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

APR 2 1 1986

MEMORANDUM FOR: Brian K. Grimes, Director
Division of Quality Assurance, Vendor
and Technical Training Center Programs
Office of Inspection & Enforcement

Eric H. Johnson, Director
Division of Reactor Safety & Projects
Region IV

Charles E. Rossi, Assistant Director
PWR Licensing-A
Office of Nuclear Reactor Regulation

FROM: Vincent S. Noonan, Director
PWR Project Directorate #5
Division of Licensing-A

SUBJECT: PROCEDURE FOR REVIEW OF COMANCHE PEAK RESPONSE TEAM (CPRT) RESULTS REPORTS

On April 4, 1986, the Applicant provided the staff with five (5) CPRT issue specific action plan (ISAP) results reports (2 electrical, 1 civil/structural, 1 testing and 1 QA/QC). We can expect 48 issue specific action plan (ISAP) results reports, 3 collective evaluation reports (construction, design, testing) and a final collective significance report to be submitted to the staff from now through October/November 1986.

Resources

The resources needed to review these results reports will be requested from the Engineering Branch and Electrical Instrumentation & Control Systems Branch, Division of PWR-A, NRR, Region IV, IE, and contractors.

Initiating Review

When the PM receives the results reports from the applicant, you will receive a memorandum enclosing the report which will identify the report number and title, the lead PM and technical reviewer, persons to complete particular sections of the evaluation, contacts for coordination with other offices as necessary, identification of an NRC consultant familiar with the particular subject matter and dates for PM receipt of any RAI, and evaluation.

Contractor Support

Following a brief review of the report you should be able to determine whether contractor assistance is needed. To initiate use of the contractor, the

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enclosed form must filled in and typed. E. Staley, secretary, PD#5 (Ext. 27425), has typed the form on the 5520 and will transmit it to your secretaries to be filled in. Signatures must be obtained by NRC lead reviewer, branch chief, myself and Technical Assistance Management Branch who will initiate the work.

Evaluation

Each evaluation must contain the following:

1.0 Introduction

The introduction must clearly identify what the issue is that is being addressed and provide a reference to the source of the issue (i.e. SSERs 7-11, CYGNA, applicant self-initiated, etc.) The source must be identified in enough specificity to easily locate, such as, this ISAP results report responds to an issue raised in SSER No. 11, Category 3, Allegation AQ-33.

2.0 CPRT Approach

Describe the CPRT approach used to address the issue.

3.0 Evaluation

3.1 Evaluation of CPRT approach

Provide staff evaluation of CPRT approach to resolve the issue.

3.2 Evaluation of Issue Specific Action Plan (ISAP) or Discipline Specific Action Plan (DSAP) Implementation

Provide staff evaluation of whether the plan (ISAP, DSAP) was implemented as identified. If it was not, why it is acceptable or unacceptable. (Identification of open inspection items for the issue should be addressed.)

4.0 Conclusion

Provide conclusion on the plan (ISAP, DSAP) and its implementation to acceptably address the issues raised by an external source or applicants self-initiated effort.

APR 21 1986

Schedule

Day	Activity
1	PM receives (ISAP, DSAP) results report from applicant; prepares memorandum; distributes to lead technical reviewer.
10	Lead technical reviewer identifies any RAI to PM (If the applicant has not responded to an open inspection item for a particular issue, a RAI should be prepared requesting applicants response.); PM prepares letter to applicant, requests response from applicant in 5 days.
15	Applicant responds to RAI; PM distributes.
25	PM receives evaluation inputs completed and signed out by E. Rossi (NRR), E. Johnson (Region IV), and B. Grimes (IE) as appropriate.
26	Meeting between technical reviewer, Section Leader, PM, and OELD to discuss issuance of evaluation at day 45 (or other schedule).
30	Issue notice to licensing board whether staff evaluation will be ready for day 45 (or other schedule).
45	Issue evaluation to all parties (normally, unless an exception is identified at the meeting on day 26).

Vincent S. Noonan, Director
PWR Project Directorate #5
Division of PWR Licensing-A

cc: R. Vollmer
T. Westerman
R. Ballard
F. Rosa
G. Bagchi
J. Knight
D. Norkin
M. Williams
B. Singh
H. Berkson
M. Carrington

NRC - ASSIGNMENT FOR COMANCHE PEAK

FIN NO: ____________ Date Assigned: ______________

Task No: ____________ Contractor: ________________

Task Title: ____

Task Description: ____

____

____

____

Expected Deliverables with Schedules: ______________________________

____

____

Qualifying Assumptions: ____

____

____

Estimated Level of Effort: ________________________ person week (Technical)

Travel: ____

Other: ____

Total Estimate Cost: _______________ (to be prepared by the TAMB)

Program Manager (Contractor: ________________________________

NRC Lead Reviewer: ____

Lead Reviewer Branch: ____

Lead Reviewer Branch Chief: ____________________________________

Project Director NRC: Vincent S. Noonan (FTS 492-7425)

Program Manager TAMB: ____

1) Title: Comanche Peak Response Team Construction Adequacy Program Audit

2) NRC Staff + Consultants:

A. Marinos	NRC
E.B. Tomlinson	NRC
R. Mastelson	NRC
P. Chan	LLNL
M. Yost	EG+G

3) Persons Contacted:

J. Christenson	ERC
A. Patterson	ERC
F. Perrino	ERC
B. Shaik	ERC
T. Kulaga	ERC

4) Documentation Reviewed: (See attached sheet)

5) Population Evaluated: Instrumentation Equipment Installation

6) The Instrumentation Equipment Installation Population is divided into two work processes which are: 1. Tubing/piping and componet installation. 2. Instrument Installation

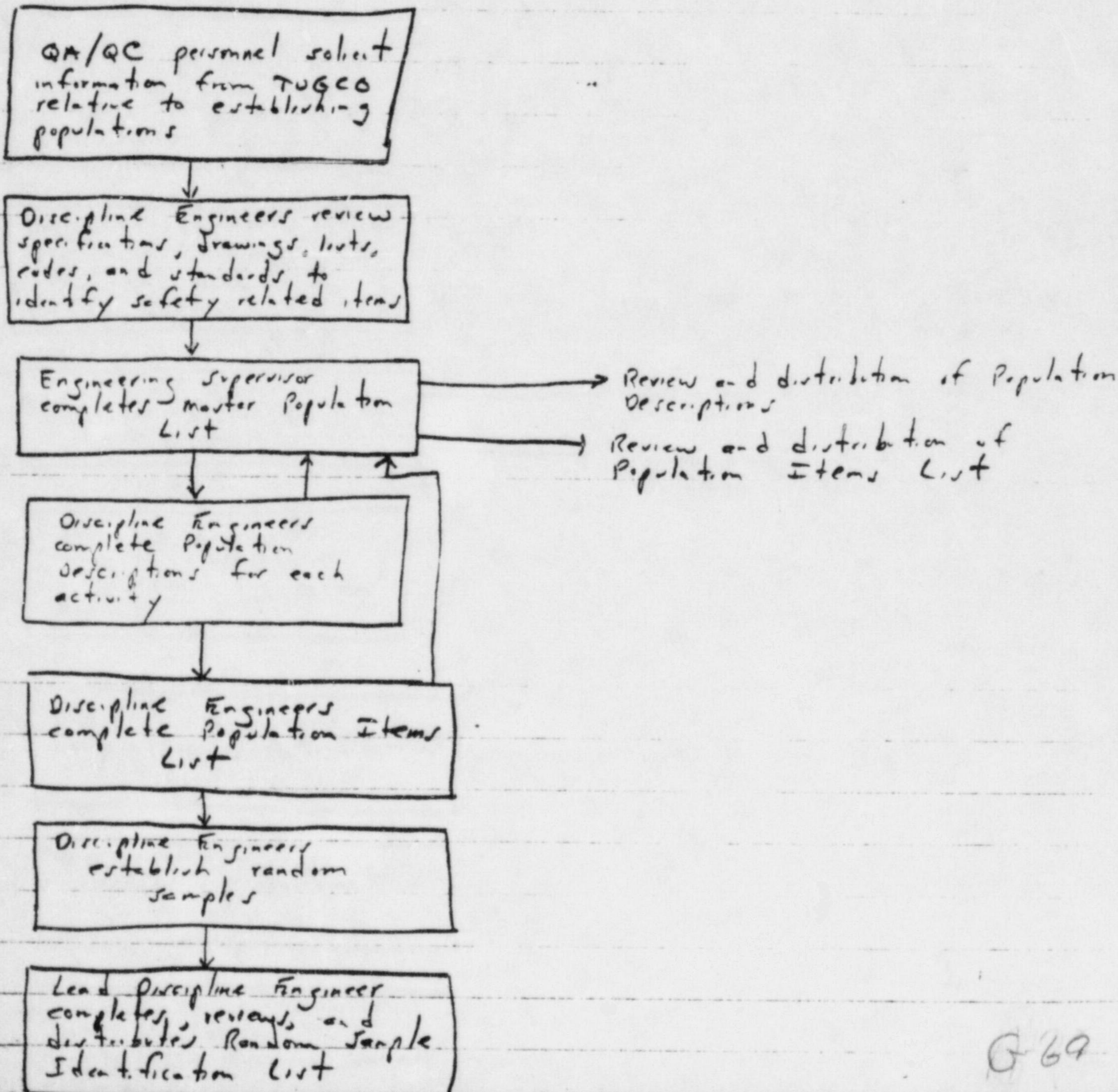
Each work process has specific attributes. Each of the specific attributes were discussed in detail with ERC personnel. In the discussion each attribute, work process, and the Instrumentation Equipment Installation population was evaluated using the above documentation to determine how each was derived and considered complete and adequate by ERC. Also discussed in detail was the sampling process and how the "60" Safe Shutdown samples were obtained

7) From the documentation evaluation and discussions with ERC personnel it appears that the Instrumentation Equipment population is a reasonably homogeneous population and there are no specific outstanding concerns at this time.

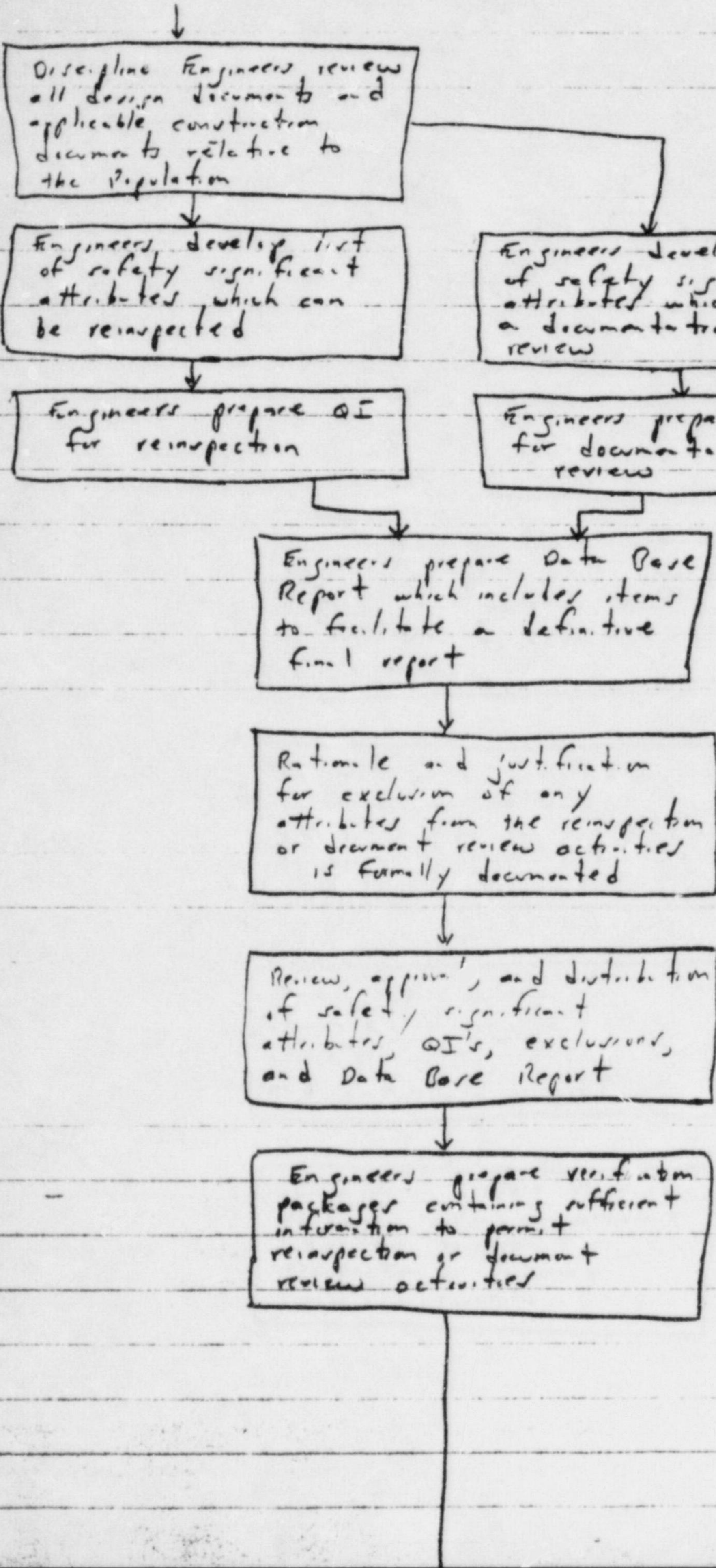
22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

~~ESTABLISHING POPULATIONS~~

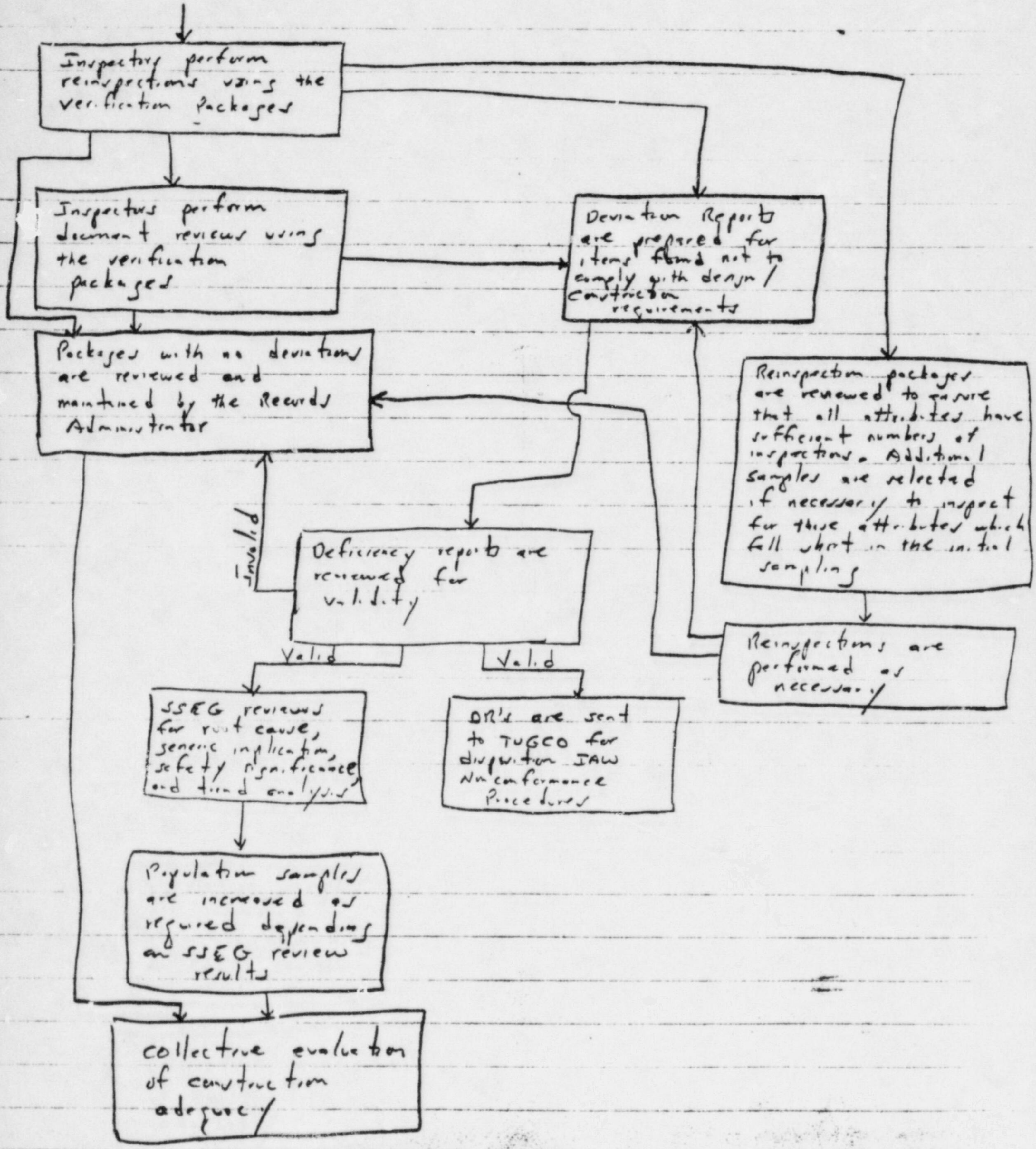
Major-categories, or populations of hardware containing similar safety related work activities will be placed into reasonably homogeneous groups, the adequacy of which can be verified using similar reinspection and/or documentation review activities.



G-69



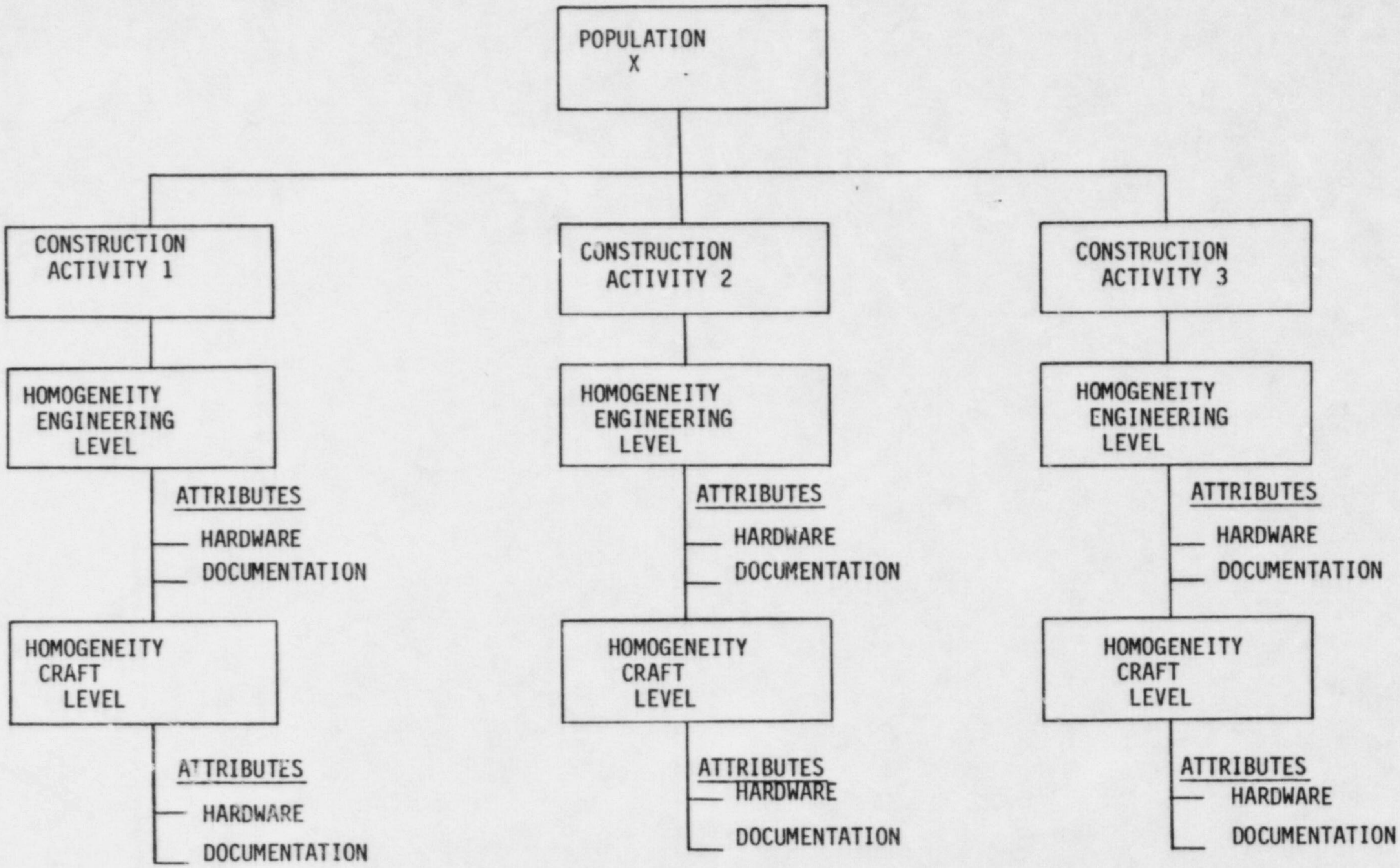
NOTE: Separate Verification Packages are prepared for each sample selected.

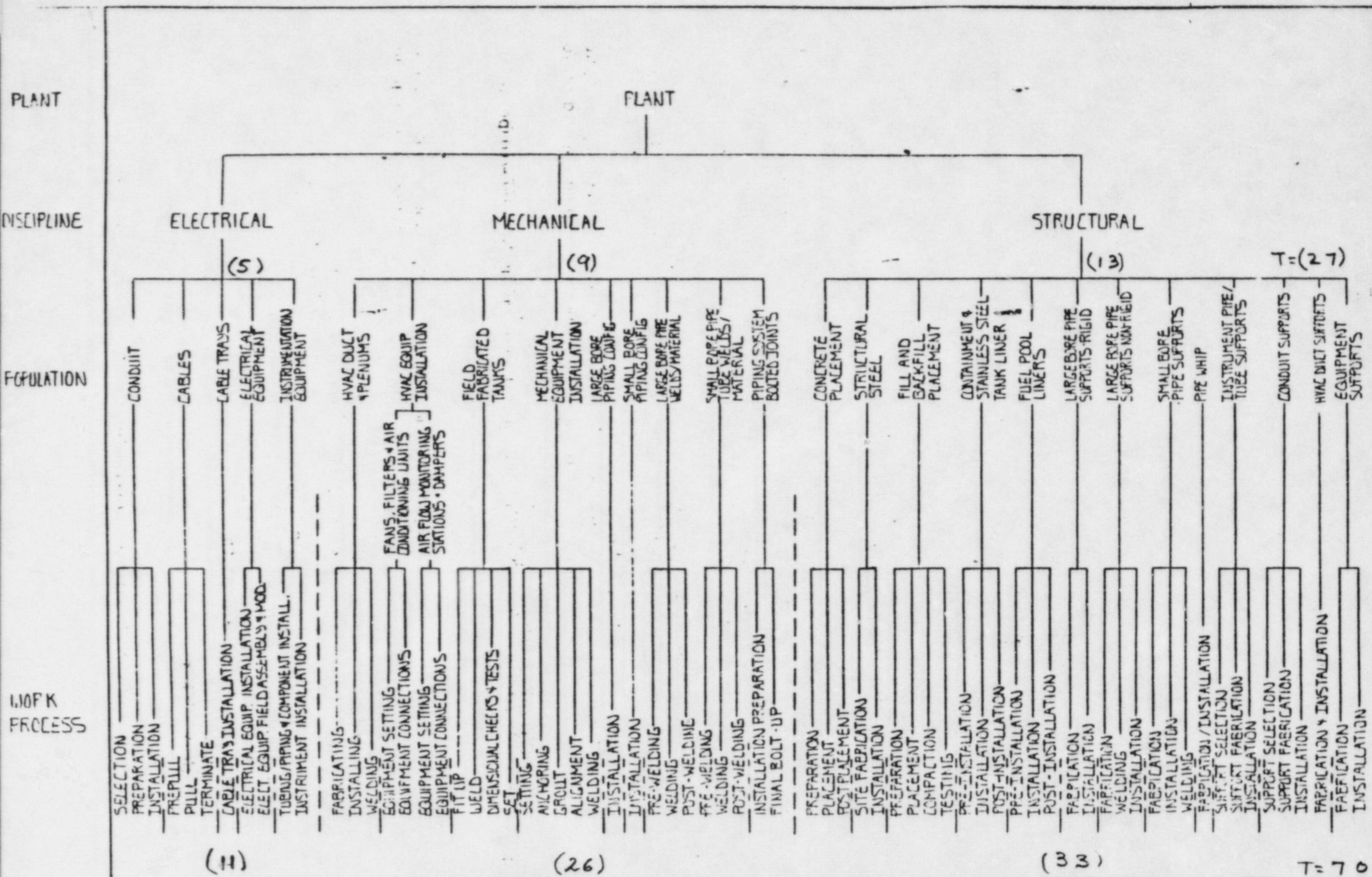


Inspectors perform reinspections using the verification packages
Inspectors perform document reviews using the verification packages
Deviation Reports are prepared for items found not to comply with design/construction requirements
Packages with no deviations are reviewed and maintained by the Records Administrator
Reinspection packages are reviewed to ensure that all attributes have sufficient numbers of inspections. Additional samples are selected if necessary to inspect for those attributes which fall short in the initial sampling
Invalid
Deficiency reports are reviewed for validity
Valid
Valid
Reinspections are performed as necessary
SSEG reviews for root cause, generic implication, safety significance and trend analysis
DR's are sent to TUGCO for disposition IAW Nonconformance Procedures
Population samples are increased as required depending on SSEG review results
collective evaluation of construction adequacy

CPSES - CPRT

HOMOGENEOUS CONSTRUCTION ACTIVITIES



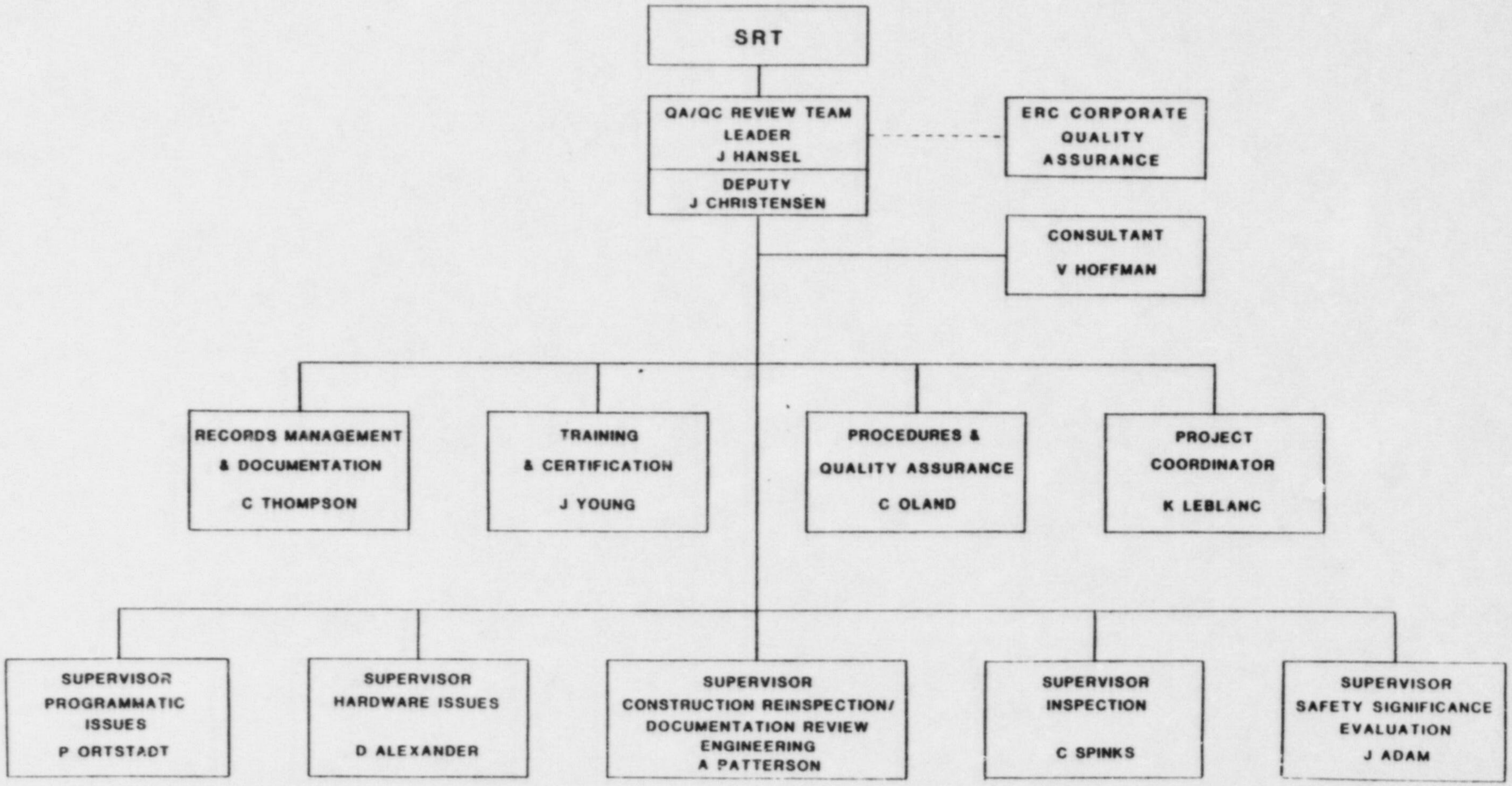


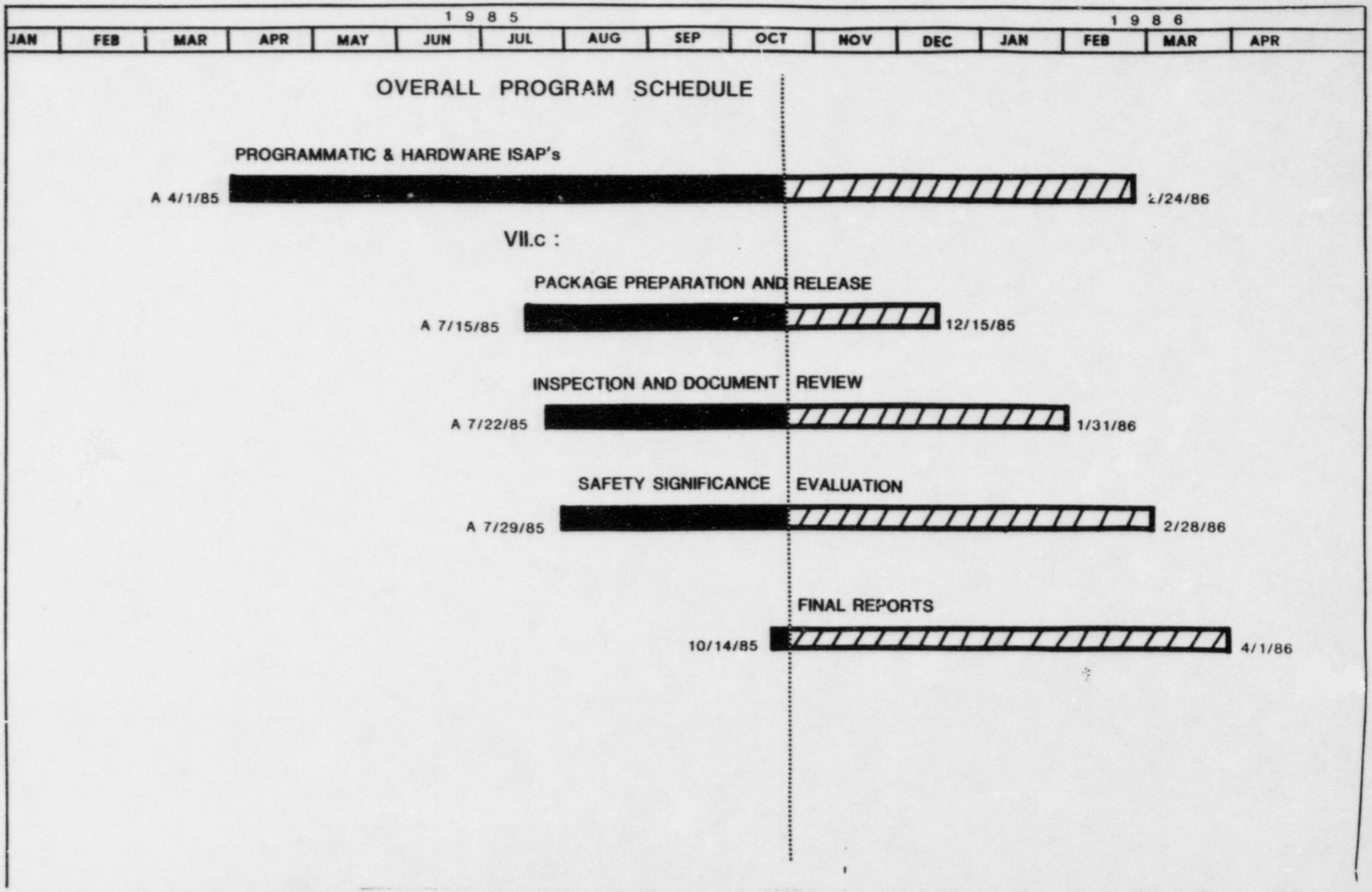
PLANT
DISCIPLINE
POPULATION
WORK PROCESS
PLANT
ELECTRICAL
MECHANICAL
STRUCTURAL
(5)
(9)
(13)
T=(27)
CONDUIT
CABLES
CABLE TRAYS
ELECTRICAL EQUIPMENT
INSTRUMENTATION EQUIPMENT
HVAC DUCT & PLENUMS
HVAC EQUIP INSTALLATION
FANS, FILTERS & AIR CONDITIONING UNITS
AIR FLOW MONITORING STATIONS & DAMPERS
FIELD FABRICATED TANKS
MECHANICAL EQUIPMENT INSTALLATION
LARGE BORE PIPING CONFIG
SMALL BORE PIPING CONFIG
LARGE BORE PIPE WELDS/MATERIAL
SMALL BORE PIPE TUBE WELDS/ MATERIAL
PIPING SYSTEM BOLTED JOINTS
CONCRETE PLACEMENT
STRUCTURAL STEEL
FILL AND BACKFILL PLACEMENT
CONTAINMENT & STAINLESS STEEL TANK LINER
FUEL POOL LINERS
LARGE BORE PIPE SUPPORTS-RIGID
LARGE BORE PIPE SUPPORTS NON-RIGID
SMALL BORE PIPE SUPPORTS
PIPE WHIP
INSTRUMENT PIPE/ TUBE SUPPORTS
CONDUIT SUPPORTS
HVAC DUCT SUPPORTS
EQUIPMENT SUPPORTS
SELECTION
PREPARATION
INSTALLATION
PREPULL
PULL
TERMINATE
CABLE TRAYS INSTALLATION
ELECTRICAL EQUIP. INSTALLATION
ELECT. EQUIP. FIELD ASSEMBLY & MOD.
TUBING/PIPING & COMPONENT INSTALL.
INSTRUMENT INSTALLATION
FABRICATING
INSTALLING
WELDING
EQUIPMENT SETTING
EQUIPMENT CONNECTIONS
EQUIPMENT SETTING
EQUIPMENT CONNECTIONS
FIT UP
WELD
DIMENSIONAL CHECKS & TESTS
SET
SETTING
ANCHORING
GROUT
ALIGNMENT
WELDING
INSTALLATION
INSTALLATION
PRE-WELDING
WELDING
POST-WELDING
PRE-WELDING
WELDING
POST-WELDING
INSTALLATION PREPARATION
FINAL BOLT-UP
PREPARATION
PLACEMENT
POST PLACEMENT
SITE FABRICATION
INSTALLATION
PREPARATION
PLACEMENT
COMPACTION
TESTING
PRE-INSTALLATION
INSTALLATION
POST-INSTALLATION
PRE-INSTALLATION
INSTALLATION
POST-INSTALLATION
FABRICATION
INSTALLATION
FABRICATION
WELDING
INSTALLATION
FABRICATION
INSTALLATION
WELDING
FABRICATION/INSTALLATION
SUPPORT SELECTION
SUPPORT FABRICATION
INSTALLATION
SUPPORT SELECTION
SUPPORT FABRICATION
INSTALLATION
FABRICATION & INSTALLATION
FABRICATION
INSTALLATION
(11)
(26)
(33)
T=70

CPSES
CONSTRUCTION INSPECTIONS

1. SIT
2. CAT (REVIEW RADIOGRAPHS AND FIELD MODIFICATIONS)
3. SRT
4. RESIDENT INSPECTOR
5. REGION IV
6. NDE MOBILE VAN (ANALYSIS FOUND ACCEPTABLE)
7. TRT
8. FSAR RELATED SITE VISITS
9. CYGNA PHASE 1, 2, 3 AND 4 WALKDOWNS
10. CPRT DESIGN ADEQUACY REVIEW WALKDOWNS
11. CPRT ISAPS (VARIOUS SELECTED RANDOM AND BIAS SAMPLES)
12. CABLE TRAY AND CONDUIT SUPPORTS - 100% REINSPECTION
13. LARGE BORE PIPES/SUPPORTS - 100% REINSPECTION
14. SMALL BORE PIPES/SUPPORTS - SELECTED SAMPLE
15. CPRT SELF-INITIATED CONSTRUCTION ADEQUACY REVIEW

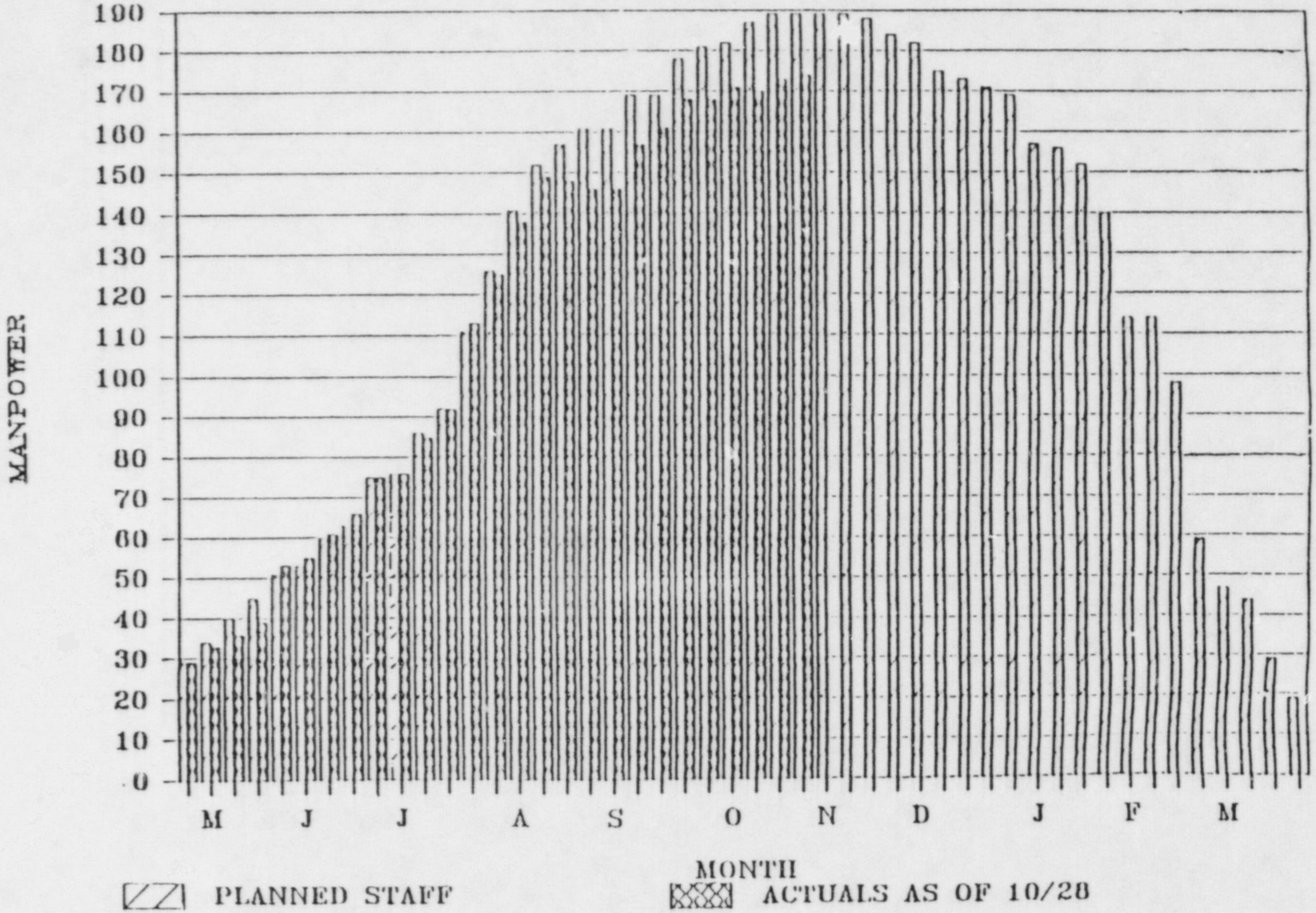
QA/QC REVIEW TEAM ORGANIZATION




1985
1986
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
OVERALL PROGRAM SCHEDULE
PROGRAMMATIC & HARDWARE ISAP's
A 4/1/85
2/24/86
VII.c :
PACKAGE PREPARATION AND RELEASE
A 7/15/85
12/15/85
INSPECTION AND DOCUMENT REVIEW
A 7/22/85
1/31/86
SAFETY SIGNIFICANCE EVALUATION
A 7/29/85
2/28/86
FINAL REPORTS
10/14/85
4/1/86

TOTAL QA/QC REVIEW TEAM

PLANNED VS. ACTUAL MANPOWER



ISSUES: LACK OF SUPPORTIVE DOCUMENTATION REGARDING PERSONNEL QUALIFICATION IN THE TRAINING AND CERTIFICATION FILES FOR ALL ELECTRICAL INSPECTORS AND ALL OTHER CURRENT INSPECTORS.

APPROACH: EVALUATION ACTION PLANNED

- PHASE I - REVIEW DOCUMENTATION OF INSPECTORS QUALIFICATIONS AGAINST REQUIREMENTS AND ANSI STANDARDS IN PLACE AT TIME OF CERTIFICATION.
- PHASE II - EVALUATE QUALIFICATIONS THAT COULD NOT BE VERIFIED IN PHASE I.
- PHASE III - EVALUATE A SAMPLE OF WORK OF THOSE INSPECTORS NOT RECONCILED IN PHASE II TO DETERMINE:
  - IF INSPECTOR WAS ABLE TO CONDUCT INSPECTIONS DESPITE WEAKNESSES IN QUALIFICATION DOCUMENTATION.
  - IF INSPECTIONS RESULTED IN SAFETY SIGNIFICANT DEFICIENCIES REMAINING IN THE HARDWARE AFTER INSPECTION.

STATUS: OCTOBER 15, 1985

- PHASE I - COMPLETE
- PHASE II - RECONCILIATION OF ALL EVALUATIONS IN PROCESS
- PHASE III - REINSPECTIONS ARE BEING COMPLETED AS THEY ARE IDENTIFIED IN PHASE II

PRELIMINARY FINDINGS:

- IN SOME CASES INSPECTOR QUALIFICATIONS WERE NOT IN ACCORDANCE WITH PROCEDURAL REQUIREMENTS AT TIME OF CERTIFICATION.

GUIDELINES FOR ADMINISTRATION OF QC INSPECTOR TEST ISAP I.D.2

ISSUE: LACK OF GUIDELINES AND PROCEDURAL REQUIREMENTS FOR THE TESTING AND CERTIFYING OF ELECTRICAL INSPECTORS.

APPROACH: EVALUATION ACTION PLANNED

- PHASE I - REVIEW OF PROCEDURES AND RECOMMENDED IMPROVEMENTS
- PHASE II - RECONCILIATION AND CONCURRENCE OF PROCEDURAL RECOMMENDATIONS
- PHASE III - REVIEW OF SYSTEM

STATUS: OCTOBER 15, 1985

- PHASE I - COMPLETE
- PHASE II - MAIN PROGRAM - COMPLETE
- PHASE III - IMPLEMENTATION IS BEING MONITORED

PRELIMINARY FINDINGS:

- WRITTEN PROGRAM DID NOT PROVIDE ADEQUATE CONTROL FOR EXAMINING INSPECTION PERSONNEL

MATERIAL TRACEABILITY ISAP VII.A.1

ISSUE: IS THE SYSTEM FOR MATERIAL TRACEABILITY ADEQUATE AND PROPERLY IMPLEMENTED?

- WAS MATERIAL IDENTIFICATION AND TRACEABILITY MAINTAINED FOR ONSITE AND FIELD FABRICATED COMPONENT AND PIPE SUPPORTS?

- DID B&R FAILURE TO PASS A 1981 ASME SURVEY RESULT FROM A FAILURE TO MAINTAIN MATERIAL TRACEABILITY?

APPROACH: EVALUATION

- OF: SYSTEM AND PROCEDURAL BASIS AND IMPLEMENTATION.

- BY: PROCEDURE AND DOCUMENT REVIEW, INTERVIEWS, INPUT FROM RELATED ISAPS: VII.B.1, VII.B.3, VII.C.

STATUS: OCTOBER 15, 1985:

- 1981 ASME SURVEY REVIEW COMPLETED.

- PROCEDURE REVIEW APPROXIMATELY 75% COMPLETE.

- OTHER ISAP RESULTS ARE NOT AVAILABLE YET.

PRELIMINARY FINDINGS:

- B&R PRACTICES DID NOT CONSTITUTE A "LOSS OF MATERIAL TRACEABILITY" IN VIOLATION OF THE ASME B&PV CODE.

- BASED ON THIS, THE ISSUE WAS NOT REPORTABLE (50:55E).

NON-CONFORMANCE AND CORRECTIVE ACTION SYSTEMS   ISAP VII.A.2

ISSUE: Are the systems for Nonconformance Control, Corrective Action, and 10 CFR 50.55 (e) reportability adequate and properly implemented?

- Did large number of forms allow for proper control of nonconformance?
- Is there an adequate trend program in place?
- Are the TUEC and Brown and Root Corrective Action Systems properly implemented?
- Are all 10 CFR 50.55 (e) reportable items being reported?

APPROACH: Evaluation

- Of: System and Procedures, Implementation.
- By: Document review, interview, and observation of current systems.

STATUS: October 15, 1985:

- NCR's review approximately 75% complete (this includes NCR's and other forms).
- Corrective Action System (including trending) 20% complete.
- 10 CFR 50.55(e) Reportability System 10% complete.

PRELIMINARY FINDINGS:

- The control of disposition/correction of nonconforming items is acceptable; however, minor improvements can be made to procedures.
- Corrective Action (Non-ASME) Procedures revised August, 1985. Improvements were made, we will assess implementation.
- Corrective Action (ASME) Procedures adequate.

ISSUE: WHAT EFFECT DID INADEQUACIES IN THE DOCUMENT CONTROL PROGRAM PRIOR TO JULY 1984 HAVE ON THE PLANT?

APPROACH: EVALUATION

- OF: INSTALLED HARDWARE; PREREQUISITE AND PREOPERATIONAL TEST PROCEDURES
- BY: EVALUATION OF RESULTS REPORTS FOLLOWING IMPLEMENTATION OF ISAPS III.D AND VII.C.

STATUS: OCTOBER 15, 1985

- EVALUATION OF ISAP III.D RESULTS

PRELIMINARY FINDINGS:

- PRELIMINARY RESULTS FOR ISAP III.D INDICATES THAT DOCUMENT CONTROL INADEQUACIES HAD NO ADVERSE EFFECT ON TESTING PROGRAMS.

AUDIT PROGRAM AND AUDITOR QUALIFICATIONS ISAP VII.A.4

ISSUE: THE TUGCO QA AUDIT PROGRAM (PROCEDURE CONTENT AND PROCEDURE IMPLEMENTATION) WAS INADEQUATE; AUDIT PERSONNEL STAFFING (NUMBER AND QUALIFICATIONS) WAS INADEQUATE.

APPROACH: EVALUATION

- OF: SYSTEM AND PROCEDURES; IMPLEMENTATION
- BY: DOCUMENT REVIEW, INTERVIEW, AND OBSERVATION OF CURRENT SYSTEMS

STATUS: OCTOBER 15, 1985

- PROGRAM DOCUMENT REVIEW COMPLETE (INCLUDES PSAR/FSAR, TUGCO QA PROGRAM, CPSES QA PLAN, AND IMPLEMENTING PROCEDURES).
- RECORD FILES REVIEW APPROXIMATELY 75% COMPLETE (INCLUDES AUDIT FILES, AUDIT PERSONNEL QUALIFICATIONS, ETC.)

PRELIMINARY FINDINGS:

- WRITTEN PROGRAM NOT COMPLETELY IN ACCORDANCE WITH APPLICABLE REQUIREMENTS (ANSI 45.2.12)
- OVERALL PROGRAM IMPLEMENTATION ADEQUACY HAS NOT BEEN DETERMINED AT THIS TIME.

MANAGEMENT ASSESSMENT ISAP VII.A.5

<u>ISSUE</u>: TUEC MANAGEMENT FAILED TO PERIODICALLY REVIEW THE STATUS AND ADEQUACY OF THEIR QA PROGRAM.

<u>APPROACH</u>:

- REVIEW IN-PLACE MANAGEMENT ASSESSMENT PROGRAMS IN OTHER ORGANIZATIONS
- DEVELOP CRITERIA FOR PROGRAM
- ASSESS CURRENT CPSES PROGRAM

<u>STATUS</u>: OCTOBER 15, 1985

- OBTAINED SOME OUTSIDE SOURCE MATERIAL (INPO)

<u>PRELIMINARY FINDINGS</u>:

- NONE AT THIS TIME

EXIT INTERVIEWS ISAP.VII.A.6

ISSUE: EMPLOYEE EXIT INTERVIEW SYSTEM INEFFECTIVE

- LACK OF EMPLOYEE CONFIDENCE
- LIMITED IMPLEMENTATION
- ACTIVITIES UNDOCUMENTED
- INCOMPLETE CORRECTIVE ACTIONS

APPROACH: EVALUATE

- OF: OMBUDSMAN/SAFETEAM PROGRAMS
- BY: PROGRAM/IMPLEMENTATION REVIEW & COMPARISON TO INDUSTRY EXAMPLES TO EVALUATE HANDLING OF PAST CONCERNS

STATUS: OCTOBER 15, 1985

- OMBUDSMAN INTERVIEWS COMPLETE
- OBTAINING INDUSTRY INPUT ON OTHER PROGRAMS

PRELIMINARY FINDINGS: NONE TO DATE

ISSUE: Are systems adequate to maintain design cleanliness and protect equipment and material from damage or deterioration?

- Were the procedural requirements for RV Cleaning adequate?
- Was equipment protected from construction activity?
- Was control of construction debris adequate to maintain required separations in "critical spaces"?

APPROACH: Evaluation

- Of: System and procedural basis and implementation.
- By: Procedure and document review, interviews, observation of TUGCO surveillance, input from related ISAPs: II.c, VI.a.

STATUS: October 15, 1985:

- Reactor Vessel cleanliness review completed.
- Procedure reviews complete.
- Observation of surveillance activity approximately 80% Complete.

PRELIMINARY FINDINGS:

- RV cleanliness verification adequate.
- Past and current procedural requirements for Housekeeping and Cleanliness adequate.
- Past procedural requirements for surveillance of Housekeeping , Cleanliness and Storage were inadequate.

ISSUE: Was the erection and inspection of the Fuel Pool Liners properly controlled and documented?

- Were fuel pool travelers changed after the fact with insufficient justification?
- Were the fuel pool travelers completed by qualified and certified personnel at the time the inspections or examinations were performed?

APPROACH: Evaluation

- Of: Fuel pool liner documentation adequacy, correctness, and completeness
- By: Procedure and document review.

STATUS: October 15, 1985:

- 1st 60 (of 300) travelers reviewed; preliminary review of related weld material issue records.

PRELIMINARY FINDINGS:

- None to date.

ISSUE: WERE THE FABRICATION CONTROLS FOR PIPING SUBASSEMBLIES AND COMPONENT SUPPORTS ADEQUATE TO ASSURE USE OF QUALIFIED PROCESS PROCEDURES AND MAINTENANCE OF MATERIAL IDENTIFICATION?

- WERE SHOP MATERIAL STORAGE AREAS PROPERLY MAINTAINED AND MATERIAL SEGREGATED?
- WAS SHOP FABRICATION WORK DONE TO APPROPRIATE REQUIREMENTS AND PROPERLY DOCUMENTED?

APPROACH: EVALUATION

- OF: SHOP FABRICATION PRACTICES, DOCUMENTATION, AND STORAGE.
- BY: PROCEDURE AND DOCUMENT REVIEW, INTERVIEW, REINSPECTION IF WE FIND DOCUMENTATION DISCREPANCIES.

STATUS: OCTOBER 15, 1985:

- PROCEDURE REVIEW APPROXIMATELY 75% COMPLETE.

PRELIMINARY FINDINGS:

- NONE TO DATE.

VALVE DISASSEMBLY ISAP VII.B.2

ISSUE: CONTROL OF DISASSEMBLED VALVE PARTS WAS INADEQUATE CREATING POTENTIAL FOR INTERCHANGING VALVE BONNETS AND INTERNAL PARTS HAVING DIFFERENT PRES. & TEMP. RATINGS.

APPROACH:

- REVIEW SPEC/PROCEDURE REQUIREMENTS
- IDENTIFY VALVES WHICH HAVE BEEN DISASSEMBLED
- SELECT SAMPLE AND PERFORM INSPECTIONS
- EVALUATE RESULTS/ROOT CAUSES
- REPORT/ADVISE TUGCO

STATUS: OCTOBER 15, 1985

- ALL INSPECTIONS COMPLETE

PRELIMINARY FINDINGS:

- NO CONSTRUCTION DEFICIENCIES FOUND

PIPE SUPPORT INSPECTIONS ISAP VII.B.3

ISSUE:

- Hardware deviations on QC accepted and installed pipe supports.
- Deviations for welds, support identification, locking devices, material identification, as-built drawings.

EVALUATION APPROACH: Verification Action Planned

- Reinspect the TRT pipe support sample to verify pipe support deviations and analyze for significance.
- Utilize the Action Plan VII.c inspection results to achieve broad and meaningful results.
- Determine root cause of each valid Construction deficiency and adverse trend.
- Evaluate for programmatic and generic implications.

CURRENT STATUS: (10/15/85)

- Reinspections 90% complete.

PRELIMINARY FINDINGS:

- Deviations found in room 77N agree with types identified by TRT.

- One Construction deficiency was issued for missing Pipe Support cotter pin in room 77N.

HILTI ANCHOR BOLT INSTALLATION ISAP VII.B.4

ISSUE:

INVESTIGATE ALLEGATIONS OF HILTI INSTALLATION DEVIATIONS

- MINIMUM EMBEDMENT
- VERIFICATION OF TORQUE
- MINIMUM EDGE DISTANCE
- SKEWED BOLTS

EVALUATION APPROACH:

- REVIEW SPEC/PROCEDURE REQUIREMENTS
- IDENTIFY ATTRIBUTES & SAMPLE
- INITIATE INSPECTION UNDER VII.C
- INITIATE TORQUE VERIFICATION PROGRAM
- EVALUATE RESULTS/ROOT CAUSES/GENERIC IMPLICATIONS

CURRENT STATUS: OCTOBER 15, 1985

- VII.C INSPECTIONS APPROXIMATELY 65% COMPLETE
- PROCEDURE AND SAMPLING FOR TORQUE VERIFICATION PROGRAM BEING PREPARED

PRELIMINARY FINDINGS:

- NO ADVERSE TRENDS IDENTIFIED TO DATE

ELECTRICAL RACEWAY SUPPORT INSPECTIONS ISAP VII.B.5

ISSUE:

- UNDERSIZE WELDS, MISPLACED WELDS
- UNAUTHORIZED CONFIGURATION CHANGES
- UNDERSIZE NUTS
- HILTI ANCHOR BOLT INSTALLATION DEFICIENCIES

APPROACH:

- CABLE TRAY SUPPORTS ARE BEING COVERED BY THE TUGCO CABLE TRAY HANGER DESIGN ADEQUACY UNIT #1 PROGRAM (CP-EI-4.0-75).
- FOR CONDUIT THE FOLLOWING APPROACH WILL BE USED:
  - REVIEW SPECIFICATIONS, DRAWINGS AND BOTH INSTALLATION AND INSPECTION PROCEDURES.
  - IDENTIFY POPULATION.
  - SELECT SAMPLES AND PERFORM INSPECTIONS.
  - PERFORM DOCUMENT REVIEW.
  - EVALUATE RESULTS/ROOT CAUSES AND GENERIC IMPLICATIONS.

STATUS: OCTOBER 15, 1985

- 33% OF INSPECTION COMPLETE.

PRELIMINARY FINDING:

- NO CONSTRUCTION DEFICIENCIES FOUND TO DATE

POPULATION LIST

ELECTRICAL (E)

CONDUIT (CDUT)
CABLE (CABL)
CABLE TRAY (CATY)
ELECTRICAL EQUIPMENT (EEIN)
INSTRUMENTATION EQUIPMENT (ININ)
* LIGHTING (LITG)

MECHANICAL (M)

HVAC DUCTS & PLENUMS (DUPL)
HVAC EQUIPMENT INSTALLATION (HVIN)
FIELD FABRICATED TANKS (FFTA)
MECHANICAL EQUIPMENT INSTALLATION (MEIN)
LARGE BORE PIPING CONFIGURATION (LBCO)
SMALL BORE PIPING CONFIGURATION (SBCO)
* PIPE - WELDS & MATERIAL (PIWM)
PIPING SYSTEM BOLTED JOINTS/MATERIAL (PBOM)

STRUCTURAL (S)

CONCRETE PLACEMENT (CONC)
STRUCTURAL STEEL (STEL)
LINERS (LINR)
FUEL POOL LINER (FPLR)
FILL & BACKFILL PLACEMENT (FILL) - DOCUMENT REVIEW ONLY
* GROUT - CEMENT (GRTC)
* GROUT - EPOXY (GRTE)
LARGE BORE PIPE SUPPORTS - RIGID (LBSR)
LARGE BORE PIPE SUPPORTS - NON RIGID (LBSN)
SMALL BORE PIPE SUPPORTS (SBPS)
LARGE BORE PIPE WHIP RESTRAINTS (PWRE)
INSTRUMENT PIPE/TUBE SUPPORTS (INSP)
CAT 1 CONDUIT SUPPORTS (COSP)
HVAC DUCT SUPPORTS (HVDS)
* EQUIPMENT SUPPORTS (EQSP)

* INDICATES NEW POPULATIONS OR CHANGES

MECHANICAL

CHECKLISTS

TOTAL REQUIRED	9
TOTAL ISSUED	9

PACKAGE PREPARATION

TOTAL REQUIRED	1470
TOTAL ISSUED	463

REINSPECTIONS

VISUAL INSPECTIONS COMPLETED	322
DOCUMENT REVIEWS COMPLETED	0
TOTAL INSPECTIONS COMPLETED	322

DEVIATION REPORTS

ISSUED	210
REVIEWED BY SSEG	13

STRUCTURAL

CHECKLISTS

TOTAL REQUIRED	12
TOTAL ISSUED	12

PACKAGE PREPARATION

TOTAL REQUIRED	2182
TOTAL ISSUED	895

REINSPECTIONS

VISUAL INSPECTIONS COMPLETED	370
DOCUMENT REVIEWS COMPLETED	122
TOTAL INSPECTIONS COMPLETED	492

DEVIATION REPORTS

ISSUED	559
REVIEWED BY SSEG	122

ELECTRICAL

CHECKLISTS

TOTAL REQUIRED	5
TOTAL ISSUED	5

PACKAGE PREPARATION

TOTAL REQUIRED	950
TOTAL ISSUED	678

REINSPECTIONS

VISUAL INSPECTIONS COMPLETED	303
DOCUMENT REVIEWS COMPLETED	252
TOTAL INSPECTIONS COMPLETED	555

DEVIATION REPORTS

ISSUED	216
REVIEWED BY SSEG	60

SAFETY SIGNIFICANCE EVALUATIONS STATUS

MECHANICAL

SUMMARY THROUGH 10-15-85				
POPULATION		NUMBER DRs RECEIVED	NUMBER SSEs COMPLETED	NUMBER CDs
HVAC DUCTS & PLENUMS	DUPL	21	1	0
LARGE BORE PIPING CONFIGURATION	LBCO	15	6	0
SMALL BORE PIPING CONFIGURATION	SBCO	23	4	0
PIPING SYSTEM BOLTED JOINTS/ MATERIAL	PBOM	7	2	0
VALVE DISASSEMBLY	VALV	4	4	0

SAFETY SIGNIFICANCE EVALUATIONS STATUS

STRUCTURAL

SUMMARY THROUGH 10-15-85

POPULATION		NUMBER DRs RECEIVED	NUMBER SSEs COMPLETED	NUMBER CDs
CONCRETE PLACEMENT	CONC	14	5	0
LINERS	LINR	80	64	0

SAFETY SIGNIFICANCE EVALUATIONS STATUS

ELECTRICAL

SUMMARY THROUGH 10-15-85

POPULATION		NUMBER DRs RECEIVED	NUMBER SSEs COMPLETED	NUMBER CDs
CONDUIT	CDUT	20	10	0
CABLE	CABL	43	24	0
CABLE TRAY	CATY	31	20	0
ELECTRICAL EQUIPMENT	EEIN	20	6	0
INSTRUMENTATION EQUIPMENT	ININ	56	0	-

SAFETY SIGNIFICANCE EVALUATIONS STATUS

SUPPORTS

Summary Through 10-15-85				
POPULATION		Number DRs Received	Number SSEs Completed	Number CDs
Large Bore Pipe Supports-Rigid	LBSR	46	13	0
Large Bore Pipe Supports - Non-rigid	LBSN	40	18	0
Pipe Supports in Room 77	PS7N	39	19	1
Small Bore Pipe	SBPS	60	20	0
Instrument Pipe/ Tube Supports	INSP	1	0	-

MISC6 - discussion

Larry Shao
Fred Leverenz prepared this as a result of our discussion with Dave Jeng
Bernie

#16

DISCUSSION OF TECHNICAL ISSUES IN CPRT SAMPLING

I. Should Human Error be Accounted for in the CPRT Sampling Process

It is possible that the sampling process and conclusions could be impacted by human error. Specifically, the technician performing the acceptance test could make an error such that a defect on a specific item was overlooked. This type of error is of the nature of that when a person is asked to write his name numerous times; while this is a well known process to an individual, a person will still make an occasional mistake. Other underlying causes of making mistakes with a greater likelihood in the detection process are: inexperience (training), working conditions (too hot), boredom (repeating process many times), etc. These are existing human error evaluation procedures which could be applied to any specific detection process to estimate the likelihood of an error. These errors generally fall in a probability range of one in a thousand to one in ten per test. This type of error can be considered in the sampling process as shown below.

Assume that the probability of a human error in the detection process is P_H. Specifically, this is the probability that the technician will miss a defect due to his error. If the population percentage detected is PD, then there are two scenarios which result in a specific item being classified as having no defects:

1. There is, in actuality, no defects;
2. There is a defect, but it is not detected.

Each of these scenarios has a probability of occurring for any given item selected from the population, that is;

(1-PD/100) = probability that a selected item is not defective

(PD/100) P_H = probability that a selected item is defected and the technician does not detect it due to an error.

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Thus, the total probability of "defect free" result on a specific item is:

$$1\text{-}PD^*/100 = (1\text{-}PD/100) + (PD/100)\ P_H \qquad (1)$$

This equation can be algebraically rearranged to a more useful form:

$$PD^* - PD\ (1\text{-}P_H) \qquad (2)$$

Or, the perceived defect level is equal to the actual level (PD) times the probability that the technician does not make an error ($1 - P_H$). In the existing sampling plan, the results obtained are really for PD*. This table can be modified, however, if a value is known for the human error (P_H). The effect is to increase number of samples needed.

For example, the upper bound for P_H can be expected to be 0.1-error/test. Thus, the success is:

$$(1\text{-}P_H) = .9$$

Thus, (rearranging equation (2))

$$PD = PD^*/(1\text{-}P_H),$$

and for

$$PD^* = 5\%$$
$$PD = 5.6\%$$

Thus, the test for 95/5, given a large human error, is in reality a 95/5.6 test. This can be adjusted for by requiring a larger sample size for zero, one, two, etc. detected defects. For example, if a 95/5 is required for zero detected items, (with P_H equal to 0.1/PD* must be 4.5% to obtain a PD of 5%), then the sample size must be 65. The following table provides estimates of a few more selected values.

SAMPLE SIZE

	.1	.01	.001	Detected Item
5.0 PD	65	60	60	0
2.5 PD	140	120	120	0
1.0 PD	340	300	300	0
5.0 PD	105	95	95	1
2.5 PD	210	190	190	1
1.0 PD	520	474	474	1

The conclusion is that only relatively large human error would impact the sampling process.

II. Is the "Sampling" Impacted if it is Conducted in Parallel by More Than One Person

Using multiple technicians to test sub-populations of a specific sample does not have any theoretical impact on the process. It does assume, as before, that no mistakes are made. In a sense, there is an advantage for more than one person performing the test. That is, one person may make a systematic mistake, and evaluate his entire sample incorrectly. Having another staff member doing the same process in parallel would minimize the likelihood of such an occurrence. Consider a situation where the entire population (or a large portion) is defective due to a common cause. A technician might assume his testing is incorrect when multiple items are found defective. He might even "adjust" his procedure to allow them to pass. If more than one technician were involved, they may recognize such a situation more readily by comparing experiences.

III. If a Sub-population of the Original Sample (Say 10%) were Checked, What Additional Insight Would be Gained if the Sample Were Taken

A. Without replacement

B. With replacement

A. Without Replacement

In the case where the sub-population is taken without replacement, the statistical methods involved would be the same as the original sample. However, the conclusions could only be based on the sampled population. That is, if the sub-population were chosen from the original sample, the conclusiohs apply only to the sample, not to the population the sample came from. If the additional samples come from original population, the results reflect the original population. In addition, in this latter case, the results can be interpreted as having increased the original sample, thus increasing confidence by a separate technician (See Section II discussion).

For example, assume the utility has taken a sample of 60 with zero defects (assume human error is small). A third party sample of 6 is taken to say that there is 95% confidence that the percentage of defects in the utility's sample is less than 46%. (Note: This assumes an infinite population and is lower for finite population.)

If, on the other hand, the sample of 6 is from the original population, the statement is modified. That is, the 3rd party sample, ignoring the utility results, can be interpreted to say that the percentage of defects in the original population is less than 40% with 95% confidence that the defects are less than 5%. Note that in the latter case, confidence is improved (95% to 97%) and the possible concerns of a common cause human error, as discussed in Part II, are qualitatively addressed.

B. With Replacement

Another possible way to do the sampling is with replacement. This allows the possibility that the same item is looked at more than once. This provides both an advantage and a disadvantage. The advantage is that if an item is picked again, there is more assurance that it was tested correctly. The disadvantage is that the sample size must be increased to allow for looking at the same item more than once. Indeed, this sampling process is not generally used and tables are not readily available. The easiest way to think about this is to keep testing until 60 different items (for 95/5) have been tested. The number of items which would be expected to be picked repeatedly depends on the original population size.

IV. Replicated Sampling

The military has, as a regular practice, required sampling for defects to be repeated by a 3rd party on "critical" items (e.g., aircraft inertial guidance parts). They require the entire sample to be repeated from the original population. That is, if the first sample was 60 items from the whole population, then the second would be an additional 60 items.

APPENDIX B
ITEM 4.4

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APPENDIX B

STAFF EVALUATION OF THE CPRT CONSTRUCTION ADEQUACY PROGRAM PLAN (CAPP)

4.0 EXTERNAL SOURCE
4.4 MECHANICAL AND PIPING ISSUES

ITEM Va 4.4.1 INSPECTION OF CERTAIN TYPES OF SKEWED WELDS IN NF SUPPORTS (ISAP Va)

4.4.1.1 INTRODUCTION
(ITEM Va)

DURING THE CPSES ASLB HEARINGS AN ALLEGATION CONCERNING THE IMPROPER INSPECTION OF SKEWED FILLET WELDS WAS MADE. THE ALLEGATION STIPULATED THAT BROWN + ROOT (B&R) QC INSPECTORS DID NOT HAVE ADEQUATE INSTRUCTIONS OR TRAINING TO PROPERLY MEASURE THE SIZE OF SKEWED FILLET WELDS DURING THE INSPECTION OF PIPE SUPPORTS. THE NRC REGION IV REACTOR INSPECTORS IN THEIR INSPECTION REPORTS 50-445/82-14 AND 50-445/84-08 SUBSTANTIATED THE ALLEGATIONS AND REVIEWED CORRECTIVE ACTION PROPOSED BY TUEC AND THE RESULTS OF ITS IMPLEMENTATION.

THE TRT ASSESSED THE SAME ALLEGATION DURING ITS JULY - SEPT 1984 ON-SITE INVES

THERE WAS NO DOCUMENTATION THAT

TIGATION, AND CONCLUDED THAT CERTAIN TYPES OF SKEWED FILLET WELDS WERE REINSPECTED CORRECTLY. THE TRT DISCOVERED THAT DURING THE VCD REINSPECTION PROGRAM FOR ASME SUPPORTS, CERTAIN WELDS THAT EXHIBITED A SKEWED CONDITION, IE INTERFACES OF CURVED SECTIONS, WERE NOT PROPERLY INSPECTED. ACCORDINGLY THE TRT, ON NOVEMBER 29, 1984, INFORMED TUEC THAT ACTION WAS REQUIRED TO RESOLVE THIS POTENTIALLY SAFETY SIGNIFICANT CONDITION.

4.41.2 CPRT APPROACH

ITEM Va

IN RESPONSE TO THE NOVEMBER 29, 1984 NRC LETTER TUEC DEVELOPED THE CPRT PROGRAM PLAN, TO INCLUDE ISAP Va. THIS ISAP ADDRESSED THE CONCERNS OF THE TRT BY ESTABLISHING A SCOPE AND METHODOLOGY FOR THE PROGRAM PLAN THAT ~~WILL BE~~ IS RESPONSIVE TO THE ISSUE. THE PROGRAM PLAN INCLUDED:

a) A REVIEW OF A DOCUMENTED CHRONOLOGY OF INSPECTION METHODS INVOLVING SKEWED WELDS TO CORRELATE THE PERIOD OF TIME AND SPECIFIC PROCEDURE REVISIONS FOR THE INSPECTION OF SKEWED WELDS.

b) PROCEDURES QI-QAP-11.1-26, QI-QAP-11.1-28, AND CP-QAP-12.1 WILL BE REVIEWED TO DETERMINE IF THE METHOD OF INSPECTION

FOR TYPE 2 SKEWED WELDS WAS ADEQUATE TO ADDRESS THE UNIQUE ASPECTS OF SKEWED WELDS.

c) THE ADEQUACY OF THE IMPLEMENTATION OF THE APPROPRIATE INSPECTION PROCEDURES WILL BE ASSESSED BY ESTABLISHING A RANDOM SAMPLE OF TYPE 2 SKEWED WELDS TO BE REINSPECTED. THE SAMPLE PLAN IS BASED ON ACHIEVING A 95% CONFIDENCE LEVEL THAT LESS THAN 5% OF TYPE 2 SKEWED WELDS WERE NOT INSPECTED PROPERLY AND MAY RESULT IN A SAFETY SIGNIFICANT CONDITION. THE REINSPECTIONS WILL BE CONDUCTED BY A THIRD PARTY.

d) THE RESULTS OF THE PROCEDURE REVIEW AND PHYSICAL REINSPECTIONS WILL BE EVALUATED TO ASSESS ROOT CAUSE AND GENERIC IMPLICATIONS. CORRECTIVE ACTION WILL BE TAKEN WHENEVER MODIFICATIONS AND PROCEDURAL CHANGES ARE REQUIRED.

e) A RESULTS REPORT WILL BE WRITTEN TO DOCUMENT THE RESULTS OF ALL PROCEDURE REVIEWS, PHYSICAL MODIFICATIONS, TREND ANALYSES AND CORRECTIVE ACTIONS

4.4.1.3 STAFF EVALUATION

~~ITEM Va~~

~~THE NRC STAFF HAS REVIEWED THE CPRT PROGRAM PLAN, ISAP Va, AND FOUND THE PLAN TO BE ORIGINALLY RESPONSIVE TO THE ISSUE. THE STAFF ON SEPTEMBER 20, 1985 SUBMITTED COMMENTS TO TUGCO CONCERNING CERTAIN ASPECTS OF THE ACTION PLAN. THE CPRT ON NOVEMBER 14, 1985, SUBMITTED THEIR RESPONSE TO THE STAFF COMMENTS. WITH RESPECT TO ISAP Va THE RESOLUTION OF THE COMMENTS WERE ACCEPTABLE SINCE THEY WERE MOSTLY CLARIFYING IN NATURE.~~

ITEM V.a

THE STAFF HAS REVIEWED THE CPRT PROGRAM PLAN, ISAP V.a, AND FOUND THE PLAN GENERALLY TO BE RESPONSIVE TO THE ISSUE. THE PLAN HAS IDENTIFIED CHRONOLOGY OF INSPECTION METHODS AND ITS RELATIONSHIP TO PROCEDURE REVISIONS TO BE THE PROPER STARTING POINT. THE PLAN ALSO ADDRESSES THE ADEQUACY OF IMPLEMENTATION OF THE APPROPRIATE INSPECTION PROCEDURES WITH THE PROPOSED SAMPLING PLAN. THE STAFF BELIEVES THAT THIS ASPECT OF THE PLAN WILL MOST LIKELY IDENTIFY THE ROOT CAUSE OF THE SKEWED WELD INSPECTION PROBLEM. THE STAFF EXPECTS THE ROOT CAUSE AND SUBSEQUENT GENERIC IMPLICATIONS, IF ANY, OF THIS ISSUE TO BE POSITIVELY IDENTIFIED, SINCE THIS ISSUE HAD BEEN PREVIOUSLY IDENTIFIED IN THE ASLB HEARINGS AND ADDRESSED BY TUEC. THE FACT THAT A PROCEDURE INTERPRETATION PROBLEM EXISTED AFTER ACTION BY TUEC IS SUGGESTIVE THAT THERE COULD BE GENERIC IMPLICATIONS WITH RESPECT TO PROCEDURE REVISION AND IMPLEMENTATION

THE STAFF ALSO REVIEWED THE [illegible] RESPONSE OF NOVEMBER 22, 1985 TO THE STAFF COMMENTS (DATED SEPTEMBER 30, [illegible]) ON ISAP V.a

IN THIS RESPONSE ON PAGES 59 - 61, THE RESPONSES FOR ITEMS 2-4 ARE ACCEPTABLE, SINCE THEY ARE MAINLY CLARIFYING IN NATURE. HOWEVER THE RESPONSE TO ITEM 1 REQUIRES ADDITIONAL EXPLANATION. THE STAFF COULD NOT FIND WHERE BOTH TYPE 1 AND TYPE 2 SKEWED WELDS WERE ADDRESSED BY B+R PROCEDURE QI-QAP-11.1-[illegible]. IF THIS WERE THE CASE THEN "STANCHION WELDS" WOULD HAD BEEN INSPECTED USING THE SKEWED WELD INSPECTION METHODS, AND MARKED AS SUCH ON THE QC CHECKLIST.

~~THE CPRT TRT ISSUES MANAGER STATED THAT, SINCE THE GENERIC IMPLICATIONS ASPECT OF THIS ISSUE WAS QA/QC RELATED, THAT ANY EFFORT IN THIS AREA WOULD BE ADDRESSED IN THE QUALITY OF CONSTRUCTION EVALUATION PERFORMED BY ERC. NEVERTHELESS, HE INDICATED THAT THE RESULTS REPORT WOULD ADDRESS THIS ASPECT.~~

4.4.1.4 CONCLUSIONS

ITEM Va

THE STAFF CONDUCTED AN EVALUATION OF THE CPRT PROGRAM PLAN FOR ISAP Va AND FOUND THE ACTION PLAN TO BE RESPONSIVE TO THE ISSUES RAISED. THE STAFF, HOWEVER, ~~WAS CONCERNED~~ REQUIRES ASSURANCE THAT THE ROOT CAUSE OF THE ISSUE AND ITS GENERIC IMPLICATIONS ~~WERE~~ ARE ~~(NOT)~~ PROPERLY ADDRESSED IN THE ACTION PLAN. THE CPRT TRT ISSUES MANAGER, SHOULD ASSURE~~D~~ THE STAFF THAT BOTH ITEMS ~~WOULD~~ WILL BE ADDRESSED IN THE RESULTS REPORT. THE STAFF PERCEIVE THE GENERIC IMPLICATION ASPECT OF THIS ISSUE AS IMPORTANT, SINCE THE INSPECTION TECHNIQUES FOR SKEWED WELDS HAD BEEN ADDRESSED PREVIOUSLY BY TUGC.

IN ADDITION THE RESPONSE TO ITEM 1 IN THE NOVEMBER 22, 1985 CPRT RESPONSE TO THE STAFF EVALUATION OF THE CPRT PROGRAM PLAN NEEDS FURTHER EXPLANATION.

5.3.3 STAFF EVALUATION

THE STAFF REVIEWED CPRT ISSUE-SPECIFIC ACTION PLAN [illegible] A SELF-INITIATED PLAN INCLUDING BOTH A REINSPECTION AND DOCUMENTATION REVIEW OF QC ACCEPTED SAFETY-RELATED WORK ACTIVITIES AT CPSES. DURING THIS REVIEW 8 CONCERNS WERE RAISED AND TRANSMITTED TO THE CPRT IN A SEPTEMBER 30, 1985 CORRESPONDENCE TO TUEC. THESE CONCERNS WERE ADDRESSED BY THE CPRT IN THE NOVEMBER 22, 1985 RESPONSE BY TUEC. THE STAFF REVIEW INDICATES THAT ALL 8 CONCERNS HAVE BEEN ADEQUATELY ADDRESSED THROUGH REVISION 3 OF THE CPRT PROGRAM PLAN

ADDITIONALLY, THE STAFF REQUIRES THAT DETAILED EXPLANATIONS AND BASES FOR DETERMINING POPULATIONS, POPULATION DESCRIPTION AND BOUNDARIES, AND CONSTRUCTION ATTRIBUTES BE [illegible]. SINCE THE PLAN DESCRIBES THE POPULATIONS TO BE ESTABLISHED AS "REASONABLY HOMOGENEOUS,

APPENDIX B

STAFF EVALUATION OF THE CPRT CONSTRUCTION ADEQUACY PROGRAM PLAN (CAPP)

5.0 SELF-INITIATED EVALUATION

5.3 MECHANICAL EQUIPMENT POPULATIONS

5.3.3 PIPING AND BOLTED JOINTS

5.3.3.1 LARGE BORE / SMALL BORE PIPE WELDS & MATERIALS

5.3.3.1.1 INTRODUCTION

~~WELDING HAS~~ CONSTRUCTION ACTIVITIES HAVE BEEN A MAJOR ISSUE AT COMANCHE PEAK STEAM ELECTRIC STATION. THE QUALITY OF WELDING DURING THE CONSTRUCTION PHASE WAS CHALLENGED BY THE INTERVENOR THROUGH TESTIMONY GIVEN BY FORMER PLANT EMPLOYEES DURING THE ASLB HEARINGS. THE NRC CONSTRUCTION APPRAISAL TEAM (CAT) AND SPECIAL REVIEW TEAM (SRT) INVESTIGATED THE QUALITY OF WELDED CONSTRUCTION DURING THEIR RESPECTIVE REVIEWS AND CONCLUDED THAT BASED UPON THEIR LIMITED REVIEW THE WELDING APPEARED ADEQUATE, HOWEVER, FURTHER INVESTIGATION WAS NEEDED.

THE NRC TECHNICAL REVIEW TEAM (TRT) WAS ESTABLISHED TO ASSESS THE VALIDITY OF ALLEGATIONS MADE BY FORMER EMPLOYEES OF CPSES. THE QUALITY OF ~~[illegible]~~ CONSTRUCTION WAS A MAJOR ISSUE ASSESSED BY THE TRT AND INCLUDES MECHANICAL EQUIPMENT, PIPING AND WELDING. ~~[illegible] LARGE BORE AND SMALL BORE PIPE [illegible]~~ IN APRIL 1985, THE TRT ISSUED NUREG-0797, SUPPLEMENT 10 WHICH PRESENTED THE CONCLUSIONS OF ITS MECHANICAL/PIPING TECHNICAL REVIEW.

5.3.3.1.2 CPRT APPROACH

IN RESPONSE TO THE TRT SSER'S 7 THRU 11, TUEC ESTABLISHED THE COMANCHE PEAK RESPONSE TEAM (CPRT). ON JUNE 28, 1985 THE CPRT ISSUED REVISION 2 OF ITS PROGRAM PLAN WHICH INCLUDED APPENDIX B TITLED "QUALITY OF CONSTRUCTION AND QA/QC ADEQUACY PROGRAM PLAN." THE PLAN HAS PROVISIONS FOR A SELF-INITIATED HARDWARE REINSPECTION, DOCUMENTATION REVIEW PROGRAM THAT COMMITTS TO ADDRESS ALL SAFETY-RELATED CONSTRUCTION WORK ACTIVITIES AT CPSES.

ACCORDING TO THE CPRT THE SELF-INITIATED PLAN REPRESENTS THE MOST DIRECT METHOD OF PROVIDING ADDITIONAL CONFIDENCE THAT ANY CURRENTLY UNIDENTIFIED CONCERNS RELATED TO THE QUALITY OF CONSTRUCTION OF INSTALLED HARDWARE AT CPSES WILL BE IDENTIFIED, EVALUATED AND CORRECTIVE ACTION TAKEN IF

REQUIRED. THE SELF-INITIATED PLAN PROPOSES THAT CATEGORIES OF SAFETY-RELATED HARDWARE CONSTRUCTED USING SIMILAR SAFETY-RELATED WORK ACTIVITIES WILL BE PLACED INTO REASONABLY HOMOGENEOUS POPULATIONS. THE ADEQUACY OF THESE POPULATIONS CAN BE VERIFIED USING SIMILAR REINSPECTION TECHNIQUES AND/OR DOCUMENTATION REVIEW TECHNIQUES. THE PLAN STATES THAT THE HOMOGENEOUS POPULATIONS WILL BE EVALUATED ON A SAMPLING BASIS USING CHECKLISTS AND APPROPRIATE PROCEDURES. ~~RANDOMLY AND SAMPLES FROM EACH POPULATION.~~ THE PLAN PROPOSES A RANDOM SAMPLE USING A 95 PERCENT CONFIDENCE/95 PERCENT PROBABILITY STATISTICAL STANDARD. A SECOND SAMPLE WILL BE EVALUATED FROM A SUBSET OF THE POPULATION THAT CONTAINS CHARACTERISTICS OF GREATER IMPORTANCE TO SAFETY (I.E. REQUIRED FOR SAFE SHUTDOWN).

AS A RESULT OF THE REINSPECTION AND/OR DOCUMENTATION REVIEW, (AND) DEVIATIONS DISCOVERED WILL BE EVALUATED FOR SAFETY SIGNIFICANCE AND ADVERSE TRENDS. IF A DEVIATION IS CONSIDERED SAFETY SIGNIFICANT, THE SAMPLE WILL BE EXPANDED AND HARDWARE DEFICIENCIES WILL BE CORRECTED. THE RESULTS OF THE SAMPLING OF THE POPULATION WILL BE EVALUATED AND UTILIZED TO PROVIDE INPUT INTO THE OVERALL EVALUATION OF CONSTRUCTION

ADEQUACY. DEVIATIONS THAT ARE NOT CONSIDERED TO BE SAFETY SIGNIFICANT WILL BE REPORTED ON DEVIATION REPORTS AND SUBMITTED TO TUEC FOR CORRECTIVE ACTION WITHIN THE TUEC QA/QC PROGRAM.

IN ITS ESTABLISHMENT OF HOMOGENEOUS POPULATIONS, THE CPRT CONSIDERED BOTH LARGE BORE AND SMALL BORE PIPE WELDS TO BE IN THE SAME HOMOGENEOUS POPULATION. THE BASIS FOR THIS IS THAT THE SAME CRAFT AND CONSTRUCTION PROCEDURES ARE USED FOR BOTH LARGE AND SMALL BORE PIPE WELDS.

5.3.3.1.3 STAFF EVALUATION

ON OCTOBER 28-30, 1985 THE NRC STAFF PERFORMED AN AUDIT OF THE CPRT SELF-INITIATED PLAN FOR CONSTRUCTION REINSPECTION/DOCUMENTATION REVIEW. THE PURPOSE OF THE AUDIT WAS TO EVALUATE WHETHER (1) THE HOMOGENEOUS POPULATIONS WERE INDEED HOMOGENOUS WITHIN THE POPULATIONS DESCRIBED; (2) WHETHER THE WORK PROCESSES DESCRIBED FOR EACH POPULATION WERE ADEQUATE FOR THE POPULATION; AND (3) THE POPULATIONS IDENTIFIED INCLUDED ALL SAFETY-RELATED CONSTRUCTION PRACTICES. THE STAFF REVIEWED THE POPULATIONS IDENTIFIED AS LARGE BORE PIPE-WELDS/MATERIALS (LBWM) AND SMALL BORE AND IN-

APPENDIX B

STAFF EVALUATION OF THE CPRT CONSTRUCTION ADEQUACY PROGRAM PLAN (CAPP)

5.0 SELF-INITIATED EVALUATION

5.4 STRUCTURAL POPULATIONS

5.4.4 LARGE BORE PIPE SUPPORTS — RIGID, LARGE BORE PIPE SUPPORTS NON-RIGID, SMALL BORE PIPE SUPPORTS.

5.4.4.1 INTRODUCTION

CONSTRUCTION OF LARGE AND SMALL BORE PIPE SUPPORTS HAS BEEN A MAJOR ISSUE AT CPSES. THE ADEQUACY OF CONSTRUCTION OF PIPE SUPPORTS WAS DISCUSSED EXTENSIVELY DURING THE PREVIOUS ASLB HEARINGS. MANY ISSUES ~~WITH~~ (PIPE SUPPORTS) WERE ALSO EVALUATED BY THE NRC ~~DURING~~ IN THE CAT AND SRT REPORTS, AND BY CYGNA DURING THEIR PHASES 1, 2 AND 3 EVALUATIONS. AS A RESULT THE NRC STAFF ESTABLISHED THE TRT IN JULY 1984 ~~AND~~ WHICH ASSESSED

MANY ALLEGATIONS OF INADEQUATE PIPE SUPPORT CONSTRUCTION PRACTICES. THE RESULTS OF THE TRT ASSESSMENT WERE PUBLISHED IN NUREG-0797 SUPPLEMENT 10 IN APRIL 1985. TUEC, IN RESPONSE TO NUREG-0797, PUBLISHED THE CPRT PROGRAM PLAN ON JUNE 28, 1985. THE PLAN ESTABLISHED A SELF-INITIATED PROGRAM TO ADDRESS THE CONSTRUCTION ADEQUACY OF PIPE SUPPORTS THROUGH A SAMPLE REINSPECTION AND DOCUMENTATION REVIEW

5.4.4.2 CPRT APPROACH

(REPEAT THE FIRST THREE PARAGRAPHS OF 5.3.3.1.2)

IN ITS ESTABLISHMENT OF HOMOGENEOUS POPULATIONS, THE CPRT CONSIDERED BOTH LARGE BORE AND SMALL BORE PIPE SUPPORTS BOTH RIGID AND NON-RIGID. THE BASIS FOR CONSIDERING ALL TYPES OF PIPE SUPPORTS IN THE SAME POPULATION IS THAT THE SAME CONSTRUCTION PROCEDURES ARE USED.

5.4.4.3 STAFF CONCLUSION

ON OCTOBER 28-30, AND DECEMBER 5, 198- THE NRC STAFF PERFORMED AN AUDIT OF THE CPRT SELF-INITIATED PLAN FOR CONSTRUCTION REINSPECTION/DOCUMENTATION REVIEW. THE STAFF REVIEWED THE POPULATIONS IDENTIFIED AS LBSR, LBSN, AND SBPS.

The population of pipe supports was divided as titled in order to assure a proper sampling of rigid and non-rigid pipe supports. This is important, since the majority of "standard catalog supports" are in the non-rigid category. The small bore sampling was not divided, because the number of non-rigid small bore supports is very small and also because the type of support is not readily obvious from the support number (as in the case for LB supports). ERC intends to sample 60 supports from each of the three groups (LBSR, LBSN, and SBPS). The SBPS populaton was made up of four

work processes; fabrication, installation, welding and inspection. The ERC management seemed to be confused as to whether inspection should be a work process or an attribute. The two LB populations did not show inspection as a work process. After much discussion, the individual in charge of the SBPS group indicated that rework to a support very often occurred during the inspection phase as a result of an UNSAT Inspection Report (IR). Since this work was performed under the umbrella of inspection in order to close out the IR, this a separate work process. The individuals in charge of the LB group appeared hesitant to accept this but eventually they did. However, at the exit interview, ERC upper management balked at this agreement and said that they would like to investigate this area further. ~~They indicated that if they made any changes they would contact the staff (the staff agrees with inspection being a separate work process).~~ AFTER FURTHER INVESTIGATION, THE CPRT DECIDED TO MAKE INSPECTION AN ATTRIBUTE UNDER EACH OF THE THREE WORK

PROCESSES. THE CPRT BASED THIS POSITION ON THE FACT THAT EVEN THOUGH THE REWORK MAY HAVE BEEN DONE AS THE RESULT OF A QC INSPECTION, THE WORK WAS PERFORMED BY THE SAME CRAFT UNDER THE SAME PROCEDURES AS THE ORIGINAL WORK

The staff reviewed the various documents (description memorandum, population description and basis, population items list, work process justification, attribute description and basis, and QI-019-020, 027 thru 030). An auditable trail existed such that all work processes and accompanying attributes could be verified. The staff noted that under pipe supports welding two attributes were omitted (cleanliness and base metal defects). ERC pointed out that cleanliness was unattainable both from an inspection standpoint (prewelding attribute), and from the point of view of document review (cleanliness was not a hold point on the Multiple Weld Data Card [MWDC]). ERC also said that they did not include base metal defects for supports as an attribute, since it was difficult to see defects through the paint. The staff pointed out that requirements for identifying base metal defects existed in ASME Subsection NF-4000 and B&R procedure QI-QAP-11.1-28. ERC stated that during the reinspection of the sample supports base metal defects were looked for in each case and noted as an "out of scope" observation for inclusion in th normal deviation system. The staff would not accept this, and asked ERC to reconsider this approach. After some discussion, ERC committed to put base metal defects into the attribute list and to treat all instances as part of the Construction Adequacy.

OBSERVATIONS

(1) Base metal defects was omitted from the welding attributes but after much discussion ERC agreed to include this attribute. The inclusion of this attribute after the inception of the reinspection process should not cause a problem, since this attribute was still inspected from an out-of-scope standpoint. Any deviation previously found will be brought into the scope and addressed accordingly.

(2) The staff has a concern about the statistical mechanics of the overlapping of the regular sample (safety-related items) with the engineered sample (safe shutdown systems). As explained to the staff, the engineered sample is independent of the safety-related sample, however, some of the samples may be common to both groups. After the safety-related sample has reached 60 and has been identified as such, the engineered sample from the 60 items are identified. This sample is then expanded until it reaches 60. Both samples now are designed to draw two independent conclusions. The question arises, if a safety significant deficiency is discovered in a sampled item that is common to both samples, are both samples expanded? ERC was unable to answer this, but agreed to present this question to the CPRT statistician.

5.4.4.4 CONCLUSIONS

THE NRC STAFF AUDITED THE CPRT SELF-INITIATED QUALITY OF CONSTRUCTION ADEQUACY TO DETERMINE THE VALIDITY OF THE HOMOGENEOUS POPULATIONS. THE POPULATION OF LARGE BORE / SMALL BORE PIPE SUPPORTS WAS REVIEWED TOGETHER WITH THE APPROPRIATE WORK PROCESSES AND ATTRIBUTES. THE CPRT AGREED TO INCLUDE BASE METAL DEFECTS AS AN ATTRIBUTE UNDER THE WELDING WORK PROCESS. IT WAS DETERMINED THAT INSPECTION WOULD BE INCLUDED AS A WORK ATTRIBUTE RATHER THAN A SEPARATE WORK PROCESS. THE NRC STAFF ~~AGREED~~ ACCEPTED ~~WITH~~ THE POSITIONS PREVIOUSLY DESCRIBED.

APPENDIX B

STAFF EVALUATION OF THE CPRT CONSTRUCTION ADEQUACY PROGRAM PLAN (CAPP)

4.0 EXTERNAL SOURCE

4.4 MECHANICAL AND PIPING ISSUES

4.4.1 INSPECTION OF CERTAIN TYPES OF SKEWED WELDS IN NF SUPPORTS (ISAP V.a)

4.4.1.1 INTRODUCTION

DURING THE CPSES ASLB HEARINGS AN ALLEGATION CONCERNING THE IMPROPER INSPECTION OF SKEWED FILLET WELDS WAS MADE. THE ALLEGATION STIPULATED THAT BROWN & ROOT (B&R) QC INSPECTORS DID NOT HAVE ADEQUATE INSTRUCTIONS OR TRAINING TO PROPERLY MEASURE THE SIZE OF SKEWED FILLET WELDS DURING THE INSPECTION OF PIPE SUPPORTS. THE NRC REGION IV REACTOR INSPECTORS IN THEIR INSPECTION REPORTS 50-445/82-14 AND 50-445/84-08 SUBSTANTIATED THE ALLEGATIONS AND REVIEWED CORRECTIVE ACTION PROPOSED BY TUEC AND THE RESULTS OF ITS IMPLEMENTATION.

THE TRT ASSESSED THE SAME ALLEGATION DURING ITS JULY - SEPT 1984 ON-SITE INVES-

TIGATION, AND CONCLUDED THAT THERE WAS NO DOCUMENTATION THAT CERTAIN TYPES OF SKEWED FILLET WELDS WERE REINSPECTED CORRECTLY. THE TRT DISCOVERED THAT DURING THE VCD REINSPECTION PROGRAM FOR ASME SUPPORTS, CERTAIN WELDS THAT EXHIBITED A SKEWED CONDITION, IE INTERFACES OF CURVED SECTIONS, WERE NOT PROPERLY INSPECTED. ACCORDINGLY, THE TRT, ON NOVEMBER 29, 1984, INFORMED TUEC THAT ACTION WAS REQUIRED TO RESOLVE THIS POTENTIALLY SAFETY SIGNIFICANT CONDITION.

4.41.2 CPRT APPROACH

IN RESPONSE TO THE NOVEMBER 29, 1984 NRC LETTER TUEC DEVELOPED THE CPRT PROGRAM PLAN, ~~AND~~ TO INCLUDE ISAP VO. THIS ISAP ADDRESSED THE CONCERNS OF THE TRT BY ESTABLISHING A SCOPE AND METHODOLOGY FOR THE PROGRAM PLAN THAT ~~WILL BE~~ IS RESPONSIVE TO THE ISSUE. THE PROGRAM PLAN INCLUDED:

a) A REVIEW OF A DOCUMENTED CHRONOLOGY OF INSPECTION METHODS INVOLVING SKEWED WELDS TO CORRELATE THE PERIOD OF TIME AND SPECIFIC PROCEDURE REVISIONS FOR THE INSPECTION OF SKEWED WELDS.

b) PROCEDURES QI-QAP-11.1-26, QI-QAP-11.1-28, AND CP-QAP-12.1 WILL BE REVIEWED TO DETERMINE IF THE METHOD OF INSPECTION

FOR TYPE 2 SKEWED WELDS WAS ADEQUATE TO ADDRESS THE UNIQUE ASPECTS OF SKEWED WELDS.

c) THE ADEQUACY OF THE IMPLEMENTATION OF THE APPROPRIATE INSPECTION PROCEDURES WILL BE ASSESSED BY ESTABLISHING A RANDOM SAMPLE OF TYPE 2 SKEWED WELDS TO BE REINSPECTED. THE SAMPLE PLAN IS BASED ON ACHIEVING A 95% CONFIDENCE LEVEL THAT LESS THAN 5% OF TYPE 2 SKEWED WELDS WERE NOT INSPECTED PROPERLY AND MAY RESULT IN A SAFETY SIGNIFICANT CONDITION. THE REINSPECTIONS WILL BE CONDUCTED BY A THIRD PARTY.

d) THE RESULTS OF THE PROCEDURE REVIEW AND PHYSICAL REINSPECTIONS WILL BE EVALUATED TO ASSESS ROOT CAUSE AND GENERIC IMPLICATIONS. CORRECTIVE ACTION WILL BE TAKEN WHENEVER MODIFICATIONS AND PROCEDURAL CHANGES ARE REQUIRED.

e) A RESULTS REPORT WILL BE WRITTEN TO DOCUMENT THE RESULTS OF ALL PROCEDURE REVIEWS, PHYSICAL MODIFICATIONS, TREND ANALYSES AND CORRECTIVE ACTIONS

4.4.1.3 STAFF EVALUATION

THE NRC STAFF HAS REVIEWED THE CPRT PROGRAM PLAN, ISAP Va, AND FOUND THE PLAN TO BE RESPONSIVE TO THE ISSUE. THE STAFF ON SEPTEMBER 30, 1985 SUBMITTED COMMENTS TO TUEC CONCERNING CERTAIN ASPECTS OF THE ACTION PLAN. THE CPRT ON NOVEMBER 22, 1985, SUBMITTED THEIR RESPONSE TO THE STAFF COMMENTS. WITH RESPECT TO ISAP Va THE RESOLUTION OF THE COMMENTS WERE ACCEPTABLE SINCE THEY WERE MOSTLY CLARIFYING IN NATURE.

ON DECEMBER 4+5, 1985 THE STAFF PERFORMED AN ONSITE AUDIT OF THE ISAP PRIOR TO COMPLETED IMPLEMENTATION FOR THE PURPOSE OF VERIFYING THE ACTION PLAN. THE CPRT PRESENTED A STATUS REPORT WHICH INCLUDED THE FOLLOWING:

a. SUMMARY OF IMPLEMENTATION TO INCLUDE
   1. REVIEW HISTORY OF INSPECTION METHODS
   2. PROCEDURE REVISION
   3 REINSPECTION SAMPLE

b. ON GOING ACTIVITIES
   1 THIRD PARTY REVIEW
   2 EVALUATION OF WELD SIZE TREND
   3 PREPARATION OF RESULTS REPORTS.

THE TRT ISSUES MANAGER OF THE CPRT WENT INTO DETAIL DESCRIBING THE STATUS OF EACH ITEM. THE STAFF WAS CONCERNED THAT THE ROOT CAUSE OF THE SKEWED WELD ISSUE HAD NOT BEEN ADDRESSED SINCE IT WAS NOT DISCUSSED IN THE PRESENTATION. THE STAFF ASKED THE CPRT TO ELABORATE ON THE ROOT CAUSE, ESPECIALLY SINCE THIS ISSUE HAD BEEN IDENTIFIED IN THE ASLB HEARINGS AND HAD BEEN PREVIOUSLY ADDRESSED BY TUEC. THE CPRT SAID THAT THE ROOT CAUSE OF THE TYPE 2 SKEWED WELD INSPECTION APPEARED TO BE A COMMUNICATIONS PROBLEM AND ONE OF MISINTERPRETATION OF TERMINOLOGY. THE CPRT SAID THAT THIS ITEM WOULD BE ADDRESSED IN THE RESULTS REPORT.

THE STAFF ALSO WAS CONCERNED THAT THE GENERIC IMPLICATIONS OF THE MISINTERPRETATION OF THE SKEWED WELD INSPECTION PROCEDURES HAD NOT BEEN ADDRESSED. THE GENERIC IMPLICATIONS OF THIS ISSUE ARE MAGNIFIED, SINCE THE PROCEDURE THAT APPARENTLY WAS MISINTERPRETED, HAD BEEN REVISED TO RESPOND TO A PREVIOUS PROCEDURE IMPERFECTION

THE CPRT TRT ISSUES MANAGER STATED THAT, SINCE THE GENERIC IMPLICATIONS ASPECT OF THIS ISSUE WAS QA/QC RELATED, THAT ANY EFFORT IN THIS AREA WOULD BE ADDRESSED IN THE QUALITY OF CONSTRUCTION EVALUATION PERFORMED BY ERC. NEVERTHELESS, HE INDICATED THAT THE RESULTS REPORT WOULD ADDRESS THIS ASPECT.

4.4.1.4 CONCLUSIONS

THE STAFF CONDUCTED AN EVALUATION OF THE CPRT PROGRAM PLAN FOR ISAP Va AND FOUND THE ACTION PLAN TO BE RESPONSIVE TO THE ISSUES RAISED. THE STAFF, HOWEVER, WAS CONCERNED THAT THE ROOT CAUSE OF THE ISSUE AND ITS GENERIC IMPLICATIONS WERE NOT PROPERLY ADDRESSED IN THE ACTION PLAN. THE CPRT TRT ISSUES MANAGER ASSURED THE STAFF THAT BOTH ITEMS WOULD BE ADDRESSED IN THE RESULTS REPORT. THE STAFF PERCEIVES THE GENERIC IMPLICATION ASPECT OF THIS ISSUE AS IMPORTANT, SINCE THE INSPECTION TECHNIQUES FOR SKEWED WELDS HAD BEEN ADDRESSED PREVIOUSLY BY TUEC.

P. CHEN #1

2.4.1 Introduction (Cont.)

Item V.d: Plug Welds

The TRT investigated allegations that incorrectly located bolt holes in baseplates, pipe supports, and cable tray supports were "plug welded" without authorization, with undocumented weld filler metal and without Quality Control inspection. The TRT concluded that the repair of misdrilled holes by welding was not prohibited by the appropriate editions of the applicable Codes. The TRT review of Brown & Root specifications established that misdrilled holes were regarded as base material defects and were supposed to be dispositioned by NCR action or engineering evaluation.

The TRT concluded that the identification of undocumented "plug welds" and the difficulty in detecting them raised a generic concern as to the potential existence of an unknown number of unauthorized "plug welds" of questionable quality. Potentially defective welds in highly stressed areas could have safety significance.

The TRT required that the Applicant modify a plan of action already proposed to NRC Region IV with respect to specific items or perform a bounding analysis to assess the generic effects of undocumented "plug welds" on the ability of pipe supports, cable, tray supports, and baseplates to perform their intended function.

Item V.e: Repositioning of the Main Steam Line.

The TRT investigated an allegation that the 32-inch MS line was forced into position by the polar crane and 3-ton come-alongs and that "tension" induced in the line as a result of movement during the alleged incident was still present in the line.

The TRT determined that repositioning of the Unit 1 loop 1 MS line had been performed due to settlement of temporary supports. The TRT learned

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2.4.1 Introduction (Cont.)

that the partially installed line had sagged due to settlement 2.4.1 of temporary supports during flushing of the system and/or construction. The TRT also determined that the TUEC piping analysis performed 1 year after the alleged incident did not adequately address the full sequence of events involved in the incident.

Accordingly, the TRT on November 29, 1984, informed TUEC that action was required to resolve this potentially safety-significant condition.

2.4.2 CPRT Approach

Item V.a: In response to the November 29, 1984 NRC letter, TUEC developed the CPRT Program Plan to include ISAP Va. This ISAP addressed the concerns of the TRT by establishing a scope and methodology, Sections 4.1.1 through 4.1.6, for the Action Plan that is responsive to the issue. The Action Plan included a review of a documented chronology of inspection methods involving skewed welds to correlate the period of time and specific procedure revisions for the inspection of skewed welds. Procedures QI-QAP-11.1-26, QI-QAP-11.1-28, and CP-QAP-12.1 will be reviewed to determine if the method of inspection for Type 2 skewed welds was adequate to address the unique aspects of skewed welds.

TUEC also committed to assess the adequacy of the implementation of the appropriate inspection procedures by establishing a random sample of Type 2 skewed welds to be reinspected. The sample plan is based on achieving a 95% confidence level that less than 5% of Type 2 skewed welds were not inspected properly and may result in a safety significant condition. The reinspections will be conducted by a third party.

Finally, the results of the procedure review and physical reinspections will be evaluated to assess root cause and generic implications. Corrective action will be taken whenever modifications and procedural cause are required. A results report will be written to document the

2.4.2 CPRT Approach (Cont.)

Finally, in Sections 4.1.1.6 through 4.1.1.8 the CPRT has stated that a review of existing QC inspection and documentation procedures will be made to identify necessary changes and also a third-party overview of the total effort will be made.

To accomplish the second objective, as described in Sections 4.1.2 through 4.1.5, random samples of cable tray supports in both Units 1 and 2 will be inspected and, if necessary, subjected to engineering evaluation. The investigative steps, in general, parallel those for ASME pipe supports and baseplates. Results will be used to assess the root cause and to determine generic implications.

Finally, preceding either of the above objectives, Section 4.2 describes the development of a viable inspection procedure to identify "plug welds", including criteria for paint by personnel meeting the CPSES Quality Assurance Program or personnel qualification requirements of the CPRT Program Plan.

Item V.e: The CPRT approach to resolve the TRT concerns resulting from the TRT investigation of the allegations regarding forced movement of the MS line and improper welding of temporary supports is described in Section 4.0, "CPRT Action Plan," of ISAP V.e, Rev. 3. A review of Sections 4.1 and 4.2 of the CPRT plan indicates that specific engineering evaluations of the MS line incident and a generic study of possible damage to other piping are proposed.

The specific engineering evaluation includes: reviews of procedures for pipe erection and placement of temporary and permanent pipe supports; interviews of personnel involved in the MS line incident; evaluations of procedures and practices; analytical evaluations of full parametric variations of analysis inputs for the MS line incident; significance of stresses and support loads resulting from the analytical evaluations; reviews of existing UT examinations and hydrostatic test data for the affected MS line; and a possible reinspection program.

2.4.2 CPRT Approach (Cont.)

The generic study for possible damage in other piping, including the Unit 1, Loop 4, MS line includes: reviews and procedures for pipe erection and placement of temporary and permanent pipe supports; reviews of Nonconformance Reports (NCRs) and Piping Deviation Request Forms (PDRFs) for circumstances similar to the MS line incident; interviews of pipe installation personnel to determine piping subjected to adjustments during fitup; review of all other sources of residual stresses in piping systems; evaluations of the significance of residual stresses due to fitup; possible additional pipe fitup evaluations; and possible modifications to Gibbs & Hill (G&H) specifications and/or related procedures to ensure that piping and associated equipment are not adversely affected during flushing activities and/or by the use of temporary supports.

Section 4.3, "Responsibilities," of ISAP V.e indicates that all activities are to be performed by third party (including a verification of previous work done by RLCA) except for the modification (if required) of procedures and specifications for the control of pipe erection, temporary supports and hydrostatic testing and flushing which was to be a Comanche Peak Project Engineering responsibility.

2.4.3 Staff Evaluation

Item V.a: The staff has reviewed the CPRT Program Plan, ISAP V.a, and found the plan generally to be responsive to the issue based on the following observations.

The plan had identified chronology of inspection methods and its relationship to procedure revisions to be the proper starting point. The plan also addresses the adequacy of implementation of the appropriate inspection procedures by means of the proposed sampling plan. The staff believes that this aspect of the plan will most likely identify the root cause of the skewed weld inspection problem. The

2.4.3 Staff Evaluation (Cont.)

members containing "plug welds" made, surface prepared using methods available to CPSES personnel, and painted. The inspectors tested detected, on average, 82% of the "plug welds." The maximum detected was 94%. The TRT notes that this reported capability is not consistent with the CPRT Program Plan stated intent of 95% confidence of a rate of 5% or more. The CPRT must address this inconsistency and propose a resolution.

(3) In March of 1985 at the CPRT action plan presentation at CPSES, the TRT stated its position that volumetric examination of any unauthorized "plug welds" found should be made since the welder, who was trying to avoid QC cognizance, would be inclined to rush the job and may, therefore, have used poor welding techniques. The CPRT has not responded directly to this position.

(4) The sample plan (Section 4.1) and the definition of a reject were stated by the TRT as incompatible as currently written. CPRT's response, which references 3.4 ISAP V.a, Item 1, is confusing and needs further explanation.

Item V.e: The staff review of ISAP V.e determined that the details of the specific engineering evaluation and the generic study of possible damage to other than the Unit 1, Loop 1, MS piping was responsive to the actions required of TUEC by the TRT. These actions are given in SSER No. 10, P. N-110, Items 1 through 8. A comparison of items in the action plan and the actions required of TUEC by the TRT found that ISAP V.e was sufficient to unbrella the actions required to resolve the issue, based on an engineering evaluation by the staff.

However, the staff has concerns that:

(1) The observation was noted in Section 3.2, "Preliminary Determination of Root Cause and Generic Implications" of ISAP V.e, Revision 3, that the phrase, "in construction practice, it is not

2.4.3 Staff Evaluation (Cont.)

at all uncommon to perform adjustments in pipe position prior to final welding, particularly when permanent supports are installed subsequent to final fitup" could predisposition the implementation of the CPRT evaluations and studies.

(1) The third party review of the RCLA work should not be limited to a verification only. Provisions for additional third party investigations should be provided, if required.

(2) Although the CPRT has indicated that its investigations performed as part of ISAP V.e, Revision 3, have concluded that the sequence of events described in SSER No. 10 relating to MS line incident is not correct, the generic implications of settlements of supports and stresses due to hydrostatic testing and flushing activities will still be required to be evaluated by TUEC, since the sequence of events described by the TRT could have occurred elsewhere.

2.4.4 Conclusions

Item V.a: The staff conducted an evaluation of the CPRT Program Plan for ISAP V.a and found the action plan to be generally responsive to the issues raised since the plan addressed inspection methods, procedure revisions, and reinspections. The staff, however, requires assurance that the root cause of the issue and its generic implications are properly addressed in the action. The CPRT TRT issues manager should assure the staff that both items will be addressed in the results report. The staff perceives the root cause generic implication aspect of this issue as important, since the inspection techniques for skewed welds had been addressed previously by TUEC.

In addition, the response by the CPRT to Item 1 of the staff letter of September 30, 1985 concerning ISAP V.a is unacceptable. The staff requires further explanation concerning the intent of procedure QI-QAP-11.1-28 with respect to skewed welds.

2.4.4 Conclusions (Cont.)

Item V.b: The staff concludes that if ISAP V.b is implemented as stated in the Plan the areas related to the original concern will be identified and resolved based on sound engineering practice, FSAR commitments and NRC guidelines. However, the staff has raised a concern that the use of trends of inspection data to determine the need for additional inspections must be reviewed on a case-by-case basis.

Item V.c: The staff concludes that if ISAP V.c is implemented as stated in the Plan all areas related to the original concern will be identified and resolved in a manner consistent with sound engineering practice, FSAR commitments and NRC guidelines.

Item V.d: For the issue concerning plug welds, the staff concludes that there are important questions related to the CPRT Program Plan scope and methodology which must be satisfactorily answered prior to approval of the Plan.

Item V.e: For the issue concerning the repositioning of the main steam line, the specific engineering evaluation and generic study described in ISAP V.e, Revision 3, of the CPRT Program Plan provides an acceptable basis for resolution of the issues and concerns resulting from the TRT investigations of allegations regarding forced movement of the main steam line and improper welding of temporary supports. However, final acceptability by the staff is contingent upon verification by the CPRT of proper implementation of the details of the specific engineering evaluations of the main steam line incident and the generic study of possible damage to other piping.

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SSER ON COMANCHE PEAK RESPONSE TEAM PROGRAM PLAN
APPENDIX B
B. F. Saffell

1.0 INTRODUCTION

The adequacy of the construction QA/QC program and the quality of construction performed within scope of that program have been questioned by a number of sources external to Texas utilities. The CPRT has been charged with responding to and resolving these concerns. This Appendix, through this SSER, documents the staff evaluation of the program formulated by the CPRT to evaluate questions concerning construction QA/QC and the adequacy of installed hardware.

The construction adequacy program proposed by the CPRT has the following three components:

a. Evaluation of external source issues
b. Root cause evaluation and generic implication assessment for each identified safety significant deficiency
c. Self-initiated reinspection of a sample of the balance of the hardware within the scope of the QA/QC ADEQUACY program.

The CPRT objectives for the construction adequacy program are to fully resolve all of the external source issues, assess in an integrated fashion all identified safety significant deficiencies and to make a statement about both the adequacy and quality of construction at CPSES.

The objective of the staff's evaluation as presented in this Appendix is to ascertain if the CPRT Program Plan describes the framework and process for performing a meaningful reinspection of the QA/QC and the construction activities performed within the scope of that program. The staff's evaluation has consisted of document reviews and audits. The scope of the staffs review has ranged from a review of the Program Plan to the checklists and quality instructions prepared for assessment of specific work activities. Subsequent sections of this Appendix address both the CPRT proposed process and the staff's evaluation of this process. The staff's evaluation addresses both the CPRT's plan for addressing external source issues as well as their self-initiated evaluation.

2.0 CPRT PROCESS FOR EVALUATION

Issue-specific action plans (ISAP) are key elements in the CPRT's process for evaluating construction adequacy. All construction QA/QC issues whether of a hardware nature or a QA/QC programmatic concern, will be the subject of an issue-specific action plan. These plans document the CPRT plan for resolving external issues. A single ISAPs describes the process and methodology for the CPRT's self-initiated hardware reinspection and documentation review. A matrix, which is being developed to provide a cross reference between each issue or concern and the respective action plan which addresses it, will provide assurance that all external source issues have been addressed by the CPRT.

As previously noted, the issue-specific action plans, prepared to address specific external source issues, will describe the process for evaluation of these issues. This process may include reinspection of hardware, documentation review, engineering analysis and evaluation, assessment of TUGCO corrective action programs and an evaluation of data collected from other CPRT review team action plans. The results report will be prepared for each ISAP as a means of documenting each individual issue evaluation.

The self-initiated hardware reinspection and documentation review program will address all safety related construction work activities at CPSES. This program insures that areas not addressed by the external source evaluation are evaluated as a means of providing additional confidence that currently any currently unidentified concerns related to construction quality are identified, evaluated, and resolved. The process for accomplishing this self-initiated program is to evaluate the work activities required to construct the Comanche Peak plants.

This evaluation will be performed on a sampling basis primarily through reinspections of safety significant attributes. Documentation reviews will be used to assess inaccessible or nonrecreatable attributes. As with other ISAPs, a results report will be prepared documenting the results of the total self-initiated evaluation program.

CPRT proposes to integrate and collectively evaluate the findings from their external source issue evaluations with the results of the self-initiated program in order to make a statement about construction quality at the Comanche Peak Steam Electric Station. Three reports will be prepared in addition to the individual action plans results reports to document the results of the integrated evaluation. Two collective evaluation reports will be prepared to address the adequacy of the construction QA/QC program and the quality of installed hardware. Finally, a summary report which integrates the results of the two collective evaluation reports, and state the CPRT's conclusions regarding the quality of construction and the QA/QC program at Comanche Peak plant.

3.0 STAFF REVIEW AND EVALUATION APPROACH

The staffs review of the program plan has included a review of each individual ISAP including the ISAP describing the self-initiated evaluation program. In addition to the review of each individual ISAP, a number of on-site audits of the documentation being prepared in support of the self-initiated evaluation have been performed. The purpose of these audits was for the staff to develop an in-depth understanding of the CPRT process for resolution of external issues and implementation of its self-initiated evaluation program. These audits also served to establish that the Applicant was documenting construction adequacy evaluation activities in sufficient detail to permit audit now or in the future. The staff's evaluation addressed not only the framework and process of the construction adequacy review program but the degree of documentation to be provided by the applicant. The staff considers documentation of these activities to be an extremely important part of the overall program.

Review of the construction adequacy program plan has been accomplished by teams of NRC staff and consultants. External source issue review teams have been organized in a manner similar to the technical review teams and include the following disciplines.

a. Electrical and instrumentation issues
b. Test program issues
c. Mechanical and piping issues
d. Civil and structural issues
e. QA/QC issues
f. Miscellaneous issues

Many of the individuals responsible for reviewing the scope methodology and implementation of the external source ISAP's were members of NRC's Technical Review Team. Review of the self-initiated evaluation program is accomplished by multidisciplinary team compassing most of the disciplines addressing external source issues. This team has reviewed the methodology for the self-initiated program and performed an audit of each of the categories of safety related hardware.

In summary, the staffs review and evaluation of the program plan has included an assessment of the scope, methodology, and process for resolution of external source issues and a self-initiated evaluation of the construction adequacy and quality at Comanche Peak. This review has been broad in scope in that it has encompassed all disciplines being addressed by the CPRT program plan. In addition, it has been deep in as much as the staff has audited a number of the processes down to level of inspection checklist preparation. Finally, the staff has required the CPRT to document the scope, methodology, implementation, results, and evaluation of each ISAP in sufficient detail to permit audits now and in the future.

WORK PROCESS DEFINITION FOR LARGE BORE PIPE SUPPORT - RIGID POPULATION GROUP (LBSR)

INTRODUCTION

The Large Bore Pipe Support - Rigid Population includes supports for piping systems (2 1/2 inch nominal pipe size and larger) all of which are safety related, Safety Class 1, 2, or 3 and Seismic Category I. It does not include those supports which utilize constant or variable spring hangers or snubbers as components. It includes all the items shown on the pipe support detail drawings (BRHs).

The installation of all supports within this population requires the following work processes:

<u>Fabrication</u> - includes all activities prior to installing the support in its final location in the plant, i.e., before connecting the support structure or components to the building structure and the vendor supplied component item to the pipe attachment point. The process also includes modification of vendor supplied catalog items.

<u>Installation</u> - includes all activities required to install the support at its final location in accordance with the pipe support detail drawing (BRH) and the construction hanger package.

<u>Welding</u> - includes all welding processes during fabrication and installation.

The following work process descriptions demonstrate that reasonable homogeneity does exist at the work process level. Regardless of the type of support, size of pipe being supported or material and components used, each work process involves: a common specification, a common construction procedure, a common construction management organization, common craft labor performing the same basic types of operations, a common inspection instruction, and a common inspection organization.

WORK PROCESS: FABRICATION

1. INTRODUCTION

Fabrication is the first of the work processes required for the installation of large bore pipe supports - rigid. It includes all activities performed prior to connecting support structures or components to the building structure and attaching the component support to the pipe. It includes modification of vendor-supplied component parts. The Fabrication Work Process applies to all items in the LBSR population.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION

a. Source of Attributes and Acceptance Criteria

Reinspection and/or documentation review attributes for the Fabrication Work Process are derived from common specification, procedures and quality instructions:

° Three Gibbs & Hill Design Specifications

1. 2323-MS-46A, "Nuclear Safety Class Pipe Hangers and Supports"

2. 2323-MS-100, "Piping Erection"

3. 2323-SS-30, "Structural Embedments"

° One Brown & Root Construction Procedure

1. CP-CPM-7.3, "General Fabrication Procedure"

° One Brown & Root Quality Instruction

1. QI-QAP-11.1-28, "Fabrication and Installation Inspection of Safety Class Component Supports"

The activities performed during the Fabrication Work Process are governed by the construction procedure and documentation.

The type of support construction is given on the design drawing and related paperwork.

b. Installation Procedure

Installation Procedures are not applicable here as they are treated as a separate work process altogether. The second work process describes the installation procedure.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION (Cont'd)

c. Applicable Codes and Standards

The ASME B&PV Code, Section III, Subsection NF is applicable to all Safety Class 1, 2, and 3 pipe supports. The requirements of this code are incorporated in the specifications, procedures and instructions. Gibbs & Hill Specification 2323-MS-46A, Rev. 6, "Nuclear Safety Class Pipe Hangers and Supports" invokes the requirements of the ASME Code along with specified addenda and Code Cases. The use of the ASME Code as a basis for all construction activities ensures attribute homogeneity.

d. Construction Work Force

All fabrication activities were performed by Brown & Root employed Structural Ironworkers, who received training to the construction procedures governing fabrication. (CP-CPM-7.3, "General Fabrication Procedure")

e. Inspection and Acceptance Standards and Inspection Group

Inspections were performed in accordance with the requirements of Brown & Root Instruction QI-QAP-11.1-28 for those activities which required witnessing by QC Inspectors. All inspections were performed by Brown & Root QC Inspectors, who were trained to the inspection instruction.

3. ATTRIBUTE APPLICABILITY

a. Description of Attributes

Activity	Attribute	Verified By
1. Verify identification marking transfer during cutting operations	Identification	Documentation Review
2. Ensure the configuration is in accordance with the design drawing	Configuration	Reinspection
3. Ensure mechanical connections are made properly	Bolting	Reinspection Documentation Review

a. Description of Attributes (Cont'd)

Activity	Attribute	Verified By
4. Ensure all material is acceptable for its intended use and is identifiable until installation	Material Traceability	Documentation Review

b. Inaccessible Attributes

There are no attributes in the Fabrication Work Process that cannot be either reinspected or evaluated by means of a document review.

c. Attribute Consistency and Sufficiency

All attributes applicable to the Fabrication Work Process, with the exception of bolting, have the same accept/reject criteria and is applicable to all sample items within the population.

Attribute consistency and sufficiency of bolting will be attained by combining three populations (small bore, large bore rigid and non-rigid supports). Accept/Reject criteria for each type of bolted joint is the same for these three populations. Although there will not be 60 of each type of bolted joint in one population, 60 of each type of bolted joint will be attained among the three populations, thereby assuring sufficiency.

d. Apparently Dissimilar Work Processes

There are no such activities within the fabrication work process.

WORK PROCESS: INSTALLATION

1. INTRODUCTION

Installation, parallelled by welding, is the next work process required for the installation of large bore pipe supports - rigid. It includes all activities required to connect the piping to a building structure through an intermediate support structure. The installation work process should result in a configuration consistent with the design. The Installation Work Process applies to all items in the LBSR Population.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION

a. Sources of Attributes and Acceptance Criteria

Reinspection and/or documentation review attributes for the Installation Work Process are derived from common specification, procedures and quality instructions:

° Three Gibbs & Hill Design Specifications

1. 2323-MS-46A, "Nuclear Safety Class Pipe Hangers and Supports"

2. 2323-MS-100, "Piping Erection"

3. 2323-SS-30, "Structural Embedments"

° Three Brown & Root Construction Procedures

1. CP-CPM-9.10, "Component Support Installation"

2. CP-CPM-9.10A, "Installation of Vendor Supplied Component Support Catalog Items"

3. CEI-20, "Installation of Hilti Drilled-In Bolts"

° One TUGCO Engineering Instruction

1. CP-EI-4.5-1, "General Program for As-Built Verification"

° One Brown & Root Quality Instruction

1. QI-QAP-11.1-28, "Fabrication and Installation Inspection of Safety Class Component Supports"

The activities performed during the Installation Work Process are governed by the construction procedure and documentation.

The type of support construction is given on the design drawing and related paperwork.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION (Cont'd)

b. Installation Procedure

All supports are installed in accordance with Brown & Root Procedure CP-CPM-9.10 and CP-CPM-9.10A as stated in a. above. Concrete Expansion Anchors are installed in accordance with Brown & Root Procedure CEI-20, "Installation of "Hilti" Drilled-in Bolts".

c. Applicable Codes and Standards

The ASME B&PV Code, Section III, Subsection NF is applicable to all Safety Class 1, 2, and 3 pipe supports. The requirements of this code are incorporated in the specifications, procedures and instructions. Gibbs and Hill Specification 2323-MS-46A, Rev. 6, "Nuclear Safety Class Pipe Hangers and Supports" invokes the requirements of the ASME Code along with specified addenda and Code Cases. The use of the ASME Code as a basis for all construction activities ensures attribute homogeneity.

d. Construction Work Force

All installation activities were performed by Brown & Root Structural Ironworkers, who received training to the construction procedures governing installation. (CP-CPM-9.10, "Component Support Installation" and CP-CPM-9.10A "Installation of Vendor Supplied Component Support Catalog Items")

e. Inspection and Acceptance Standards and Inspection Group

All inspections of installation work processes were performed in accordance with the requirements of Brown & Root Instruction QI-QAP-11.1-28. All inspections were performed by Brown and Root QC Inspectors, who were trained to the appropriate inspection instruction(s).

3. ATTRIBUTE APPLICABILITY

a. Description of Attributes

Activity	Attribute	Verified By
1. Ensure support is permanently marked with support number.	Identification	Reinspec[illegible]

a. Description of Attributes (Cont'd)

Activity	Attribute	Verified By
2. Ensure location and orientation are acceptable	Location and Orientation	Reinspection
3. Ensure all items are installed in accordance with the drawing	Configuration	Reinspection
4. Ensure bolting meets the requirements	Bolting	Reinspection Documentation Review
5. Ensure Hilti Bolts are installed properly	Concrete Expansion Anchors	Reinspection Documentation Review
6. Verify Vendor Supplied Component Support Catalog Items are installed properly	Vendor Supplied Components	Reinspection Documentation Review
7. Ensure all material acceptable and identification of material is documented	Material Traceability	Documentation Review

b. Inaccessible Attributes

There are no attributes in the Installation Work Process that cannot be either reinspected or evaluated by means of a document review.

c. Attribute Consistency and Sufficiency

All attributes applicable to the Installation Work Process, with the exception of bolting, have the same accept/reject criteria which is applicable to all sample items within the population.

Attribute consistency and sufficiency of bolting will be attained by combining three populations (small bore, large bore rigid and non-rigid supports). Accept/Reject criteria for each type of bolted joint is the same for these three populations. Although there will not be 60 of each type of bolted joint in one population, 60 of each type of bolted joint will be attained among the three populations, thereby assuring sufficiency.

WORK PROCESS: WELDING

1. INTRODUCTION

Welding is a work process which can be performed during the fabrication and installation work processes. It includes all the activities required to join two members together by welding.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION

a. Source of Attributes and Acceptance Criteria

Welding has been divided into Piping Welds (integral) and Support Welds (non-integral) because they are governed by different Subsections of the ASME Code. Piping Weld attributes are derived from the ASME B&PV Code, Section III, Subsections NB, NC, or ND for Code Classes 1, 2, and 3, respectively. Support Weld Attributes are derived from the ASME B&PV Code, Section III, Subsection NF. The characteristics of the two welding groups are identical, only the accept/reject criteria differs.

b. Installation Procedure

All welding for component supports is performed in accordance with Brown and Root Procedure CP-CPM-7.3D, "Welding and Related Processes". All welding for piping attachments is performed in accordance with Brown and Root Procedure CP-CPM-6.9D, "Welding and Related Processes".

c. Applicable Codes and Standards

Welding for component supports is governed by Subsection NF, piping attachments by Subsections NB, NC, and ND, of the ASME Code as stated in a. above.

d. Construction Work Force

All welding activities were performed by Structural Ironworkers, who received training to the construction procedures governing installation and certification to applicable welding procedures.

e. Inspection and Acceptance Standards and Inspection Group

All support welds were inspected to the criteria given in Brown and Root Instruction QI-QAP-11.1-28. Piping Welds were inspected to the criteria given in Brown and Root Instruction QI-QAP-11.1-26. All welding inspections are performed by Brown and Root QC Inspectors.

WORK PROCESS: WELDING
(Cont'd)

3. ATTRIBUTE APPLICABILITY

a. Description of Attributes

Activity	Attribute	Verified By
1. Ensure location, size, and profile of weld is acceptable	Location, Size and Profile	Reinspection
2. Ensure reinforcement and offset of butt welds are within specified limits	Reinforcement, Offsets	Reinspection
3. Ensure surface condition acceptable and there are cracks or lack of fusion	Surface Condition, Cracks/Fusion	Reinspection Documentation Review
4. Verify welds were performed by qualified welders	Welder ID	Reinspection Documentation Review
5. Ensure no rust exists on stainless steel piping welds	Rust	Reinspection

b. Inaccessible Attributes

There are no attributes in the Welding Work Process that cannot be either reinspected or evaluated by means of a document review.

c. Attribute Consistency and Sufficiency

Piping welds are only applicable to supports which have members integrally welded to the pipe. All accept/reject criteria for the attributes are the same for all sample items within the population, thereby ensuring consistency. Multiple piping welds can be used for one sample item and the similarity of large bore pipe supports-rigid and small bore pipe supports populations will ensure that a sufficient number of items are inspected to draw valid conclusions about piping welds.

Support welds are applicable to all sample items within the population. Accept/reject criteria for all welds is the same ensuring consistency. Multiple welds for each sample item will be sufficient to draw valid conclusions regarding the adequacy of support welds.

3. ATTRIBUTE APPLICABILITY (Cont'd)

d. Apparently Dissimilar Work Processes

There are no such activities within the Welding Work Process.

STRUCTURAL

POPULATIONS

- LARGE BORE PIPE SUPPORTS RIGID
- LARGE BORE PIPE SUPPORTS NON-RIGID
- SMALL BORE PIPE SUPPORTS

ACTIVITIES/ATTRIBUTES (LARGE BORE PIPE SUPPORTS RIGID)

WORK PROCESS	FABRICATION	INSTALLATION	WELDING
ATTRIBUTES	Identification	Identification	Pipe Welds (Integral)
	Configuration	Location & Orientation	Support Welds (Non-Integral)
	Bolting	Configuration	
	Matl. Traceability*	Bolting	
		Concrete Expansion Anchors**	
		Vendor Supplied Components**	
		Matl. Traceability*	

* DOCUMENT REVIEW ONLY

** REINSPECTION AND DOCUMENT REVIEW

NO * MEANS PERFORMED ONLY DURING THE REINSPECTION PROCESS

#15

LARGE BORE PIPE SUPPORTS - RIGID

A. The Large Bore Pipe Supports-Rigid Population consists of supports for piping systems designated in Section 17A of the FSAR that are safety related and are safety class 1, 2 and 3 and Seismic Category I. The population is defined as follows:

1. Supports for large bore piping (2-1/2" nominal pipe and larger).

2. Support components as shown on pipe support drawings (e.g. Structural Steel, NF Welds, standard manufactured components, plate, bolting material, anchor bolts and nuts - Hilti type and Richmond studs, etc.)

3. Supports that are construction complete and final QC accepted up to and including June 17, 1985.

4. Supports located in Units 1, 2 and Common areas.

5. All supports which are safety related and are safety class 1, 2 and 3 and Seismic Category 1.

6. Supports which utilize anchors, guides, rigid restraints, and three dimensional restraints.

B. The work processes for this population are defined as:

1. Fabrication

2. Welding

3. Installation

4. Inspection

Pipe Supports are fabricated in accordance with Brown & Root Procedure CP-CPM-7.3 and installed in accordance with Brown & Root Procedure CP-CPM-9.10. Welding is performed for all supports during fabrication and installation in accordance with Brown & Root Procedure CP-CPM-7.3D. All supports are inspected in accordance with Brown & Root Procedure QI-QAP-11.1-28.

C. The acceptance criteria is the same for each attribute when verifying every sample item for the simple reason that all supports in this population must conform to the requirements of the ASME Boiler & Pressure Vessel Code, Section III, Division 1, Subsection NF. The work processes described previously are essential for assurance that pipe supports will safely perform its intended function. The design of pipe supports is shown on the Hanger Detail Drawing (BRH). The Hanger Detail Drawing initiates the construction process. All work performed must comply with the Hanger Detail Drawing requirements and the ASME Code (Subsection NF) requirements. The acceptance criteria are based on design and code requirements and are applicable to all supports.

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LARGE BORE PIPE SUPPORTS - RIGID (Cont'd)

D. Pipe supports are fabricated and installed by Brown & Root employed ironworkers. Welding is performed by qualified welders for both fabrication and/or installation which are also Brown & Root employees. Ironworkers and Welders receive additional on-site training by Brown & Root in accordance with procedures discussed earlier in this text.

E. Inspections for all supports in this population are performed by Brown & Root Field Quality Control Inspectors (QCI). The inspectors are certified by Brown & Root in accordance with B&R Instruction QI-QAP-2.1-5, "Training and Certification of Mechanical Inspection Personnel". All inspectors must be certified by the site level III Mechanical Inspector for the attributes or areas being inspected in accordance with the above procedure.

LARGE BORE PIPE SUPPORTS-[redacted]RIGID

WORK PROCESS / ATTRIBUTES

- **FABRICATION**
  - Identification
  - Configuration
  - Bolting
  - Piping Welds
  - Support Welds
  - * Material Traceability
- **WELDING**
  - Piping Welds (Integral Attachments)
  - Support Welds
- **INSTALLATION**
  - Identification
  - Location & Orientation
  - Configuration
  - Bolting
  - Piping Welds
  - Support Welds
  - Concrete Expansion Anchors
  - Support Components
  - * Material Traceability

* Documentation Review

#11

Definition of Work Processes for
Population Large Bore Pipe Supports - Non-Rigid

A. Summary of systems, structures and components:

The category of Large Bore Pipe Supports - Non-Rigid identifies a homogeneous population of supports for piping systems (2½ inch nominal pipe size and larger) all of which are safety related, Safety Class 1, 2 or 3 and Seismic Category I. It includes only those supports which utilize constant or variable spring hangers or snubbers as components. It includes all items as shown on the pipe support detail drawings (BRH's).

B. Why Work Processes are the same for all population items:

The work processes involved with the installation of large bore non-rigid pipe supports are fabrication, welding, installation and inspection. The work processes define the sequence employed by the craftsmen during support installation.

Class 1?

These work processes are applied during the installation of supports within this population, regardless of the size of pipe being supported, the type of support or material and components used.

The fabrication of all ASME Component Supports in this population is performed in accordance with Brown and Root Procedure CP-CPM 7.3B "Fabrication of ASME Component Supports". Welding for all supports, during fabrication and installation, is performed in accordance with Brown and Root Procedure CP-CPM 7.3D "Welding and Related Process." Installation of all supports is performed in accordance with Brown and Root Procedure CP-CPM 9.10 "Component Support Installation", including the appendix CP-CPM 9.10A "Installation of Vendor Supplied Component Support Catalog Items." Inspection of all supports is performed in accordance with Brown and Root Quality Instruction QI-QAP 11.1-28 "Fabrication and Installation Inspection of Safety Class Component Supports."

C. Why acceptance criteria are the same for each attribute when verifying every sample item:

The work processes described previously were developed to ensure that the support will safely perform its intended function. The construction process is initiated through the design document, the pipe support detail drawing (BRH). All work performed must comply with the drawing and the ASME Code (Subsection NF). The procedures used for the work processes are based on the design and Code requirements with acceptable variations and tolerances. The acceptance criteria are based on these preset variations and tolerances and are applicable to all supports.

D. Justification for work process/crafts:

All pipe supports are fabricated and installed by Brown and Root employed Ironworkers. All Welding performed during fabrication and/or installation is done by qualified Welders which are also Brown and Root employees. All Ironworkers and Welders are trained by Brown and Root to the aforementioned Construction Procedures.

E. Justification for work process/Inspection Groups:

In general, all inspections are performed by Brown and Root Field Quality Control Inspectors (QCI). Inspectors are certified by Brown and Root in accordance with B & R Instruction QI-QAP-2.1-5 "Training and Certification of Mechanical Inspection Personnel." All Inspectors must be certified by the Site Level III Mechanical Inspector for the attributes or areas being inspected in accordance with the above procedure.

LARGE BORE PIPE SUPPORTS- NON-RIGID

WORK PROCESS / ATTRIBUTES

FABRICATION

- ✓ Identification
- ✓ Configuration
- ✓ Bolting
- Piping Welds
- Support Welds
- * Material Traceability

WELDING

- Piping Welds (Integral Attachments)
- Support Welds

(WHAT WILL BE CHECKED)

INSTALLATION

- Identification
- Location & Orientation
- Configuration
- Bolting
- Piping Welds
- Support Welds
- Concrete Expansion Anchors
- Support Components
- * Material Traceability

DEFINE THESE

* Documentation Review

WORK PROCESSES COMMON TO ALL NON-RIGID PIPE SUPPORTS

- Fabrication
- Welding
- Installation
- Inspection

Attributes and Acceptance Criteria

- All supports within the population are a combination of the attributes
- Derived from Common Specifications, Procedures and Instructions
  - One Fabrication Procedure, Brown & Root, CP-CPM 7.3B "Fabrication of ASME Component Supports"
  - One Installation Procedure, Brown & Root * CP-CPM 9.10 "Component Support Installation"
  - One Inspection Procedure, Brown & Root QI-QAP 11.1-28 "Fabrication and Installation Inspection of Safety Class Component Supports"
  - One Welding Procedure, Brown & Root CP-CPM 7.3D "Welding and Related Process"

* Includes CP-CPM 9.10A "Installation of Vendor Supplied Component Support Catalog Items"

Codes and Standards

- One specification governs all supports Gibbs & Hill Specification 2323-MS-46A "Nuclear Safety Class Pipe Hangers and Supports".
- All supports must meet the requirements of the code

  ASME B&PV Code, Section III, Division 1, Subsection NF

Organization

- Brown and Root was responsible for all site Construction activities for pipe supports.

Personnel

- Brown and Root employed and trained all personnel involved in the Fabrication, Installation and Inspection of Pipe Supports.

DEFINITION OF WORK PROCESS FOR SMALL BORE PIPE SUPPORTS

The category of small bore pipe supports identifies a homogeneous population of pipe supports for those piping systems designated in Section 17A of the FSAR that are safety related and Safety Class 1, 2 or 3 and Seismic Category I.

Boundaries for the supports are for 2-inch nominal pipe and smaller with supports components as shown on pipe support drawings. Examples of this are structural steel, NF welds, standard manufacturer's components, plate, bolting material, anchor bolts and nuts (HILTI and Richmond type), etc.

The work processes involved with small bore pipe supports (SBPS) are Fabrication, Installation, Welding and Inspection. These work processes define the sequence employed by the craftsmen during support erection.

The work processes are applied during the installation of the support regardless of the support's size, material, intended function or designation. The same work processes also apply to non-safety related pipe supports.

Comparison of the work process versus population items to show they are homogeneous, regardless of the population item selected is as follows:

Fabrication - A small bore support is selected for installation using the engineers detailed drawing and the hanger location drawing leased on the piping isometric.

Material is requisitioned either in bulk or by piece number based on the detail drawing's bill of materials. The material is then transported to the field or fabrication shop where it is then preassembled prior to installation.

Preassembly can consist of marking for identification, putting subassemblies or components together by bolting or welding to allow for ease of installation.

Installation - The material that constitute the small bore support is taken to the location indicated on the detail drawing and location drawing.

The components, after identification of installation order, are located and oriented to the configuration shown on the detail and location isometric.

In the process of installation various attributes combine to make a complete support (i.e. bolting, concrete expansion anchors, vendor supplied components, etc.)

Welding - The work process of welding is broken out into two attributes based on various governing code requirements. The first attribute is pipe welds where a form of some material type is integrally attached to the pressure boundary by a welding process controlled by an approved welding procedure. The code reference is ASME III subsection NB, NC or ND. The second attribute covers the balance of welds on a pipe support again controlled by an approved welding procedure and ASME III subsection NF.

Not all supports require welding but the process in such that it is universal to all supports when used.

Inspection - The process of inspection covers all applicable attributes to an individual support plus the rework o a support should it be found deficient. The inspection process covers the physical application of work when performing such processes as non-destructive examinations (PT, MT & RT), torquing of bolts or inspection of vendor supplied components (spring cans, struts, snubbers).

The process covers all supports as it is embodied by one inspection procedure QI-QAP.11.1-28.

Small bore pipe supports were segregated out from all other pipe supports based on design and erection methods of the piping systems they support which are somewhat different than those addressing large bore:

1. Small bore piping is normally field routed and supports are adjusted more readily to suit installed field conditions.

2. Stress analysis and reconciliation of small bore piping and supports is handled on a separate level from that of large bore.

3. The ability to provide sampling giving a much clearer and overall larger database from which to draw conclusion about the construction and inspection aspects of pipe supports as a whole. Acceptance criteria is the same for each particular attribute as all criteria was defined in various specifications, procedures and quality instructions which tied together by reference to give total instructional guidelines for any one particular attribute.

Not all attributes under each particular work process apply to one individual support. As such, there are sixty (60) samples that would embrace all work processes but not of all the individual attributes. To address not the sixty (60) work processes but sixty (60) of each attribute is accomplished by clustering of attributes across three populations, small bore, large bore rigid and non-rigid supports. By doing this we not only address the criteria for sixty (60) of each work process but sixty (60) of each attribute to provide a more definitive basis for the final report.

Justification for the work processes breakdown is that the craft of structural ironworkers (fitters, welders and helpers) performed the fabrication, installation and welding while the inspection group performed all the necessary inspections and tests required to complete installation of any one particular support. Since Brown & Root acted as construction managers and employed all crafts and inspectors which performed appropriate work process, it would make these work processes homogenous by nature of association.

Inspection as a group provided surveillance of work processes by performing various tests and measurements to assure the quality of the installation. All attributes under the work process were subject to inspection by one inspection group comprised of inspectors adept to varying levels of inspections (VT,UT, RT, etc.) which encompassed all work processes.

STRUCTURAL

POPULATIONS
- LARGE BORE PIPE SUPPORTS RIGID
- LARGE BORE PIPE SUPPORTS NON-RIGID
- SMALL BORE PIPE SUPPORTS

ACTIVITIES/ATTRIBUTES

WORK PROCESS / ATTRIBUTES

- FABRICATION
  - Identification
  - Configuration
  - Bolting
  - Matl.Traceability*
- INSTALLATION
  - Identification
  - Location & Orientation
  - Configuration
  - Bolting
  - Concrete Expansion Anchors**
  - Vendor Supplied Components**
  - Matl.Traceability*
- WELDING
  - Pipe Welds (Integral)
  - Support Welds (Non-Integral)
- INSPECTION
  - Location & Orientation
  - Configuration
  - Bolting
  - Pipe Welds (Integral)
  - Support Welds (Non-Integral)
  - Concrete Expansion Anchors
  - Vendor Supplied Components
  - Inspector Certification*
  - NDE*
  - In-Process Operations*
  - Matl.Traceability*

*DOCUMENT REVIEW ONLY
**REINSPECTION AND DOCUMENT REVIEW

BASIS FOR SIMILARITY OF WORK ACTIVITIES
POPULATION: SMALL BORE PIPE SUPPORTS

Work Activities Common to all Supports:

- Fabrication
- Installation
- Welding
- Inspection

Attributes and Acceptance

- All supports in population are made up from attributes in whole or part
- Derived from common specifications, procedures and quality instructions:
  - Three Gibbs & Hill Design Specifications
    1. 2323-MS-46A, "Nuclear Safety Class Pipe Hangers and Supports"
    2. 2323-MS-100, "Piping Erection"
    3. 2323-SS-30, "Structural Embedments"
  - Four Brown & Root Construction Procedures
    1. CP-CPM-7.3, "General Fabrication Procedure"
    2. CP-CPM-9.10, "Component Support Installation"
    3. CP-CPM-9.10A, "Installation of Vendor Supplied Component Support Catalog Items"
    4. CEI-20, "Installation of Hilti Drilled-In Bolts"
  - One TUGCO Engineering Instruction
    1. CP-EI-4.5-1, "General Program for As-Built Verification"
  - One Brown & Root Quality Instruction
    1. QI-QAP-11.1-28-, "Fabrication and Installation of Safety Class Component Supports"

CODES AND STANDARDS

- All supports must meet requirements of ASME Section III, Div. 1., Subsection NB,NC,ND and NF, as applicable.

ORGANIZATION

- Brown & Root Construction Management Team was responsible for all activities related to the fabrication, installation and inspection of all small bore pipe supports.

CRAFTS

- Brown & Root employed and trained all personnel involved in the fabrication, installation and welding of small bore pipe supports.

INSPECTION GROUPS

- Brown & Root QA/QC handled all aspects of inspections related to small bore pipe supports under inspection procedure QI-QAP-11.1-28.

INFORMATION ONLY

#7

66125

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: PIPE WELDS
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	LG BORE POP ~~ITEM~~	SM BORE ~~ACCESS~~	PKG NO.	COMMENTS
27188	41078/1	CS-2-AB-032/FW2A	001 -			
39050	50968/2	DO-1-DG-009A/37		001 1		
15484	23395/3	CC-X-AB-025/24		002 2		
62599	94582/4	SW-2-AB-027/23A		003 3		
6136	09271/5	CC-1-EC-016/7	002 1			
30013	45347/6	CS-2-SB-020/6	003 -			
65838	99476/7	WP-X-AB-182/3		004 -		
25630	38724/8	CS-1-SB-030/32A	004 2			
7109	10741/9	CC-1-RB-027/2	005 3			
49572	74899/10	MS-1-RB-020/16		005 -		
55199	83281/11	RM-1-SB-002/FW6-4		006 -		
8149	12312/12	CC-1-RB-064A/15	006 4			
38991	58912/13	DO-1-DG-008A/26		007 4		
18513	27971/14	CH-2-AB-006/25-2	007 5			
14317	21631/15	CC-2-SB-071/14-5		008 5		
44121	66664/16	FSI-2-2107-01-C-01-1Q2/FW-39		009 -		

APPROVED BY: ______________________ DATE: ______________
QA/QC LEAD DISCIPLINE ENGINEER

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COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
22684	34273/17	CS-1-AB-209A/FW3		010 [6]		
30805	46544/18	CS-2-SB-078/FW1		011 [7]		
26227	39626/19	CS-1-SB-065/16		012 [8]		
13137	19848/20	CC-2-SB-002/1-1		013 [9]		
48476	73243/21	GH-X-AB-061/2A		014 [-]		
57295	86568/22	SI-1-RB-043/FW9A		015 [10]		
19844	29983/23	CH-2-SB-009/11		016 [11]		
59127	89336/24	SI-2-RB-055/1-4		017 [-]		
27417	41425/25	CS-2-AB-050/FW7A	008 [6]			
30142	45542/26	CS-2-SB-030/8	009 [-]			
FE 14891	22499/27	CC-X-AB-010/FW24		018 [12]		
1454	02196/28	AF-1-YD-006/45		019 [13]		
23873	36070/29	CS-1-RB-016/4		020 [14]		
43623	65911/30	FSI-1-602-02/FW26		021 [15]		
57747	87251/31	SI-1-SB-009/FW 2-1A	010 [-]			
62245	94047/32	SW-1-YD-015/FW1A	——	——	——	——

APPROVED BY: ______________________________ DATE: ______________
QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
39687	59964/33	DO-1-DG-044/10		022 16		
35043	52447/34	CT-2-RB-002/18	011 –			
58209	87950/35	SI-1-SB-025/23	012 –			
16741	25294/36	CH-1-AB-045/8A		023 17		
48039	72584/37	GH-X-AB-046/FW20		024 –		
58446	88307/38	SI-2-AB-001/FW 13-2	013 –			
37824	57149/39	DD-1-FB-001/9-3		025 –		
11897	17975/40	CC-2-RB-051/FW2	014 7			
44947	67912/41	FSI-X-2617-04-1Q3/FW13		026 –		
36603	55304/42	CT-2-SB-008/24		027 –		
25420	38408/43	CS-1-SB-026/24-1	015 8			
53093	80220/44	RC-1-RB-020/9	016 9			
44585	67364/45	FSI-X-2107-04-B-05-1Q3/FW 18		028 –		
51019	77086/46	MS-2-RB-044/15		029 –		
53236	80435/47	RC-1-RB-039/18		030 18		
13567	20498/48	CC-2-SB-020/6		03[illegible] 19		

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QA/QC LEAD DISCIPLINE ENGINEER

[illegible] Revision [illegible]

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
58470	88344/49	SI-2-AB-004/1	017 [10]			
59036	89199/50	SI-2-RB-045/4-1	018 [11]			
57134	86326/51	SI-1-RB-032/FW-40		032 -		
64013	96719/52	SW-2-YD-002/FW-2	—	—	—	—
48077	72640/53	GH-X-AB-047A/FW-27A		033 -		
19336	29215/54	GH-2-EC-004A/24	019 [12]			
45268	68396/55	FW-1-RB-008A/FW-1A	020 [13]			
58374	88199/56	SI-1-YD-001A/1-23	—	—	—	—
30159	45568/57	CS-2-SB-030/FW 28	~~021~~ -	SBWM-086 -		This sample was originally called LBWM but was later found to be SBWM
10399	15712/58	CC-2-AB-034/FW-5-1	—	—	—	—
38627	58362/59	DD-X-AB-003/FW 10	022 -			
58195	87929/60	SI-1-SB-025/ 11A	023 -			
47678	72038/61	GH-X-AB-024/FW-22A		034 -		
37261	56299/62	CT-2-SB-067/FW-4		035 -		
14484	21883/63	CC-X-AB-001/24	024 [14]			
10881	16440/64	CC-2-EC-003B/FW-23		036 [20]		

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
53757	81223/65	RC-2-RB-028/FW-8		037 [21]		
49960	75486/66	MS-1-SB-007/13-2	025 [15]			
16676	25196/67	CH-1-AB-042/15-3		038 [22]		
63315	95665/68	SW-2-SB-033/30		~~039 [23]~~		This package was later found to be inaccessible SUPERSEDED. REFER TO SBWM.
4024	06080/69	BR-X-AB-048/FW7	026 [–]			
18081	27319/70	CH-1-SB-024/37-2		040 [24]	23	
64983	98185/71	VD-2-SB-005/31	027 [–]			
32653	49336/72	CT-1-RB-015/FW96		041 [–]	~~24~~	
44771	67645/73	FSI-X-2107-06-01-1Q3/ FW-1A		042 [–]		
23582	35630/74	CS-1-RB-007/3-2		043 [25]	24	
44252	66862/75	FSI-2-2108-01-01-1Q2/FW-3		044 [26]	25	
15111	22831/76	CC-X-AB-016A/28		045 [27]	26	
45315	68467/77	FW-1-RB-0088/19-1	028 [16]			
7041	10638/78	CC-1-RB-023/34		046 [28]	27	
24677	37285/79	CS-1-RB-057/11		047 [29]	28	
25536	38583/80	CS-1-SB-0288/24-1	029 [–]			

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COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

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SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
50041	75608/81	MS-1-SB-010/FW-16		048 [30]	29	
37789	57096/82	DD-1-AB-013/16-1	030 -			
33543	50681/83	CT-1-RB-043/5-3	031 -			
13326	20134/84	CC-2-SB-009/7		049 [31]	30	
9234	13952/85	CC-1-SB-038/8A		050 [32]	31	
13860	20941/86	CC-2-SB-049/11		051 [33]	32	
55976	84576/87	SF-X-FB-017A/61		052 -		
61076	92282/88	SW-1-SB-004B/FW 7A		053 [34]	33	
5720	08642/89	CC-1-EC-002/5-5A	—	—	—	—
* 33134	50063/90	CT-1-RB-031/56		054 -		
64642	97670/91	VA-X-AB-013/FW5		055 -		
28838	43572/92	CS-2-RB-017A/7-1		056 [35]	34	
* 33113	50031/93	CT-1-RB-031/43		057 -		
8035	12139/94	CC-1-RB-058B/16	032 [17]			
47928	72416/95	GH-X-AB-043/12		058 -		
32799	49557/96	CT-1-RB-022/FW-2	033 -			

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QA/QC LEAD DISCIPLINE ENGINEER

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COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________________
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SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
[redacted]						
16063	24269/97	CN-1-AB-027/85-2		059	35	
23592	35645/98	CS-1-RB-007/11A		060	36	
27806	42013/99	CS-2-AB-073B/13	034 [18]			
43855	66261/100	FSI-2-2106-16-2-2Q3/FW-10		061	37	
65667	99218/101	WP-X-AB-050/36	- - -	- - -	- - -	- - -
39874	60246/102	DO-1-YD-010/1-3	—	—	—	—
23954	36193/103	CS-1-RB-018/27-3		062	38	
352	00531/104	AF-1-SB-008A/15A		063	39	
49464	74737/105	MS-1-RB-012/FW-13	035 –			
35118	53061/106	CT-2-RB-006/3	036 –			
5702	08614/107	CC-1-EC-001/42	037 [19]			
63971	96656/108	SW-2-SI-009/26		064	40	
41097	62095/109	FSI-00043-20/5		065	41	
51551	77889/110	MS-2-SB-056/FW-3A	038 [20]			
11198	16918/111	CC-2-EC-010/FW-2A	039 [21]			
30623	46268/112	CS-2-SB-060/10		06[illegible]	42	
36989	55[illegible]8/113	CT-2-SB-046/FW6A	- - -	- - -	- - -	- - -
16826	25423/114	CN-1-EC-002/2	040 [22]			
58956	89078/115	SI-2-RB-040/2	041 [23]			
8731	13192/116	CC-1-SB-013/35	042 [24]			
46945	70931/117	GH-2-SB-005/FW-1	- - -	- - -	- - -	- - -
51047	77128/118	MS-2-RB-046/FW-9	- - -	- - -	- - -	- - -
24555	37100/119	CS-1-RB-037B/4-5A		067	43	
6823	10308/120	CC-1-RB-013/FW-16		068	44	

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COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

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SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
1206	01822/121	AF-1-SB-030A/12	043 25			
4893	07393/122	CC-1-AB-030/FW-18	044 26			
* 33579	50735/123	CT-1-RB-044/14				
4911	07419/124	CC-1-AB-033/1	045 27			
* 33150	50087/125	CT-1-RB-031/68-1				
47502	71772/126	GH-X-AB-018A/19-3A				
30256	45714/127	CS-2-SB-036/1-4	046 -			
39195	59220/128	DO-1-DG-014/36	047 28			
7125	10764/129	CC-1-RB-028/8	048 29			
11701	17678/130	CC-2-RB-037/FW-1		069 46	45	
16637	25137/131	CH-1-AB-041/9-2		070 47	46	
48965	73983/132	GH-X-AB-079/23A				
65776	99383/133	WP-X-AB-085A/11				
53916	81463/134	RC-2-RB-071/FW-41				
31251	47218/135	CS-2-SB-103A/FW-8		071 48	47	
53840	81348/136	RC-2-RB-060/FW-4		072 49	48	
58176	87900/137	SI-1-SB-024/FW-22A				
36515	55171/138	CT-2-SB-003/FW-19				
47834	72273/139	GH-X-AB-036/6				
20726	31315/140	CH-2-SB-048/2-1		073 50	49	
9747	14727/141	CC-2-AB-002/15		074 51	50	
55428	83748/142	SF-1-RB-011/2	049 -			
58788	88824/143	SI-2-RB-023/4-3				
10374	15674/144	CC-2-AB-032/14	050 30			
18237	27554/145	CH-1-SB-028/20		075 52	51	

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SBWM 039 --superseded by--> SBWM 085
LBWM 021 --become--> SBWM 086
New Package --> SBWM 087

COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

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QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
24909	37635/146	CS-1-SB-013/FW-18		076 52		
4948	07476/147	CC-1-AB-033/FW-74				
43685	66005/148	FSI-2-8106-14-01-103/FW-42		077 53		
16630	25126/149	CH-1-AB-041/7-4		078 54		
37717	56987/150	DD-1-AB-004/14-1	051			
28675	43326/151	CS-2-RB-011/FW-1		079 55		
46664	70506/152	GH-1-AB-004/FW-8				
* 3643	05504/153	BR-X-AB-010/FW-30				
47294	71458/154	GH-X-AB-015A/1-9				
60420	91290/155	SI-2-YD-002A/FW1-50				
14349	21680/156	CC-2-SB-072/18		080 56		
26521	40071/157	CS-2-AB-007/6	052			
63828	96439/158	SW-2-SI-008/FW 27		081 57		
58822	88876/159	SI-2-RB-028/FW3A	053 31			
61446	92840/160	SW-1-SB-018/FW 24				
15525	23456/161	CC-X-AB-026/41		082 58		
23465	35453/162	CS-1-RB-004/24-7		083 59		
43309	65437/163	FSI-1-566-01/FW-10		084 60		
23325	35242/164	CS-1-AB-242/8				
28241	42669/165	CS-2-AB-092/35				
28182	42580/166	CS-2-AB-090/FW-7				
2674	04040/167	AF-2-SB-065/20		085 61		Supersedes SBWM-039
51511	77829/168	MS-2-SB-030/FW 11				
63451	95870/169	SW-2-SB-037/5-3				
17305	26146/170	CH-1-SB-004/61				
30159	45568/57	CS-2-SB-030/FW 28		086		see explanation for Seq No. 57
		FSI-1-133-01/FW-021		087		Control Pressure Transmitter

What about these three!

COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

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QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
5124	07742/171	CC-1-AB-043B/3A				
61450	92846/172	SW-1-SB-018/2B				
47093	71154/173	GH-X-AB-005/16				
3230	04879/174	BR-2-SB-014/7	054-			
36058	54480/175	CT-2-RB-075/2				
30257	45715/176	CS-2-SB-036/2A	055-			

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
39058	59014/177	DO-1-DG-009B/FW-1				
53147	80301/178	RC-1-RB-028B/FW-5	056 32			
35458	53574/179	CT-2-RB-029/FW5A	057			
31964	48295/180	CT-1-RB-007/FW24				
9099	13748/181	CC-1-SB-035B/FW-14				
59632	90100/182	SI-2-SB-003/FW9A	058			
57562	86972/183	SI-1-RB-066/[illegible]				
63303	95646/184	SW-2-SB-033/18				
16869	25488/185	CH-1-EC-003A/S-1A	059 33			
27519	41579/186	CS-2-AB-065/11	060 34			
25421	38409/187	CS-1-SB-026/24-2A	061 35			
49433	74690/188	MS-1-RB-011/FW15	062 36			
58497	88384/189	SI-2-RB-005/FW-1				
61347	92691/190	SW-1-SB-016/43				
26785	40472/191	CS-2-AB-016/23				
47197	71311/192	GH-X-AB-009/3				

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

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QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
4288	06478/193	BR-X-AB-076/FW-5				
6733	10172/194	CC-1-RB-008/31-2A				
15489	23402/195	CC-X-AB-026/FW-4				
63744	96312/196	SW-2-SI-006B/FW21				
28060	42396/197	CS-2-AB-084/10	063 037			
48079	72644/198	GH-X-AB-047A/29				
32627	49296/199	CT-1-RB-015/FW70				
30671	46342/200	CS-2-SB-064/9A	064 38			INVALID SAMPLE - NOT Q.C. ACCEPTED PER NCR M-16922 & PHONE CONVERSATION W/RON BLACK. SUPERSEDED REFER TO LBWM-087
47137	71220/201	GH-X-AB-006/FW-40				
8584	12969/202	CC-1-SB-007/FW-4				
38063	57510/203	DD-1-YD-025/FW25				
63763	96349/204	SW-2-SI-007A/M-1				
38700	58472/205	DO-1-DG-001/14	065 39			
53181	80352/206	RC-1-RB-032/FW5A				
45615	68920/207	FW-1-SB-029/31	066 40			
35818	54118/208	CT-2-RB-055/2				

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COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

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QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
23512	35524/209	CS-1-RB-0058/5				
37866	57213/210	DD-1-SB-001/FW-14				
53741	81198/211	RC-2-RB-027/FW 12				
35358	53423/212	CT-2-RB-021/FW53				
26684	40317/213	CS-2-AB-013/FW-6				
52232	78919/214	PS-1-RB-014/15A				
19620	29644/215	CH-2-SB-001/FW8				
43900	66330/216	FSI-2-2106-2-01-1Q2 FW 17				
61363	92715/217	SW-1-SB-017/13				
58497	88384/218	SI-2-RB-005/FW1				
22783	34423/219	CS-1-AB-211/15				
20363	30767/220	CH-2-SB-038/37A				
48953	73964/221	GH-X-AB-079/14				
9334	14103/222	CC-1-SB-040/28				
15255	23048/223	CC-X-AB-019/5A				
5176	07820/224	CC-1-AB-044/FW 27	. 067 "		"	

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COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
56920	86002/225	SI-1-RB-021/FW 42				
49310	74504/226	MS-1-RB-008/FW 36				
8018	12114/227	CC-1-RB-058A/FW62				
34300	51824/228	CT-1-SB-024/5-2				
65896	99564/229	WP-X-AB-213/13				
55434	83757/230	SF-1-RB-012/FW-1				
48061	72617/231	GH-X-AB-047A/8				
31979	48318/232	CT-1-RB-007/39				
65323	98698/233	WP-2-SB-022/24				
31318	47319/234	CS-2-SB-105/12A	068 42			
45179	68262/235	FW-1-RB-006A/1B-1	069 43			
38933	58825/236	DO-1-DG-006B/26				
56934	86023/237	SI-1-RB-022/FW-4				
51961	78509/238	PS-1-RB-002/FW 35				
4689	07084/239	CC-1-AB-006/FW-3	070 44			
43127	65161/240	FSI-1-557/FW 3-3				

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
SECOND RANDOM SAMPLE IDENTIFICATION

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QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
5495	08302/241	CC-1-AB-062/8-1	071 [45]			
42671	64473/242	FSI-1-2108-01-04-1Q2 FW-16				
33572	50725/243	CT-1-RB-044/9-3				
7724	11670/244	CC-1-RB-048/2	072 [46]			
27495	41542/245	CS-2-AB-063/1-3				
48905	73891/246	GH-X-AB-076/14A				
63319	95670/247	SW-2-SB-033/34				
13113	19812/248	CC-2-RB-136/1-15				
19087	28839/249	CH-2-AB-022/FW-8				
46763	70656/250	GH-1-AB-050/20				

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM

FIRST RANDOM SAMPLE IDENTIFICATION

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SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
31470	4[redacted]/251	CS-X-AB-013/FW-16A		073 47		
55338	83[redacted]/252	RM-X-EC-001/14				
16467	29[redacted]/253	CH-1-AB-035/62				
39681	59[redacted]/254	DO-1-DG-044/4				
49801	75[redacted]/255	MS-1-RB-036/30				
46959	70[redacted]/256	GH-2-SB-006/FW-3	—			
42967	64[redacted]/257	FSI-1-529/FW-3	—			
34519	54[redacted]/258	CT-1-SB-031/58	—			
54106	81[redacted]/259	RC-2-SB-002/19				
53349	80[redacted]/260	RC-1-RB-044/54				
50043	75[redacted]/261	MS-1-SB-011/FW 1A				
61705	93[redacted]/262	SW-1-SB-024/20-3				
15074	25[redacted]/263	CC-X-AB-015/31				
6215	0[redacted]/264	CC-1-EC-019/13		074 48		
51675	78[redacted]/265	MS-2-SB-063/12				
45602	68[redacted]/266	FW-1-SB-029/18		075 49		
56066	84[redacted]/267	SF-X-FB-019/1-3				
22783	34[redacted]/268	CS-1-AB-211/15	⇒ NOT NEEDED - SAME AS SEQ. NO. 219			
45274	68[redacted]/269	FW-1-RB-008A/FW-5-2				
39604	59[redacted]/270	DO-1-DG-038/8				
756	0[redacted]/271	AF-1-SB-020/8A		076 50		
23336	35[redacted]/272	CS-1-AB-242/19				
2009	03[redacted]/273	AF-2-SB-029/3		077 51		
22252	33[redacted]/274	CS-1-AB-126/6				
23587	35[redacted]/275	CS-1-RB-007/6				

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QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
36225	5 [redacted] 3/276	CT-2-RB-080/33	—			
11941	18 [redacted] 2/277	CC-2-RB-053/31		078	052	
50886	7 [redacted] 5/278	MS-2-RB-034/FW4				
5623	0 [redacted] 5/279	CC-1-AB-076/3				
43038	6 [redacted] 7/280	FSI-1-535/FW-4	—			
3951	0 [redacted] 9/281	BR-X-AB-044/FW13-3				
42536	6 [redacted] 9/282	FSI-1-2107-04-8-01-1Q2/FW-4	—			
35328	5 [redacted] 7/283	CT-2-RB-020/FW-4	—			
32282	4 [redacted] 5/284	CT-1-RB-012/44	—			
14170	2 [redacted] 0/285	CC-2-SB-066/FW-1		079	053	
14563	2 [redacted] 3/286	CC-X-AB-002/34A		080	054	
35013	5 [redacted] 2/287	CT-2-RB-001/FW-28	—			
54607	8 [redacted] 7/288	RH-1-SB-018/6				
21604	3 [redacted] 2/289	CS-1-AB-024/19A				
953	0 [redacted] 9/290	AF-1-SB-026A/5A		081	055	
386	0 [redacted] 2/291	AF-1-SB-009/20		082	056	
48331	7 [redacted] 5/292	GH-X-AB-056/4-12	—			
50423	7 [redacted] 5/293	MS-1-SB-054/6-10		083	057	
37233	5 [redacted] 6/294	CT-2-SB-065/11	—			
16026	2 [redacted] 4/295	CH-1-AB-027/50A				
11072	1 [redacted] 9/296	CC-2-EC-004/FW-86				
33053	4 [redacted] 1/297	CT-1-RB-030/169	—			
43284	6 [redacted] 9/298	FSI-1-566/FW-4	—			
64922	9 [redacted] 2/299	VD-2-SB-004/FW-6				
3054	0 [redacted] 4/300	BR-2-SB-001/9-2				

APPROVED BY: ______________________________ DATE: ________________
QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________

QA/QC DISCIPLINE ENGINEER

	SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
	46071	6[redacted]9/301	FW-2-RB-022/1-3		084 058		
3" ✓	38205	5[redacted]5/302	DD-2-AB-004/FW-10				
1/4" X	28746	4[redacted]3/303	CS-2-RB-011/FW 19				
6" ✓	36269	5[redacted]9/304	CT-2-RB-080/80	—			
1" X	29781	4[redacted]6/305	CS-2-RB-082/10-3	X			
1/2" X	10209	15[redacted]5/306	CC-2-AB-027B/FW-8				
3/4" X	15448	23[redacted]0/307	CC-X-AB-024B/13				
	34827	5[redacted]1/308	CT-1-SB-040/57				
	5745	06[redacted]0/309	CC-1-EC-002/27			59 085	
	2383	0[redacted]0/310	AF-2-SB-054A/6			60 086	
	16595	2[redacted]4/311	CH-1-AB-040/14-1				
	63957	9[redacted]5/312	SW-2-SI-009/18				
	38261	5[redacted]0/313	DD-2-AB-010/FW-4				
	24827	3[redacted]2/314	CS-1-SB-011/10			61 087	- This sample must be included in our engineered sample due to the omission of LBWM-064
	47980	7[redacted]4/315	GH-X-AB-044/28				
	29276	[redacted]33/316	CS-2-RB-034/FW1A				
	33325	[redacted]52/317	CT-1-RB-032/54	—			
	25797	[redacted]77/318	CS-1-SB-043/28				
	34993	[redacted]71/319	CT-1-YD-004/FW-34A	—			
	31375	[redacted]05/320	CS-X-AB-001/FW 1-5A				
	10894	[redacted]59/321	CC-2-EC-003B/FW-32-5			62 088*	
	19928	3[redacted]9/322	CH-2-SB-013/FW-20			63 089*	
	5550	0[redacted]5/323	CC-1-AB-067/9-1				
	37477	5[redacted]5/324	CT-2-SB-070/42	—			
	65128	98[redacted]4/325	WP-1-SB-005B/9-1	—			

APPROVED BY: ______________________ DATE: *Submitted to inspectors, but not yet needed for our sample.

QA/QC LEAD DISCIPLINE ENGINEER

COMANCHE PEAK RESPONSE TEAM
FIRST RANDOM SAMPLE IDENTIFICATION

PREPARED BY: ______________________
QA/QC DISCIPLINE ENGINEER

SAMPLE NO.	RAN/ SEQ NO.	DESCRIPTION	POP ITEM	ACCESS	PKG NO.	COMMENTS
53220	80 [redacted] /326	RC-1-RB-039/2				
59910	90 [redacted] /327	SI-2-SB-019/20				
56684	85 [redacted] /328	SI-1-RB-010/20-1				
53251	80 [redacted] /329	RC-1-RB-039/27				
23490	35 [redacted] /330	CS-1-RB-005A/18				
27327	41 [redacted] /331	CS-2-AB-040/11-7				
13078	19 [redacted] /332	CC-2-RB-134/20				
51888	78 [redacted] /333	PS-1-RB-001/28-14	—			
62174	93 [redacted] 0/334	SW-1-YD-002/FW 15				
40496	61 [redacted] /335	DO-2-DG-042/FW-39				
32755	4 [redacted] 0/336	CT-1-RB-020/1-1A	—			
43297	6 [redacted] 9/337	FSI-1-566/FW-19	—			
49120	7 [redacted] 7/338	MS-1-RB-003/FW-17				
38649	5 [redacted] 5/339	DD-X-AB-003/FW-31	—			
53065	8 [redacted] 7/340	RC-1-RB-017/FW-3		090* 64		
54241	8 [redacted] 4/341	RH-1-RB-004/FW-7		~~091~~ 65		Penetrations are now numbered LBWM-091 & LBWM-092. If these samples (#341 & 346) are needed, they will have to be numbered LBWM-093 & LBWM-094.
59690	9 [redacted] 7/342	SI-2-SB-010/13				
33402	5 [redacted] 8/343	CT-1-RB-041/FW-29	—			
1092	0 [redacted] 9/344	AF-1-SB-027B/51				
61808	9 [redacted] 8/345	SW-1-SI-004/1a				
7761	1 [redacted] 5/346	CC-1-RB-053/FW-2		~~092~~ 66		Penetrations
34118	5 [redacted] 9/347	CT-1-SB-014/44	—			
31911	4 [redacted] 5/348	CT-1-RB-006/FW-20	—			
63603	9 [redacted] 0/349	SW-2-SB-040/38				
17488	2 [redacted] 22/350	CH-1-SB-008/10				

APPROVED BY: ______________________ DATE: ______________
QA/QC LEAD DISCIPLINE ENGINEER

#2

Section-IV

1) Page IV-83, Paragraph 2.5 -

To date I have not seen this section, Testing Program Issues. If you have received the ISAPs that were due on March 1, 1986, this section needs to be completed. If you have not received this information, please call Charlie Trammell at (301-492-7317) and see how he wants to proceed.

3/19/80

Section IV

1) Pages IV-86 through IV-105

I have enclosed the entire section on Quality of Construction, Self-initiated Evaluation for your review. Paragraph 3.2 was prepared by Angelo Marinos and is in the format that he feels this section should be in, in order to minimize the implementation aspect. Please review paragraphs 3.3 and 3.4, written by Teledyne, to see if you agree they are O.K. as is, or whether they need to be revised to reflect consistency with Paragraph 3.2. I have also included Paragraph 3.1, scope, which might help you in this review.

#11

SSER STATUS

Report Body	Responsible	Status
Abstract	Marinos	Needed, later
Contributors	Teledyne	Needed, later
Acronyms/Abbrev.	Teledyne	Needed, later
1.0 Introduction	Marinos	Needed, later
2.0 Summary of NRC Rev. & Eval.	Marinos	Needed, later
3.0 Conclusions	Marinos	Needed, later
4.0 Summary-Outstanding Issues	Marinos	Needed, later
5.0 Confirmatory Issues	Marinos	Needed, later
Appendix I	Teledyne	
✓ 1.0 Introduction	Saffell ✓	~~Needed~~ OK
✓ 2.0 CPRT Program Plan Desc.	Saffell ✓	~~Needed~~ OK
✓ 3.0 NRC Review and Eval	Saffell ✓	~~Needed~~ OK
✓ 4.0 CPRT CAPP/DAPP Common		
✓ 4.1 QA/QC of CPRT Act.	DFL ✓	OK
✓ 4.2 Accept Criteria	DFL ✓	OK
✓ 4.3 Corrective Actions	DFL ✓	OK
X 4.4 Independence of CPRT Org.	Marinos (X)	Needed
✓ 4.5 Discipline Interfaces	Teledyne ✓	Needed
✓ 5.0 Overall Summary & conclusions	Teledyne ✓	Needed, later
X 6.0 References	Teledyne (X)	Needed, later

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J. Knox

Appendix A

JOHN ✓1.0 Introduction	(2 sets to merge) ✓	Nevshemal/Masterson/TERAO	
✓2.0 Process for Evaluation	✓		
✓3.0 Staff review & Eval. Appr.	✓		
✓4.0 4.1 Intro		JJR ✓	O.K.
✓4.2 Elec. I & C		Riveria ✓	O.K.
JOHN ✓4.3 Mech. Syst. & Components		Nevshemal ✓	O.K. JOHN
✓4.4 Civil/Struct.		JJR ✓	O.K.
✓4.5 Piping & Supports	~~ADD STATEMENT~~ ADD VIC'S ABOUT VIC'S	Terao ✓	O.K.
✓4.6 New QA/QC		(Hale/Grimes) ✓ JHM	O.K.
JIM ✓4.7 Closed Ext. Source	(2 sets)	JHM + Masterson ✓ Terao	? JIM
✓5.0 5.1 Self Initiated Eval.		Nevshemal ✓	O.K.
✓5.2 Elect. I & C		Riveria ✓	O.K.
RJM ✓5.3 Mech Syst. & Comp Design Act.		NFV/Masterson/TERAO ✓	O.K.
✓5.4 Civil/Struct Design Act.		JJR ✓	O.K.
✓5.5 Piping & Supports Des. Act (2 sets)		RDH/Terao ✓	
X 6.0 Exc. of Vendors etc.	(3 sets)	RDH/Terao/Nevshemal ✓	
X 7.0 Overall Summary and Conc.		Knox (X)	Missing
X 8.0 Refs.		Teledyne (X)	

Appendix B

E. Tomlinson

✓1.0 Introduction	Saffell ✓	~~Needed~~ OK
✓2.0 CPRT Process for Eval	Saffell ✓	~~Needed~~ OK
✓3.0 Staff Review & Eval Approval	Saffell ✓	~~Needed~~ OK
✓4.0 4.1 Intro	JAF ✓	O.K.
X 4.2 Elect & Inst. (needs work	L. Stanley ✓	O.K.
✓4.3 Test Prog. Issues	JHM ✓	O.K.

njm	√4.4 Mech & Piping Issues (3 sets) FIRE DOOR	Masterson/Terao/Other	✓	?
	✓4.5 Civil/Struct	JAF	✓	O.K.
	4.6 QA/QC (Hale/Grimes)	JHM	✓	O.K.
	4.7 Misc.	JHM	✓	O.K.
	4.8 Closed Ext. Issues	JHM	✓	O.K.
5.0	5.1 Scope Intro, Etc.	Saffell	✓	~~Needed~~ OK
	5.2 Elect. Eqt (on Cable) Pops. (2 sets)	Tiveria/Yost	(X)	
njm	5.3 Mech. Eqt. Pop. (needs work)	JAF	✓	
	5.4 Struct Pops. (clean up)		✓	
	5.4.2, 3, 4 Combined			
	6.0 Exclusion of Vendors	JJR	* ✓	O.K.
	7.0 Overall Summary & Conclus.	Teledyne	(X)	Needed, Later
	8.0 References	Teledyne	(X)	Needed, later

WORK PROCESS DEFINITION FOR PIPE WELDS/MATERIAL POPULATION GROUP (PIWM)

INTRODUCTION

The PIWM population group includes all safety-related welds which have been QA/QC inspected and accepted, and whose function is to maintain the integrity of piping systems and pressure boundaries. This population encompasses pipe welds, containment penetration welds (flange weld to sleeve), branch line connection welds, and abandoned integral attachment welds. This population also includes safety-related pressure boundary welds for mechanical equipment which require similar installation techniques, procedures, and personnel.

Performing a weld in the PIWM population group requires one work process:

- Welding

The following work process description demonstrates that reasonable homogeneity does exist at the work process level. Regardless of the possible differences in the welds (weld configuration, material type or welding process) being performed, each work process involves: common erection specification requirements; common installation procedure requirements; a common construction management organization; common craft labor performing the same basic types of operations; a common inspection procedure; and a common inspection organization. A sufficient number of samples will be randomly selected from the PIWM population group to ensure that meaningful conclusions can be drawn regarding construction adequacy of the welding work process, and in turn, the PIWM population group.

Within the work process of welding, there are different welding methods utilized in making a weld. In Unit 1 and Common areas, and Unit 2, there are two types of welding methods used in performing ASME Section III Code Class 1, 2, 3, and MC, piping and pressure boundary welds: Gas Tungsten Arc Welding (GTAW) and Shielded Metal Arc Welding (SMAW). These welding methods are utilized in both carbon and stainless steel welding and are performed by the same work force. Each welding method will have 60 randomly selected samples within the weld reinspection and document review phases of this population group.

WORK PROCESS: Welding

1. INTRODUCTION

Welding is the sole work process required for installation in the Pipe Welds/Material (PIWM) population group. It includes the activities necessary to establish a safety-related piping or pressure boundary weld joint.

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION

* Homogeneity for the welding work process is demonstrated on the basis that attributes and acceptance criteria for the reinspection and document review are derived from specifications, installation procedures, codes and standards, and inspection procedures which are common to the activities involved in accomplishing the welding work process for the PIWM population group:

a. Source of Attributes and Acceptance Criteria

The Gibbs & Hill Specifications 2323-MS-100, Rev. 8, "Welding Erection Specification", 2323-MS-101, Rev. 4, "Mechanical Erection Specification", and 2323-ES-100, Rev. 2, "Electrical Erection Specification", are the common source for establishing the attributes and acceptance criteria for the welding work process. These specifications all reference and include the ASME Section III Code welding requirements (refer to Section 2c below).

b. Installation Procedure

Brown & Root Construction Procedure CP-CPM-6.9, Rev. 2, "General Piping Procedure", with Appendices, (in particular, Appendix CP-CPM-6.9D, Rev. 6, "Welding and Related Processes"), applies to all installation activities for welding a safety related piping or pressure boundary weld, and is the common installation procedure for all the attributes.

Previous revisions of the specifications and procedure identified above have been reviewed for impact on the selected attributes. No significant changes were found which would affect the homogeneity of the work process.

WORK PROCESS: Welding
(Cont'd)

2. HOMOGENEOUS WORK PROCESS JUSTIFICATION (Cont'd)

c. Applicable Codes and Standards

All PIWM welding work process activities were performed in accordance with the ASME B&PV Code, Section III, 1974 Edition to and including Summer 1974 Addenda. Welds within the PIWM population group fall under the requirements of ASME Section III, Subsections NB, NC, ND, and NE. These requirements have been incorporated into the specifications (refer to section 2a) and installation procedure (refer to Section 2b) mentioned previously.

d. Construction Work Force

The Brown & Root Construction Management organization has been responsible for all piping and pressure boundary welding activities since the beginning of the construction project. Therefore, there has been both programmatic and procedural consistency of the welding work process.

All PIWM welding work process activities were performed by the Brown & Root Pipe Department Welders. The welders perform their welding to the requirements of Brown & Root Construction Procedure CP-CPM-6.9 (refer to Section 2b). Welder qualification is in strict compliance with B&R Specification WES-031, "Specification for the Qualification of Welders and Welding Operators".

When a weld is required, the joint conditions require that a Weld Procedure Specification (WPS) be used. That WPS requires that welders making the welds be qualified to standard tests. A welder qualified to these tests will be so indicated on a Welder Qualification Matrix of all welders within the B&R Pipe Department Welders, and therefore, any qualified welder could be called upon to perform the weld on that particular joint. Most welders have the qualifications to perform welds of various welding methods, on various types of base materials.

e. Inspection Acceptance Standards and Inspection Group

Brown & Root Quality Instruction Procedure QI-QAP-11.1-26, Rev. 17, "ASME Pipe Fabrication and Installation Inspections", was used to inspect all PIWM welding work process activities. All inspections are performed by the Brown & Root QA/QC ASME Group inspectors.

3. ATTRIBUTE APPLICABILITY

a. Description of Attributes

Listed below are the major activities that comprise the welding work process activities and the corresponding attributes for evaluating the adequate performance of those activities.

	ACTIVITIES	ATTRIBUTES
1.	Proper end-prep and fitup of the weld joint	Fitup
2.	Cleanliness of the weld joint	Cleanliness
3.	Identify the base materials to be welded	Base Material Traceability
4.	Welding performed to the proper qualified Weld Procedure Specification (WPS)	Weld Procedure
5.	Identify the weld material to be used	Weld Material Traceability
6.	Welder must have proper qualifications to perform weld	Welder Qualification
7.	Correct configuration of the weld	Configuration
8.	Correct weld size and profile	Weld Size and Profile
9.	No excessive radial weld shrinkage	Radial Weld Shrinkage
10.	No excessive under-cutting	Undercut

WORK PROCESS: Welding
(Cont'd)

a. Description of Attributes (Cont'd)

	ACTIVITIES	ATTRIBUTES
11.	Surface of the weld is free of overlap, ripples, and ridges to allow for proper NDE	Surface of Weld
12.	No cracks, lack of fusion, and crater cracks	Cracks, Lack of Fusion, and Crater Cracks
13.	No min.wall violations to base material caused by welding activities	Base Material Defects
14.	Welder ID symbol has been documented	Welder ID
15.	Acceptable visual inspections have been performed	Visual Inspections
16.	Acceptable Non-Destructive Examinations have been performed	NDE
17.	Proper certification of the inspectors who have accepted these activities	Inspector Certification

WORK PROCESS: Welding
(Cont'd)

a. Description of Attributes (Cont'd)

The following are the major activities and corresponding attributes which are not common to every PIWM population group sample.

ACTIVITIES	ATTRIBUTES
18. Correct amount of weld reinforcement for butt welds	Butt Weld Reinforcement
19. Proper preheating of weld area had occurred	Preheat
20. No rust has developed on weld due to contamination of weld	Weld Rust
21. No rust has developed on base material due to contamination of base material	Base Material Rust
22. Compliance with impact test requirements	Impact Tests
23. Compliance with post weld heat treatment requirements	Post Weld Heat Treatment

b. Attribute Consistency and Sufficiency

The attribute "Butt Weld Reinforcement" (item 18 above) does not apply for every weld due to differences in weld joint configuration. This attribute is an additional inspection of the weld size beyond the "Size and Profile" attribute (item 8 above) to verify that the amount of weld reinforcement on butt welds does not exceed ASME code requirements. Since the same weld surface condition is being evaluated in all cases, the homogeneity of the welding work process is not affected.

b. Attribute Consistency and Sufficiency (Cont'd)

The attribute "Preheat" (item 19 above) will not apply for each weld. The Preheat attribute provides additional assurance that construction adequately followed the applicable Weld Procedure Specification in performing the weld, and was included for this reason.

The attributes "Weld Rust" and "Base Material Rust" (items 20 and 21 above) will be investigated only on those samples which are stainless steel. A sufficient number of these attributes provides an indication of possible contamination of the stainless steel resulting from the use of carbon steel or carbon steel contaminated tools. Stainless steel samples will be randomly selected to provide confidence in the conclusions about these attributes.

The attributes "Impact Test" and "Post Weld Heat Treatment" (items 22 and 23 above) will not apply for each weld. These attributes are included to provide additional assurance that construction has adequately followed the applicable WPS while performing the weld.

The attributes identified above are associated with worker activities that are reasonably similar to other worker activities and associated attributes that apply to all samples. Therefore, it is not necessary to select and evaluate additional samples of item-specific attributes. All attributes will be sampled in sufficient quantity to permit valid observations to be made regarding the adequacy of the welding work process.

DISCIPLINE — MECHANICAL

POPULATION GROUP — PIPE WELDS/MATERIAL

WORK PROCESS — WELDING (170)

ATTRIBUTES

PREWELDING

- CLEANLINESS
- FITUP *
- WELD PROCEDURE *
- BASE MATERIAL TRACEABILITY **
- WELD MATERIAL TRACEABILITY *
- WELDER QUALIFICATION *

HOLD POINTS

WELDING

- CONFIGURATION
- SIZE AND PROFILE
- BUTT WELD REINFORCEMENT
- RADIAL WELD SHRINKAGE N/A
- UNDERCUT
- SURFACE OF WELD
- CRACKS, LACK OF FUSION, AND CRATER CRACKS
- BASE MATERIAL DEFECTS
- PREHEAT *
- HOLD POINTS *

POSTWELDING

- WELDER ID SYMBOL **
- WELD RUST (SS ONLY)
- BASE MATERIAL RUST (SS ONLY)
- VISUAL INSPECTIONS *
- NDE *
- IMPACT TESTS *
- POST WELD HEAT TREATMENT *
- INSPECTOR CERTIFICATION *

* DOCUMENTATION REVIEW ONLY

** REINSPECTION AND DOCUMENTATION REVIEW

Comments on Train C Conduit Criteria Document

1. The program addresses Unit 1 and common areas only. Resolution of the problem for Unit 2 is not defined.

2. Screening level 1 - weight check is based on sampling study results rather than "worst case" calculations.

3. Screening level 2 - good supports check is based on sampling study results rather than "worst case" calculations. In addition, there are no load or dimensional limits on "good" supports.

4. Screening level 3 - interaction potential check does not define a zone of influence.

5. Screening level 4 - seismic capacity check in field calculates tributary span weights on the basis of one half of adjacent span lengths. This will be unconservative for certain supports.

6. Screening level 7 - safe shutdown system check does not give any details of methodology.

7. Sway interactions of conduits are only considered by screening level 3. It appears that potential sway interactions would be missed if a conduit system meets one of the "strength" screening levels.

8. Appendix A - Seismic Evaluation using refined criteria:

   a) Stress acceptance criteria for unistrut members does not appear to address local buckling of compression flanges.

   b) Self weight of supports do not appear to be considered in analysis.

c) The use of a 1.1 multimode factor for equivalent static analysis of straight conduit runs requires justification.

d) The fatigue curves which define allowable numbers of cycles provide a factor of safety of only 1.5 on cycles. This appears too low for fatigue evaluations (ASME code uses a factor of 20).

e) The sample calculations consider loads in only one or two directions rather than three directions. (Conduit clamps provide restraint in three directions.)

f) There are errors in sample calculations where stress units are used in place of force units and vice versa.

9. Appendix D - Target Analysis:

a) Allowable weight versus height curves for missiles impacting piping targets were developed for stainless steel pipes. Application of these curves to carbon steel pipes should be justified.

b) Piping target evaluation assumes that all missile energy is absorbed by plastic deformation of pipe. Failure of target pipe supports is not addressed.

c) Allowable weight versus height curves for missiles impacting HVAC duct targets are based on evaluation of one duct size only (36" x 27" - GA16). Application of these curves to other duct sizes should be justified.

d) All tables and figures associated with part II - "Length of Missile Conduit Span which Participates in Impacts Upon Targets" are missing. No results are given.

10. Appendix E - Criteria for Screen levels 1, 2 and 4:

a) Why are special supports type 7 classified as "good" supports if they require evaluation on a case by case basis?

b) How can a support as complex as the multi-tiered gang support with rod hangers (type 8) be classified as a "good" support not requiring any evaluation?

c) Screen level 4 defines tables of support capacity in two directions only while conduit clamps have the capability of transmitting loads in three directions.

References Used by C. Hofmayer

1. Comanche Peak Response Team Program Plan and Issue Specific Action Plans, Revision 3

2. NUREG-0797, Supplement 8

3 Letter from V. S. Noonan to W. G. Counsil dated August 9, 1985; NRC Staff Evaluation of the Comanche Peak Response Team Program Plan.

4 Letter from V. S. Noonan to W. G. Counsil dated September 30, 1985; NRC Staff Evaluation of the Comanche Peak Response Team Program Plan - Detailed Comments.

5 Letter from W. G. Counsil to V. S. Noonan dated November 22, 1986; Response to NRC Staff Evaluation of the Comanche Peak Response Team Program Plan.

6. CPRT Program Plan and Issue-Specific Action Plans, Revision 2, June 26, 1985

7 CPRT Program Plan and Issue-Specific Action Plans, Revision 1, November 19, 1984

8 CPSES, Unit 1 and 2, Program Plan and Issue-Specific Action Plans, October 8, 1984

9. Letter from D. G. Eisenhut to M. D. Spence dated September 13, 1984; Comanche Peak Review

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10. Handout, March 6, 1985 meeting at Comanche Peak Site, TRT Civil/Structural, Mechanical and Miscellaneous Issues

11. Handout, October 10-11, 1985, NRC Inspection Audit of CPRT Civil/Structural Areas

12. Handout, February 14, 1986, NRC Inspection Audit at EBASCO, CPSES Unit 1 and Common, Conduit and Conduit Support Program

13. Handout, February 14, 1986, NRC Inspection Audit at EBASCO, CPSES Unit 1 and Common Areas, Train C Conduit 2" Diameter and Under (TRT Issue I.C)

14. Miscellaneous Handouts, December 2, 1985, NRC Inspection Audit at TERA Concerning Design Activity Program

~~15.~~

15. Table of Contents, Gibbs and Hill Project Procedures Manual, May 31, 1985

16. Introduction and Table of Contents, Gibbs and Hill Analytical Engineering Manual.

17. Table of Contents, Gibbs and Hill 2323 Project Guide, September 25, 1985.

18. CPRT Design Adequacy Procedure 21, "Homogeneous Design Activity Validation and Selection of Specific Items for Review, Draft of Revision 0.

19. Handout, CPRT Design Adequacy Program Status Briefing on November 5-6, 1985

As you are aware a substantial amount of work remains to complete FIN A-3803, Evaluation of Selected NRC Open Items Before Plant Fuel Load, Project No 1: Supplemental Safety Evaluation Report Development for Comanche Peak. As part of this project BNL is providing NRC assistance in the following items

1) SSER Development for Civil/Structural Categories 18-36 and CASE Items 1-17
   a) Review and comment on Draft SSERs
   b) Perform additional review of AC-56, AC-80, AC-84 and CASE 4.
   c) Prepare and assist in feedback interviews with allegers.

2) Support Meetings with Intervenors Concerning Supplement 8 to NUREG-0797

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3) Review and Comment on NRC SSER Concerning CPRT Program Plan

4) Review and Preparation of SSERs Concerning TUGCO Implementation of Civil/Structural Issue Specific Action Plans (ISAPs)

   a) I.c - Electrical Conduit Supports
   b) II.a - Reinforcing Steel in the Reactor Cavity
   c) II.c - Maintenance of Air Gap Between Concrete Structures
   d) II.d - (i) - Ceiling Element Design
      (ii) - Damage Study Verification
   e) II.e - Rebar in the Fuel Handling Building

5) Review and Preparation of SSERs Concerning TUGCO Implementation of Civil/Structural Discipline Specific Action Plan (DSAP VIII)

   a) Cable Tray and Conduit Supports
   b) TRT-Related Issue - Steam Generator Lateral Supports
   c) Self - Initiated Review

6) Review of HVAC Support Design Issues

7) Hearing Assistance for Civil/Structural Areas.

In addition to the above, Battelle Columbus Laboratories continues to provide services to BNL in the mechanical, piping and miscellaneous allegation areas. These efforts include:

1) Assistance to NRC staff in the planning for ASLB hearings
2) Audits of TUGCO implementation of CPRT Program Plan
3) Preparation of NRC SSER Concerning CPRT Program Plan
4) Hearing Assistance for Mechanical, Piping and Miscellaneous Areas

To support the above services we estimate that BNL will require $250,000 between April 1 and September 30, 1986. It is also assumed that other consultants such as Teledyne and EAS will continue to provide technical support services, particularly for items 5a and 5c. Furthermore, we require an additional __________ to fully fund our subcontract with BCL which currently expires on 9/30/86. To complete the above services we estimate that an additional $200,000 will be required in FY 87.

CC: M. Reich
C. Hofmayer

1. Man Power, Cable tray Support.   Jerry Crosby Dick
Bob Totti

	Hanger Unit 1	Conduit Unit 1	Hanger Unit 2	Conduit Unit 2
Engr.	300 Engr. 400,000 spent	(732 Suppt) spent 10,000 ~~20,000~~	260 Engr. spent 600,000	spent 200,000
Man Yr	to go 430,000 M-H	~~to go~~ ~~21,000~~ 21,000 ?	to go 210,000 M-H	to go 31,000
	400 M-Yr		400 M-Y.	
% Completion	~~26% + rework~~ 15%	30% rework 30%	60%	80%
date for completion	9/30/86	9 1/1/86 ~~10/86~~	9/30/86	10/86

(Closeout) Seismic issue) Conduits Suppt EBASCO

Conduit 500,000 M-H Unit 1 & 2

HVAC

Unit 1   Unit 2

Surveillance Unit 2 done

~~gaps~~ board A to Concrete

12/84 identify problem.
gaps between base plate & concrete
3 D suppt attached to duct not installed as shown in the drawing
duct support attachment in unit 1 & Common

discontinuity between two drawings < 1983 sketch / As-built drawing

Van Son HVAC & suppt installed —
CGL was the designer / analysis

Update of HVAC program in Jan 1986

Unit 1/Common — Unit 2

Attachments — 1342

5-11 %

Sampling Basis — 3900

422 Systems

357 [illegible]

65 Tr B ~~[illegible]~~ HVAC

Diesel Generator — Exhaust System ~~Exhaust System~~

Train A & B → 65

Control Room 357 System

W

%

Corr — 2 to 3 % - Walkers

8 % - Engineering Analysis

Completion date — Aug/86

People — 20 Engr

Manyears — 8 1/3

Reportable issue — Content

Dave, Here's edited version of Philleo's Report in accordance with the required format. Charlie 4/24/86

isap eval

MISC14 (4/14/86)

~~Note: Paragraphs 3 and 4 are in the format required for the staff report.~~

Evaluation of ISAP II.b

Concrete Compression Strength

1.0 Introduction

~~1. Statement of Problem~~

The TRT investigated allegations that concrete strength tests were falsified. The TRT reviewed an NRC Region IV investigation (IE Report No. 50-445/79-09; 50-446/79-09) of this matter that included interviews with 15 individuals. Of these, only the alleger and one other individual stated they thought that falsification occurred, but they did not know when or by whom. The TRT also reviewed slump and air entrainment test results of concrete placed during the period the alleger was employed (January 1976 to February 1977) and did not find any apparent variation in the uniformity of the parameters for concrete placed during this period. Although the uniformity of the concrete placed appears to minimize the likelihood that low concrete strengths were obtained, other allegations were raised concerning the falsification of records associated with slump and air content tests. The Region IV staff addressed these allegations by assuming that concrete strength test results were adequate. Furthermore, a number of other allegations dealing with concrete placement problems (such as deficient aggregate grading and concrete in the mixer too long) were also resolved by assuming that concrete strength test results were adequate.

¶ As a result of the above investigation the TRT required

~~2. Action Required by NRC~~

TUEC ~~shall~~ to determine areas where safety-related concrete was placed between January 1976 and February 1977, and provide a program to assure acceptable concrete strength. It was required that the program ~~shall~~ include tests such as the use of random Schmidt hammer tests on the concrete in areas where safety is critical. ~~The program shall~~ It also was to include a comparison of the results with the results of tests performed on concrete of the same design strength in areas where the strength of the concrete is not questioned, to determine if any significant variance in strength occurs. Finally, TUEC ~~shall~~ was required to submit the program for performing these tests to the NRC for review and approval prior to performing the tests.

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2.0 CPRT Approach

The CPRT approach to the resolution of this is described in the CPRT Program Plan under ISAP Item II.b.

~~3. Staff Evaluation~~

~~3.1 Evaluation of the CPRT Conceptual Plan~~

The CPRT ~~concept~~ approach was as follows:

a. Determine the unit of placed concrete which is the smallest volume having assignable properties.

b. Form populations of such units representing Category I concrete placed during the period January 1976 - February 1977 (concrete at issue) and March - August 1977 (control concrete).

c. Select a random sample of accessible surface locations from each population of sufficient size to render statistical comparisons meaningful.

d. Conduct a Schmidt hammer test at each selected location.

e. Make statistical comparisons of the two populations both on an overall basis and at the tenth percentile value. The tenth percentile strength ~~in~~ is the characteristic strength used in design.

f. Examine the 28-day concrete cylinder strength data for Category I concrete during the same time periods and determine for each time period whether the sample of cylinder strengths and the sample of Schmidt hammer tests describe the same population.

g. If the above steps do not settle the issue satisfactorily, do the necessary testing to determine the Schmidt hammer compressive strength calibration curve for the materials used at Comanche Peak and perform the statistical analyses on computed strength values rather than on hammer rebound numbers.

New Section
3.0 Evaluation
3.1 Evaluation of the CPRT Approach

MOVE OUT NEW PARAGRAPH

Members of the NRC Technical Review Team (TRT) discussed the issues involved in the ~~conceptual~~ plan with members of the CPRT both in person and by telephone on several occasions as it was evolving. The TRT finds the plan acceptable. Use of a device such as the Schmidt hammer is preferable to drilled cores, not only because it is less disruptive to continuing operations at the project, but also because for a given amount of effort much more data may be obtained. The argument that the hammer only tests surface layers of concrete is not germane because there is no reason to suspect that concrete strengths are biased with respect to distance from the surface. When strength of a particular structural element is not the issue but where the characterization of strength over a considerable period of time is desired, a random selection of surface areas produces as good a sample as any other random process. Finally, the use of the raw data from the hammer readings is preferable to the use of computed strength values since the conversion to strength introduces unnecessary uncertainties.

3.2 Evaluation of ~~the~~ ISAP Implementation ~~of the CPRT plan~~.

The CPRT identified all the concrete placements in Category I structures which occurred during the period January 1976 to February 1977 and all those which occurred during the 6-month period immediately following. In forming populations for testing the truckload of concrete was adopted as the smallest unit with assignable properties. By arbitrary procedures which distributed accessible surfaces among truckloads, the CPRT determined that there was a population of 1305 test areas available for the concrete at issue (January 1976 - February 1977) and a population of 2090 test areas available in the control concrete (March - August 1977). From these populations random samples of 119 and 132, respectively, were selected for test by the Schmidt hammer. The CPRT also examined all the Category I 28-day cylinder strengths compiled during the two periods.

At each test location Schmidt hammer tests were run in accordance with ASTM C805-79 by employees of the Southwest Research Institute.

Those performing tests were trained to the requirements of "Schmidt Hammer Test on Concrete at the Comanche Peak Steam Electric Station," Nuclear Projects Operating Procedure X-FE-108-1, Revision 1, Southwest Research Institute, San Antonio, TX, January 1985, and they were certified to the requirements of the employer's quality assurance program and in accordance with USNRC Regulatory Guide 1.58, Revision 1. At each location the surface was ground to remove at least ¼-inch of concrete (in addition to floor topping) in order to insure that tests were not affected by a carbonated surface layer.

The CPRT tested all samples for normality and considered three statistical tests for comparing the two populations of hammer tests. One was rejected because of its inferior power. Of the remaining tests, one tests whether the tenth percentile of the population for the concrete at issue (CAI) is greater than or equal to the tenth percentile of the population of control concrete with both distributions considered normal. The second determines whether 90 percent or more of the concrete-at-issue population exceeds the tenth percentile of the control conrete population with no assumption of normality of the CAI population. Finally, differences between the population of hammer results were compared with differences between the population of cylinder strength results.

Members of the TRT visited the site when testing began and observed 14 tests. They also examined data as it was developed and reviewed the methods of analysis. The TRT finds the implementation of the plan to be acceptable.

4. Conclusions

Both populations of hammer readings were accepted as normal at the five percent level of significance. Both by visual examination and statistical test the strength of the concrete at issue are lower than the control concrete. By statistical test there is a high confidence that the tenth percentile of the concrete at issue is no more than five percent less than the control concrete. The cylinder data also demonstrate that concrete placed during the time period of the concrete at issue has lower strength than that placed during the period of the control concrete. The difference at the tenth percentile is 9.3%. For published calibration curves this difference corresponds to about a 5% difference in hammer readings. It is concluded by the CPRT that falsification cannot be identified.

The TRT concurs in the finding. While it wished to avoid a correlation between hammer results and strength values, some interpretation of the data became necessary when the concrete at issue proved to be weaker than the control concrete. However, the only portion of the correlation that became relevant is the slope of the calibration curve in the vicinity of the 4,000 psi strength level. This value can be deduced from published calibration curves without assuming a specific calibration curve. Thus it could be established that both hammer data and cylinder data indicated the same difference in strength between the concrete placed during the two time periods. It is also significant to note the normality of the distribution of cylinder strengths during the concrete-at-issue time period. Any significant amount of falsification would almost certainly distort the distribution.

¶ The above conclusion is contingent upon the TRT's confirmatory ~~review~~ audit of the supporting documents referenced in the CPRT Results Report. This audit will be performed at the site in early June 1986.

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1. **Title**: Comanche Peak Response Team Construction Adequacy Program Audit

2. **NRC Staff and Consultants**:

J. A. Calvo, NRC (Chairman)
J. A. Nevshemal, Westec
B. F. Saffell, Battelle Engineer
E. Tomlinson, NRC
J. Flaherty, Teledyne
R. Philleo, Consulting

3. **Persons Contacted**:

J. L. Hansel, ERC
J. T. Christensen, ERC
D. Boulton, ERC
J. Brand, ERC
A. Patterson, ERC
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M. Iannuci, ERC
J. M. Schauf, ERC
G. Hefter, ERC
A. Burke, ERC
H. Bossung, ERC
J. Brown, ERC
R. Tate, ERC

4. **CPRT Construction Adequacy Program**

An audit of the Comanche Peak Response Team (CPRT) Construction Adequacy Program was conducted on October 16 and 17, 1985, at the Comanche Peak Steam Electric Station site. All disciplines--mechanical, civil, and electrical--were audited by a team composed of NRC staff and consultants. Through this audit, the NRC reviewed the basis for establishment of the groupings within each discipline and the work process populations associated with each discipline and utilized by the CPRT for assessment of construction adequacy. The primary purpose of this audit was to evaluate the homogenuous nature of the work process populations from an engineering perspective. Detail review of work process populations will be accomplished in subsequent audits.

The Construction Adequacy Program is being performed within the purview of the Comanche Peak Response Team with ERC, Inc. responsible for performing the construction adequacy review. The presentation made by Mr. John Hansel of ERC, Inc., at a public meeting held on October 3 and 4, 1985, in Grandbury, Texas, provided the basis for the staff's initial audit of the CPRT Construction Adequacy Program.

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Work process populations are being developed for the construction activities for safety related systems, components, and supports. Each work process is evaluated by a random sample drawn from a category of systems, components, or supports related to that work process. Further, items reviewed as part of a sample must be construction complete and quality approved. Each work process sample is expanded to include an engineering sample. The engineering sample assumes that a number of safe shutdown system items equivalent to the number of items addressed by the random sample are also reviewed for adequacy of construction.

5. **Mechanical Discipline**

The mechanical discipline is divided into nine groupings or categories which are:

(a) HVAC ducts and plenums
(b) HVAC equipment installation
(c) Field fabricated tanks
(d) Mechanical equipment installation
(e) Large bore piping configuration
(f) Small bore piping configuration
(g) Large bore pipe welds/material
(h) Small bore pipe welds/material
(i) Piping system bolted joints/material.

Each of these areas was discussed with ERC personnel by NRC staff and consultants participating in the audit of the Construction Adequacy Program. The construction adequacy review for the mechanical discipline is approximately 15% complete as of this inspection. Completion is scheduled for the end of February, 1986. In terms of scope, the Construction Adequacy Program Review for the mechanical discipline is addressing only construction complete and quality approved items. Only field construction activities are addressed by the scope of this activity; vendor fabrication is not within the scope of the Construction Adequacy Program. For each of the mechanical areas, ERC had prepared a "Population Description" addressing the contents of each category, its boundary,

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and any specific interfaces germane to the population. In addition to the Population Descriptions, a chart describing the work processes associated with the mechanical items within each grouping was provided and discussed with ERC's Population Engineers. This flow chart contained attributes associated with each work process. ERC indicated these attributes are providing the basis for the checklists which are being developed for re-inspection of mechanical systems and components.

ERC reported that the construction adequacy review is being performed in accordance with their own quality assurance program which is compatible with the CPRT's quality assurance program. ERC's implementation of the Construction Adequacy Review Program is being audited by both CPRT and ERC quality assurance personnel.

Specific comments on each of the areas within the mechanical discipline are provided in the subsequent paragraphs.

a. HVAC Ducts and Plenums. The HVAC duct and plenum category encompasses 6800 items. Fabrication, installation and welding are the three work processes associated with construction of HVAC ducts and plenums. Bahnson Service Company was a subcontractor to Brown & Root for all HVAC duct and plenum construction. The installation of this equipment was characterized by a single craft -- sheet metal workers and welders and a single subcontractor. Installation and fabrication procedures are based on Gibbs & Hill Specification MS-85. The attributes associated with each work process were reviewed and appeared to be complete.

b. HVAC Equipment. There are 604 items in the HVAC equipment category. This equipment was either installed by Brown & Root or Bahnson and this was the basis for subdividing this category. The work processes associated with HVAC equipment installation are, basically, the setting of the equipment and then connecting it. These two work processes are being evaluated for each installer of this equipment. Further, the attributes of each work process

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are the same, regardless of the installer. The attributes associated with the work processes were reviewed and appeared appropriate for the process.

c. Field Fabricated Tanks. This particular activity was discussed in a qualitative manner. We were informed that eight field fabricated tanks exist and that all would be reinspected. This was not pursued further as population homogeniety was not an issue because of the 100% reinspection.

d. Mechanical Equipment Installation. Mechanical equipment installation encompasses 336 items to be installed in both Unit 1 and Unit 2. The governing design document is Gibbs & Hill Mechanical Erection Specification 2323-MS-101. The implementation of this is accomplished by Brown & Root Specification titled "General Installation of Mechanical Equipment", CP-1. The governing quality assurance procedure is Brown & Root QI/QAP11.1-39 titled "Mechanical Equipment Installation Inspection". Qualitative results of the sampling conducted so far indicates that 20-25% of the sample drawn is from Unit 2. The remainder of the sample is from Unit 1 and common areas. The work processes associated with mechanical equipment installation are setting, anchoring, welding and, for rotating equipment only, alignment. The attributes of each work process were discussed in depth. ERC personnel indicated that if a particular attribute of the work process was not addressed when the sampling activity was completed, assessment would be made as to whether or not the sample needed to be expanded to include that attribute. If a decision was made not to specifically address that attribute, the basis for this decision would be provided in the report addressing the construction adequacy evaluation of, in this instance, mechanical equipment. Work process homogeniety is evaluated by checking to make sure that the same organizations are involved, procedures have remained nominally constant, and that the welder inspector qualification standards have remained the same. Sampling is performed at the work process level. Since evaluation of equipment is made at the work process level, each sample will be expanded such that sixty evaluations will be made for each work process. This means that more than the minimum number of equipment items (60) are addressed during completion of the sampling process.

This particular category was pursued further in that an installation procedure for a heat exchanger and a pump (rotating equipment) was reviewed to evaluate the compatibility of the attributes associated with work processes with the installation requirements contained in the procedure. Compatibility did appear to exist between the work process attributes and installation procedures for both cases. In one case, the installation procedure for heat exchanger CP1-CCAHHX-01 was reviewed to see if this specific installation procedure was compatible with the attributes of the work processes for mechanical equipment installation. The procedure for installing an auxilliary feed water pump, CP1-AFAP-MD-01 was reviewed to evaluate its compatibility with the alignment work process attributes.

The work processes and their attributes are considered to be appropriate to the installation of mechanical equipment. Further, work process population homogeniety appeared to exist based on the two installation procedures reviewed.

e./f. Large Bore Piping Configuration/Small Bore Piping Configuration. The large and small bore piping configuration construction adequacy reviews were addressed together using 3000 Brown & Root isometric drawings. The scope of this activity is intended to assess the work process of piping installation through evaluation of attributes such as location, size and orientation of piping and pipe components. The Brown & Root isometric drawings provide the basis for sampling both large and small bore piping. Large bore piping includes that piping which is 2½ inches and larger in diameter; small bore piping is that piping less than 2½ inches in diameter. If an isometric drawing containing both large and small bore piping were to be

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drawn as part of a sample, it conceivably could be used in both the large and the small bore work process populations. The installation work process and its attributes are the same for both large and small bore piping. The piping considered in this review includes all ASME code piping. As with the other mechanical categories, a sample of sixty will be drawn for large bore piping and another sample of 60 will be drawn for small bore piping at random. Each sample would then be examined and expanded to ensure that sixty cases of piping within safe shutdown systems were considered for each large and small bore piping. ERC reported that all piping of large and small bore is installed to one procedure and by one craft -- pipe fitters. Some attributes such as piping valves would obviously be included in any sample for drawn for either large or small bore piping. There are other attributes such as expansion joints, screw joints, and strainers which because they are very few in the system, might not be included in a sample. ERC reported that following the sampling process a review to assess the adequacy of this sample for construction adequacy review would be made. However, a specific component, because it was not included in a sample, would not necessarily be examined only for that reason.

The number of attributes corresponding to the installation of large bore piping appeared accurate and complete. However, the number of them seems to preclude evaluation of them all through the random and engineered sampling process. If ERC suggests that it is not imperative that all such as screwed joints, strainers, and expansion joints be evaluated from a configuration viewpoint, their report should justify this type of conclusion. It appears that the sample should include some number of components which are not extensively used in piping to provide confidence that these components are installed correctly. Their sampling process appears to address the key items such as piping orientation, valve location and orientation, and bends.

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g./h. Large Bore Pipe Welds & Material/Small Bore Pipe Welds & Materials. As with large and small bore pipe configuration, the welding of large and small bore pipe are considered as one grouping. Separate samples, however, are utilized to address each. More than 66,000 welds are required to connect safety-related large and small bore piping. The work processes associated with welding of either large or small bore are prewelding, welding, post-welding. As with the other categories within the mechanical discipline, the population description was reviewed and appeared complete. The process of construction adequacy review is about 40% complete. The initial review has been completed; samples have been drawn and preparation of reinspection procedures is in process. Approximately 65% of the sample drawn is either Unit 1 or common. The remainder is Unit 2. ERC personnel were not sure if any Class 1 welds were included in the sampling. It was indicated that Brown & Root performed all field welding. ERC further reported that the weld inspection processes are the same regardless of the ASME code class. The categories of large and small bore pipe welds were not separated to distinguish between the welding of stainless steel pipe opposed to carbon steel pipe. ERC indicated that the welders were qualified to weld both stainless steel and carbon steel piping and hence there was no need to separate this. At the exit, the staff expressed concern regarding the lumping of stainless steel welding with carbon steel welds. ERC agreed to review the sample to determine the number of stainless and carbon steel welds. Welds addressed by this study include only field welds.

Welds of the penetration sleeve to flange were included within this category. There are 282 such welds in this category. None were included in the random or engineering sampling, however, the large and small bore samples were supplemented to include one mechanical and one electrical penetration weld.

Welds work processes and attributes appeared complete but conclusions regarding population homogeneity cannot be reached until review of implementation procedures and welder qualifications is completed. Further, as previously noted, concern exists for the consideration of stainless and carbon steel welds as part of the same population.

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i. Piping System Bolted Joints. Two work processes comprise the piping system bolted joint category. They are installation preparation and final bolt fitup. There are 7000 bolted joints at the Comanche Peak Power Station. The work processes and their attributes appeared to be compatible with the bolting of piping joints. The procedure which governs this is CP-CPM-6.9E Rev. 8. A flow chart and population description had been prepared to provide the basis for the sampling of bolted joints. The staff's review did not yet pursue this to the depth required to draw a firm conclusion regarding the homogeneous nature of the work process populations.

6. Electrical Discipline

7. Civil/Structural Discipline

8. Conclusion

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END