placement "ticket" prior to ordering the concrete.

B. Temperature, slump and air-entrainment tests plus the required record cylinders were made at both the truck and pump line discharge points in accordance with the project requirements.

C. Bottom of 19'-0 lift could not be observed since there was no lighting within the forms.

D. FQC could not answer query regarding liquid head capacity of formwork.

E. Air-entraining test equipment utilized by FQC was tested and calibrated by user himself.

F. Vibrators were used to transport concrete between deposition points at bottom of "elephant trunks". The five-foot transport distance specified by procedure was exceeded.

G. Vibrators were not "certified" as meeting specification requirements.

H. Standby carpenters were not available during initial deposition (grout, plus two 18" layers) approximately 3'-0.

III. CONCLUSIONS

A. Adequate lighting within the formwork should be provided so that inspection for cleanliness, disposition of grouts and concrete can readily by observed.

B. Placement crews should receive additional training with regard to specification requirements of placement, consolidation and the use of vibrators.

OBSERVATION OF RIGGING OF PIPE SEGMENT

I. SCOPE

Lifting 12 ton, 30" diameter, 41'-0 long fabricated pipe segment from elevation 51'-4 (construction building, operating floor) and placing it on supports fastened to crane wall at elevation 93'-6.

II. OBSERVATION

A. Rigging crew foreman directed choker placing, lifting, replacing and relifting of segment off supporting dunnage until the pipe moved upward in a level position without rotating.

B. Each end of the segment was tied off with guide lines as the pipe was carefully raised and guided between the steam generator and pressurizer until it reached the desired elevation.

C. Chain falls, attached to crane wall, were used to transfer load from polar crane.

III. CONCLUSION

The expertise of the rigging crew foreman was apparent during each movement of the segment. He maintained complete control of each worker's movement and activity.

OBSERVATION OF SITE SAFETY TOUR

I. SCOPE

Observe Site Safety Committee tour.

II. OBSERVATION

A. Tour was conducted by the safety supervisor, electrical supervisor, welding supervisor (two), QC inspector, boilermaker steward and safety supervisor.

B. When walking into a building, it was observed that a fire hydrant and hose station was completely blocked for access by rebar stored around.

C. While touring the different buildings (auxiliary building, diesel building, fuel building, reactor building), comments were made where housekeeping needed improvement, crafts working in situations where safety belts were needed, where craftsmen were using and working on ladders not tied down, electrical cords, weld leads and hoses were not being strung up off the floors.

D. The one-hour tour provided the safety supervisor with an overview of areas that need improvement.

III. CONCLUSION

The intent of the tour was to obtain material for the weekly Construction Safety Meeting and this was accomplished.

OBSERVATION OF SMALL BORE PIPE FABRICATION SHOP

I. SCOPE

Observe small bore fabrication shop.

II. OBSERVATION

A. The shop layout was well planned to provide a good production environment.

B. The shop supervisor's office was equipped with drawings and specifications to meet job requirements.

C. Fabrication booths were properly equipped with tools and equipment, adequate working space, good lighting and proper weld flash screens.

D. Piping material was stored on dunnage or in racks outside the shop. The shop also housed a material room for issuing elbows, valves, etc.

E. The pipe bending machine setup works very efficiently for cost savings of welding joints. This is highly productive.

F. The finished fabricated sections are marked with proper identification and stored in metal racks and properly arranged to allow withdrawal of items sufficiently.

III. CONCLUSION

Fabrication of spool pieces meets construction needs and schedule.

OBSERVATION OF CABLE TERMINATIONS

I. SCOPE

Observe cable terminations, second shift, switchgear room and control building.

II. OBSERVATION

A. There are only three electricians assigned to cable terminations on the second shift.

B. On October 21, 1982 these individuals were terminating control cables in two cubicles of a switchgear assembly.

C. The second shift starts at 4:30 p.m. and from 4:30 p.m. to 6:00 p.m. the electricians were in the process of getting set up: ladders, trouble lights, tools, paper work, etc.

D. All calibration stickers on crimping tools were current.

E. The foreman was very active in tracking down proper routing information that had been pulled incorrectly by the pulling crews.

F. The foreman said that his men had no training and he did not know of any documents that covered cable terminations. (Specification 350 covers control cable termination and there is a training program available.)

G. FQC inspected terminations and found some unsatisfactory.

III. CONCLUSION

Training of foremen and electricians responsible for terminating cable should be provided prior to activity start.

OBSERVATION OF CATEGORY I WELD FIT UP

I. SCOPE

Fit up of Category I weld on HVK.003.101-3 Service Water Piping System - elevation 23'-6. Reference: Dwg EB-39 P-3.

II. OBSERVATION

A. Four-man fit-up crew aligned vertical riser with elbow in accordance with procedures. This operation required approximately one hour.

B. When both the senior fitter and welder were satisfied with both the plumbness and identification alignment, this joint was tack welded and placed on hold for FQC inspection in accordance with the hold points defined in the weld data package.

C. Both the weld data package and the welding process procedure were complete. WPP W-3171, slits one to seven were validated for this date (October 25, 1982).

III. CONCLUSION

The crew foreman, welder and the fit-up crew were aware of the project procedures regarding the fitting up and welding of Category I piping systems. They were proceeding to each hold point, as required, and were following project procedures.

OBSERVATION OF ELECTRICAL GROUNDING INSTALLATION

I. SCOPE

Observation of grounding in area around Boron recovery tanks, area between Boron recovery tanks, and reserve auxiliary transformers.

II. OBSERVATION

A. Areas around Boron recovery tanks, between Boron recovery tanks, and reserve auxiliary transformers were being backfilled the entire week of October 18 to October 22, 1982.

B. On October 21, the backfill operation had come up to approximately 30" below grade.

C. Laborer's foreman coordinated with electrician's foreman and electricians installed ground cable per drawings.

D. Connections were compression type using "T&B" material.

E. Electricians performed grounding installations in full compliance with field procedures.

F. When electricians were through installing ground cable, foreman inspected their work and notified laborer's foreman that he may continue.

III. CONCLUSION

Grounding process is efficient, accurate and of high quality.

OBSERVATION OF IN-PLACE DENSITY TEST

I. SCOPE

Observe quality control conduct in-place density test of Category III structural backfill.

II. OBSERVATION

A. FQC Level 1 inspector performed in-place density test of Category III structural backfill in area adjacent to service building.

B. After inspector took sample, he returned to laboratory to complete the test.

C. Completion of test involved weighing samples, weighing test bottle, baking sample and weighing baked sample.

D. Calculations indicated that the compaction was 96.5 percent. The specification (967) calls for a minimum of 95 percent.

E. Inspector recorded area elevation in accordance with procedure.

F. Test equipment was all in calibration.

G. Coordination between FQC and construction was very good. The specification calls for 12" lifts and inspections on every other lift.

H. A backfill ticket was passed back and forth between construction and FQC as the work progresses and FQC inspects the appropriate lifts.

I. Inspector did not know the numbers of the quality standards and QA directives that he was working to.

J. Inspector has worked at site 13 months. He was originally hired just to work in the laboratory but through in-house training he has been elevated to inspector. He has had previous construction (non-nuclear) experience.

K. Inspector stated he was reevaluated yearly.

III. CONCLUSIONS

A. Very efficient testing program was being applied.

B. Coordination between FQC and construction is excellent and provides for good utilization of manpower.

OBSERVATION OF CONSTRUCTION FACILITIES AND EQUIPMENT

I. SCOPE

Observe warehouses 1, 4, 5 and 6 for level A and B stored items.

II. OBSERVATION

A. All warehouses observed had controlled access.

B. Level A storage area was environmentally, controlled and properly maintained.

C. Adequate fire protection met requirements and facilities were clearly identified and areas were clear for easy access.

D. Proper equipment was available for receiving, storage and issuing materials.

E. Nonconforming materials were tagged and placed in a segregated area. Some cases exist where an item is too large for the area and cannot be placed in the area.

F. Materials were neatly placed in marked bins and housekeeping was good.

III. CONCLUSIONS

A. Facilities for equipment storage are adequate and satisfy industry requirements.

B. Material and equipment is properly stored and identified.

OBSERVATION OF S&W SITE DOCUMENT CONTROL CENTER (DCC)

I. SCOPE

DCC personnel were interviewed and work efforts observed and discussed. Logs and records were reviewed and discussed.

II. OBSERVATION

A. All incoming mail to S&W on site is processed and distributed through DCC. Document receipt checklists verify receipt of major records such as drawings, specifications and manuals; logs and master files of these documents are maintained. One major category of documents (QA records) is not logged or maintained by DCC. The site QA organization maintains all files and documents in this area.

B. A records type list developed by S&W and approved by NUSCO defines project records types, retention, cognizance, final dispostion, etc. With some exceptions, the DCC cannot determine if they are receiving all of the available records on a given type.

C. With the exception of QA records, the DCC is currently capturing documents for eventual filming and entry into the S&W computerized file search and retrieval system where this responsibility has been assigned to S&W per the Project Records Type List. The DCC is depending upon the QA organization to eventually return all QA records to the DCC for filming and entry into computer system.

D. There is no specific schedule to ensure the complete turnover of records to NUSCO to support the planned overall project schedule.

III. CONCLUSIONS

A. The site DCC appears to be functioning effectively to receive and distribute material forwarded to the site. Procedures appear to be effective to ensure drawings, specifications and manuals are complete and up-to-date in master files as well as work sites.

B. With some exceptions (e.g., drawings, specifications, manuals), the DCC cannot ensure that all material of a given type has been received and processed or that all records have been captured for long-term storage and retrieval.

OBSERVATION
OF
PIPE HANGER FABRICATION SHOP

I. SCOPE

Observe of the general layout and operation of the pipe hanger fabrication shop.

II. OBSERVATION

A. The fabrication shop is located in one corner of warehouse 6 and is separated from the main warehouse by corregated metal wall panels which enclose a 150 ft. by 40 ft area.

B. On the exterior wall of the pre-engineered metal warehouse building is a rolling metal door to the stock material storage area. Also located on this wall are large exhaust fans to remove weld fumes.

C. In one corner of this shop is the enclosed office where the construction supervisor maintains his files, drawing racks and prepares "cut" sheets that are given to the shop pipefitters to cut material for pipe hangers.

D. All hanger material pieces are banded together, palletized, and stored in the fabrication shop end of the main warehouse. The pallets are stored on purchased steel racks up to four levels high.

E. The shop itself is well organized with metal burning tables, power saws, job cranes, clean, well lighted and apparently very productive.

F. Manning level was eight men.

G. The outside stock maintenance storage area was on a concrete slab with an 8' cyclone fence enclosing an area of about 20 ft. by 100 ft. Material was orderly on dunnage or in steel maintained racks. All material is classified as Category I whether used in Category I areas or other areas. This is to prevent misuse of nondocumented materials in Category I areas.

H. Oxygen and gas is piped into the building from main supply headers.

I. Material inventory is monitored to prevent shortages of shapes, etc. for all hanger requirements. Square tube material is used extensively for pipe hangers throughout the building.

J. The fabrication shop supervisor indicated that the shop is working very well. He can keep well ahead of field erection requirements.

K. Material heat numbers and hanger identification numbers are stencilled clearly into the hanger components.

III. CONCLUSION

A. The pipe hanger fabrication shop is well organized and functional.

B. Hanger material is cut and bonded into hanger packages for ease of assembly in the field.

OBSERVATION OF SITE QA RECORDS VAULT

I. SCOPE

The QA records vault at the site was inspected and cognizant S&W personnel were interviewed.

II. OBSERVATION

A. The records vault is considered to be of sufficient size if planned records filming is completed on a reasonable schedule.

B. A large quantity of radiographs are presently stored on shelves (in envelopes with paper separators) rather than more secure and orderly filing in metal file cabinets preferred by ANSI 45.2.9; a question has arisen on Mylar versus paper separators.

C. The vault has no positive control features for environmental control. A branch ventilation duct from the general office areas around the vault is provided for heating and cooling but S&W advised that there is no dedicated thermostat for the vault. Dehumidifiers are available inside the vault and are run extensively. Temperature and humidity are logged once each working day by vault personnel. There are no temperature or humidity indications without entering the vault. No precautions such as smoke detectors and alarms are in use.

D. The adequacy of the site QA vault, including the need for duplicate records and environmental controls were the subject of S&W home office QA audits at the site (site audits 22 and 23) in 1980. These issues have been resolved to the satisfaction of S&W home office on the basis that the vault has been accepted by NRC as meeting the intent of ANSI 45.2.9 and because dehumidifiers added to supplement available HVAC systems for humidity control appear to be functioning in an acceptable manner. Although vault humidity has exceeded the recommended 40 to 50 percent level for film storage, S&W considers that levels as high as 55 percent are acceptable based upon discussions with film suppliers.

III. CONCLUSIONS

A. Not all radiographs are being stored in metal cabinets, the preferred storage approach per ANSI 45.2.9.

B. Although the records vault appears to meet the minimum requirements of ANSI 45.2.9 and has been accepted by NRC and S&W QA management, the adequacy of environmental control features appears to be marginal.

OBSERVATION OF S&W CALIBRATION LABORATORY

I. SCOPE

Observe the actions of the S&W calibration laboratory personnel as they take an imaginary piece of M&TE and integrate it into their program. Observe the physical laboratory itself, storage areas and environmental control.

II. OBSERVATION

A. The senior technician (FQC inspector) was able to assign a unique M&TE number for the imaginary tool. He described that it would be permanently scribed on the tool.

B. Both technicians were able to describe the preparation of a file folder with history card and the use of that folder to track tool use and recalibration while in the program.

C. Both technicians could have issued the tool with the proper paper work and both explained how their "issue slip" tracking system worked.

D. Review of a current folder showed proper paper work with follow-up for a tool that was returned out of tolerance.

E. Laboratory space was adequate and outfitted with working standards that are calibrated by outside organizations to NBS standards.

F. Temperature and humidity log was readily available and was current and within the specified limits. Lighting was good.

G. Office space next to the laboratory was tight but efficiently organized. Files and records were readily available.

H. All recalibrated tools were in a locked cabinet labeled "ready for issue" in a Class "A" storage area. Approximately 95 percent of the M&TE is in the field at any given time.

I. A Class "B" storage area existed for tools in storage prior to calibration or tools that were scrapped.

J. New gauges were in to support the upcoming hydro program.

K. The technician in training was not allowed to sign any recalibration data unless the senior technician countersigned. The senior technician has six years navy training in this field.

L. A review of the overdue file showed three pieces of M&TE still out and was informed that proper overdue paper work had gone out to these people as well as verbal contact. The most overdue date was October 11, 1982 (today being the 20th) for equipment issued to electricians.

III. CONCLUSIONS

A. The S&W calibration laboratory is adequately staffed and outfitted to maintain the M&TE program on site.

B. The two technicians are aware of their duties and carry them out satisfactorily.

C. No problems were witnessed at this time that violated the calibration manual guidelines that control the laboratory.

OBSERVATION OF FQC RECEIPT INSPECTION

I. SCOPE

Observe FQC receipt inspection of a Category II vessel.

II. OBSERVATION

A. In warehouse 2, observed the inspection of a demin water storage tank.

P.O. No.: 225.930-060-14
Tag No.: 3 LWS Demin 2
Vendor: Illinois Water Treatment

B. The warehouse inspector explained the receipt inspection process for this particular piece of equipment. The inspector was fully conversant in all aspects of receipt inspection when posed with different possible situations.

C. Numerous personnel were not wearing hard hats.

D. The inspector was familiar with the receipt inspection training program.

III. CONCLUSIONS

A. The QC receipt inspector was well versed in the procedures necessary to perform receipt inspection.

B. Safety practices should be improved in the warehouse area.

OBSERVATION OF HILTI BOLT INSTALLATION

I. SCOPE

Observe QC monitoring the torquing of Hilti bolts used for anchoring surface mounted support plates.

II. OBSERVATION

A. On elevation 24'-6" of auxiliary building 410, a surface mounted plate was being anchored onto the concrete ceiling using four 1" diameter hilti bolts. The plate was identified as DSA-232 and the reference installation drawing was 545-B.

B. QC was present to witness the torquing of the Hiltis to a specified value of 200 ft. lbs.

C. The torque wrench being used was supplied by NEVCO and was identified by an inscribed number 05397. The last calibration date identified on the wrench was August 31, 1982 with a recalibration due date of October 31, 1982.

D. The QC inspector first proceeded to verify the nuts were untorqued. He then confirmed the torque wrench setting and watched the dial gage as the NEVCO craftsman proceeded to apply torque.

E. After several attempts to torque the bolts, it became obvious that the torque wrench was defective (i.e., the dial gage did not register even after several attempts to apply significant torque).

F. The QC inspector indicated that this was only the second time in over a year that he had encountered a defective tool used for QC activities.

G. The torque wrench was immediately taken to the S&W calibration laboratory where the QC inspector requested confirmation by the test laboratory technician that the tool was defective. The laboratory is a restricted area so the check could not be witnessed; however, the technician report backed that the tool was defective; the dial gage did register but the reading was low.

H. When asked what the calibration laboratory did next, the technician stated the wrench would first be evaluated to determine if it could be repaired. If not, it would be scrapped.

I. The QC inspector stated that his next step was to issue an inner office communication (IOC) identifying the defective tool and initiate an investigation to identify previous uses of this wrench since its calibration date. The inspector stated that any bolts identified would have to be retorqued.

J. The inspector then returned to the work location, a new torque wrench was provided by NEVCO, and the torquing activity resumed.

K. The inspector indicated since joining QC over a year ago, he had received extensive training. Prior to this job, the inspector worked about five years at NUSCO in the QC field.

III. CONCLUSION

The QC inspector was well versed in the procedures to follow in performing his duties, including what to do if a defective tool is encountered.

OBSERVATION OF CONTROLLED COMPACTED FILL

I. SCOPE

Observe controlled compacted fill in reserve transformer area, Boron recovery tank area and area adjacent to auxiliary building.

II. OBSERVATION

A. On October 18 and 19, backfill was being placed in the reserve transformer area, the Boron recovery tank area and in an area adjacent to the auxiliary building.

B. The backfill foreman stated that he is told what areas to work by the area supervisors. He knows what his lifts are by looking at the prints or he gets the information from area supervisors.

C. The FQC inspector, who does backfilling inspections, stated that construction calls FQC when an area is being backfilled. FQC then inspects in accordance with the specifications, prints and standards.

D. The S&W Chief Construction Supervisor for laborers stated that the number of inches in a lift was determined by the type of compacting equipment.

E. During backfilling in an area adjacent to the auxiliary buildings, observed laborers placing crushed stone as a bedding for a pipe. They were bringing the stone up in 4" lifts, leveling and then compacting.

III. CONCLUSION

Based upon the observations, the backfill process appears to meet site procedures and specifications.

OBSERVATION OF DRAWING CONTROL

I. SCOPE

The S&W training film used to introduce site personnel to the document record card system for drawing control was reviewed. Three drawing stations were observed to determine if the document record card system was being used effectively and if personnel using the drawing stations were aware of procedures for drawing control.

II. OBSERVATION

A. S&W Document Control uses a video tape presentation to provide training for a document record card system which is used for drawings to document the revision history, distribution and outstanding documents (E&DCRs, N&Ds, VRs) impacting drawings. The film lasts 45 minutes and covers the correct use of the system. The following problems were noted based upon a review of the film and discussions with S&W Document Control manager and S&W training manager.

1. The document record card system uses the terminology "NA" in an unconventional sense relative to the incorporation status of documents which could affect a drawing. Specifically, "NA" does not mean "not applicable" but instead is used to denote "not incorporated at this time". The training film makes the point several times emphasizing that documents labeled "NA" may be applicable and must be consulted by the user to ensure that a drawing is accurate and current.

2. Not all personnel who are currently using drawings have received the video tape training. Also, there is presently no program to ensure that users receive refresher training or a program to monitor the effectiveness of the video tape training.

B. Three of the approximately 114 drawing stations at the site were selected for review and observation to determine if the document records card system was effective and being used correctly. The following comments apply:

1. Ten percent of the drawings at the three selected stations were reviewed against the information on document record cards. No deficiencies were noted. The revision status of the drawings and record cards agreed and spot checks of applicable E&DCRs, N&Ds and VIRs indicated that these documents were available at the drawing station.

2. A review of the drawings at station 55 (intake structure platform) revealed that a few drawings had white record cards and should have had green.

3. An electrical craftsman at station 55 who stated that he consulted drawings as part of his job was unaware of the document record card system, did not know how to determine the correct revision status of a drawing, and did not know how to determine which E&DCRs, N&Ds or VIRs were outstanding against a drawing. This craftsman stated that he had worked on site since March 1982 and had not received any training on the document record card system.

4. An electrical craftsman foreman at station 55 was aware of the document record system, had seen the training film on the record cards, but did not correctly understand the terminology "NA" regarding incorporated status of E&DCRs, N&Ds and VIRs. The foreman stated that "NA" indicated non-applicable and that these documents need not be consulted.

5. A S&W Document Control employee at station 55 and a S&W Document Control employee at station 54 (intake structural shack) could not correctly explain the terminology "NA" on the record card and both stated that it indicated non-applicability. Both of these S&W employees indicated they had seen the training film.

6. An uncontrolled copy of S&W drawing 12179-EM-8A-6 was posted on the wall at drawing station 54. This drawing was not initialled or otherwise marked to indicate that it had been checked against the document record card.

7. An area foreman (craft) at station 7 (control building - 29 ft. level) did not understand the "NA" terminology on the drawing record card. The foreman indicated that "NA" meant non-applicable and that it would not have to be consulted. When the correct use of "NA" was explained to him, the foreman stated he had seen the training film but this area had always been confusing. As a result, he stated he checked all E&DCRs, N&Ds and VIRs on the record card by subject as listed on the card to determine which of these documents he should review.

III. CONCLUSIONS

A. The training provided to site personnel concerning the document record card system for drawing control is not effective.

B. The unconventional use of the terminology "NA" on record cards is leading to considerable confusion. The training film which specifically emphasizes this point does not eliminate this confusion.

OBSERVATION OF HEAVY EQUIPMENT RIGGING

I. SCOPE

Observe rigging a support pillar for steam generator D.

II. OBSERVATION

A. One of the support pillars (about 20' long and weighs 11,000 lbs.) for steam generator D was being lowered, via the polar crane, down a narrow passage between the steam generator and associated support structure.

B. There was an abundance of pipe fitters involved in the installation; five directly participating and three watching.

C. The foreman was well aware of the installation procedure and what precautions needed to be taken (i.e., no contact with the shell of the steam generator and protection of the mating surfaces).

D. QC was not present during the installation but was called later by the foreman when they reached a hold point. The QC inspector appeared soon after being paged.

E. Bolting pillars to the steam generator could not be completed because washers for the bolts were missing plus the wrench for tightening could not be located. Since the bolts were special, the craftsmen had to "jerry-build" a special tool for tightening the bolts.

F. The craftsmen did not have sufficient lighting (or a flash light) to check hole alignment for bolt installation. As a result he used a cigarette lighter to provide better lighting.

G. Several situations were noted where poor safety practices were observed.

1. Working off a non-anchored scaffold which resulted in unstable conditions when heavy work was being performed.

2. No safety belts being used when working off high elevation platforms and beams which had no safety railings.

3. Personnel were allowed to walk under riggers (who were using heavy hard tools) with no warning signs or barriers installed.

III. CONCLUSIONS

A. The rigging crew observed were experienced and knew the specific requirements for performing the assigned task.

B. Safety practices should be improved during rigging activities.

OBSERVATION OF INSTALLATION OF SMALL BORE PIPE

I. SCOPE

Installing small bore pipe ISO on chilled water system elevation -24' 6" reactor containment building and interview with supervisor and foreman.

II. OBSERVATIONS

A. Supervisor stated about 25 percent of ISOs have rework but most rework is minor.

B. Category can be reworked without engineering approval and as-built later according to the supervisor.

C. Categories 1, 2 and 3 cannot be done without engineering approval.

D. Supervisor stated QC is responsive with rare exceptions - engineering as well.

E. Foreman stated he receives scheduling information from area foreman by work packages. He works to those priorities unless directed otherwise.

F. Supervisor approves all material withdrawals. Materials are ordered from bill of materials on ISOs withdrawn from pipe fabrication shop and delivered to area.

G. Work area was well lighted, congested but not cluttered.

H. Two pipe fitters were assembling the piping from information on the ISO. No welding being done.

I. Interview with supervisor was interrupted two times for him to discuss with foreman problems they had encountered.

J. Supervisor feels confortable with responsibility, authority and acountability.

III. CONCLUSION

From the interview and observing work in progress, the supervisor appears well qualified and is familiar with project procedural requirements. He also appears to have good communication with craft foreman.

OBSERVATION OF CABLE PULLING

I. SCOPE

Observe cable pulling to assure compliance with design documents and to assess quality of final products.

II. OBSERVATION

A. Most cable pulling is done on second shift. Cable pulling has only been going on for a few months.

B. Because problems were encountered pulling in large power cables and multiple control cables, the bulk of the cable pulling scheduled during the four weeks that INPO was at the site was limited to Category II and Category III cables pulled by hand.

C. Category I cables were being installed between isolation cabinets and main control board in control building. Cables have prefab connectors. The cables are relatively short and were being installed by hand.

D. The cables were trimmed properly and installed in an orderly fashion.

E. The cable trays were covered by welding blankets to protect them from welder's sparks and falling debris.

F. Category II cables were being installed in the turbine building and between the turbine buiding and control building.

G. The foreman was experienced but had no previous nuclear power plant cable pulling experience.

H. He stated that no training had been conducted in cable pulling other than the basic Phases I and II indoctrination for new hires.

I. Cables were tie-wrapped in screen house. Electricians were securing cables to rungs of cable tray correctly.

III. CONCLUSION

Electricians observed in cable pulling activities were performing their work satisfactorily.

OBSERVATION
OF
DOCUMENT CONTROL IN FIELD

I. SCOPE

Observe documentation being used by electricians working on elevation 24' 6" of the hydrogen recombiner building.

II. OBSERVATION

A. One electrician was drilling holes in small plates. The foreman had given the electrician a sketch on white lined paper showing the dimensions and locations of the holes.

B. The foreman stated that the information was available on controlled documents; however, rather than give the electrician a full size drawing, he had transferred the information to an 8-1/2" x 11" piece of paper for the convenience of the electrician.

C. Two other electricians were installing exposed conduit, hangers and boxes in a cubicle. The location of exposed conduit is shown diagramatically on controlled drawing EE50D-2.

D. In addition, the electricians had several sketches that showed the exposed conduit, hangers and boxes in greater detail.

E. These sketches were marked "preliminary sketches" and issued September 23, 1982. The originator of these sketches is SEG.

F. The SEG indicated that if there were any changes such that the preliminary sketches would become invalid, he would contact the foreman and the electricians would be notified of the changes.

III. CONCLUSION

Construction activities are being performed using sketches and information that is not in a controlled form.