

NRC ENFORCEMENT CONFERENCE

BRAIDWOOD PROJECT

DECEMBER 20, 1983

EXTENSIVE EVALUATIONS

A. TECHNICAL SUPPORT GROUP

SCOPE

EVALUATE OVERALL EFFECTIVENESS OF QUALITY CONTROL PROGRAMS AND OF WORK ACTIVITIES FOR EACH CONTRACTOR (EIGHT TOTAL).

TEAM

R. TUETKEN	-	ASST. CONSTRUCTION SUPERINTENDENT, BYRON
R. BYERS	-	CONSTRUCTION STRUCTURAL ENGINEER, BYRON
J. GIESEKER	-	ASST. TECH STAFF SUPERVISOR, LASALLE
R. BRAUN	-	QUALITY ASSURANCE SUPERVISOR, LASALLE
L. TAPPELLA	-	CONSTRUCTION ELECTRICAL ENGINEER, BRAIDWOOD
G. GROTH	-	CONSTRUCTION MECHANICAL ENGINEER, BRAIDWOOD

DURATION

SEPTEMBER 14, 1983 THROUGH SEPTEMBER 24, 1982: NINE (9)
WORKING DAYS

B. DANIEL CONSTRUCTION COMPANY EVALUATION

SCOPE

- A. EVALUATE THE GENERATION AND PROCESSING OF PIPING, INSTRUMENTATION AND HANGER/SUPPORT TRAVELER DOCUMENTATION;
- B. REVIEW RETRIEVABILITY OF TRAVELER DOCUMENTATION;
- C. EVALUATE QUALITY CONTROLS ABILITY TO SUPPORT THE CONSTRUCTION EFFORT;
- D. EVALUATE THE GENERATION AND PROCESSING OF HANGER RETROFIT DOCUMENTATION;
- E. REVIEW TRAVELER DOCUMENTATION TO DETERMINE IF IT PROVIDES THE INFORMATION REQUIRED TO COMPLETE N-5 DATA REPORTS.

TEAM

TWO (2) SENIOR ENGINEERS - COMBINED NUCLEAR CONSTRUCTION EXPERIENCE OF TWENTY-ONE (21) YEARS .

DURATION

INITIAL: MARCH 7, 1983 THROUGH MARCH 28, 1983: 26 MAN DAYS

FOLLOW-UP: MAY 5, 1983 THROUGH JUNE 17, 1983: 25 MAN DAYS

DANIELS REVIEW TEAM RESULTS/RECOMMENDATIONS

- SMALL BORE PIPING SYSTEMS DOCUMENTATION INCOMPLETE
- ESTABLISH A QUALITY CONTROL DOCUMENTATION REVIEW GROUP TO PERFORM TECHNICAL AND COMPLETENESS REVIEWS
- IMPROVE DOCUMENTATION LEGIBILITY
- CLARIFY QUALITY ASSURANCE PROCEDURES
- WELDING SUPERVISOR REVIEW ALL WELD CONTROL RECORDS
- DEVELOP A SYSTEM FOR PREPARATION OF N-5 DATA REPORTS

SUMMARY

ACTIONS HAVE BEEN TAKEN OR ARE IN PROCESS ON ALL THE ABOVE RECOMMENDATIONS.

DANIEL FOLLOW-UP TO CONTINUE IN JANUARY, 1984.

- INDICATES ACTION TAKEN WHICH RESULTED FROM TECHNICAL SUPPORT GROUP OR DANIEL CONSTRUCTION REVIEW RECOMMENDATIONS.

RESULTS/RECOMMENDATIONS

PHILLIPS, GETSCHOW:

- A. IMPROVE/INCREASE ENGINEERING AND MANAGEMENT STAFF
- B. QUALITY CONTROL TOO INVOLVED IN LINE WORK
- C. DOCUMENT ACCOUNTABILITY NEEDS IMPROVEMENT
- D. RE-FOCUS PROBLEM RESOLUTION
- E. INCREASE TRAINING FOR PRODUCTION FIELD SUPERVISION
- F. QUALITY CONTROL SUPERVISOR TOO INVOLVED IN DETAILS

L. K. COMSTOCK

- A. REDUCE THE NUMBER OF BACKLOGGED HANGER INSPECTIONS
- B. INCREASE THE CONFIGURATION INSPECTION REQUIREMENT FROM 35% TO 100%
- C. INCREASE THE NUMBER OF INSPECTORS
- D. STREAMLINE DOCUMENTATION AND TRACKING DEVICES

RESULTS AND RECOMMENDATIONS - (CONT'D)

PULLMAN

- A. INCREASE 10% CONFIGURATION INSPECTION REQUIREMENT TO 100%
- B. PERFORM RETRO-FIT INSPECTION
- C. INCREASE THE NUMBER OF INSPECTORS

SUMMARY

ACTIONS HAVE BEEN TAKEN OR ARE IN PROCESS ON ALL THE ABOVE RECOMMENDATIONS.

QUALITY ASSURANCE
REVIEWS AND CORRECTIVE ACTIONS

- I. GENERAL OFFICE AUDIT
- II. UNIT CONCEPT INSPECTION
- III. INCREASE AUDITS & SURVEILLANCES
- IV. INPO SELF INITIATED EVALUATION
- V. CONTRACTOR - QUALITY ASSURANCE

I. GENERAL OFFICE AUDIT

PURPOSE - TO DETERMINE ADEQUACY OF Q.C. INSPECTION PROGRAMS

SCOPE - MULTIPLE AREAS

SIX AUDITORS - 300 MANHOURS

RESULTS

- HVAC HANGERS
- ELECTRICAL PENETRATIONS
- CONDUIT SEPARATION

II. UNIT CONCEPT INSPECTION PROGRAM

3RD PARTY OVERINSPECTION

PURPOSE

61 UNITS PERFORMED

5 MULTI - DISCIPLINE LEVEL II INSPECTORS

RESULTS

- 185,825 SQ. FT. INSPECTED
- 28,906 ITEMS INSPECTED
- 2,782 ITEMS FOUND DEFICIENT

III. INCREASE AUDITS & SURVEILLANCES

QUANTITY PERFORMED

	<u>AUDITS</u>	<u>SURVEILLANCES</u>
JANUARY '81 - JUNE '82	49	≅ 700
JULY '82 - PRESENT	89	≅ 900
INCREASE	82%	25%

ANSI N45.2 STANDARDS

- OCTOBER, 1983 - COMPREHENSIVE AUDIT
- 35 TEAM MEMBERS
 - OVER 2,800 MANHOURS

ADDITIONAL AUDIT TRAINING

IV. INPO SELF INITIATED EVALUATION

COVERED BYRON AND BRAIDWOOD PROJECT

20 MAN TEAM

3,800 MANHOUR EFFORT

AREAS EVALUATED

- ORGANIZATION & ADMINISTRATION
- DESIGN CONTROL
- CONSTRUCTION CONTROL
- PROJECT SUPPORT
- TRAINING
- QUALITY PROGRAMS
- TEST CONTROLS

RESULTS

- 23 - NO WEAKNESS IDENTIFIED
- 10 - WEAKNESS IDENTIFIED
- 3 - GOOD PRACTICE IDENTIFIED

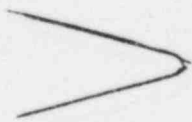
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BRAIDWOOD PROJECT

DECEMBER 20, 1983

PROJECT CHANCES AND CORRECTIVE MEASURES

A. PROJECT - GENERAL

- QUALITY WORK AND QUALITY DOCUMENTATION A TOP PRIORITY
- GERRY GROTH, LEAD MECHANICAL ENGINEER, CONSTRUCTION
- LARRY TAPPELLA, PROJECT QUALITY CONTROL COORDINATOR
- SIX (6) CONSTRUCTION FIELD ENGINEERS ADDED
- ON-SITE PROJECT ENGINEERING GROUP ESTABLISHED
 - DAN SHAMBLIN, MANAGER - LASALLE EXPERIENCE
 - WARREN VAHLE
KEN STEELE
EARL WENDORF  GROUP LEADERS
LASALLE EXPERIENCE
 - THREE (3) ADDITIONAL ENGINEERS - LASALLE EXPERIENCE

A. PROJECT - GENERAL (CONT'D)

- SARGENT AND LUNDY SITE ENGINEERING
 - INCREASED FROM 20 - (8/82) TO 329 - (12/83)
 - TIMELY RESOLUTION OF CONSTRUCTION INSTALLATION PROBLEMS
 - ENGINEERING EFFORT CLOSER TO FIELD
 - 80 HAVE BYRON OR LASALLE EXPERIENCE
- STARTUP SUPERINTENDENT ESTABLISHED
 - CHUCK TOMASHEK - BYRON EXPERIENCE
 - INCORPORATE OVERALL LASALLE AND BYRON EXPERIENCES -
(METHODS AND PERSONNEL)

PROJECT CHANGES AND CORRECTIVE MEASURES

B. SITE CONTRACTORS - OVERALL

- EDISON MANAGEMENT MET WITH CONTRACTOR PROJECT AND QUALITY CONTROL/QUALITY ASSURANCE PERSONNEL
- ENCOURAGED CONTRACTORS TO BRING IN BEST AVAILABLE MANAGEMENT TALENT
- INCREASED INSPECTORS
- ALL INSPECTORS CERTIFIED TO ANSI N45.2.6
- QUALITY CONTROL INSPECTOR CERTIFICATION - RE-INSPECTION (SAME AS BYRON)
- ALL CONTRACTORS UPGRADED WORK PROCEDURES
- INCREASED EMPHASIS ON TRAINING FOR ALL PERSONNEL
- COMPUTERIZATION OF INFORMATION

--- RESULTED FROM TSG/DANIEL REVIEW

PROJECT CHANGES AND CORRECTIVE MEASURES

C. PHILLIPS, GETSCHOW COMPANY - MECHANICAL

- EDISON PERSONNEL WORKED WITHIN PHILLIPS, GETSCHOW COMPANY,
THEN TRANSFERRED BACK TO CONSTRUCTION

PROJECT MANAGEMENT

- INITIALLY ADDED (08/01/83):

SITE MANAGER
ASSISTANT TO SITE MANAGER
SITE SUPERINTENDENT
STAFF ASSISTANT TO Q.C./ENGINEERING
PROJECT ENGINEER

LASALLE
TEAM

- LATER ADDED:

2 AREA SUPERINTENDENTS - NUCLEAR EXPERIENCE

ASST. AREA SUPERINTENDENT
AREA GENERAL FOREMAN
NIGHT SUPERINTENDENT

LASALLE
EXPERIENCE

--- RESULTED FROM TSG/DANIEL REVIEW

C. PHILLIPS, GETSCHOW COMPANY - MECHANICAL (CONT'D)

ENGINEERING

- ADDED:

- PROJECT ENGINEER
- ASSISTANT PROJECT ENGINEER
- 4 GROUP SUPERVISORS

45 YEARS
NUCLEAR
EXPERIENCE

- 7 OTHER EXPERIENCED PERSONNEL

- DEVELOPED SYSTEM TURNOVER AND TESTING GROUP ---
COORDINATES WITH QUALITY CONTROL ON SYSTEMS COMPLETION

- ESTABLISHED DOCUMENT STATION CONCEPT:

- STANDARDIZED, STRINGENT CONTROL OF PROCESS DOCUMENTS
- 6 FIELD ENGINEERS IN 4 DOCUMENT STATIONS
- LASALLE CONCEPT
- 8 OF 19 DOCUMENT TECHNICIANS ARE LASALLE EXPERIENCED

--- RESULTED FROM TSG/DANIE REVIEW

C. PHILLIPS, GETSCHOW COMPANY - MECHANICAL (CONT'D)

OFFICE IMPROVEMENTS

- VAULT INCREASED 600 SQUARE FEET TO 1500 SQUARE FEET
- QUALITY CONTROL AREA INCREASED 1500 SQUARE FEET TO 3000 SQUARE FEET
- TRAINING FACILITY ADDED - 800 SQUARE FEET

C. PHILLIPS, GETSCHOW COMPANY - MECHANICAL (CONT'D)

QUALITY CONTROL

- SPLIT INTO OFFICE AND FIELD
 - ASSIGNED NEW QUALITY CONTROL SUPERVISOR
 - ASSIGNED GENERAL FOREMAN OF FIELD INSPECTORS
 - ESTABLISH 8 LEAD TECHNICIANS IN DOCUMENT REVIEW
(3 HAVE LASALLE EXPERIENCE)
 - REVISED QUALITY CONTROL TECHNICIAN CERTIFICATION
 - QUALITY CONTROL TECHNICIANS INCREASED 18 TO 56 ---
BACKLOG REVIEW, INITIAL AND FINAL REVIEW, N-5 REVIEW
 - FIELD INSPECTORS INCREASED 25 TO 50
 - QUALITY CONTROL OVERALL INCREASED 57 TO 125
 - INCREASED QUALITY CONTROL MONITORING
 - COMPUTER ADDED --- MATERIAL TRACEABILITY, INSPECTOR
QUALIFICATIONS, WELD PROCEDURE QUALIFICATION
 - EMPHASIS ON TRAINING AND CERTIFICATION
- RESULTED FROM TSG/DANIEL REVIEW

C. PHILLIPS, GETSCHOW COMPANY - MECHANICAL (CONT'D)

VERIFICATION EFFORTS

1. QUALITY CONTROL INSPECTOR CERTIFICATION - RE-INSPECTION
2. DOCUMENTATION REVIEW OF 10,000 LARGE BORE WELD DATA SHEETS
3. HEAT NUMBER TRACEABILITY OF SMALL BORE PIPE BEFORE JULY 1, 1983 AND LARGE BORE PIPE BEFORE NOVEMBER, 1982
4. RE-INSPECT INSTRUMENTATION PIPING (DOING 100%; COMPLETE 0%)
5. HANGER RE-INSPECTION (DOING 100%; COMPLETE 98%)
6. EQUIPMENT REINSPECTION (DOING 100%; COMPLETE 100%)

--- RESULTED FROM TSG/DANIEL REVIEW

PROJECT CHANGES AND CORRECTIVE MEASURES

D. L. K. COMSTOCK COMPANY - ELECTRICAL

QUALITY CONTROL MANPOWER

- FIELD INSPECTORS INCREASE

	<u>07/82</u>	<u>11/83</u>
LEVEL II	11	47
LEVEL I	11	4
TOTAL	<u>22</u>	<u>51</u>

- OVERALL INCREASE 25 TO 64.

--- RESULTED FROM TSG/DANIEL REVIEW

D. L. K. COMSTOCK - ELECTRICAL (CONT'D)

QUALITY CONTROL MANAGEMENT CHANGES AND OPERATIONAL IMPROVEMENTS

- QUALITY CONTROL MANAGER REPLACED 11/82
- QUALITY CONTROL MANAGER REPLACED 08/83
- WEEKLY QUALITY CONTROL AND CONSTRUCTION MEETINGS ESTABLISHED 09/82
- SUPERVISOR OF INSPECTORS ESTABLISHED
- LEAD INSPECTORS ESTABLISHED
- INSPECTION STATUS/CONTROL SYSTEM IMPLEMENTED
- MARKING OF MYLARS FOR INSPECTION STATUS
- INSTALLATION AND INSPECTION STATUS IS BEING COMPUTERIZED
- TRAINING COORDINATOR ESTABLISHED

INSPECTIONS

- INCREASE CONFIGURATION INSPECTION 35% TO 100%

--- RESULTED FROM TSG/DANIEL REVIEW

D. L. K. COMSTOCK - ELECTRICAL (CONT'D)

DOCUMENT CONTROL IMPROVEMENTS

- IMPROVED DOCUMENT TRACKING SYSTEM
- DOCUMENT CONTROL SUPERVISOR REPLACED 02/83
- PERSONNEL INCREASE 7 TO 14

OFFICE IMPROVEMENTS

- INCREASE 3700 SQUARE FEET TO 7000 SQUARE FEET
- NEW QUALITY ASSURANCE VAULT

DOCUMENTATION REVIEW

- IMPROVE DOCUMENT QUALITY AND RETRIEVABILITY
- NEW VAULT CONSTRUCTED
- RECORDS REVIEW IN PROGRESS - COMPLETE 02/15/84
- DAILY, CURRENT REVIEW OF NEW RECORDS

--- RESULTED FROM TSG/DANIEL REVIEW

PROJECT CHANGES AND CORRECTIVE MEASURES

E. G. K. NEWBERG - STRUCTURAL

- QUALITY CONTROL MANPOWER: INCREASED 3 TO 6
- REVISED OVER 20 PROCEDURES
- TOTAL REVISION TO QUALITY ASSURANCE MANUAL
- COMPUTERIZED SEVERAL PRODUCTION AND QUALITY CONTROL TRACKING DEVICES
- INCREASED TRAINING
- QUALITY CONTROL STRUCTURAL STEEL REVIEW IN PROGRESS

--- RESULTED FROM TSG/DANIEL REVIEW

PROJECT CHANGES AND CORRECTIVE MEASURES

F. PULLMAN - HVAC

- MANPOWER:

	<u>06/82</u>	<u>12/83</u>
- PRODUCTIVE CRAFTS	40	42
- NON-PRODUCTIVE CRAFTS	18	80
TOTAL	<u>58</u>	<u>122</u>
- Q.C./Q.A.	3	19

- NEW DEPARTMENTS:

- ENGINEERING/DOCUMENT CONTROL - 9
- SURVEY AND RESEARCH - 5
- FCR/FEM - 5
- CORRECTION NOTICES - 3
- COMPUTERIZED TRACKING OF INSPECTION STATUS WELDER QUALIFICATIONS, ETC.
- INCREASED CONFIGURATION INSPECTION 10% TO 100%
- 100% RETRO-FIT INSPECTION COMPLETE FOR WELDING AND CONFIGURATION
- 100% RETRO-FIT INSPECTION OF DUCT BROCHURE ITEMS IN PROGRESS

--- RESULTED FROM TSG/DANIEL REVIEW

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BRAIDWOOD STATION

DECEMBER 20, 1983

PULLMAN SHEET METAL

WELDER QUALIFICATIONS

1. ALL WELDERS QUALIFIED.
2. WELDERS RECEIVE DOCUMENTED TRAINING BY PULLMAN SHEET METAL QUALITY ASSURANCE/QUALITY CONTROL ON EACH PROCEDURE FOR WHICH THEY ARE QUALIFIED.

TRAINING COVERS MATERIAL SPECIFICATION, WELDING PROCESS, FILLER METAL CLASSIFICATION, AND JOINT DETAIL.

3. EACH WELDER IS ASSIGNED A UNIQUE I.D. NUMBER.
4. WELDERS ARE REQUIRED TO STAMP EACH WELD WITH I.D.
5. QUALITY CONTROL VERIFIES PRESENCE OF WELDER I.D. DURING VISUAL INSPECTION OF WELDS.

NRC ENFORCEMENT CONFERENCE

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WELDING PROCEDURES

1. ALL WELDING PROCEDURES APPROVED (REVIEWED AGAINST DESIGN SPECIFICATION AND CODE).
2. FROM MARCH, 1978 TO SEPTEMBER, 1979 ONLY TWO (2) WELDING PROCEDURES:
 - A. 7018 SMAW FOR HANGERS
 - B. SILICON-BRONZE HANGER TO DUCT

3. APRIL, 1980 TO DATE NUMBER OF PROCEDURES IS NINE (9). BREAKS INTO FOUR (4) GROUPS:

A. GROUP 1 - HANGERS - 1 PROCEDURE

B. GROUP 2 - HANGER TO DUCT - 4 PROCEDURES

C. GROUP 3 - STAINLESS DUCT - 2 PROCEDURES

D. GROUP 4 - RCFC PLENUMS AND AUXILIARY BUILDING
HOUSINGS - 2 PROCEDURES

WELDING MANHOUR BREAKDOWN

<u>TYPE OF WELDING</u>	<u>PERCENT OF TOTAL MANHOURS</u>
HANGERS (1 PROCEDURE AVAILABLE)	40%
HANGER TO DUCT (4 PROCEDURES AVAILABLE)	15%
SEAL WELDING HOUSINGS AND DUCT (2 PROCEDURES AVAILABLE)	45%

(0207D)

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PULLMAN SHEET METAL

FILLER METAL CONTROL

1. ALL WELDING FILLER METAL IS CERTIFIED MATERIAL.
2. WELDING MATERIAL REQUIRING ENVIRONMENTAL CONTROLS (E-7018, E-308 AND E-309) HAS HAD CONTROLLED ISSUANCE.

3. LISTED BELOW ARE THE QUANTITIES OF THE VARIOUS FILLER METALS WHICH HAVE BEEN USED ON-SITE:

	<u>TYPE OF FILLER METAL</u>	<u>QUANTITY</u>
SMAW	E-7018	12,875 POUNDS
	E-6013	1,350 POUNDS
	E-308	155 POUNDS
	E-309	420 POUNDS
MIG	ER705-2	2,430 POUNDS
	ER308	360 POUNDS
	ER309	1,420 POUNDS
	E71T-GS	1,700 POUNDS
SILICON BRONZE	RCU SI-A	750 POUNDS

4. VERIFICATION OF PROPER FILLER METAL USAGE:

- A. 100% VISUAL INSPECTION OF HANGER WELDS IDENTIFIED NO EVIDENCE OF SILICON-BRONZE.
- B. REVIEW OF CERTIFIED MATERIAL TEST REPORTS FOR TWO (2) HEATS OF E6013 SHOWS ACTUAL TENSILE STRENGTH TO BE 70KSI OR GREATER.
- C. PERFORMED RANDOM INSPECTION OF HANGER WELDS TO IDENTIFY POSSIBLE IMPROPER USAGE OF STAINLESS STEEL FILLER METAL.

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BRAIDWOOD PROJECT

DECEMBER 20, 1983

PULLMAN SHEET METAL

QUALITY CONTROL INSPECTION OF WELDING

1. MARCH, 1978 TO SEPTEMBER, 1979 (SHUTDOWN)
 - A. 100% WELD INSPECTION BY PULLMAN SHEET METAL FOREMAN
 - B. 10% WELD INSPECTION BY PULLMAN SHEET METAL QUALITY CONTROL
 - C. 10% WELD INSPECTION BY PITTSBURGH TESTING LABORATORIES
2. APRIL, 1980 (RESUMPTION OF WORK) TO PRESENT
 - A. 100% WELD INSPECTION BY PULLMAN SHEET METAL QUALITY CONTROL
 - B. 10% WELD INSPECTION BY PITTSBURGH TESTING LABORTORIES
 - C. PERFORMED INSPECTION OF PREVIOUS WELDING (COMPLETED INSPECTION JANUARY, 1983)

3. NOVEMBER, 1982 TO PRESENT

- A. INSTITUTED 100% CONFIGURATION INSPECTION OF PREVIOUS WORK (COMPLETED INSPECTION MAY, 1983)

4. AS OF MAY, 1983 ALL PREVIOUS DUCT HANGER WORK HAD BEEN INSPECTED FOR WELD QUALITY AND CONFIGURATION.

- A. INSPECTION RESULTED IN 1480 CORRECTION NOTICES (CN'S) ESTIMATED QUANTITY OF WELD'S INSPECTED IS 55,000.

- B. CN'S WERE REVIEWED TO ANALYZE RESULTS OF WELDING DISCREPANCIES.

684 CN'S ON HANGER TO HANGER WELDS COVERING 4029 WELDS

441 CN'S ON HANGER TO DUCT WELDS COVERING 1726 WELDS

90% OF INSTALLATIONS ACCEPTABLE.

5. JULY, 1983 TURNED IN 50.55(E) ON DUCT FITTING CONFIGURATION.

- A. BEGAN INSPECTION OF INSTALLED DUCT FITTINGS. INSPECTION OF INSTALLED DUCT AND FITTINGS SCHEDULED TO COMPLETE SEPTEMBER, 1984.

6. FEBRUARY, 1983 TO AUGUST, 1983

- A. INSTITUTED INPROCESS INSPECTION OF WELDING BY PULLMAN SHEET METAL QUALITY CONTROL
- B. INSPECTED A MINIMUM OF THREE (3) WELDERS PER WEEK
- C. SEVENTY-EIGHT (78) SURVEILLANCES PERFORMED TO DATE WITH ONLY ONE (1) DEFICIENCY NOTED. THE DEFICIENCY WAS AN ERROR IN THE WELDING PROCEDURE.

7. AUGUST, 1983 TO PRESENT

- A. INSTITUTED 100% INPROCESS INSPECTION OF WELDING BY PULLMAN SHEET METAL QUALITY CONTROL TO ESTABLISH CONFIDENCE LEVEL ON NEW PROGRAM IMPLEMENTATION.

NRC ENFORCEMENT CONFERENCE

BRAIDWOOD PROJECT

DECEMBER 20, 1983

PULLMAN PROGRAM IN EFFECT SINCE AUGUST, 1983

1. EXPANDED SHOP TICKET
2. WELDING PROCEDURE PRE-ASSIGNED BY PULLMAN SHEET METAL
ENGINEERING
3. TYPE OF WELD ROD AND HEAT NUMBER USED ON INSTALLATION IS
RECORDED ON SHOP TICKET
4. WELDER I.D. RECORDED ON SHOP TICKET

(0216D)

REVIEW OF PROCEDURES

- A. S & L has reviewed all Pullman Site and Shop procedures, duct brochure details, design drawings, field change requests.
- B. Q.A. is 100% in line in assuring all procedures received S & L review before implementation.
- C. S & L and Q.A. review all procedures against Specification L-2782, FSAR commitments, Q.A. Manual compliance, AWS D1.1 guidelines, and previous concerns with HVAC erection.

APPROVED MATERIAL

PSM's procurement, control, and incorporation of only approved materials (including filler materials) Q.A. verified 100% of Pullman's material adequacy on:

Q.A. Audit 20-82-20

Q.A. Audit 20-82-30

WELDER TRAINING

All Pullman's welders received documented training for each procedure:

Training Covered
Material Specifications
Welding Processes
Position of Welding
Filler Metal Classifications
Single or Multiple Pass
Welding Current
Polarity
Welding Progression
Preheat and Interpass Temperature
Electrode Size
Amperes Range
Voltage Range
Types of Joints - Details

Site Q.A. has verified this documented training.

Q.A. WITNESSING OF QUALIFICATION TESTS

SITE Q.A. HAS WITNESSED SITE WELDER QUALIFICATION TESTS. SINCE FEBRUARY OF 1981, Q.A. HAS WITNESSED 404 AWS GUIDED BEND QUALIFICATION TESTS.

PSM IN-PROCESS SURVEILLANCES

From February through June, 1983, Pullman Q.C. performed 78 in-process surveillances of actual welding. From June through December, 1983, PSM Q.C. has performed an additional 488 in-process surveillances - no instance of improper filler material placement was observed.

CONFIDENCE DUE TO SIZE OF WORK FORCE

- (1) ONLY A SMALL NUMBER OF WELDERS
- (2) WORKING WITH A LIMITED NUMBER OF ACCEPTABLE WELDING PROCEDURES
- (3) DEALING WITH FAMILIAR CONFIGURATIONS AND DETAILS

RESULTED IN CONFIDENCE THAT PROPER WPS AND FILLER MATERIAL WAS USED.

PTL SURVEILLANCES DIRECTED BY Q.A.

A) 10% OVERVIEW OF ALL PSM WELD INSPECTIONS. FROM 1980 THROUGH 1983, 9132 WELDS WERE EXAMINED WITH 8577 FOUND ACCEPTABLE (94% ACCEPTANCE LEVEL).

B) RANDOM OVERVIEW SURVEILLANCES DIRECTED BY Q.A. ON CONFIGURATIONS, HOUSEKEEPING, STORAGE, WELDING DETAILS.

C) UNIT CONCEPT INSPECTIONS -

A PLANNED SERIES OF SURVEILLANCE MODULES WHICH PROVIDE INDEPENDENT DESIGN COMPLIANCE VERIFICATIONS -

OF 1121 ASPECTS ON PSM WELDING COVERED IN 14 UNIT CONCEPT INSPECTIONS, 877 WERE FOUND ACCEPTABLE. (THIS SAMPLE WAS OF BOTH SAFETY RELATED, NON-SAFETY RELATED, COMPLETE AND INCOMPLETE CONSTRUCTION, INSPECTED AND UNINSPECTED ITEMS.)

SITE Q.A. AUDITS OF PULLMAN'S ACTIVITIES

15 audits performed from May, 1980 through November, 1983 (two of these is PSM Chicago Shop)

218 total questions

32 were related to welding activities and welder qualifications

44 were referenced to 10CFR50 Appendix B

69 were referenced to Pullman's procedures

42 were referenced to Pullman's Q.A. Manual

18 were referenced to ANSI daughter documents

8 were referenced to Spec. 2782 requirements

8 were referenced to Regulatory Guides

3 were referenced to AWS D1.1

*NOTE - some questions had more than one reference.

Q.A. SURVEILLANCES

Site Q.A. performed 119 surveillances from April, 1980 through the present and of these,

59 addressed welding, welder qualifications or control of weld filler material.

12 documented actual witnessing of welding in compliance with correct welding procedure.

1 extensively documented a review of all WPS documentation.

1 involved actual destructive testing to verify the correct WPS was used.

8 covered large samplings of acceptability of welder qualifications.

G.O. AUDITS

Four of the General Office Audits conducted between April, 1981 through October, 1983, examined Pullman's on site activities.

A total of 75 questions were asked.

*11 questions examined welding controls, welder qualifications, and filler metal control.

*62 questions were referenced to 10CFR50 Appendix B.
7 questions were referenced to CECQ Q.A. Manual compliance.

1 question was referenced to Pullman's Q.A. Manual.

*30 questions were referenced to Regulatory Guides.

3 questions were referenced to Pullman's procedures.

*29 questions were referenced to Specification requirements.

NOTE: Many questions had more than one reference.

Additionally one of the General Office Audits which examined PSM (3/11-15/82) was composed of all LaSalle auditors with experience in LaSalle HVAC concerns. Another audit (9/20-10/11/82) utilized a cognizant LaSalle auditor to audit Pullman's program adequacy.

Q.A. DIRECTED "RETRO" PROGRAMS

- A) 100% visual verification of all previous (1) welding, (2) duct and hanger configuration, and (2) equipment installation was required of Pullman (Jan., 1983).
- B) Site Q.A. issued a Stop Work on all new work (except in U-1 D/G Room) in June of 1983, to allow Pullman to complete the re-verification program.
- C) Re-verification program resulted in large numbers of Correction Notices being generated and the status of generation and closure of CN's was reported to and closely monitored by Site Q.A. (weekly status).

BASES FOR CONSIDERING PULLMAN'S
PAST PRACTICES ACCEPTABLE

1. S & L REVIEW AND APPROVAL OF ALL PROCEDURES.
2. P.S.M. INSTALLED ONLY VERIFIED ACCEPTABLE MATERIALS.
3. DOCUMENTED TRAINING OF ALL WELDERS.
4. SITE Q.A. HAS WITNESSED 100% OF ALL WELDER QUALIFICATIONS.
5. ONLY A LIMITED NUMBER OF ACCEPTABLE WELDING PROCEDURES AVAILABLE.
6. P.S.M. HAD PERFORMED IN-PROCESS WELDING SURVEILLANCES.
7. P.T.L. PERFORMING SURVEILLANCES FOR Q.A.
8. Q.A. AUDITS
 - (A) AUDITS ON PULLMAN REFERENCED TO ALL REQUIREMENTS.
 - (B) SURVEILLANCES ON PSM COVERED WELDING.
 - (C) G.O. AUDITS UTILIZING OFF-SITE AUDITORS.
9. Q.A. ATTENTION TO P.S.M.'S STATUS OF INSTALLATION AND INSPECTION.

OVERALL POSITION

Although, CFCo has directed Pullman to upgrade the quality of the documentation of their Q.C. pre-welding, in-process, and post weld inspection checks in response to the NRC inspectors concerns, the up front programatic controls listed above were and still are adequate to control the welding performed by PSM.

1 -PROCEDURAL CONCERNS PERCEIVED TO AFFECT HARDWARE

4.3.7 - MINIMUM EMBEDDED CONDUIT BEND RADIUS VERSUS
S & L SPEC. EF-103

4.8.7 - INCORPORATION OF EF-103 REQUIREMENTS IN QC
PROCEDURE

4.3.8 - PRECAUTIONS TO BE TAKEN ON SENSITIVE CABLE PULLS

2 - PROCEDURES REQUIRING MINOR CLARIFICATIONS

- 4.3.5 AND 4.8.5 - REVISE THE CABLE PAN INSPECTION
FORM TO MATCH THE INSTALLATION REQUIREMENTS
- 4.8.5 - CLARIFY QUALITY CONTROL'S RESPONSIBILITY
CONCERNING "IN PROCESS" INSPECTION OF CABLE PAN
BOLTING
- 4.8.8 - CLARIFY PROCEDURE REQUIREMENTS WITH REGARDS TO
INSPECTION FOR - SHARP EDGES AND TRAY EDGE
SOFTENERS
- 4.8.8 - EXPAND/CLARIFY THE PROCEDURE TO SHOW HOW QC
VERIFIES:
 - PROPER TYPE/SIZE OF CABLE
 - INSTALLED PER DESIGN ROUTING
 - NO REVERSE BENDS
- 4.3.13- EXPAND/CLARIFY TORQUE REQUIREMENTS FOR
ELECTRICAL CONNECTIONS
- 4.3.8 AND 4.8.8 - EXPAND THE INSTALLATION AND INSPECTION
REQUIREMENTS FOR CABLE GRIPS

BACKLOG: DOCUMENT REVIEW STATUS (B. Brown)

Week of: 10-24-83 Report by: _____ Date: 10-31-83

Area:	Documents Reviewed: this week	Documents to: Review	% completed
Welding(1)	37	12 891	36-1-90 100%
Configurations(2)	549	749	93-2 100%
Terminations(3)	0	4,045	0-90 100%
Junction Boxes(4)	0	1,715	0-90 100%
Cable Tray(5)	0	2,395	0-90 100%
Conduit(6)	0	818	0-90 100%
Equipment(7)	0	83	0-90 100%
CEA's(8)	0	9763	10-90 100%
Total(9)	586	33,459	36-8-90 73%

CABLE

PULLING

100%

TRAINING RECORDS

100%

WELDING RECORDS

100%

AUDIT

100%

ICR'S / NCR'S

100%

SITE REVIEW BOARD MAKE-UP

CECO Q.A.

PROJECT CONSTRUCTION

PROJECT MANAGEMENT

L. K. COMSTOCK

(1) Q.C.

(2) Q.A.

(3) PRODUCTION

(4) ENGINEERING

THESE REVIEWS ADDRESS THE FOLLOWING ASPECTS FOR EACH
PROCEDURE REVISION.

(1) CECO LESSONS LEARNED FROM BYRON/LASALLE

(2) LKC LESSONS LEARNED FROM FERMI/COOK/PERRY

(3) RECENT SPECIFICATION CHANGES

(4) ANY PENDING CECO, LKC, NRC AUDIT ITEMS

(5) ANY ASSOCIATED Q.C. CONTROLS OR Q.A. ASPECTS
RESULTING FROM SUCH CHANGES

(6) FUTURE PLANNED WORK ACTIVITIES

PTL INSPECTIONS

PITTSBURGH TESTING LABORATORIES INSPECTION ACTIVITIES

- (A) A 10% OVERVIEW INSPECTION OF ALL LKC WELDING INSPECTIONS.
- (B) RANDOM OVERVIEW SURVEILLANCES DIRECTED BY Q.A. EXAMINING FOR SPECIFICATION COMPLIANCE AND PROCEDURE ADHERANCE.
- (C) UNIT CONCEPT INSPECTIONS - TO DATE 61 SUCH SURVEILLANCES HAVE BEEN COMPLETED WITH 44 HEAVILY COVERING ELECTRICAL ASPECTS.

Q.A. SITE AUDITS

42 AUDITS CONSISTING OF 423 QUESTIONS

MAY '80 - PRESENT

QUESTIONS

<u>REFERENCES</u>	<u># REF. AUDITED</u>
10CFR50 APPENDIX B	86
LKC PROCEDURES	270
LKC Q.A. MANUAL	57
ANSI	41
REG. GUIDES	11

38 OTHER QUESTIONS REFERENCED SUCH THINGS AS:

CECO Q.A. MANUAL
NATIONAL FIRE CODE
SPEC. L-2790A

*NOTE MANY QUESTIONS HAD MORE THAN ONE REFERENCE.

Q.A. SURVEILLANCES

FROM START-UP IN 1980 THROUGH THE PRESENT, 270 SURVEILLANCES HAVE BEEN PERFORMED ON LKC. THE AREAS REVIEWED (AGAINST REGULATORY BASIS, ANSI DAUGHTER DOCUMENTS, FSAR COMMITMENTS, SPEC. L-2790A, LKC PROCEDURES) INCLUDED, BUT WERE NOT LIMITED TO, HOUSEKEEPING, STORAGE, WELDING, CABLE PULLING & TERMINATING, DOCUMENT CONTROL, DESIGN CONTROL, GENERAL FIELD ACTIVITIES, & CALIBRATION CONTROL.

G.O. AUDITS

5 AUDITS

MAY '80 THRU PRESENT

50 QUESTIONS

40 QUESTIONS REFERENCED 10CFR50 APPENDIX B

7 QUESTIONS REFERENCED REG. GUIDES

4 QUESTIONS REFERENCED LKC PROCEDURES

2 QUESTIONS REFERENCED CECO Q.A. MANUAL

*NOTE, SOME QUESTIONS HAD MORE THAN ONE REFERENCE

**THESE NUMBERS DO NOT REFLECT THE OCTOBER/1983

"MEGA-AUDIT"

LKC CHANGES

- (1) RECENT L. K. COMSTOCK Q.C. MANAGEMENT CHANGES
- (2) THE INCREASE IN Q.C. INSPECTOR MANPOWER LEVELS
- (3) THE STRENGTHENING OF LKC'S ON-SITE Q.A. GROUP TO 2
FULL TIME AUDITORS AS POSITIVE STEPS TO ENSURE A
CONSTANTLY IMPROVING PROGRAM.

Q.A. BASES FOR CONFIDENCE IN LKC

- (1) ON-SITE PROCEDURE REVIEW PROCESS
- (2) S & L REVIEW OF ALL SITE PROCEDURES
- (3) PTL SURVEILLANCE ACTIVITIES DIRECTED BY Q.A.
- (4) SITE Q.A. AUDITS & SURVEILLANCES
- (5) GENERAL OFFICE AUDITS
- (6) RECENT CHANGES AND INCREASES IN LKC Q.C. AND Q.A.

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BRAIDWOOD PROJECT

DECEMBER 20, 1983

EVALUATIONS, MANAGEMENT REVIEWS, PROJECT CHANGES
AND CORRECTIVE MEASURES

REVIEW GROUPS

1. TECHNICAL SUPPORT GROUP
2. DANIEL CONSTRUCTION
3. EDISON QUALITY ASSURANCE
4. PHILLIPS, GETSCHOW COMPANY

RESULTS

1. MANAGEMENT CHANGES AND ADDITIONS
2. RE-ORGANIZATION OF ENGINEERING AND QUALITY CONTROL DEPARTMENT
3. INCREASED TRAINING FOR PERSONNEL
4. INCREASED EMPHASIS ON DOCUMENTATION
5. CLARIFY QUALITY ASSURANCE PROCEDURES

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BRAIDWOOD PROJECT

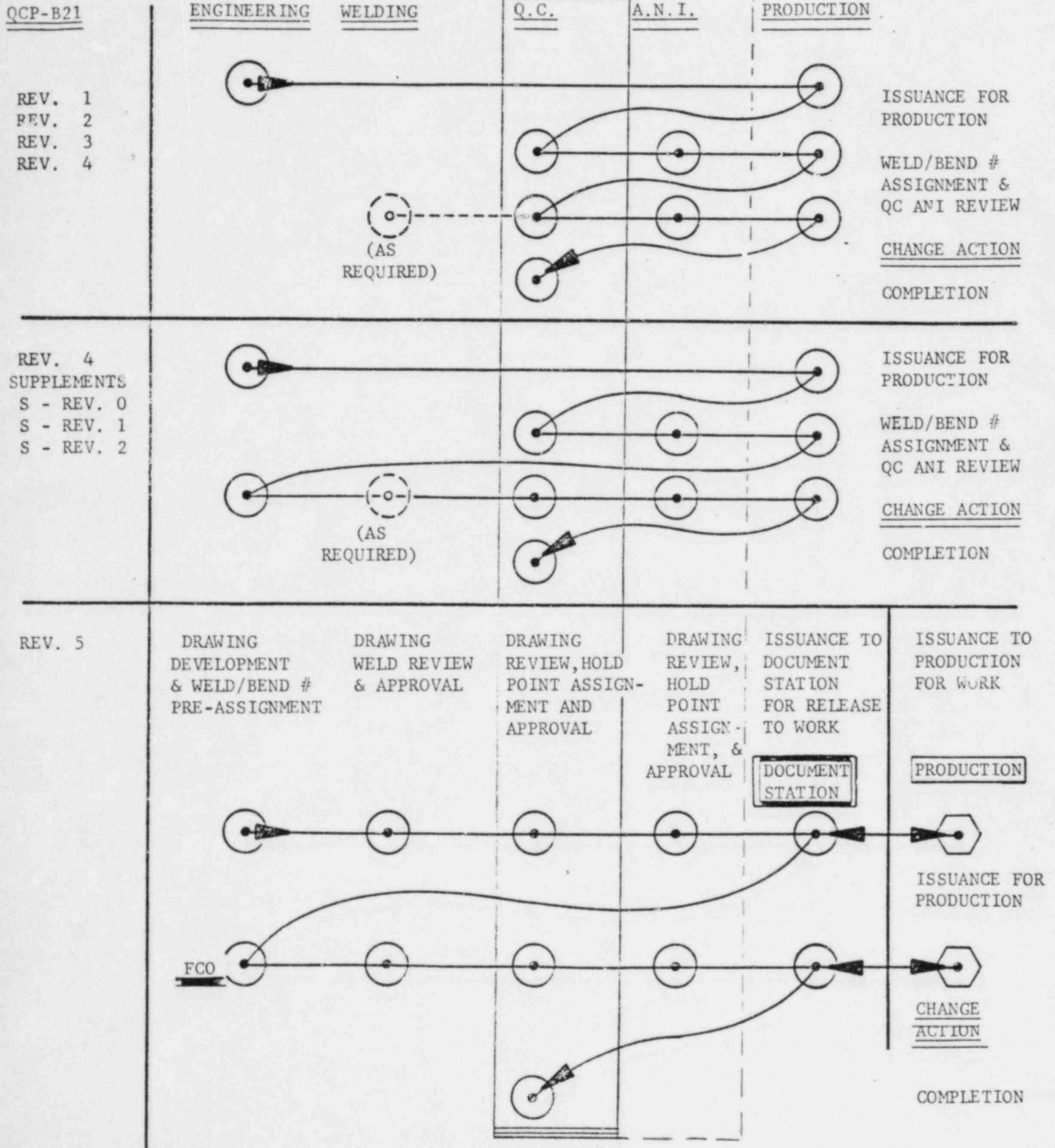
DECEMBER 20, 1983

AGENDA

AS A RESULT OF REVIEW GROUPS WORK, MANY OF THE PROBLEMS IN THE FOLLOWING FOUR (4) AREAS HAD BEEN PREVIOUSLY IDENTIFIED AND CORRECTIVE ACTIONS WERE UNDERWAY AT THE TIME OF NRC INSPECTIONS.

1. SMALL BORE FIELD ROUTING CHANGES
2. VERIFICATION OF FIELD ROUTED DIMENSIONS
3. MATERIAL TRACEABILITY
4. SMALL BORE PIPE SUPPORT SELECTION

P.G. CO. SMALL BORE INSTALLATION PROCEDURE - QCP-B21 - DEPICTS CLASS 2 & 3 ONLY; CLASS 1 PIPING CHANGES ALWAYS GO TO A.E. FOR PRIOR AUTHORIZATION/APPROVAL



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DECEMBER 20, 1983

SMALL BORE FIELD ROUTING CHANGES - CLASS 2 AND 3 ONLY

QCP B21, REVISIONS 0, 1, 2, 3, 4

1. QUALITY CONTROL/ANI REVIEW AND HOLD POINT ASSIGNMENT OF INITIAL PACKAGE.
2. ALL CLASS 1 PIPING ROUTING CHANGES SENT TO ARCHITECT/ENGINEER FOR REVIEW AND APPROVAL.
3. QUALITY CONTROL/ANI REVIEW AND HOLD POINT ASSIGNMENT OF ADDED/DELETED WELDS/BENDS ON ROUTING CHANGES.
4. ROUTING REVISIONS MARKED IN RED.

(0175D)

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SMALL BORE FIELD ROUTING CHANGES - CLASS 2 AND 3 ONLY

QCP B21, REVISION 4, SUPPLEMENTS 0, 1, 2

1. ADDED FIELD ENGINEERING REVIEW AND APPROVAL OF ROUTING CHANGE PRIOR TO ERECTION.
2. INCORPORATED QUALITY CONTROL DIMENSIONAL VERIFICATION OF INSTALLED PIPING PER PGCP-40.
3. INCORPORATED QUALITY CONTROL DIMENSIONAL VERIFICATION OF ALL PIPE, VALVE AND COMPONENT HEAT NUMBERS ON FIELD INSTALLATION DRAWINGS.

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DECEMBER 20, 1983

SMALL BORE FIELD ROUTING CHANGES - CLASS 2 AND 3 ONLY

QCP B21, REVISION 5

1. COMPLETE REWRITE OF PROCEDURE
 - A. UPDATE TO ESTABLISH PROCEDURAL/QUALITY ASSURANCE MANUAL CONSISTENCY AND STANDARDIZE PROCEDURAL FORMATS AND INCORPORATE NEW MANAGERIAL CONCEPTS.
 - B. INCORPORATE ALL SUPPLEMENTS INTO PROCEDURE
2. EXPANDED GENERALIZED QUALITY CONTROL INSPECTION REQUIREMENTS TO BE MORE SPECIFIC.
3. ADDED REQUIREMENT FOR FIELD CHANGE ORDER (FCO) INITIATION AND APPROVAL BY ENGINEERING OF ROUTING CHANGES.
4. ADDED DOCUMENT STATION REQUIREMENTS.
5. IDENTIFIED RECORD RETENTION REQUIREMENTS - TEMPORARY/PERMANENT.

(0177D)

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BRAIDWOOD PROJECT

DECEMBER 20, 1983

VERIFICATION OF FIELD ROUTED DIMENSIONS

- APRIL, 1983 - PHILLIPS, GETSCHOW COMPANY SITE QUALITY ASSURANCE AUDIT IDENTIFIED FINDING - LACK OF QUALITY CONTROL VERIFICATION OF FIELD ROUTED SMALL BORE PIPING DIMENSIONS.
- MAY, 1983 - PHILLIPS, GETSCHOW COMPANY DEVELOPED, OBTAINED APPROVAL FOR PGCP-40 "VERIFICATION, PREPARATION AND TRANSMITTAL OF AS-CONSTRUCTED DRAWINGS".
1. RESPONSE TO PHILLIPS, GETSCHOW COMPANY QUALITY ASSURANCE DEPARTMENT FINDINGS.
- MAY, 1983 - PHILLIPS, GETSCHOW COMPANY IMPLEMENTED PGCP-40, VERIFICATION OF PREVIOUSLY INSTALLED PIPING.
- OCTOBER, 1983 - PHILLIPS, GETSCHOW COMPANY CHANGED ALL PIPING INSTALLATION PROCEDURES TO REQUIRE "AS-CONSTRUCTED" VERIFICATION AS PART OF INSTALLATION INSPECTION CRITERIA.
- FEBRUARY, 1984 - PGCO-40, VERIFICATION OF PREVIOUS INSTALLATIONS WILL BE COMPLETE.

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BRAIDWOOD PROJECT

DECEMBER 20, 1983

VERIFICATION OF FIELD ROUTED DIMENSIONS

PGCP-40

1. PROVIDES SPECIFIC DIMENSIONAL CRITERIA FOR VERIFICATION OF PIPING CONFIGURATION (INPUT PROVIDED BY ARCHITECT/ENGINEER).
2. PRODUCTION DEPARTMENT TAKES DIMENSIONS.
3. QUALITY CONTROL DEPARTMENT PERFORMS 100% VERIFICATION.
4. NOTES IF PIPING IS WITHIN 3 INCH OF ANOTHER INSTALLATION AND POINT OF THAT LOCATION.
5. ESTABLISH TRANSMITTAL MECHANISM OF "AS-BUILT" DRAWINGS.

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DECEMBER 20, 1983

PGCP-40 - VERIFICATION STATUS - SMALL BORE

SCOPE OF PGCP-40 IN MAY, 1983 (ASME SMALL BORE DRAWINGS	758
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COMPLETED AS-CONSTRUCTED ASME SMALL BORE DRAWINGS PER PGCP-40 TO DATE	869
--	-----

TOTAL INSTALLED ASME SMALL BORE DRAWINGS TO DATE	979
--	-----

AS-CONSTRUCT STATUS OF INSTALLED SMALL BORE PIPING	89%
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TOTAL ASME SMALL BORE DRAWINGS DEVELOPED BY PHILLIPS, GETSCHOW COMPANY TO DATE	1,335
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PGCP-40 SHALL BE UTILIZED TO AS-CONSTRUCT. ALL ASME SMALL BORE
DRAWINGS INSTALLED PRIOR TO QCP-B21, REVISION 5.

(0212D)

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DECEMBER 20, 1983

MATERIAL TRACEABILITY

- NOVEMBER, 1982 - PHILLIPS, GETSCHOW COMPANY REVISED WELD DATA REPORT TO REQUIRE VERIFICATION OF MATERIALS JOINED BY WELDING PROCESS ON LARGE BORE PIPING.
- APRIL, 1983 - PHILLIPS, GETSHOW COMPANY QUALITY ASSURANCE IDENTIFIED DEFICIENCY WITH DOCUMENTATION OF SMALL BORE MATERIAL HEAT NUMBERS ON DRAWINGS.
- JUNE, 1983 - PHILLIPS, GETSCHOW COMPANY REVISED QCP-B21 TO REQUIRE VERIFICATION OF SMALL BORE MATERIAL HEAT NUMBERS ON DRAWINGS.
- JULY, 1983 - COMMONWEALTH EDISON COMPANY REPORTED POTENTIAL 50.55(E) DEFICIENCY - QUALITY CONTROL VERIFICATION OF HEAT OR MARK NUMBERS OF INSTALLED PIPING SYSTEM COMPONENTS WAS NOT ADEQUATELY DOCUMENTED.
- AUGUST, 1983 - SURVEY STARTED BY PHILLIPS, GETSCHOW COMPANY UTILIZING MIL-STD-105D TO ESTABLISH TRACEABILITY.
- JANUARY, 1984 - TRACEABILITY SURVEY PLANNED COMPLETION.

PHILLIPS, GETSCHOW COMPANY

SMALL BORE CUMULATIVE SAMPLE

2 INCH AND UNDER

TOTAL NUMBER OF DRAWINGS IN SAMPLE - 128

TOTAL NUMBER OF ITEMS TO VERIFY - 1415

TOTAL ITEMS VERIFIED IN THE FIELD - 1230 86.9%

TOTAL ITEMS VERIFIED THROUGH DOCUMENTATION - 1383 97.7%

TOTAL ITEMS VERIFIED IN THE FIELD & THROUGH DOCUMENTATION - 1414 99.9%

TOTAL ITEMS NOT VERIFIED TO BE TRACEABLE IN THE FIELD OR THROUGH
DOCUMENTATION - 1 .1%

NOTE: THIS ITEM WAS IDENTIFIED ON A PHILLIPS, GETSCHOW COMPANY
NONCONFORMANCE.

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BRAIDWOOD PROJECT

DECEMBER 20, 1983

MATERIAL TRACEABILITY - SUMMARY

1. PHILLIPS, GETSCHOW COMPANY HAS INITIATED CORRECTIVE ACTIONS TO FULLY DOCUMENT MATERIAL TRACEABILITY DURING THE INSTALLATION PROCESS.
2. A SAMPLE VERIFICATION SHOWS THE ADEQUACY OF SMALL BORE MATERIAL TRACEABILITY FOR PREVIOUS INSTALLATIONS.

SMALL BORE SAMPLE SIZE	1415 ITEMS
TRACEABILITY MARKINGS VERIFIED IN FIELD	1230 ITEMS (86.9%)
TRACEABILITY MARKINGS VERIFIED BY DOCUMENTATION	1383 ITEMS (97.7%)
TRACEABILITY MARKINGS VERIFIED IN FIELD AND BY DOCUMENTATION	1414 ITEMS (99.7%)
3. IN ALL SAMPLE CASES PHILLIPS, GETSCHOW COMPANY HAS A STORES REQUEST DOCUMENT TO SUPPORT THE TRACEABILITY MARKINGS VERIFIED IN FIELD.
4. SIMILIAR RESULTS ARE BEING OBTAINED FOR LARGE BORE PIPING MATERIAL.
5. FINAL REPORT - 50.55(E) WILL DOCUMENT SAMPLE RESULTS AND CONCLUSION.

(0213D)

SMALL BORE PIPING SUPPORT SELECTION ACTIVITY
BY PHILLIPS, GETSCHOW CO. AT BRAIDWOOD

COMPARISON OF LASALLE PIPING CONTRACTOR'S ACTIVITIES AND
BRAIDWOOD PIPING CONTRACTOR'S ACTIVITIES

	<u>LASALLE</u> (MORRISON)	<u>BRAIDWOOD</u> (PHILLIPS, GETSCHOW CO.)
SUPPORTED HOT PIPING	YES	NO
SUPPORTED COLD PIPING	YES	YES
CONCEPTUAL SUPPORT DESIGN	YES	NO
SELECTION OF TYPICAL SUPPORT DETAILS	YES	YES
METHOD & DATA UTILIZED:	*PI-LS-16	SIMPLIFIED GUIDELINES
ANALYTICAL LOCATIONS	YES	NO
THERMAL LOADS & MOVEMENTS	YES	NO
DYNAMIC LOADS & MOVEMENTS	YES	NO
GLOBAL COORDINATE FORMAT (X, Y, & Z)	YES	NO
TYPICAL CALCULATION FORMULAS	YES	YES
ASSEMBLY COMPONENTS	YES	NO
TYPICAL SUPPORT CONFIGURATIONS	YES	YES
ALL BUILDING AREAS	YES	NO

*S&L PROJECT INSTRUCTION UTILIZED BY THE A.E.'S (S&L)
SUPPORT DESIGNERS, AS WELL AS BEING ISSUED TO MORRISON
AS AN INCLUSION IN THEIR SPEC.

PHILLIPS, GETSCHOW CO. PROCEDURE PGCP-22
FOR SUPPORT SELECTIONS

TOTALLY RESTRUCTED PROCEDURE, BOTH IN CONCEPT AND IN WORDING, TO:

- BE MORE SPECIFIC IN METHODOLOGY
- REINFORCE REQUIREMENTS
- ENHANCE TRAINING
- BENEFIT PROCEDURAL IMPLEMENTATION

PHILLIPS, GETSCHOW CO. PROCEDURE PGCP-22
FOR SUPPORT SELECTIONS

SOME CHANGES MADE:

- ORGANIZATION CHANGE; ADDED CHECKER POSITION
- EXPANDED TRAINING; SCOPE, QUANTITY AND INTENSITY
- ADDED PROFICIENCY TEST; EVALUATION TRAINING AND PERSONNEL COMPETENCY
- INSTITUTED "CONTROLLED REFERENCE BOOK
- DEVELOPED STANDARD CALCULATION SHEETS;
20 TECHNICAL CALCULATION SHEETS AND
4 ADMINISTRATIVE CONTROL SHEETS

PHILLIPS, GETSCHOW CO. PROCEDURE PGCP-22
FOR SUPPORT SELECTIONS

VERIFICATIONS: (ALL WERE FOUND ACCEPTABLE)

- S&L TOTAL REVIEW OF WORK PRIOR TO 10/83.
- S&L IMPLEMENTATION REVIEW
- CECO. Q.A. SURVEILLANCE AND AUDIT
- FORMAL PROCEDURE ACCEPTANCE/APPROVAL BY CECO.
(PCD & Q.A.) AND THE A.E. (S&L)

NRC ENFORCEMENT CONFERENCE

BRAIDWOOD PROJECT

DECEMBER 20, 1983

SUMMARY

1. REVIEW GROUPS IDENTIFIED MANY OF THE PHILLIPS, GETSCHOW COMPANY PROBLEMS WITH SMALL BORE PIPING INSTALLATION ROUTING CHANGES, QUALITY CONTROL VERIFICATION OF PIPING CONFIGURATION, PIPING MATERIAL TRACEABILITY, AND SMALL BORE PIPE SUPPORT SELECTION.
2. CORRECTIVE ACTIONS WERE UNDERWAY AT THE TIME OF NRC INSPECTIONS FOR MANY OF THE PROBLEMS.
3. THESE CORRECTIVE ACTIONS INCLUDED MANAGEMENT CHANGES AND ADDITIONS, REORGANIZATION OF ENGINEERING AND QUALITY CONTROL DEPARTMENTS, PROCEDURAL REVISIONS, VERIFICATIONS OF PREVIOUS INSTALLATIONS AND TRAINING OF PERSONNEL.
4. THE STRENGTHENING OF THE PHILLIPS, GETSCHOW COMPANY QUALITY PROGRAM AS PREVIOUSLY COMMITTED TO THE NRC HAS BEEN AN ONGOING AND EVOLVING PROCESS AND SHOULD BE COMPLETED SHORTLY.

SMALL BORE PIPING

Q.A. INVOLVEMENT

I. CONCERNS ADDRESSED BY Q.A.

II. CONCERNS CONSIDERED IN COMPLIANCE

III. CONCERNS PREVIOUSLY IDENTIFIED

IV. CONCERNS NOT IDENTIFIED BY Q.A.

V. CONCLUSION

I. CONCERNS ADDRESSED BY Q.A.

- A. MEASURING EQUIPMENT USAGE
- B. FIELD ENGINEER RESPONSIBILITIES
- C. SUPPORT SELECTION
- D. SUPPORT SELECTOR TRAINING

II. CONCERNS CONSIDERED IN COMPLIANCE

- A. PGCO AUDIT PLAN
- B. S & L ASSESSMENT OF PGCO
- C. FIELD ROUTING OF PIPE
- D. ROUTING PROCEDURE ADEQUACY

III. CONCERNS PREVIOUSLY IDENTIFIED

- A. FCR STAMP ON DRAWING
- B. MATERIAL TRACEABILITY DOCUMENTATION
 - 1. SMALL BORE
 - 2. LARGE BORE

IV. CONCERNS NOT IDENTIFIED BY Q.A.

- A. Q.C. CONFIGURATION CHECKS
- B. Q.C. DIMENSIONAL CHECKS
- C. PGCO NCR #789 DISPOSITION
- D. PGCO INFO REQUEST INSTEAD OF FCR

V. CONCLUSION

- A. MAJORITY OF ITEMS PREVIOUSLY ADDRESSED
- B. NEED FOR IMPROVEMENT
- C. Q.A. PROGRAM EFFECTIVE

NRC ENFORCEMENT CONFERENCE

BRAIDWOOD PROJECT

DECEMBER 20, 1983

VIII. SUMMARY

- EXTENSIVE EVALUATION PERFORMED BY TECHNICAL SUPPORT GROUP AND DANIEL CONSTRUCTION
- SIGNIFICANT ORGANIZATIONAL, PROCEDURAL, MANAGEMENT, AND PERSONNEL CHANGES
- PHILLIPS, GETSCHOW COMPANY REPLACED ALL TOP SITE MANAGEMENT - 21 NEW PERSONNEL ON-SITE
- ACQUIRED MANY LASALLE AND BYRON EXPERIENCED PERSONNEL
- REPLACED OR ADDED QUALITY CONTROL SUPERVISORS AT EACH OF THE THREE MAJOR CONTRACTORS
- ADDED ON-SITE QUALITY ASSURANCE SUPERVISOR AT EACH OF THE THREE MAJOR CONTRACTORS
- INCREASED MAJOR CONTRACTOR QUALITY CONTROL/QUALITY ASSURANCE

88 (08/82)

214 (12/83)

- INCREASED MAJOR CONTRACTOR QUALITY CONTROL INSPECTORS

53 (08/82)

123 (12/83)

(0217D)

VIII. SUMMARY

- QUALITY CONTROL INSPECTOR RE-INSPECTION (ALL CONTRACTORS)
- DOCUMENT REVIEW 10,000 LARGE BORE WELDS (PHILLIPS, GETSCHOW COMPANY)
- PIPING HEAT NUMBER TRACEABILITY (PHILLIPS, GETSCHOW COMPANY)
- 100% RE-INSPECTION INSTRUMENTATION (PHILLIPS, GETSCHOW COMPANY)
- 100% RE-INSPECTION HANGERS (PHILLIPS, GETSCHOW COMPANY)
- 100% RE-INSPECTION EQUIPMENT (PHILLIPS, GETSCHOW COMPANY)
- 100% DOCUMENTATION REVIEW (L. K. COMSTOCK)
- QUALITY CONTROL STRUCTURAL STEEL REVIEW (GKN)
- 100% RE-INSPECTION WELDING (PULLMAN)
- 100% RE-INSPECTION CONFIGURATION (PULLMAN)
- 100% RE-INSPECTION DUCT BROCHURE ITEMS (PULLMAN)