Bechtel Western Power Company ENGINEERS - CONSTRUCTORS

PHOENIX OFFICE, 10040 NORTH 43RD AVENUE, SUITE 1-I, GLENDALE, ARIZONA 85302
(602) 842-8500, FACSIMILE 842-8525

EE580 FIELD VERIFICATION

FINAL REPORT

REFERENCE NRC ALLEGATION RV-87-A-047

PALO VERDE NUCLEAR GENERATING STATION

MAY 1988

EE580 FIELD VERIFICATION

FINAL REPORT

REFERENCE NRC ALLEGATION RV-87-A-047

JOB ORDER 172

TABLE OF CONTENTS

EE580 FIELD VERIFICATION

FINAL REPORT

REFERENCE NRC ALLEGATION RV-87-A-047

I. SUMMARY

The EE580 verification program resulted in a total of 106,251 cards being reviewed. All cards were reviewed against the EE580 data base. The following provides a summary breakdown of the cards reviewed:

1. 86,375 of the cards reviewed were related to the NRC allegations. Based on the results of the review, 77,121 cards were determined to be in agreement with the EE580 data base. The remaining, approximately 9,000 cards were identified as requiring further engineering evaluation or field walkdown.

2. 19,876 cards were reviewed due to the difference in design revision between the card and the EE580 data base. Of these cards, approximately 3500 were identified as requiring further engineering resolution or field walkdown.

In summary, this field verification effort was able to successfully status approximately 93,750 cards. A total of 12,500 cards were identified for further action.

It was apparent during the review process and in discussions held with ANPP personnel, that people are more cognizant of the criticality for maintaining the EE580 system. It appears this is a result of training implemented by ANPP to personnel utilizing the EE580 system.

II. PURPOSE

Bechtel was requested under Job Order No. 172 to verify the installation configuration of the EE580 Circuit and Raceway Tracking System for Units 1, 2, and 3. The purpose of the verification was to address statements made to the NRC regarding the status of outstanding EE580 cards and the status of the safety related cards in the vault relative to the EE580 data base. Reference NRC Allegation RV-87-A-047.

III. OBJECTIVE

The primary objective of this task was to verify the accuracy of the EE580 data base. In order to accomplish this goal, the following secondary objectives were established:

1) Develop a "snap shot" of the EE580 data base in the form of a component listing and a corresponding individual component report to be used as a basis for the review effort.
2) Status all class 1E cards in the vault by a comparison with the EE580 data base obtained in Item 1.
3) Locate all the cards listed in the outstanding card file (*C).
4) For all the discrepancies identified in Items 2 and 3, perform a records review (card vault, and microfilm storage) to resolve these problems. Any cards that could not be resolved after this review are to be identified for a more detailed Engineering review and field walkdown. This additional review is outside the scope of this initial field verification.

Additionally, although not part of the concerns addressed in the NRC Allegation, the installation cards identified as having design revisions were also reviewed.

IV. METHODOLOGY

To address the allegations made to the NRC, the status of the outstanding installation cards (*C) and the Class 1E installation cards were reviewed in total for all three units and common. Additionally, it was determined that installation cards designated by a design revision (DR) notation would be reviewed in order to further "clean up" the EE580 data base. The category of *C and DR components required a component listing and a corresponding individual component report to perform the review process. The individual component report is a document that contains detailed information regarding engineering and construction status of a component. The Class 1E components were reviewed against a component listing which identified the latest revision of the component. This review consisted of verifying the latest revision card in the vault with the latest revision card identified in the component listing.

Personnel assigned to the EE580 verification program are familiar with the EE580 system. Some personnel were involved only on a temporary basis as a result of re-assignment Personnel involved in the EE580 verification program are identified in the Project Signature List in Exhibit A.

To review installation cards for each unit and common a sequential process was developed in order to arrive at the final analysis of cards that require further resolution. It was necessary to status cards during the review process, some of which required generating the latest revision card, statusing the card and returning the card to the vault for record purposes. When all areas were reviewed and final cards remaining could not be verified without more extensive research, the card was classified as needing an Engineering resolution or walkdown. The remaining cards can be researched further by reviewing various design documents to determine if they are "Paper Change Only". Following this review, the remaining cards will require a walkdown to inspect the as-built installation against the EE580 data base to verify the status of the system. Each card group review process is described below:

- o <u>OUTSTANDING INSTALLATION CARDS</u>

  1. Provided the proper status in the EE580 data base for cards that are valid but not previously statused.

  2. Installation cards verified with work organizations were considered to be valid outstanding cards and no action was taken.

3. Installation cards not found in the vault were researched in the Work Order files to obtain microfilm reference for traceability.

4. Installation cards not found in the vault or Work Order files were identified for further Engineering resolution or walkdown.

5. Installation cards in the vault that did not have the latest revision were reviewed against the EE580 data base to determine if the subsequent revisions were "Paper Change Only".

o CLASS 1E INSTALLATION CARDS

1. The remaining Class 1E installation cards in the vault which were not reviewed in outstanding or design revision files were reviewed relative to the EE580 component listing.

2. Installation cards that reflect the same revision as the data base were considered valid and no further action was required.

3. Installation cards that did not reflect the same revision were reviewed for further resolution, i.e. Engineering resolution or walkdown.

- DESIGN REVISION CARDS

1. Review the latest card in the vault relative to the EE580 individual component report to identify the proper status of the installation cards.

2. If the card revision was a change not affecting the installation, "Paper Change Only" was noted on the latest revision card and returned to the vault.

3. The remaining cards were identified for further Engineering resolution or walkdown.

- OUTSTANDING INSTALLATION CARDS

When work is to be performed to implement a design, a card is requested from the EE580 system and is identified in the data base as an outstanding card by denoting a *C with the date of issue. A *C file (listing of components with *C designation) and an EE580 data base individual component report were generated for the review process.

In order to reduce the review base, work organizations were contacted and copies of the outstanding cards in their possession were obtained. These cards were then correlated with the individual component report thereby eliminating these cards from further review. This was based on the fact that the work control process would routinely satisfy the system by removing the *C (no longer an outstanding card) when the work was completed and the EE580 cards were returned to the vault through normal procedures.

The following work organizations were contacted for outstanding cards:

1. Central Maintenance
2. Unit 1, 2 and 3 maintenance
3. I&C Service Building
4. Units 1, 2, and 3 Work Control
5. Bechtel Construction
6. APS Nuclear Construction

With the known outstanding cards identified and removed from the list, a new list was generated and forwarded to Records Management Computer System (RMCS) for assistance. RMCS obtained a copy of the latest revision card contained in the vault for review by the Task Force against the EE580 data base individual component report. The cards that agreed with the data base were statused in the data base by removing the *C since it was identified the *C remained due to an oversight in processing.

EE580 cards that were not the latest revision were researched further where a Work Order could be identified. The microfilm vault was then reviewed to obtain a reference to status the card. If the correct revision card was in the microfilm vault then a new card was generated and the microfilm cartridge and frame number was written on this card. This new card was then returned to the vault. If the latest revision card could not be found in the microfilm vault the component was identified for further action.

Additionally, the cards that were identified as not having the latest revision were further reviewed to determine if any of the cards were considered "Paper Change Only". The latest revision card was generated and reviewed against the card in the vault. If the information on the new card that defined the installation of the component was the same as the information on the card in the vault, the new card was stamped with "Paper Change Only" and the new card was placed in the vault. The installation information reviewed w[illegible] items such as the following:

1. Points and blocks
2. Cable code
3. To/From
4. Location
5. Routing
6. Raceway code

The EE580 data base was updated to remove the *C from the system, since the latest revision card was identified as filed in the vault. The *C file was used as a master list to identify the status of the finding as the review progressed.

The EE580 listing identifies components for Engineering resolution or walkdown and is provided as an enclosure to Bechtel letter BE/ANPP-0632. These items are to be resolved at a later date.

- CLASS 1E INSTALLATION CARDS

  A component listing identified with the latest revision was generated as the base document to review against the latest revision cards in the vault. The results of the review are noted in the listing which was retained as the master list. The Class 1E listing contained all Class 1E components not identified in the MC or Design Revision installation card review. This resulted in the total Class 1E installation cards being verified for all units and common.

  The final list consists of components that did not have a card in the vault or the latest revision card was not in the vault. This listing identifies components for Engineering resolution or walkdown and is provided as an enclosure to Bechtel letter BE/ANPP-0632.

- DESIGN REVISION INSTALLATION CARDS

  A component listing and an individual component report were generated as the base documents to review against the latest revision cards in the vault. These files reflected any component in the EE580 data base that was identified by a design revision. Any design revision increases the data base revision when it is initiated. In some cases the design revision could be the result of a design change that does not affect construction, i.e. a drawing note, drawing number change etc.. In other cases the design revision affects construction and the card is generated and issued to construction for appropriate action. If the installation information of the component on the card being

reviewed was found to be the same as the earlier revision card, the new card was stamped "Paper Change Only" and was placed in the vault. The information reviewed were items such as the following:

1. Points and blocks
2. Cable code
3. To/From
4. Location
5. Routing
6. Raceway Code

The EE580 listing identifies components for Engineering resolution or walkdown and is provided as an enclosure to Bechtel letter BE/ANPP-0632. These items are to be resolved at a later date.

V FINDINGS AND RECOMMENDATIONS

As a result of the EE580 verification program, various categories of findings were identified. For clarification, the category of finding is described below:

Finding	Description
Remove *C	A valid card which corresponded to the data base, was in the vault but through oversight was not statused in the EE580 data base.
Outstanding card	An installation card was issued and verified to be with a work organization.

Microfilm card	The correct installation card was not in the vault but was found in the microfilm vault. A new card was generated and the microfilm location was referenced on the card for record purposes.
NIV	Not in Vault - No card was found in the vault or in microfilm. Engineering resolution or walkdown.
LCNIV	Latest Card Not in Vault - The latest revision card was not in the vault but a lower revision card was present. Engineering resolution or walkdown.
PCO	Paper Change Only - An installation card in the vault had corresponding information for installation as the EE580 data base but the revision on the card in the vault was different from the data base.
Valid Card	The installation card in the vault corresponded to the information in the EE580 data base.

To elaborate further, the following is a breakdown of the number of cards for each of the findings in the three files that were reviewed.

- OUTSTANDING INSTALLATION CARDS

Remove *C	4650
Outstanding Cards	1718
Micofilm	87
Eng. Res./Walkdown	3893
PCO	266
TOTAL	10,614

- CLASS 1E INSTALLATION CARDS

Valid cards	70324
Eng. Res./Walkdown	5437
TOTAL	75,761

- DESIGN REVISION INSTALLATION CARDS

PCO	12222
Eng. Res./Walkdown	3499
LCIV	4155
TOTAL	19,876

Additionally, during the verification process a number of activities were identified that appear to warrant a possible change in methods of performing these activities and are described below:

Observation 1

There are blue cards in the vault containing installation buy offs that were not attached to the parent card and are not identified with the parent card component ID making it difficult to correlate the installation card with the buy off card.

Recommendation 1

Some associated cards are stapled together with the parent card but have since been separated and not re-stapled. It is recommended that all cards be identified with the parent component ID number in the event the cards become separated.

Observation 2

Cards that are microfilmed do not appear to be properly identified so that front and back can be easily correlated as the same card. The front of two cards were copied on one page and the back of two cards were copied on another page. This makes it difficult to correlate the back with the proper front of the card.

Recommendation 2

When cards are copied it is important to copy the front and back of the same card on the same paper. This also applies to the microfilm process.

Observation 3

Subsequent revisions of non-1E cards that were previously treated as 1E did not appear to be placed in the "Q" vault as earlier revisions were.

Recommendation 3

Problems of this nature may be avoided by placing all cards in a single vault treated as Q class storage.

Observation 4

There are hand written cards in the vault for removed cables with no computer generated card attached.

Recommendation 4

A revised sparing procedure would minimize this problem and is identified in Exhibit B.

Observation 5

Work commence FCR's were not being followed up by requesting an EE580 card to process for the vault.

Recommendation 5

It is necessary to ensure follow-up to provide EE580 cards for the vault record.

Observation 6

Work orders that were reviewed indicated some cards were not in the vault and other cases indicated copies of cards in the vault with no copy in the microfilmed Work Order package.

Recommendation 6

The same recommendation as item 2 and ensure procedures are followed.

Observation 7

Deleted components were not cleared from the circuit and raceway program.

Recommendation 7

This problem will be overcome by implementing the attached sparing procedure identified in Exhibit B.

Observation 8

It appeared that work not completed was not identified so the EE580 program could be returned back to the original configuration.

Recommendation 8

This item requires feedback from the work organizations to identify components where work has not been initiated and installation cards must be returned to the EE580 coordinator for restoration of the data base to the proper asbuilt condition.

Observation 9

It appeared the design revision PCO's were not being cleared in the EE580 data base.

Recommendation 9

This item is being resolved by implementing the desk procedure provided to the EE580 coordinator. The desk procedure is identified in Exhibit C.

Observation 10

It appeared that changes made to components were not being identified for proper action if not installed per original changes or additions to the circuit and raceway program

Recommendation 10

Design change and work procedures must be followed. Existing procedures if followed, are adequate to resolve this issue.

Observation 11

Work Orders with outstanding cards not closed or returning cards to EE580 coordinator in a timely manner.

Recommendation 11

A time frame must be established between completion of work and closure of the Work Order to ensure timely updating of documents and prevent possibility for loss of information. The recommended time frame is thirty (30) calendar days for processing.

Observation 12

There were 212 cards for Unit 3 that required QC on the original work but on retermination after fuel load under Work Order 216117 there was no QC requirement for inspection of the CEDM cables from the reactor.

Recommendation 12

QC and QS & E were contacted to review the requirements for QC inspection for this specific work involving reterminations. Engineering should identify the requirement for inspection since the cables require conformance to cable bends on reinstallation.

EXHIBIT A

PROJECT SIGNATURE LIST

PVNGS
PROJECT SIGNATURE LIST

SIGNATURE AND INITIALS OF PERSONNEL
AUTHORIZED TO SIGN ENGINEERING DOCUMENTS

DISCIPLINE OR GROUP: J.O. No. 172 EE590 VERIFICATION

NAME (Type or Print)	TITLE	NORMAL SIGNATURE	NORMAL INITIALS
JOHN MOUSEL	ENGR		JPM
F. E. EICHLER	SUPV. DSGR	F. E Eichler	FE
J. A. MacKINNON	ENG. SUPV.	J A MacKinnon	
F. C. ROXAS	ENGR.		
P. D. REYES	SUPV. DESIGNER		
CHHAYINDER S. SARNA	ENGR	Chhayinder S. Sarna	CS.
SIMON S. SERKIN	ENGR.		
ANDREW S. LATTOUF	SUPV. DESIGNER		
ROBERT M BAILEY	ENGR		RB
STANLEY T. LEONG	EES/SUPV.		

**Authorization rescinded - changed assignment.
***Authorized to sign for group supervisor.

EXHIBIT B

DESK PROCEDURE FOR DELETING & SPARING COMPONENTS

Table of Contents

1. Purpose:

This Desk Instruction establishes the uniform processes for modification of the CKT & Raceway Pro[illegible]s to the commodities.

2. Scope:

This procedure covers the following:

The CKT & Raceway Program Modification of spared, damaged, renamed and deleted cables.

The CKT & Raceway Program Modifications of spared, damaged, renamed, abandoned and deleted Raceways.

3. CKT & Raceway Program Engineering Deletion of Cables:

The following shall be followed where deletion of cables is required:

A. Delete cable identification (ID) from the CKT & Raceway Program Data Base for cables below the Primary Status JR (Jobsite Received).

B. When cables status is jobsite received (JR). Check with construction to determine if cable is installed or not. If cable is not installed, delete the cable ID and add engineering hold (G7EH) to cable and terminations. The cable will be later purged from the CKT & Raceway Program.

If cable is installed, process according to Construction Partial or construction complete primary status (G6CP or G6CC) using sparing procedure as described in Paragraph 4 below.

C. When a cable is to be removed by a DCP or other documents, the cable will be deleted and a secondary status engineering hold (G7EH) will be added to the cable. This cable will be purged when the DCP or other documents are closed out.

4. CKT & Raceway Program, Engineering Sparing of Cables:

When a cable is identified by engineering as not required but is already pulled, as evidenced by a Primary Status (G6) value of CP (Construction Partial) or CC (Construction Complete), the cable shall be spared using the following process for the cable and its terminations:

A. Control Characteristic values shall be revised as follows:

1) Cable shall be assigned a Secondary Status of Construction delete (G7CD) to indicate that the cable was installed then deleted.

2) Scheme drawing associating the cable to a particular drawing shall be changed to "Spare" so that a report of all spare cables can be ordered by asking for all cables with the drawing number (D1) "Spare",

3) Cable system (G1) assignment shall be revised to "ZS" and removed from its previously assigned system, also cable sub-system (G2) shall be revised to "spare".

All Control Characteristics and their values are listed in the CKT & Raceway Data Base Project Reference Library Report.

The Above steps are summarized in the Table below:

Control Characteristics	Value
No change except as noted below	
G7 Secondary Status	CD to be manually assigned to prevent ID from going into Unit "D"
D1 Scheme Drawing	Change to "Spare"
G1 System	Change to "ZS"
G2 Sub-System	Change to "Spare"

B. Cable "From" and "To" locations shall remain the same, unless cable has to be pulled back and coiled at a tray or special Raceway, then the location at the "From" end of the cable will be called *EZMNDUMMY or the "To" location will be called *EZMNDUMMY1. The Raceway where the cable is to be coiled will be also linked to location *EZMNDUMMY or *EZMNDUMMY1.

(Where * place correct unit number).

C. Control characteristics for terminations shall be revised as follows.

Control Characteristics	Value
G2 Sub-System	"Spare
G7 Secondary Status	G7CD (Constructed but deleted) to be manually assigned to prevent ID from going into Unit D.
Wire Numbers	Manually assign one spare wire (SP), the program will generate remaining spare Wire Numbers.

If cable "From" and "To" locations are changed to *EZMNDUMMY or *EZMNDUMMY1 assign Secondary Status (G7) value (NT) to the appropriate termination.

(Where * place correct unit number).

Notes:

1. Design Note 1 or 2 shall be assigned to indicate the prior circuit history, i.e., Scheme Drawing Number. This note shall be assigned to both the cable and its terminations. For cable that is pulled back to a tray or Special Raceway, a note should be added: Cable is coiled at "Raceway ID".

2. When a cable is spared the Implementing Document (DCP, S-Mod, etc.) shall require that additional possum tags be affixed at each end of the cable indicating that it is spare.

5. CKT & Raceway Program Engineering Renaming of Cables:

A cable is renamed to utilize an existing spared cable that has similar vias and cable type of the active cable in the Data Base. Engineering should verify with the field construction or maintenance personnel that the existing cable can be utilized to reach its final destination and that the cable is not damaged.

Upon verification that the existing cable can be utilized, engineering will add design notes to the cable as follows:

1. For new ID of cable:

   Design Note 1: "This cable originally pulled as ID # _____."

2. For existing ID of cable:

Design Note 1: All previous notes shall be erased and a new note shall be added as follows: "This cable renamed as ID _____."

Engineering will remove all vias for the existing cable, and add one via "EK*EZZRMNKA000". (Where * place the correct unit number).

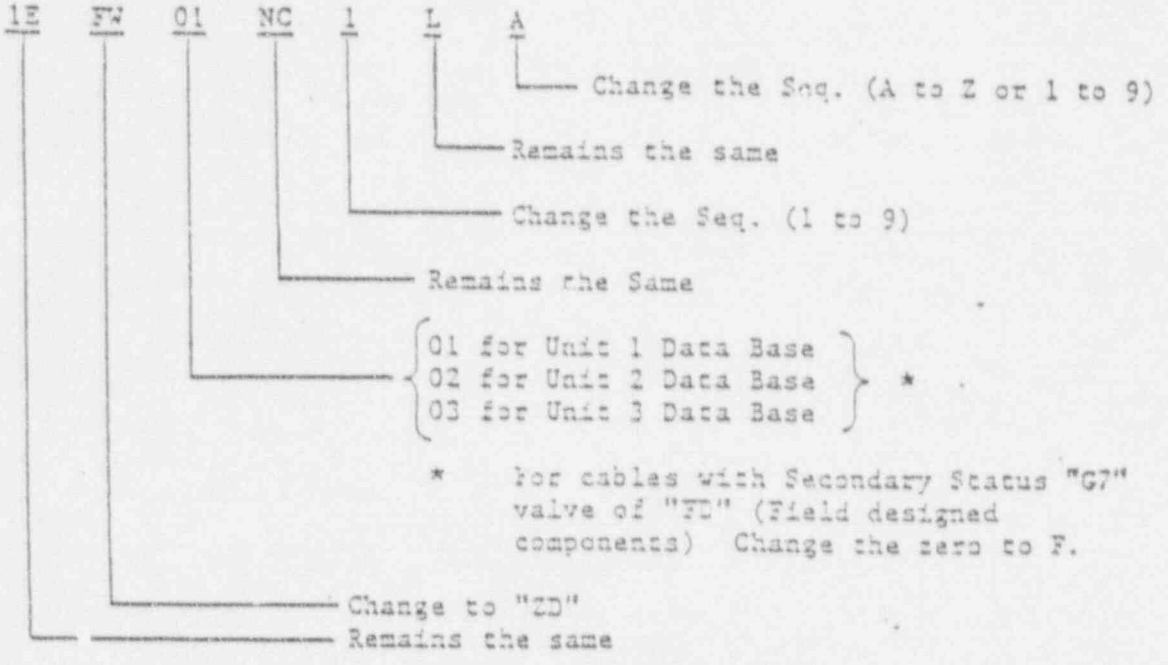
The length of cable shall be reset to one foot. the CC values for the existing cable and terminations shall be changed to the following values:

Control Characteristics	Value
No change except as indicated	
G7 Secondary Status	"CD"
D1 Scheme Drawing	"Renamed"
G1 System	"ZS"
G2 Sub-System	"Renamed"

6. CKT & Raceway Program, Engineering Modification of a Damaged cable.

When the field determines that a cable is damaged, and it cannot be removed from the Raceway, a new cable ID shall be assigned to the damaged cable using the following process. The existing cable ID will be used to pull a new cable:

Example: Existing ID 1EFW01NC1LA



CAUTION: Check to see that the new ID has not been already assigned

New ID 1EMD01NC9LX:

The following control characteristics & values shall be assigned to the damage cable.

Control Characteristics	Value
All Data the same as existing ID except -	
D1 Scheme Drawing	Damaged
G2 SUB-System	DMGED
G7 Secondary Status	CD (To be manually assigned to prevent ID from going into Unit D).

Linkages	Valve
"From" & "To" locations	Same as existing ID
Vias	Same as existing ID up to where the field has identified it has been cut off.
Where the cable is cut off add Special Raceway to Vias	EK*EEERMNKA000
(* = Unit Number)	
Terminations	
G7 Secondary Status	CD (Manually assigned)
G7 Secondary Status	NT
Wire Numbers	Manually assigned 1 Spare Wire Number (SP). The Program will generate remaining spare Wire Numbers.

Notes:

The following design detail notes shall be assigned to the new cable ID:

Design Note 1 shall reference deviation report or rework order, etc.,

Design Note 2 shall indicate prior circuit history such as original cable ID and Scheme drawing.

7. CKT & Raceway Program, Engineering Deletion of Raceways:

Where deletion of Raceway is required for any reason, the process is as follows:

A. Raceway at Primary Status ER::

Engineering to purge all Raceways at or below Primary Status of ER.

B. Raceway at Primary Status JP:

Engineer should check with construction and/or maintenance to determine if the Raceway is installed.

1) If it is not installed delete the Raceway ID.

2) If the Raceway is installed Primary Status of CP (Construction Partial) or CC (Construction Complete).

The following actions can be taken, and the procedure is referenced in the following sections.

Raceway Removed (See Section 8)
Raceway Renamed (See Section 9)
Raceway Damaged (See Section 10)
Raceway Spared (See Section 11)

8. CKT & Raceway Program, Engineering Raceway Removed:

In the event that Raceway must be removed a DCP is generated and the Raceway information shall be changed in the Data Base as follows:

Control Characteristics	Value
D2 Layout Drawing	"Removed"

Design Note: "Raceway Removed"

Linkages

Remove all existing links and cables from the Raceway

Add: Linkages - ZZREMOVE & ZZREMOVE1

When DCP is closed out delete the Raceway from the Data Base

9. CKT & Raceway Program, Engineering Renaming of Raceway:

A Raceway is renamed in the event that it was installed and not required, then the Raceway ID had to be revised due to a separation group change, a service level change, etc. In this case change the CKT. and Raceway, Data Base using the following process:

A. Make the following changes to the existing Raceway ID:

Control Characteristics	Value
G7 Secondary Status	CD to be manually assigned to prevent ID from going into Unit D.
Length	Reset to 1 foot.
DESIGN NOTE	Raceway is renamed (New ID).

Linkages

1) Remove all existing links and cables from Raceway.

Add:

2) Linkages - ZZRENAME & ZZRENAME1

b. For the New Raceway ID add the following Design Note: "Raceway originally installed as (Old ID)

10. CKT & Raceway Program, Engineering Modification of Damaged Raceway:

Raceway Damaged:

When the field identifies a Raceway as damaged and it is unusable but it is to remain in place, change the CKT. and Raceway Data Base using the following process:

Control Characteristics	Value
E1 Design Option	"3"

Linkages

No change unless determined otherwise

Add Design Note: "Unusable Raceway Damaged".

11. CKT and Raceway Program, Engineering Sparing or Abandoning of Raceway:

If a Raceway is identified as no longer being required but it cannot be removed no changes are required to its control characteristics or values. A DESIGN NOTE will be added which states "Spare Raceway Abandoned as Installed."

Linkages No change unless design documents altered them.

Examples De-terminated from equipment at one or both ends.

Change: One end link to ZZEND
Second end link (if necessary) to ZZEND1

12. CKT & Raceway Program, Locations:

A. A location with a Primary Status less than JR, shall be deleted.

B. A location with a Primary Status equal or greater than JR shall be evaluated and a determination made as to the course of action to be taken.

13. Input Procedure:

Data input to the CKT and Raceway Data Base shall be initiated by completing the input Data Documents. Parameters from the source documents (e.g., Deviation Reports, Rework Orders, etc.,) shall be entered on input Data Documents Control Characteristics "Type" H6, "Value" the Document Number. All components associated to a DCP will be assigned a Control Characteristics "Type" H8, "Value" the DCP Number.

The above steps are summarized in the Table below:

Control Characteristics	Valve
H6 Other Documents	"Document Number"
Example:	FCR W856E
H8 DCP	"DCP Number" hyphen "Rev. Number"
Example:	10JSQ003-0

Components that have a Primary Status no greater than ER or are new to the Data Base can be entered when the next update run is activated. Components already installed or have a Primary Status of JR will have their new input data entered into a Configuration Control File, and this data will be updated in the Data Base when a work order is issued for work to commence.

Exhibit C

EE580 Desk Procedure

1. Outstanding Cards

When a responsible engineer (R.E.) requests cards for a Work Order, the data base must be checked to assure there is no outstanding card with the same revision. If a card is outstanding, the EE580 Coordinator will provide the Work Order number and individual who has the card to the R.E. who has the responsibility to obtain the card from the current Work Order. If no card is outstanding the card will be issued for the Work Order.

2. Design Revisions (DR)

When an ICD shows there is a DR to a component, the EE580 Coordinator shall implement the following (retain ICD for 2 weeks after resolution of components).

a. No Outstanding card

If the DR is a "Paper Change Only" (PCO) and there is no outstanding card, the EE580 Coordinator (after verifying the change is paper change only and does not affect construction) shall obtain a new card and note PCO on the card remarks section and initial/date to be returned to RMCS.

b. Outstanding Card

If the DR is a PCO and the card is outstanding, the responsible engineer (R.E.) shall be informed and shall return the current card (in exchange for the new revision card) from the Work Order to the EE580 Coordinator to be destroyed. If the original card has been signed off, the R.E. will staple the new revision card to the signed off card noting "PCO" on the remarks section of the latest revision card.

c. DR not a PCO

If the DR is not a PCO, the RE will be informed that a new revision is out and the old revision card is to be returned to the EE580 coordinator who will destroy the card. If the work is complete and the previous revision card is signed off the RE has the responsibility to resolve the DR.

3. Control of Configuration File

When cards are requested for components, the design change is then rolled to the data base from the configuration control file. Only the components requesting cards on a Work Order will be entered into the data base from the configuration file. The remaining components will remain in the configuration file until requested by a Work Order.

Prior to rolling the configuration file to the data base when cards are requested, a CCI dump must be run for these cards. The CCI must be retained until the work is complete and the cards returned to be statused. In the event the work is not complete, the CCI dump will be used to re-configure the file and return that portion of the data base to the original design.

ANPP

ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

INITIATOR SECTION

DATE:	SYS:	UNIT:	EQUIPMENT TAG NUMBER:	COMPONENT TYPE:
11/18/88	SG	ALL	1J SGBUY 0170G	VALVOP

EQUIPMENT DESCRIPTION: SG-1 LN1-1 MSIV

INITIATOR:	EXT:	STA:	DEPT:
CABLE/WARRINER	1361	6425	MAINT. IC-1

REFERENCE DOCUMENTS: PID/S-MOD/PCF/WR/WO DOC: SEE ATTACHED LIST

SPECIAL EER CONSIDERATION

SYSTEM ENGINEER OR STA CONTACTED: NENEMAR

ROOT CAUSE REQUIRED? YES ☐ NO ☐ INITIATED BY: ☐ TREND ☒ EVENT ☐ TSCCR *

POTENTIAL NONCONFORMANCE CONDITION: YES ☒ NO ☐ NQR ☐ (YES - FOR QUALITY RELATED COMPONENTS ONLY)

PROBLEM DESCRIPTION:

Wrong part obtained from warehouse, DDN against part, improper follow up.

Instructions/work order references inappropriate, design basis errors.

(See attached for additional comments)

(See attached list potential affected equipment -Unit 1 only for example)

(See attached list work task summary this instrument)

SUGGESTED RESOLUTION / NEEDS ASSESMENT:

BY DIRECTION:

1. What's actually required? What's acceptable?
2. How did this occur?

BY PERSONAL OPINION: Correct all problems reported, specified, all areas of specific and general concern, all associated documents including ECE's/EER's/SDCN's /SCN's/Design basis etc as is appropriate/required by applicable license requirements/regulatory commitments, etc. Prevent reoccurance!!!!

FURTHER ENGINEERING EVALUATION IS REQUIRED TO RESOLVE THIS CONDITION AND CANNOT BE HANDLED BY THE NORMAL WORK CONTROL PROCESS:

INITIATOR'S SUPERVISOR: [signature] DATE 12/13/88 INITATORS'S MANAGER: [signature] DATE

SYSTEM ENGINEER'S RESOLUTION

IS THE AFFECTED COMPONENT QUALITY RELATED ? YES ☐ NO ☐

DOES THIS DEFICIENCY DOCUMENT A NONCONFORMANCE CONDITION ? answer only if question above is marked "YES" YES ☐ NO ☐ N/A ☐

WILL THIS DEFICIENCY AFFECT THE OPERABILTY OF THE COMPONENT OR SYSTEM ? YES ☐ NO ☐

ANPP

ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/ INTERIUM RESOLUTION/DISPOSITION:

PROBLEM DESCRIPTION:

Applicable controlled dwg M234A-59-15 inc SDCN's for Solenoid G, P/N W30248, T.M. P/N W30248. When ordered by SIMS through warehouse resulted in obtaining wrong part, P/N W30965 (previous P/N at "some time", see item AH reference, but even though previous P/N, we still should have received a "VSH-65600" vice a "VSH-66200". There was no corresponding quality related engineering/procurement document to allow part use, suitability of use/equivalency/ etc. No ECE/EER was referenced or found. PC insisted part was "correct" based on SIMS and had part bought.

Prior knowledge of system "problems" in documentation, specific prints, EER/ECE problems etc. plus more than obvious observable deficiencies in prints/TM/Specifications to incorrect references (TM vice controlled dwgs), special environmental qualifications of those solenoids/coils prompted halting work, requesting WO amendment and obtaining correct parts.

Suggestion tochange coils also resisted, since quals are generally very specific to use (both by system and normal state, energized or normally de-energized).

The PC bases his "equivalency" and "applicability" on "SIMS", vice specific mfg. P/N (P.O. Spec) and associated Skinner P/N (specific application P.O. PVNGS). He also referenced using a "sister" solenoid valve coil, using a W.O. specific EER that had distinct problems of its own, indications it was improperly processed and based on the wrong information/TM prints vice controlled dwgs, prints that were several revisions behind, etc. (Indication is that this EER has been used previously, part of a "bag of tricks" to overcome objections by other people in similar situations, vice proper resolution...ie expediency vice the appropriate procedural/quality resolutions).

No specific information was found to exist in the TM M234A-52-22 for any of the ADVC specific/special design Skinner Solenoid valves used either "historically" or their proper (presumably) replacements/equivalents. TM update, EIM 55-4 update/agumentation, dwg M234A-105-2 update, qualification reports, etc. Updates seem both appropriate and overdue to conform to ANSI N45.2 requirements.

The attempted use of EER 87-SG-210 (for reasons stated above also) to switch coils, even though different part numbers and even if there were no other areas of dispute, would seem to at a minimum require some form of configuration control/update per N45.2. Also, with reference to the TM, it is specific in Table VI-3 (REV G) that the coils are the same (See Kit #) and the EER seems to have been both redundant/unnecessary (except correcting the typo would have been a help/valid use). The fact that this EER was written to a superceeded revision of a TM dwg that was incorrect to its corresponding controlled M234A dwg is an indication that it was improperly prepared/reviewed/implemented etc in the first place, pointing to an EER deficiency of program proportions of unknown magnitude and implications to configuration/quality control. Even if the EER had been written to a correct design output basis document, it would still have been based on a revision since superseded (!) and cross-comparison/applicability would seem to be warranted. (For additional see ref. items I, J, K, L, P, Q, W, X, AA, AB, AD, AF, AG, and AH to appreciate-may not be inclusive).

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

PROBLEM DESCRIPTION (CONTINUED)

Given just the available documentation at the time the work order was in the field, use would seem to have constituted a quality part substitution w/out prior concurrence, without adequate quality/documentation/design output basis control and hence a non conforming situation by approved work document (since preparer/reviewer/QC revie etc personnel are not sufficiently trained/do not have adequate skills to perform the tasks which they have been assigned, this is both a known/obvious deficiency for the Unit 1 I&C PC involved, but the engineering level/procurement leval/Deer Valley level involvements were suspected, but not as graphically illustrated in this PO spec and others (See ES system EERS 88-ES-004, 006-010 to appreciate).

The potential for a valve (at stores, purchased) to have been an MSR item is always available, and then qualified life considerations become significant as regards substitutions of active parts, especially these coils! (ie, one valve is qualified life, normally energized, the other isn't!)

Suggest that TM Table VI-3 be appropriately corrected (typo) and upgraded to reflect solenoids E, F, G, and H, as well as associated controlled dwg (?)

The issues relative to quality, configuration control, design output and if they appropriately reflect design input documents, must all be resolved to adequately determine what action to take in regards to this EER.

The work performed will have to be evaluated after these issues are resolved and appropriate repair/rework/retest etc performed.

The causes need to be determined, corrective actions initiated to preclude reoccurrence, whether or not this is a reportable occurance is also debatable.

This monitoring report addresses only some of these issues, and use of a CAR against this EER's associated WO was requested. EER 88-SG-138 has a number of similarities and cross reference/analysis/resolution may be both an advisable and productive means for disposition of multiple, related problems on not only the MSIV/MFIV valves, but also other problems in this PO spec as yet unresolved and/or undetected.

Due consideration during the resolution process is suggested to the requirements of ANSI/N45.2 et al, as appropriate to restoration of design basis.

Additional items for consideration are listed as Ref. Items AJ-AN.

ANPP

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

REFERENCE LIST

ITEM	SOURCE	DESCRIPTION OF ITEM "(REMARKS ON ITEM)"
A	SIMS	MFG P/N SEARCH(S) C/I 4500-000285
B	SIMS	REFERENCE DOCUMENT SEARCH SCREEN WML 013
C	SIMS	EQUIPMENT DATA INQUIRY SCREEN WML 019
D	SIMS	NAMEPLATE DATA SCREEN WML 011
E	SIMS	EQ PART 2 ADD/CHANGE SCREEN WML 009
F	SIMS	EQ PART 1 CHANGE/DELETE SCREEN WML 007
G1/G2	SIMS	WR/WO ARCHIVE INQUIRY SCREEN WML 039 G1 1JSGBUY0170G TRAIN B } EQUIVALENT FUNCTIONS/ G2 1JSGAUY0170C TRAIN A } DIFFERENT TRAINS ONLY
H1	ROS	90064353/P157L09, TRACK #571235BER, 33205577... SPECIFICALLY, JOB DESCRIPTION "1JSGEUY0170G" (NOTE,"E"VICE"B" AND IT IS EVIDENT WHY MATERIAL HISTORY WASN'T "LOCATABLE" TO PC)
I	TAG	A/DV TAG # AND PVNGS GREEN TAG #71877 FOR MFG P/N W30965, S/N 641, ORC #5567-87, PROCUREMENT LEVEL 2M
J	DDC	EIM 551#4 SKINNER VALVE, MAINTENANCE AND CLEANING INSTRUCTION
K	DDC	DDR EIM REPORT SORT BY MANUFACTURERS, CLIENT DOCUMENT #, SKINNER PRECISION 28 JUL 88 REV, PG. 58 (ABOVE SPECIAL ORDER PART - NO SPECIFIC INFO FOUND!)
L	DDC	ECE-SG-A104 (ECER DER 86-11) REV 1 QUAL LIFE EVALUATION SKINNER SOLENOID VALVES MODEL # V5H65600, V5H65590 REV 1 7-87
M	DDC	A/DV QUALIFICATION REPORT E9023-QR-2 (DWG M234A-6B-9MF)
N	DDC	QUALIFICATION REPORT E600-52-4 (BECHTEL LOG)
O	DDC	DER 86-11 A/DV P/N W30248, W30247
P	DDC	M234A-104-1 ENVIRONMENTAL QUALIFICATION REPORT, ANALYSIS OF SOLENOID VALVES MANUFACTURED BY SKINNER
See item A 1 → Q	DDC	M234A-105-2 SPARE PARTS RECOMMENDATION LIST FOR MSIV'S & MFIV'S (TYPOS ("HISTORICAL" P/N)

SOURCE DDC = DOC TRL UNIT 1 AND/OR ANNEX DDC
T.M. = TECH MANUAL

SIMS = STATION INFORMATION MANAGEMENT SYSTEM
OPS = OPERATIONS
??? = REFERENCED TO WORK ORDER, ITS SOURCE UNKNOWN

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-1416

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

REFERENCE LIST - PAGE 2 of 3

P	DDC	EER-87-SG-210 MSIV'S/FWIV'S(NOTE. THESE WO'S WERE PERFORMED BY DISC/ELEC. THIS WAS ALSO THE PC'S "SOLUTION" TO MOST ALL PROBLEMS)
S	OPS	WORKING COPY - 410P-15G01 REV 4 PCN 04 MAIN STEAM. SECTIONS 1.2.3.9.12 AND APPENDIX D (WHERE ALL "SAFETY" PERSONNEL AND EQUIPMENT, CAN BE READILY FOUND BY BOTH THE WORKERS AND THE PC)
T	DDC	01E-SGB-023 REV 2 ELE D1A MSIV'S. 125 VDV POWER SUPPLY REF VP M234A-58
U	DDC	13E-SGB-023 REV B (SAME DWG "T" EXCEPT DESIGN VICE "AS BUILT")
V	SIMS	MATERIAL HISTORY. ALL SIMILAR SOLENOIDS IN USE FROM PO SPEC MM2344. E9023-1.-2.-11 (A,C,E & G MSIV, A&C MFIV) (SEE ALSO "SISTER VALVES"SOLENOIDS ON SUBSTITUTIONS B,D,F & H)
W	DDC	M2344-66-6 SCHEM FOR A/D SELF CONTAINED HYDRAULIC ACTUATOR (TM M2344-62. ASSYDWG 93-15169 SHEET 2 OF 2. SEE NOTE 4/REV G)
X & Y	DDC	TM M2344-62-2E (INCL SDCN A00838. SD7735. SDCN SD4077) SECTION IV ACTUATOR OPERATIONS "L" TO EXERCISE MSIV. "M" ON THE PRECHARGE CHECK ACCUMULATOR #2. CAUTION: 2.3.84 SECTION V ACTUATOR INSTALLATION. FRONT TABLE V1-3 REV G.ALL DWGS VS THEIR EQUIVALENT CONTROLLED "M234A-XXX" SDR DWGS.
Z	SIMS	EQ REPETITIVE WORK INQUIRY LISTS/WMA001 FOR ALL EQUIPMENT UTILIZING THESE SPECIFIC SOLENOIDS/PARTS. TO DETERMINE EXTENT REWORK/REPAIR/RETEST (IN THE EVENT WORK WAS PERFORMED UNDER AMENDED PM WO TASKS) (ALSO SHOWS HOW INABILITY FOR PC TO CORRECTLY IDENTIFY THE CORRECT INSTRUMENT #/TRAIN, HELPED LEAD TO PROBLEMS)
AA	DDC	ANSI N45.2.11 -1974 QUALITY ASSURANCE REQUIREMENTS FOR THE DESIGN OF NUCLEAR POWER PLANTS. SECTIONS 3.4.5 &6. (HINTS AS THE EXTENT OF "NON CONFORMANCE" WE ARE DOING TO THIS SYSTEM/VALVES)
AB	DDC	EER-88-SG-011 FAILURE...MSIV 170 FAST CLOSED, DURING FULL POWER OPS, TRIPPED PLANT. (SIGNIFICANCE OF MAINTENANCE ACTIVITY).
AC	DDC	EER-87-SG-044 135GAUV0175 SOLENOID, MISAPPLICATION, TORQUE VALUES SOLENOIDS (REFERENCE/INFO ONLY, POOR PRACTICES..)

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

REFERENCE LIST - PAGE 3 of 3

AD	T.M.	M234A-52-22 SECTION IX HYDRAULIC ACTUATOR COMPONENT DETAILS. SECTION 10.0 (SPECIFIC ATTENTION TO 10.4) ALSO FROM TM, TABLE VI-3 (SPECIFIC ATTENTION TO ITEMS 13 & 14, SOLENOID VALVE SEAL KIT/SOLENOID VALVE COILS - POTENTIAL NONCONFORMANCE CONDITION PREVIOUS WORK IF SEALS EXCHANGED TOO! NOTE ALSO E,F,G,H COILS ARE OMITTED MSIV'S)
AE	DDC	ANSI/N45.2-1977 QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR NUCLEAR FACILITIES (SEE ITEM 16)
AF	DDC	TN-E-4880 (PO SPEC M7234A) SKINNER 3-WAY SOLENOID VALVE V5H65600
AG 1	DDC	CORRESPONDENCE BECHTEL/ADVC E-53009, DER 86-11 (REF ITEM "O"). REPLY/REQUEST 10CFR50.55 (E) REVIEW, ADDITIONAL DEFICIENCY RE: 10CFR21 (LACK OF FOLLOW-UP, RESOLUTIONS)
AH 1	DDC	DWG M234A-105-2 SPARE PARTS RECOMMENDATION LIST (SEE A/DV S.O. ITEM #5) E9023-02A PART 065/W30964; 066/W30965 E9023-01A PART 067/W30964; 068/W30965 (THIS IS A "HISTORICAL" REFERENCE/ACTUAL P/N ETC... APPLICABILITY/UPDATE?)
AG 2	QC	MONITOR REPORT MC-86-1116 WO# 324345 11/7/86 (START OF INVESTIGATION PROCESS REQUESTED BY FIELD PERSONNEL DUE TO PC RESISTANCE)
AH 2	PART	POS 90064353, INFO (OFF PART)
AI	DDC	DWG M234A-14-9 (VP 93-15169 REV G). COMPARE TO DISPOSITION EER-86-SG-091 DWG USED (FROM TM, VICE CONTROLLED DWG!!)
AJ	DDC	DWG M234A-59-15 (INCL SDCN'S, VP F-5155 REV H). COMPARE TO DISPOSITION EER-87-SG-210 (VP F-5155 REV G FROM TM; DIFFERENT REV AND FROM TM, VICE CONTROLLED DRAWING)
AK	???	CM WO 324345 HOLDPOINT REFERENCE TO TM DWG, VICE CONTROLLED DWG!
AL	??	CM WO 324345 STEP 9A.4.5 COMPARE TO REF ITEM "AF"
AM	??	CM WO 324345 VARIOUS STEPS. HELP EXPLAIN WHY PC COULDN'T FIND THE MATERIAL HISTORY (DIDN'T KNOW INSTRUMENT #) AND OTHER PERTINENT INFORMATION.
AN	Reference S/AM	COMPARE WO 324345 INSTRUCTIONS/PRECAUTIONS ETC TO REF ITEM "S", TO GET A CLEAR INDICATION OF EQUIPMENT AND PERSONNEL SAFETY INADEQUACIES. (PO SPEC CONTAINS ADDITIONAL INFO THAT IS HELPFUL/REQUESTED, AND "SOMEHOW" WAS NEVER FOLLOWED UP ON)

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

AFFECTED EQUIPMENT - each unit

TYPE VALVE	GROUP
MSIV	A/DV Serial No's
	1. E9023-1-(1-12 Train A, 1-12 Train B) (see M234A-66-6 for full equipment listings solenoids A, B,C,D,E,F,G,&H UNIT 1,2,3; also M234A-59-15)
MFIV	2. E9023-2-(1-6 Train A) (see M234A-56-13 for listings train A solenoids A,B,C,D)
MFIV	3. E-9023-11-(1-6 Train B) (see M234A-56-13 for listings Train B solenoids Train B)

Valves by Group:

1	2	3
SGEUV 170	SGA UV 174	SGB UV 132
SGEUV 180	SGA UV 177	SGB UV 137
SGE UV 171		
SGE UV 181		

NOTE

May not be complete listing

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

WORK TAST SUMMARY LIST

WMA0001 A01 SIMS REPETITIVE WORK INQUIRY LIST 11/21/88 07:39:34

EQ 1JSGBUY 0170G VALVOP

EQ DESC SG-1 LN-1 MSIV LOC E3093N10100140

TASK#	WORK CENTER	WORK DESC
020746	MNTC	********** EQUIPMENT QUALIFICATION PROGRAM **********

016515 MNTC STROKE VALVE PER ATTACHMENTS.
MULT EQ

058196 OENG PERFORM SURVEILLANCE TEST PROCEDURE 73ST-1DG02.
MULT EQ

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM
A
1of5

```
ID03A                  STOCK STATUS BY C/I #                        11/06/88 ** 0913913
C/I #: 4500-000205   STRM: 222   U/I: EA   AUC:   1825.638
BUY #: 22 -- C/I SHORT: VALUE 3WAY SOLENOID              NEXT CYCLE COUNT:
C/I LONG: VALUE, 3WAY SOLENOID,NORMALLY [illegible] [illegible] 8HSH-AS-00
     120VDC,FOR A/DV MSIV & FWIV SUD [illegible] & 2 [illegible]              STD REQ #
     DWG 93-15165 REV BR2 & 93-15158 [illegible]          2HF381          0000000
ORD POL: 50    [illegible] LOC : C/06A07           LEAD TIME: 20   HAZARDOUS: N
STG LVL: C  HANDLING: 01  PM: N  SHELF LIFE: N  SAFETY: Y  SPEC #: 13MN234A
LAST ACTIVITY = ISSUED: 06/30/87   RECEIVED: 11/10/87 LAST CYC CNT: 07/13/87
OLDEST PROM. DATE PO #:               PO QTY:                PO PROM:
********************** VENDOR INFORMATION ***********************************
NUMBER     NAME              NUMBER     NAME                NUMBER     NAME
100706 AIR PRODUCTS &      102772 ANCHOR DARLING

*********************** QUANTITIES ******************************************
ON-HAND:          26  RESRV:              EOQ:           2  12 MTH USE:
ON-ORDR:              AVAIL:          20  ROP:           1       TADJ:
**************************** OPTIONS ****************************************
ENTER = C/I#:                [illegible]          PF1 = NEXT STRM   PF2 = SIMS/AMIS
PF3  = MFG LIST     PF12 = MAIN MENU      PF24 = HELP
```

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

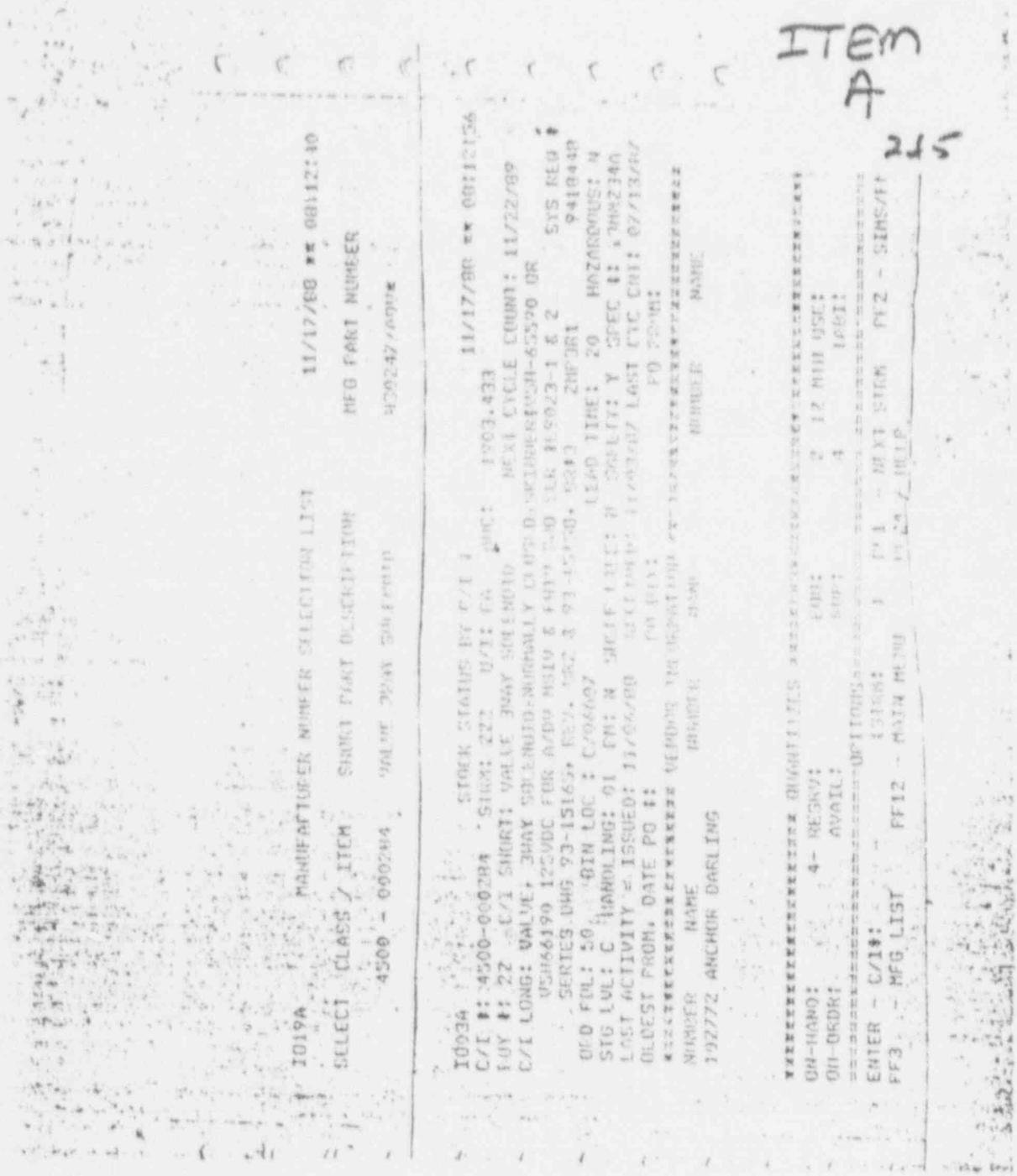
EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/ INTERIUM RESOLUTION/DISPOSITION:

ITEM A

215

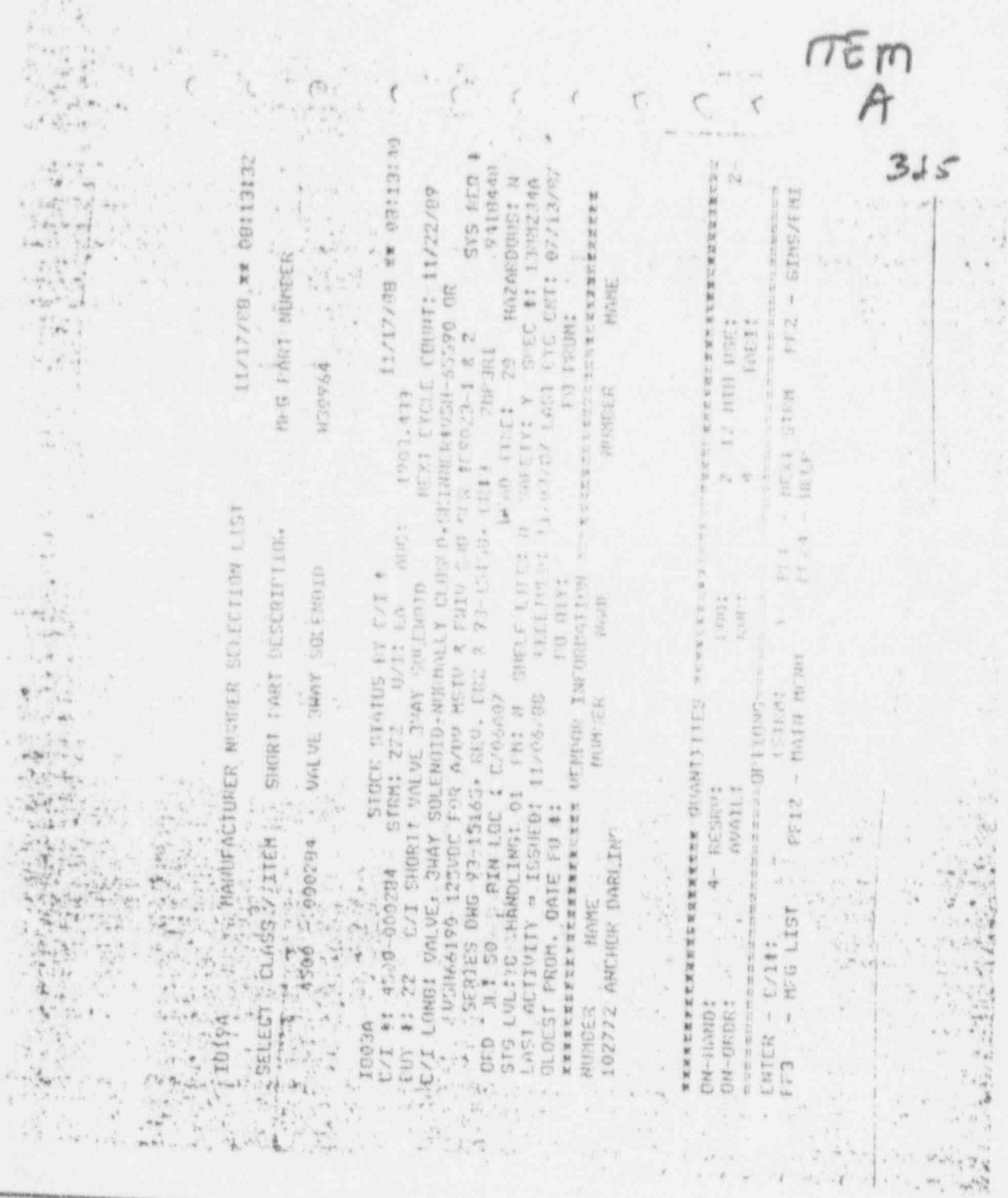


CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM A

315

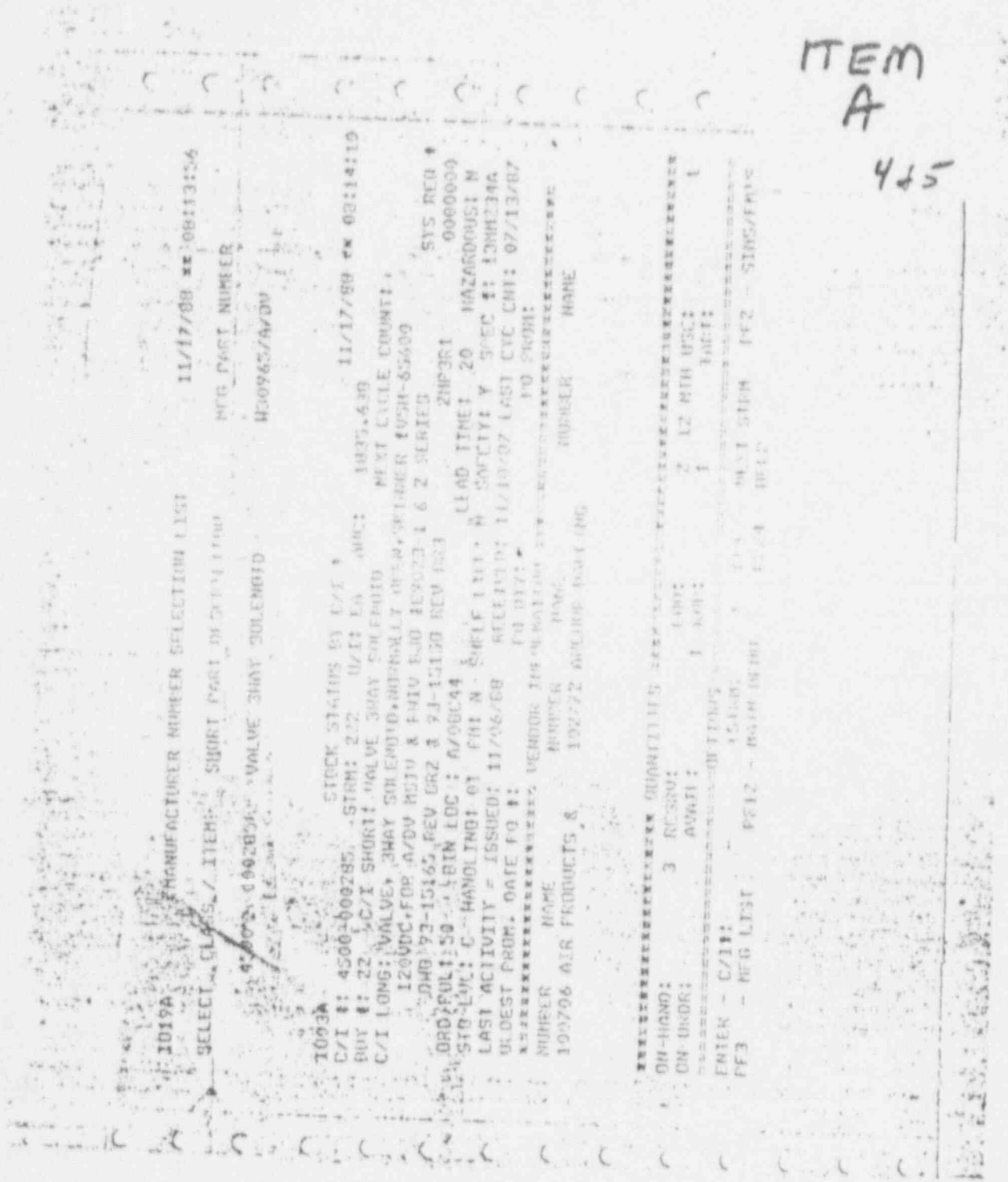


CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM A

415



ANPP

ENGINEERING EVALUATION REQUEST

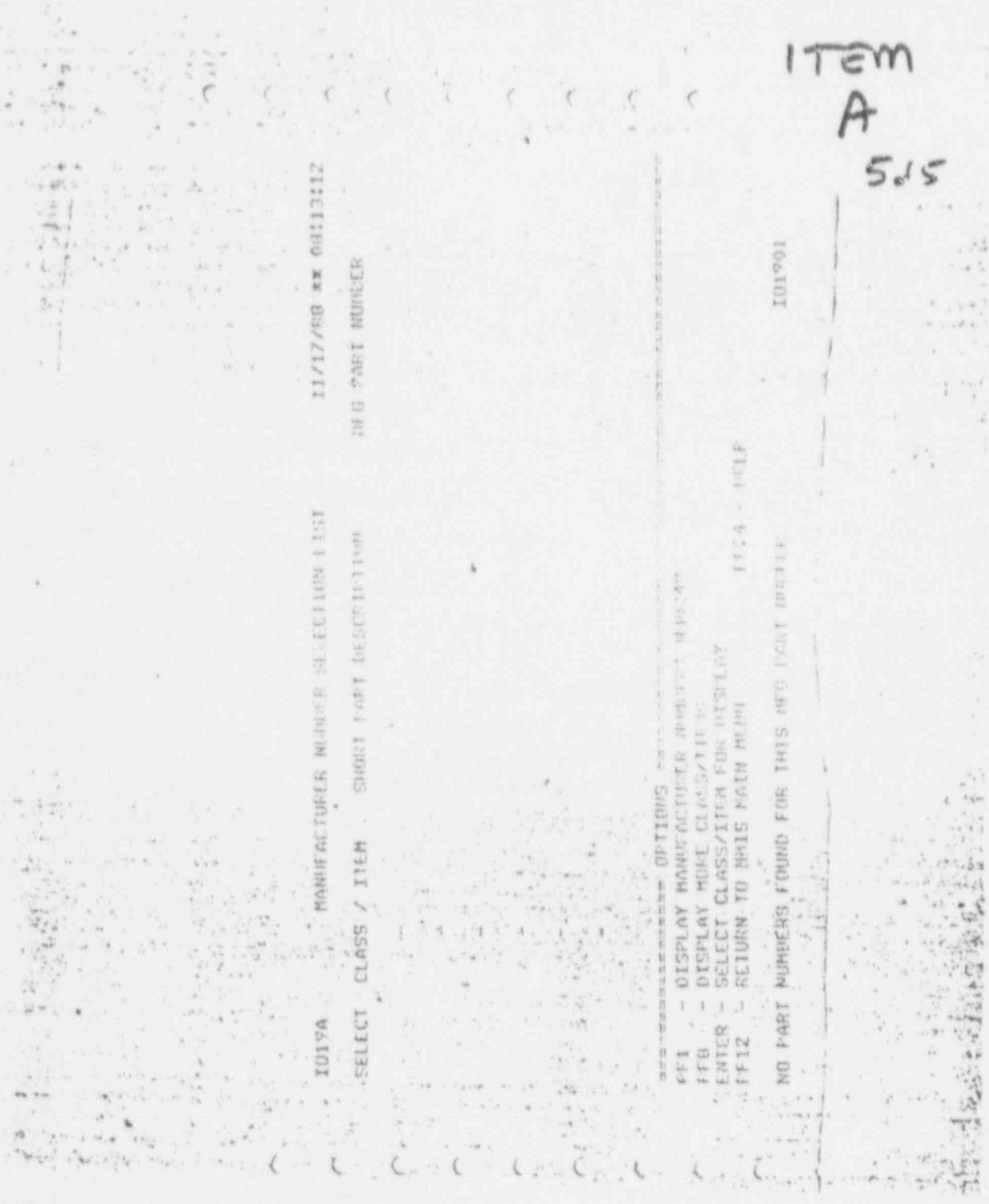
PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM A 5 of 5



ANPP

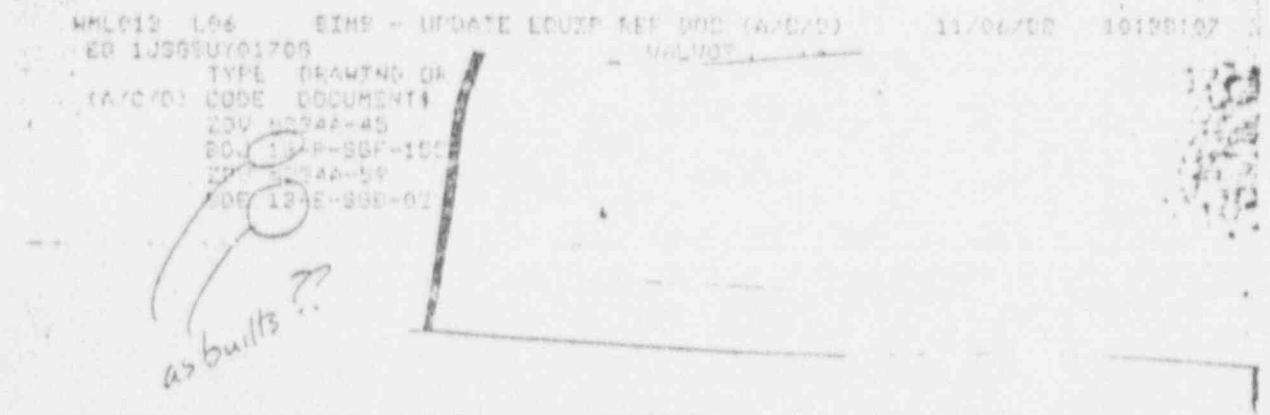
ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM
B
1 of 1



OPTIONS

ENTER - PROCESS A/C/D PF1 - PART1 CHANGE PF2 - PART2 CHANGE
PF3 - UPDATE EQ NAMEPLATE PF4 - DISPLAY EQ SUMMARY PF5 - UPDT SD BOUND TAG
PF6 - UPDATE COMMENT
PF7 - NEXT EQ
PF8 - MORE PF9 - SECONDARY MENU PF10 - MAIN MENU
PF11 - SIGNOFF PF24 - HELP

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM C 1 of 1

incomplete

```
WML019  L07          SIMS- SUMMARY EQUIP DATA INQUIRY          11/06/88   10:50:32
ED         1JSGBUY0170G                               VALVOP  UNIT 1   SYS SG   TR B
ED DESC    SG-1 LN-1 MSIV                   MFR CODE  S124  MODEL  VS
                                            VEND CODE A391  MFR SER NO
ENGINEERING/NPRDS DATA:  PRI SOURCE DOC  DOM 13-M-SGP-001       REV 09 CODED 010
A TYPE                   SOLENOID-DC                     APS QA       Y   BECHT-Q  Q
B SUB-TYPE               DIRECT ACTING                   SEISMIC CAT  1   VALV CAT A
C ACTUATION SPEED        INSTANTANEOUS                   SAFE CLASS   1E
D NOT REQUIRED                                           CODE CLASS   E
E NOT REQUIRED                                           MFR DESIGN STD IEEE 323/344
F NOMINAL SIZE-RANGE (   UNDER 1/2 IN.                   PO#               MM-294M
G FORCE RATING (OPTION   DC      PE20   TECH MAN M224-0-02            MIR FRAME
H TORQUE RATING (OPTIO                  VALV MRI                      VALV IND
J NOT REQUIRED                          QUAL REPORT                   QUAL LIFE 06
DSGN PRESS               VENDOR COMP#                                 ILCD SOL
OPER PRESS               POWER SOURCE E-PKC-2208
DSGN TEMP                PIPE ID#
OPER TEMP                LOC
NPRD COMP#               LDC          K2073U10160146
VERIFIED YES             INT ENVIR    AMB TEMP BETW -10F & 120F
                                      AIR

                         EXT ENVIR    AMB TEMP BETW -10F & 120F
                                      TEMP AND HUMID NOT CONTROL
INPUT           TO                OUTPUT        .0
SETPOINT        +      -             ANNUN                       FIRE ZONE
SETPOINT        +      -             ANNUN                       SPECIAL
ACCURACY +      -             AND +
*************************************OPTIONS****************************************
PF1  -SPARE PART  PF2 -NAMEPLATE  PF3 -REF DOC  PF4 -COMMENT  PF5 -ENDRY TAGS
PF7  -NEXT ED
PF12 -RETURN WR/TASK/MODEL/WO                    PF24 - LP        PF9 -SECOND MENU
```

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM
D
1 of 1

WRL011 L05 UPDATE MISC EQUIP/NAMEPLATE DATA (A/C/D) 11/06/89 10:20:14

ED 1JDGBUF01709 VALVE

(A/C/D) NAMEPLATE DATA

TYPE 3 WAY

TEMP RANGE -40 DEGF TO

+180 DEGF

BURST PRESS 10,000 PSIG

OP SPEED 600 CYCLES/MIN

10 WATTS

180°C?

See ref item AF

OPTIONS

ENTER - PROCESS A/C/D PF1 - PART1 CHANGE PF2 - PART2 CHANGE

PF3 - UPDATE ED REF DOC PF4 - DISPLAY ED SUMMARY PF5 - UPDT ED BOUND TAG

PF6 - UPDATE COMMENT

PF7 - NEXT ED

PF8 - MORE PF9 - SECONDARY MENU PF10 - MAIN MENU

PF11 - SIGNOFF PF24 - HELP

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM
E
1 of 1

```
WML009  L03     SIMS- EQUIP PART2 ADD/CHANGE                          11/04/88   10:39:09
EQ 1JSGBUY01700                           VALVOP VERIFIED YES
DSGN         DSGN         OPER          OPER
PRESS UNITS TEMP UNITS PRESS UNITS TEMP UNITS      PIPE ID#

PLD SLD  CODE   VALV  APS QUAL       ENVIR QUAL  MTR  VALV   VALV
D  CAT   CLASS  CAT   QA  REPORT#    CLAS LIST FRAME MK#     END  PERC#
Q  1       E     A    Y
INPUT RANGE
FROM   TO     UNITS SETPT PLUS MINUS UNITS R/F  ANNUN                  FIRE ZONE

OUTPUT RANGE
FROM   TO     UNITS SETPT PLUS MINUS UNITS R/F  ANNUN                  SPECIAL

INST ACC          INST ACC %
PLUS MINUS UNITS  PLUS  MINUS      POWER SOURCE                  ELEC DWG
                                   E-PHB-2200
************************************OPTIONS*************************************
ENTER = PROCESS ADD/CHG       PF4  = PART1 CHANGE              PF2  = UPDT EQ NAMEPLTE
PF3   = UPDT EQ REF DOC       PF5  = UPDT COMMENT
PF7   = NEXT EQ
PF9   = SECOND MENU           PF12 = MAIN MENU                 PF11 = SIGNOFF
PF10  = UPDT EQ SOUND TAGS    PF24 = HELP
```

APPENDIX A OF 73AC-9ZZ29 REV 7

ANPP

ENGINEERING EVALUATION REQUEST

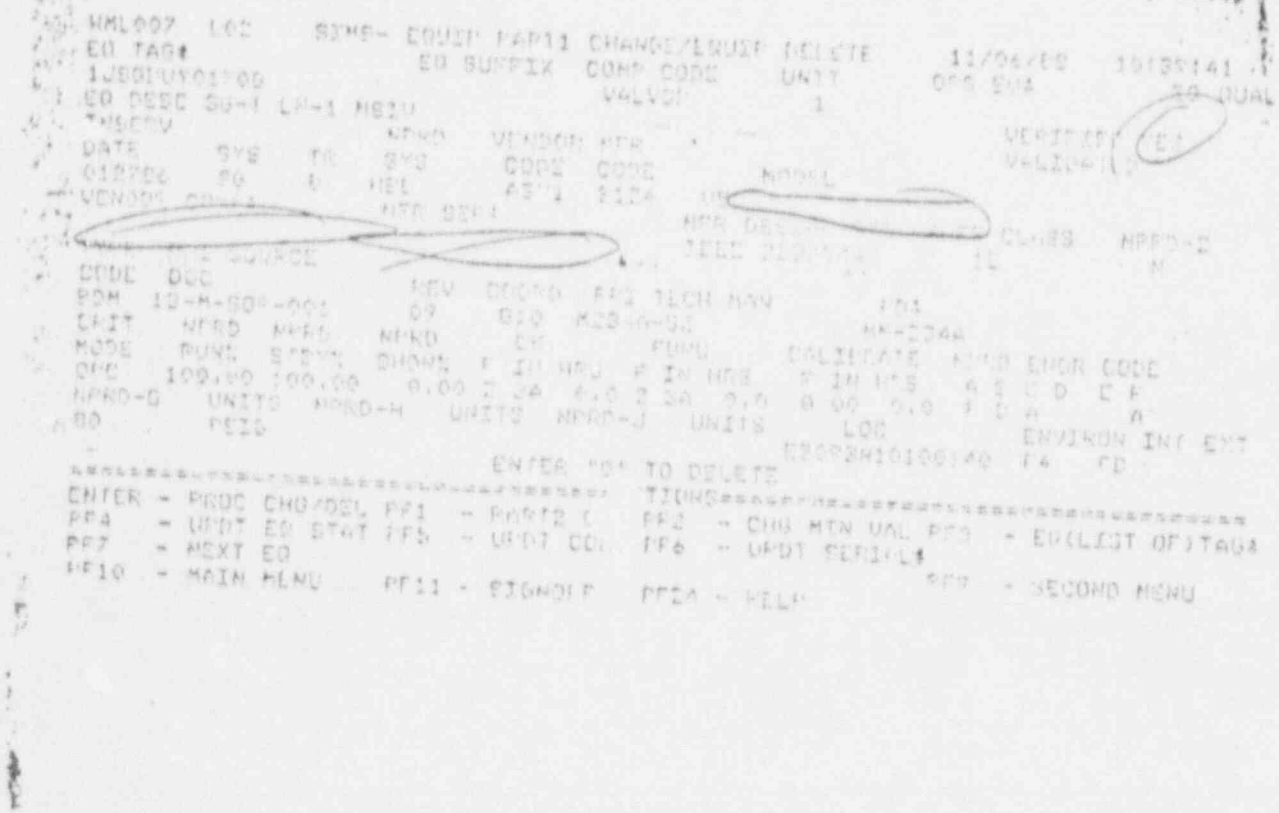
PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM
F
1 of 1



ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM G1

1 of 1

PC probably Typo, 8601 and always...

```
WMC039  C3#          DIMS WR/WO ARCHIVE INQUIRY              11/06/88   10:52:21
EQ 1JSGUUY01700
EQ DESC SG-1 LN-1 MSIV                 VALVE              WO# 00246452  WR#   MEO067
WORK DESC PERFORM SURVEILLANCE TEST PROCEDURE 73ST-1OO08.                  TASK# 058196
                                                                          MODEL#
ACTION TAKEN   COMPLETED Y   WAIVED *  POSTPONED
               CANCELLED     FAILED    NOT APPROVED       COMP           TIME
WORK PERF **  COMPLETE PERFORMANCE ** FAILED **           CLSD 101387 TIME

ARCH EQ    1JSGUUY01700                              DOC
                                         VALVE    MANU
EQ 1JSGUUY01700
EQ DESC SG-1 LN-1 MSIV                 VALVE              WO# 00246452  WR#   MEO01
WORK DESC                                                                 TASK# 058196
                                                                          MODEL#
ACTION TAKEN   COMPLETED     WAIVED    POSTPONED
               CANCELLED     FAILED    NOT APPROVED       COMP           TIME
WORK PERF                                                 CLSD 101387 TIME

ARCH EQ
                                                      NAME
*******************************OPTIONS*****************************************
PF5  - NEXT WO#
PF7  - NEXT EQ                      PF6  - NEXT WR#
PF8  - MORE WO#
PF10 - MAIN MENU                    PF9  - SECONDARY MENU
 NO MORE TO DISPLAY   1117          PF11 - SIGNOFF PF24 - HELP
```

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM G2
1 of 1

N? SGAUV0170G

per PC, they probably mean SG01 "typo"

```
WMC0?? [illegible]

EQ [illegible]
EQ DESC [illegible]
WORK DESC [illegible]

ACTION TAKEN   COMPLETED       [illegible]
               CANCELLED       [illegible]
WORK PERF [illegible]
          TURNING DEEP [illegible] CONTROL [illegible]
          ** PARTIAL PERFORMANCE [illegible]
ARCH EQ   [illegible]

EQ 1JSGAUY0170C
EQ DESC SG-1 LNAV MSIV SOLENOID                [illegible]
WORK DESC PERFORM SURVEILLANCE [illegible]

ACTION TAKEN   COMPLETED       AI ID
               CANCELLED       FAILED
WORK PERF ** COMPLETE PERFORMANCE [illegible]             TIME

ARCH EQ   1JSGAUY0170C

PF5  = NEXT WO#                     PF4  [illegible]
PF7  = NEXT EQ
PF8  = MORE WO#
PF10 = MAIN MENU                    PF1 [illegible]
 NO MORE TO DISPLAY   111Z
```

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

[illegible]

9157609

ITEM

H1

1 of 1

ISSUE DATE: 11-6-88

JOB DESCRIPTION: [illegible] Matl QR

4300 - [illegible] VALVE [illegible] SOLENOID [illegible] 971236889 1

2m

332.05577

S/n 641

Green Tag Issued #71877

SGE NO SUCH COMPONENT!

(1JSGAUY0170G)

ISSUED BY (NAME & EMP ID): Q. Zedder 94134

RECEIVED BY

DATE

Q. Zedder

1

APPENDIX A OF 73AC-9ZZ29 REV 7

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM I 1.A1

S.O. P-D010-6

ANCHOR/DARLING VALVE CO.
701 First Street, P.O. Box 3428
Williamsport, PA 17701-0428

CUSTOMER P.O. 33205517
PART NAME SOLENOID VALVE 3-WAY NORMALLY OPEN
A/E W30965 CLASS 1E ... 000285
TAG NO. [illegible] & 2
FOR 28X24X28 MSIV DWG. 93-15165 / 24X22X24 FWIV 93-15158

NO 4500 - 8R5	33205... 77	6	QTY 1
DESCRIPTION VALVE, 3 WAY SOLENOID, NORMALLY OPEN ... IE ... FOR A/D ... [illegible]			
PART NO W 30965		TEMP PART NO / DELETE DATE NA	
CONTRACTOR TRACKING NO NA		TRACKING NO PO # APS 871235887	
CONTRACTOR TRANSFER FORM NO NA		ASME CODE CLASS NA	
SERIAL HEAT 641	RDS # 90064353	CLASS IE YES ☐ NO ☒	
SHELF LIFE NO OF MOS NA	DO NOT USE AFTER (DATE) NA	WO NO 00-324345	DOC NO 5587-87
INSPECTED BY [signature]	DATE 12-30-87	PROCUREMENT LEVEL 211	STORAGE LEVEL B

№ 71877

EIMSSI #4

ITEM J

1 of 2

SKINNER VALVE

New Britain, Connecticut

MAINTENANCE AND CLEANING INSTRUCTIONS

C, V5, X5, Q5 and V61 Series Valves

1. Shut off pressure to the valve and electric current. The valve need not be removed from the line.
2. Remove nut at top of coil cover. Cap, coil housing and coil can then be removed from bolt.
3. Using special Skinner wrench nut (Skinner Part V0-233) unscrew the sleeve assembly from the body. DO NOT use a pipe wrench, as a wrench may crush the sleeve assembly and make the valve inoperative.
4. In order to completely disassemble the Q5 valve, it is necessary to remove the snap ring from the recess in the bottom of the valve body or in Q5 valves manufactured after 1965 a threaded plug with holes for fitting the V0-233 wrench nut. The cap, "O" ring and piston may then be removed.

INSPECTION:

1. If the valve fails to operate, the coil should be checked to make sure it is not burned out.
2. Occasionally, if mishandled, valves may leak at the flange seal. If the medium is a liquid, such a leak may damage the coil. A flange leak may be corrected by tightening the sleeve assembly into the valve body or replacing the flange seal. Use wrench nut, Skinner Part V0-233. Do not use a pipe wrench on the sleeve assembly.
3. If the valve leaks at the seat or the plunger sticks in the energized position, examine the soft inserts in the plunger and the seat of the sleeve assembly for the presence of excessive dirt or wear. If the inserts show considerable wear, the plunger should be replaced.
4. If the valve develops a loud buzzing noise, examine the inside of the sleeve assembly and upper portion of the plunger and remove all foreign matter embedded in these parts. Caution: In Three Way and Two Way Normally Open Valves be careful not to damage the sleeve seat. Clean the plunger and seats and seals with kerosene. Do not expose the rubber parts to any type of commercial cleaning fluid.
5. If external leakage occurs around the cap of the Q5 valve, the seal should be removed and inspected for imperfections.

If the valve leaks internally, examine the piston inserts for excessive wear. Also inspect main exhaust orifice for dirt accumulation, scratches and nicks.

If the valve is sluggish during energization and de-energization, check for dirt accumulation or wear on both piston and piston bore. The piston should slide freely into the piston bore without binding. Inspect and clean all passageways of dirt or foreign matter.

REASSEMBLY:

Reassemble the valve by following the disassembly procedure in reverse order. Make sure the seal at the flange end of the assembly and the return spring are in place when the sleeve is screwed into the body. After screwing the flange into the body and before assembling the coil to the valve, it is advisable to apply pressure to the port which leads to the body chamber and check for leakage around the flange. If the valve has a sleeve port, this port at the top of the valve must be capped to make this test. If the medium is air or gas, leakage can be noted by applying water to the joint and watching for air bubbles. If the medium is liquid, leakage is readily apparent. DO NOT tighten the nut at the top of the coil housing excessively, since doing so will put an undue strain on the sleeve assembly.

REPLACEMENT PARTS:

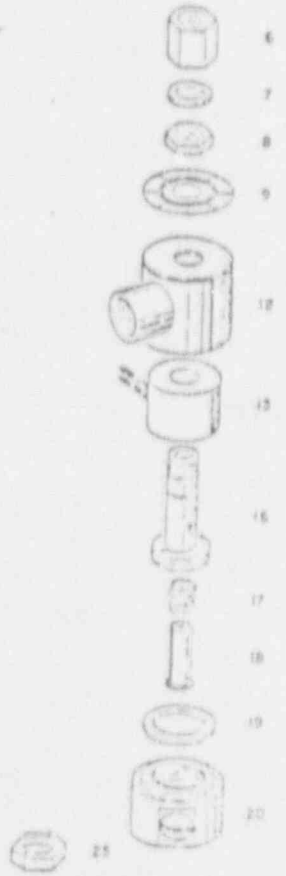
Orders for replacement parts should include:

1. Part Description
2. Valve Number
3. Voltage

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM J 222



PARTS LIST

Skinner V5D40820 120/60
3-way, Multi-Purpose Solenoid Valve

ITEM		
6	V5-903	3/8" NPT Sleeve Adapter
7	V3-116	Adapter Seal
8	V5-114	Housing Nut
9	V5-4	Nameplate, Conduit Housing
12	V5-1726M	1/2 NPT Conduit Housing
13	V5-631F24	Coil, 120/60, Varnished
16	V5-2723	Sleeve Assembly
17	V5-9110	Plunger Spring
18	V5-1335	Plunger
19	V5-113	Flange Seal
20		Body-solenoid required as replacement part. Consult Skinner.
25	V0-223	Spanner Sleeve Nut (for removing or installing Sleeve Assembly)

How to order parts:

1. Include valve number and voltage (take from nameplate).
2. Include part number and description.
3. Specify quantity.

SKINNER PRECISION INDUSTRIES, INC.
New Britain, Connecticut, USA 06050

40

ANPP

EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-141

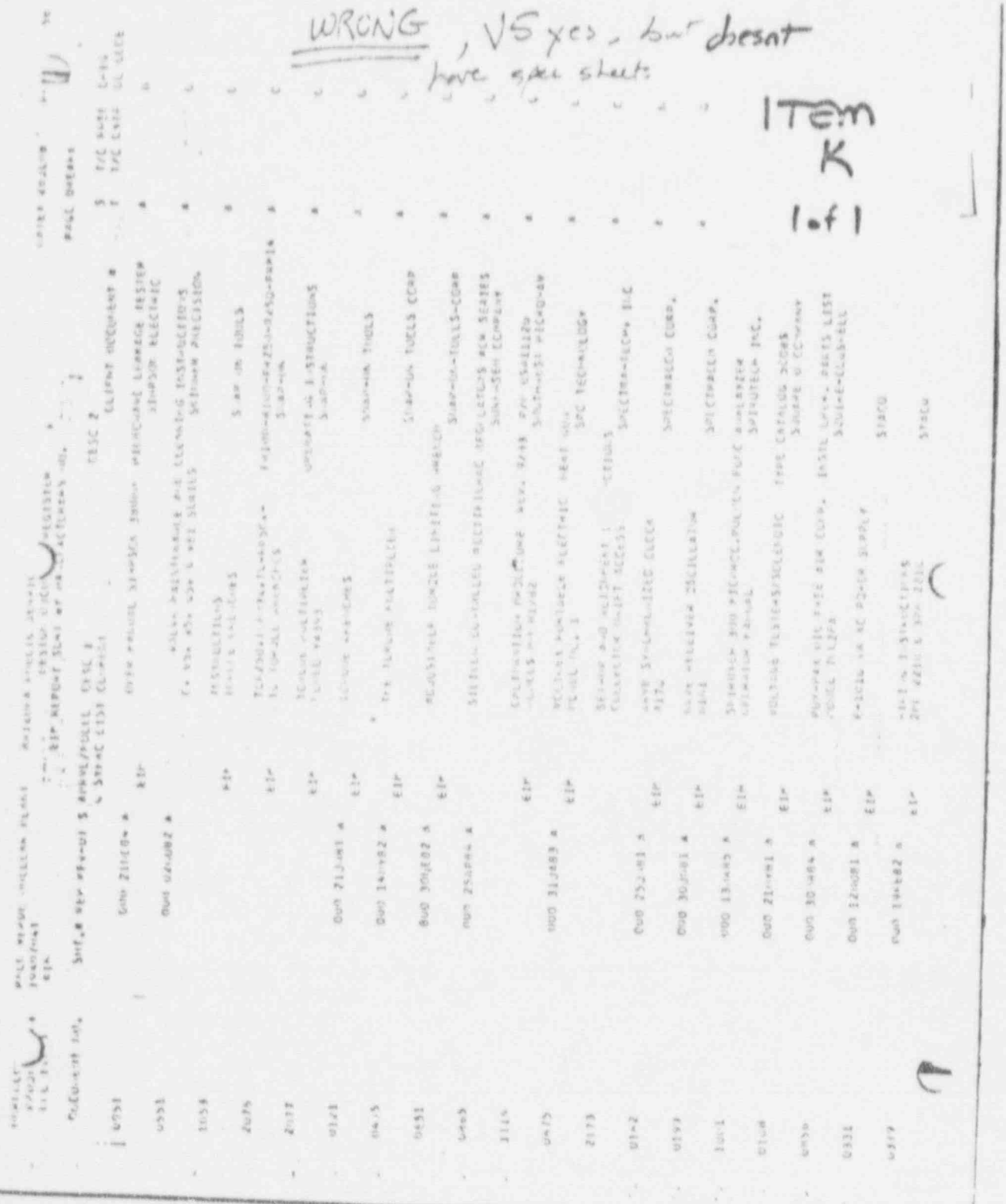
CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

WRONG, VS yes, but doesn't have spec sheets

ITEM K

1 of 1



ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

Arizona Nuclear Power Project

EQUIPMENT CHANGE EVALUATION (ECE)

PAGE 1 OF 8

ECE PURPOSE

[ ] NEW EQUIPMENT EQ REQUIREMENTS EVALUATION [ ] SHELF LIFE EVALUATION

[ ] REPLACEMENT EQUIPMENT/PARTS EVALUATION [X] QUALIFIED LIFE EVALUATION

[ ] EQUIPMENT MODIFICATION EVALUATION [ ] EQUIPMENT PROBLEM EVALUATION

[ ] NONCONFORMANCE EVALUATION [ ] SDDR EVALUATION

[ ] OTHER (Describe)

SKINNER SOLENOID VALVES

MODEL NO. V5H65600

MODEL NO. V5H65590

ECE NUMBER 5/30/86 ECE-SG-A014

DCEE NUMBER DER 86-11

ECP NUMBER N/A

NCR / SDDR NUMBER N/A

OTHER REFERENCES D86-942, D86-1219, D86-1018, D87-6500

INSTRUCTIONS: If ECE is to provide the basis for decisions shown in Attachments 1, 2, and/or 3 of 73AC-22.01, reference applicable decision codes on Sheet 2 of the ECE form and provide the required justification. Use as many sheets as required. For other evaluations leave the "LOGIC CODE" column blank and enter "N/A" at the top of each sheet. Sheet 3 of the ECE form may be used to present comparison data for original and replacement items when appropriate.

SUMMARY OF ECE FINDINGS AND CONCLUSIONS

ITEM L

10 pgs total

Summary

The original qualification report for Skinner solenoid valves (Model No. V5H65600) did not consider the affects of self heating due to continuous energization. A re-analysis by Anchor Darling established an unacceptable short qualified life for the solenoid valves. (Reference DER 86-11)

Using actual service temperatures, the qualified life of Model No. V5H654600 Skinner solenoid valves (normally energized) was established at 3.8 years. These valves are qualified for use at Palo Verde at operating voltages of 135 Vdc and for short periods at 140 Vdc during battery charging.

Model No. V5H65590 Skinner solenoid valves are not normally energized (Reference Wyle Report No. 26057-? Revision C/Bechtel Log No. E600-52-4).

REV	REV DATE	REVISION DESCRIPTION	RE	CHECKER	SUPV. ELECT.	QA	NEM
1	7/1/87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	5/30/86	INITIAL ISSUE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX A OF 73AC-9ZZ29 REV 7

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ANPP EQUIPMENT CHANGE EVALUATION (ECE) | ECE NUMBER ECE-SG-A014 | PAGE 2 OF 8

LOGIC CODE	EVALUATION DESCRIPTION
1/P	

PROBLEM

During a recent review to reestablish 1E qualification documentation for all devices attached to the 125 Vdc power supply, it was discovered that the Skinner solenoid valves were inappropriately qualified without considering temperature rise associated with continuous energization as required by their use in the Main Steam Isolation Valves (MSIV's) and Main Feedwater Isolation Valves (MFIV's). These valves, supplied by the Anchor Darling Valve Company (ADVC), have hydraulic actuators controlled by electrically actuated Skinner solenoid valves (Model No. V5H65600). During normal operation of the main steam and main feedwater systems, these normally energized solenoid valves maintain the MSIV's and MFIV's in the open position. ADVC's reanalysis of the energized condition established an unacceptable short life time for the solenoids. (Reference DER 86-11)

EVALUATION

Anchor Darling's re-analysis was based on conservative, theoretical service temperatures in an energized mode. In order to reduce this conservatism actual PVNGS temperature measurements of Model V5H65600 Skinner solenoid valves energized at 125 Vdc were obtained. Based on these measurements, a new service temperature of 170°F was established for the energized valves.

Since the environmental qualification of solenoid valves operating in a de-energized mode is adequately addressed in the previous test program, this report establishes the qualified life of solenoid valves continuously energized at 125 Vdc and intermittently at 140 Vdc. This document shall be used to supplement the tests performed in Anchor/Darling Qualification Report E9023-QR-2 (Reference 1).

E9023-QR-2

M23V9-68-9

920 mf

↑ see item M

Equipment Description

Equipment Name: 3-Way Solenoid Valves
Manufacturer: Skinner Precision Industries, Inc.
Model Number: V5H65600

PVNGS Plant and System Identification

Original Specification Number: 10407-13-MM-234A
Tag Numbers:

MSIV	MFIV
13J-SGA-UY-170A	13J-SGA-UY-174A
13J-SGA-UY-171A	13J-SGA-UY-177A
13J-SGA-UY-180A	13J-SGB-UY-132A
13J-SGB-UY-170E	13J-SGB-UY-137A
13J-SGB-UY-171E	
13J-SGB-UY-180E	
13J-SGB-UY-181E	
13J-SGA-UY-181A	

ITEM L 2.1 10

(Continuation sheet 2 of 3)

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-2[illegible]-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:
FOR INFORMATION ONLY

ANPP EQUIPMENT CHANGE EVALUATION (ECE) | ECE NUMBER ECE-SG-A014 | PAGE 3 OF 8

LOGIC CODE	EVALUATION DESCRIPTION
N/A	

System: Main Steam
Location: Main Steam Support Structure
Function: The solenoid valves energize or de-energize to control air-flow to the 4-way valves, which in turn control the flow of high pressure hydraulic fluid to open or close the MSIV's or MFIV's.
Performance Requirements: Maintain proper positioning of the 4-way valves.

Definition of Service Conditions

Maximum environmental service conditions for equipment located in the Main Steam Support Structure (MSSS) are identified by PVNGS FSAR Table 3F-1, MSSS - Environmental Designator II.

	Normally/ Abnormal	Accident/ Post-Accident
Temperature:	140°F*	300°F**
Radiation (TID):	1.0E3 rads	1.0E6 rads
Relative Humidity:	90%	Steam/Air
Pressure:	Atmospheric	21 psig**
Duration:	40 years	180 days***

* The 140°F temperature includes a 20°F margin to account for heat transmitted to the solenoid valve from the MSIV/MFIV piping. This margin is considered conservative since actual measurements have shown temperatures in the area of the solenoid valve to be 133.9°F (Reference 2).

** Increases in temperature and pressure resulting from a MSLB are transient effects, postulated to last for only 15 minutes.

*** Based on NRC requirements for 180 day post accident operability.

With the exception of normal service time/temperature exposure, qualification for all remaining environmental service conditions is demonstrated in Anchor/Darling Qualification Report E9023-QR-2 (Reference 1).

ITEM
L
3 of 10

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ANPP EQUIPMENT CHANGE EVALUATION (ECE) | ECE NUMBER ECE-SG-A014 | PAGE 4 OF 8

LOGIC CODE	EVALUATION DESCRIPTION
N/A	

Operability Requirements

The subject equipment is required to remain functional through the following service conditions:

(X) Normal Service

(X) Abnormal Service

(X) Seismic

(X) Post-Seismic

(X) Accident

(X) Post-Accident

ITEM L 4 of 10

Determination of Actual Service Conditions

In order to establish the Normal/Abnormal service temperature of the solenoid valves while continuously energized, temperature measurements were taken from a sample of four energized valves in an operating unit that had reached a steady state heat transfer condition. Temperatures varied from 143°F at the valve bodies to a maximum of 168°F at the top of the coil housing (see Attachment 1).

Measurement sample and results were as follows:

Tag No.	Max. Temp. (°F)
1J-SGB-UY-180E	158
1J-SGA-UY-180A	163
1J-SGA-UY-170A	161
1J-SGB-UY-170E	168

These valves were energized at 135 Vdc while PVNGS Unit 1 was at full power operation. Measurements were taken May 29, 1986, midday, with an outside ambient temperature of 105°F, which is well above the average outside temperature at the Palo Verde location, thereby providing additional margin to service temperatures.

Since the heat rise due to self-heating of the solenoid valve is caused by the coil when energized, the coil experiences the greatest heat rise. Other valve components experience heat rise proportionate to coil proximity.

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ANPP EQUIPMENT CHANGE EVALUATION RECORD | ECE-SG-A014 | PAGE 5 OF 8

LOGIC SEQ | EVALUATION DESCRIPTION

N/A

Therefore, for conservatism, thermal aging calculations performed in this analysis shall be based on an energized service temperature of 170°F, and no credit will be taken for lower temperatures during de-energized periods or periods when the plant is shut down. This conservatism adequately accounts for the additional heat rise of 1.47°C (Reference 3) generated during brief periods of 140 VDC battery charging.

Calculation of Qualified Life for Actual Service Conditions

The aging calculations in the original test report did not consider the service temperature when the coil is energized, the following will establish a service life based on actual plant temperature data and the original thermal aging performed on the test specimen during the preconditioning phase of the test. This will establish the equivalent qualified life of the test specimen at the higher service temperature due to energization.

The following Arrhenius equation will be used to derive the new qualified life of the solenoid valves, at the actual service temperature due to energization; based on the original test aging temperature and aging duration (317.6 hours at 250°F):

$$t_1/t_2 = \exp\left[\frac{E_a}{K_B}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

ITEM L 5 of 10

where:

E_a = Activation Energy

K_B = Boltzman's constant (8.617×10^{-5})

exp = exponent to base e

t_1 = aging time (hours) at aging temperature

t_2 = qualified life at service temperature

T_1 = Aging temperature in °K

T_2 = Service temperature in °K

Valve components that contain potentially age-sensitive materials are:

- Elastomeric Gaskets and Seals
- Solenoid Coils

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

EQUIPMENT CHANGE EVALUATION (ECE) | ECE NUMBER: ECE-SG-A014 | PAGE 6 OF 8

TRAIN CODE	EVALUATION DESCRIPTION
N/A	

The Elastomeric Gaskets and Seals are composed of Viton flurocarbon rubber which has an activation energy of 1.259eV (Reference 4).

The service life of Viton at the actual service temperature based on the original test report is:

$$\frac{317.6 \text{ hours}}{\text{LIFE}} = \exp\left[\frac{1.259}{8.617E\text{-}5}\left(\frac{1}{394K} - \frac{1}{350K}\right)\right]$$

$$\text{LIFE}_{(viton)} = 3.3612E4 \text{ hours or } 3.8 \text{ years}$$

The Solenoid Coils are composed of various materials of which the potting compound was determined to be the weak link material in the original test report. The activation energy for the potting compound is 1.42ev (Reference 1).

The qualified life of the potting compound at the actual service temperature based on the original test report is:

$$\frac{317.6 \text{ hours}}{\text{LIFE}} = \exp\left[\frac{1.42}{8.617E\text{-}5}\left(\frac{1}{394K} - \frac{1}{350K}\right)\right]$$

$$\text{LIFE} = 6.101E4 \text{ hours or } 6.9 \text{ years}$$

CONCLUSIONS

Therefore, based on the above, the qualified life of Model No. V5R65600 Skinner solenoid valves in an energized mode is 3.8 years. These valves are qualified for use at Palo Verde at operating voltages of 135 Vdc and for short periods at 140 Vdc during battery charging.

This evaluation only applies to Skinner solenoid valves, Model No. V5R65600 that are normally energized. The qualified life of the normally de-energized valves remains unaffected.

ITEM L 6 of 10

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ANPP EQUIPMENT CHANGE EVALUATION (ECE) | ECE NUMBER ECE-SG-A014 | PAGE 7 OF 8

LOGIC CODE	EVALUATION DESCRIPTION
N/A	

References

1. Bechtel Log No. 10407-M234A-68, Anchor/Darling Report No. E9023-QR-2, Rev. A, "Qualification and Operability Assurance Report for Main Steam and Feedwater Isolation Valves (with Addendums)", April 15, 1980.

2. Bechtel Interoffice Memorandum No. IOM-E-13215 from W. G. Bingham to V. N. Tiwari, April 11, 1986, Subject: Bechtel Job 10407, MSIV's/MFIV's Record of Temperature at Hydraulic Actuator in Unit 1.

3. Wyle Laboratories, Preliminary Engineering Report No. 26457-B, February 13, 1986.

4. DuPont, Elastomers Division, Publication No. E-41875, "Engineering Guide to the DuPont Elastomers", (n.d.).

ITEM L 7 of 10

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ATTACHMENT 1
ECE-SG-A014
PAGE 8 OF 8

Arizona Nuclear Power Project

Prepared by:
Signature [signature]
Name/Ext/Sta Larry Thornsberry 2989/6077

DATE

TO Norm Spooner
Sta # 4065
Ext 4055

Reviewed By:
Signature ______
Name/Ext/Sta

Approved by:
Signature [signature]
Name/Ext/Sta William Simko 6555/6077

SUBJECT Temperature of Continuous Energized Skinner Solenoid Valves

File: 86-015-201

Per your request, the temperature of the Energized Skinner Solenoid Valves were found to be as follows:

1SGA-UY-0170A	-	161°F
1SGA-UY-0180A	-	160°F
1SGB-UY-0170B	-	16[illegible]°F
1SGB-UY-018[illegible]B	-	15[illegible]°F

These were the highest temperatures on the valves, which were found near this end of the solenoid valve near the coil. Temperatures ranged from 155°F - 165°F. Temperatures were taken with a contact pyrometer with Unit 1 at 100% power.

LT/WS/dlm

Item
L
8 of 10

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:
FOR INFORMATION ONLY

ECE FORM E | ECE NUMBER ECE-SG-A014 | PAGE EA OF 8

ITEM L
9 of 10

ECE TECHNICAL REVIEW CHECKLIST

1. Were design inputs correctly selected and incorporated into the evaluation?
   ✓ Yes ___ No ___ N/A Justification: SEE QUALIF. REPORT E600-52-4 & THIS ECE.

2. Are the acceptance criteria incorporated in the design document sufficient to allow verification that design requirements have been satisfactorily accomplished?
   SAME AS ITEM 1 ABOVE
   ✓ Yes ___ No ___ N/A Justification:

3. Were applicable codes, standards, and regulatory requirements identified?
   ✓ Yes ___ No ___ N/A Justification: SAME AS ITEM 1 ABOVE

4. Have the design interface requirements been satisfied such as seismic testing, environmental qualification, radiation exposure, impact of failure, etc.?
   SEE BODY OF THIS ECE.
   ✓ Yes ___ No ___ N/A Justification:

5. Were purchasing, receiving, inspection, shipping and storage requirements considered in the evaluation?
   ___ Yes ___ No ✓ N/A Justification: PURPOSE OF THIS REVISION IS TO RE-QUALIFY A NEW QUALIF. LIFE. ITEM IS NOT A PURCHASED ITEM.

6. Were construction and operating experience included in the evaluation?
   ___ Yes ___ No ✓ N/A Justification: SCOPE WAS LIMITED OF THIS ECE IS NOT DIRECTED TOWARDS CONST. & OPNS. EXPER.

71483.01.012 (Sheet 1 of 2)

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-146

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

FOR INFORMATION ONLY

ECE FORM E - CONTINUATION PAGE | ECE NUMBER ECE-SG-A014 | PAGE A.R OF A

ECE TECHNICAL REVIEW CHECKLIST

7. Are adequate identification requirements such as critical characteristics specified?

___Yes ___No ✓ N/A Justification: SAME AS 5 ABOVE ITEM L 10 of 10

8. Are the specified parts, equipment, and processes suitable for the required application?

✓ Yes ___No ___N/A Justification: SEE ECE

9. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?

✓ Yes ___No ___N/A Justification: SEE ECE

10. Have adequate maintenance features and requirements been specified?

___Yes ___No ✓ N/A Justification: SCOPE AND RESULTS OF THIS ECE IS NOT DIRECTED TOWARD MAINT.

11. Have adequate preoperational and subsequent periodic test requirements been appropriately specified?

___Yes ___No ✓ N/A Justification: SCOPE AND RESULTS OF THIS ECE IS NOT DIRECTED TOWARD PRE-OPER + PERIODIC TEST.

FIN22.01.022 (Sheet 2 of 2)

PAGE ___ OF ___

ENGINEERING EVALUATION REQUEST

ANPP

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

DER 86-11 FOR INFORMATION ONLY PG 1 of 38

DEFICIENCY EVALUATION REPORT

WESTERN POWER DIVISION

10 CFR 50.55(e)
AND/OR
10 CFR PART 21 ☒ 20 [illegible]

1. REPORT NO. 86-11
REV NO. 0
DATE 2/27/86
PAGE 1 OF 1

2. PROJECT - NAME JOB NUMBER	3. UNIT	4. Q CLASS	5. REFERENCE DOCUMENTS
PVNGS - 10407	3	Q	a. M[illegible]-3 b. M[illegible]-3 c. M[illegible]-3 — Item 0

6. SEISMIC CATEGORY	7. HOW DISCOVERED
I	During the evaluation of Class 1E Equipment Qualification Documentation

8. REQUIREMENT

The Skinner solenoid valves Model No. V5H55600 are used in the hydraulic actuator system of the Main Steam Isolation Valves (MSIVs) and Main Feedwater Isolation Valves (MFIVs).
Per Anchor Darling Valve Company (ADVC) logic diagram references a and b, these solenoid valves are continuously energized. Hence their equipment qualification documentation should be based on this condition.

9. DESCRIPTION OF CONDITION

Per reference c, the qualification of the solenoid valve was based on deenergized coils and the corresponding qualified life was determined to be 5.5 years.

Since the solenoid valves are continuously energized, the equipment qualification document submitted by ADVC does not match the operating condition and the qualified life of the solenoid valve is indeterminate.

NOTE: Unit 3 valves are under control of Bechtel construction.

ITEM 0
pg 1-5 of 38

10. REPORT INITIATOR: [illegible] — [illegible] — DEPT

11. QA VALIDATION OF BLOCKS 1-10: [signature] 2/25/86 8:20 AM

12. QA DELIVERY OF DER TO: [signature] 2/26/86 8:15 AM; [signature] 2/26/86 8:37 AM; [signature] 2/26/86 8:45 AM

13. PRELIMINARY EVALUATION

POTENTIALLY REPORTABLE YES ☒ NO ☐ — [signature] PROJ ENG DATE 3/13/86 — [signature] 3/13/86 PROJ MGMT DATE

DATE CLIENT NOTIFIED 3/13/86 (D.R. Larkin)

14. FINAL EVALUATION

REPORTABLE 10CFR50.55(e) YES ☐ NO ☒ — REPORTABLE 10CFR21 YES ☐ NO ☒ — REPORTABLE 10CFR50.73 YES ☐ NO ☐ — 10CFR21 REPORT BY ______

[signature] 5/21/86 PROJ ENG DATE — [signature] PROJ MGMT DATE — [signature] QA DATE

15. VERIFICATION OF CORRECTIVE ACTION

QA	DATE	REV	DATE	CORRECTIVE ACTION TRANSFERRED TO NCR CAR NO.
[signature]	12/22/86	Rev 0	5/21/86	

16. DISTRIBUTION LIST

☒ INITIATOR ☒ QA MGR PROJECTS ☒ EVALUATION COMMITTEE OTHERS
☒ PROJ MGR ☒ PROJ ENGR ☒ CLIENT ☐
☒ SITE CONST MGR ☒ PROJECT QE ☐ PROJ DOC CENTER ☐
☐ PROJ PROC MGR ☒ MGR OF QA ☐

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

DER 86-11

FOR INFORMATION ONLY

PG 2

PROJECT FILE D.4.11

WESTERN POWER DIVISION	PALO VERDE NUCLEAR GENERATING STATION PROJECT EVALUATION – DEFICIENCY EVALUATION REPORT JOB NO. 10407	REPORT NO. 86-11 REV DATE 0/ 20MY86 PAGE 1 OF 3

PREPARED BY	Q CLASS	UNIT	REFERENCE DOCUMENTS
V. Karrian (NAME) 5-20-86 (DATE)	Q	3	See Section V

PROJECT EVALUATION ☐ INTERIM REPORT ☒ 50.55(e) FINAL REPORT ☒ PART 21 REPORT

TITLE: Skinner Solenoid Valves

ITEM 0 245

I. CONDITION DESCRIPTION

During a recent review to reestablish 1E qualification documentation for all devices attached to the 125 Vdc power supply, it was discovered that the Skinner solenoid valves were qualified based on being normally deenergized rather than energized as required by their use in the Main Steam Isolation Valves (MSIVs) and Main Feedwater Isolation Valves (MFIVs). These valves, supplied by the Anchor Darling Valve Company (ADVC), have hydraulic actuators controlled by electrically actuated Skinner solenoid valves (Model No. V5H6350U). During normal operation of the main steam and main feedwater systems, these normally energized solenoid valves maintain the MSIVs and MFIVs in the open position. ADVC's reanalysis of the energized condition established an unacceptable short life time for the solenoids.

II. EVALUATION

The Skinner solenoid valves listed on the attachment are Class 1E components. Per IEEE 323-1974, all Class 1E equipment must have proper documentation for the qualified life. The valves and accessories shall have a design life of not less than 40 years at specified conditions, exclusive of expendable material, per Specification 13-MM-234A, Paragraph 4.5.1. Also, the average time between scheduled maintenance periods shall be 12 months (8760 hours). To provide a design life of 40 years for the MSIVs/MFIVs, preventative maintenance can be performed in accordance with the vendor's recommendation for changeout.

ADVC submitted qualification documentation based upon normally deenergized, instead of continuously energized, solenoids. These documents were reviewed and accepted by the project.

IDENTIFY CALCULATION OR OTHER DESIGN DOCUMENT WHICH WILL BE INITIATED OR REVISED TO SUPPORT THIS EVALUATION

SAR IMPACT ☐ YES ☐ NO

DOCUMENT TITLE, NUMBER AND REVISION AND FORECAST COMPLETION DATE

PEM EVALUATION AND REPORTABILITY RECOMMENDATION

5/20/86 (DATE)

☐ REPORTABLE

☒ NOT REPORTABLE

APPENDIX A OF 73AC-92229 REV 7

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

Def 86-11

FOR INFORMATION ONLY

P63

ITEM D 3 of 5

For Skinner solenoid valves, reanalysis was required to establish qualified service life for the normally energized condition at 125 Vdc (a new condition) and 140°F ambient. ADVC evaluated the qualified life and concluded that it would be less than four (4) months because the methodology and data used in the original qualification report (Reference 1), which was written based on testing and thermometric analysis. Consequently, the project reanalyzed the qualified service life using (1) information from Wyle Laboratories for temperature rise due to the normally energized mode, (2) manufacturer's data about the nonmetallic components, and (3) *in situ* ambient conditions for the MSIVs/MFIVs at ANPP. The analysis shows that the qualified service life is at least 5 years (Reference 2).

The root causes of this condition are:

1) ADVC's EQ program did not consider the effect of continuous energization of the Skinner solenoid coils in establishing their qualified life.

2) The project's EQ review of the vendor's qualification documentation did not take into account the continuously energized condition of the Skinner solenoids.

Transportability

Solenoid Valves Supplied by ADVC to ANPP Under Other Contracts - Under P.O. 13-PM-0118, ADVC supplied power-operated valves using Class 1E ASCO solenoids in the pneumatic control circuit. Since these are normally deenergized, the present equipment qualification documentation is adequate.

Solenoid Valves Supplied by Other Vendors to ANPP - Three other manufacturers, ASCO, Target Rock and Valcor, have supplied Class 1E solenoid valves to ANPP under both the C-E scope and BOP scope. The quantities of normally energized solenoids are 26 for ASCO, 12 for Valcor and 15 for Target Rock for a total of 53 per unit.

The qualification documentation packages for the C-E scope, ASCO solenoid valves (25), Target Rock solenoid valves (2) and Valcor solenoid valves (12), address continuous energization at 125 Vdc which is reflected in the respective qualified lives assigned to the above equipment.

The remaining 13 Target Rock solenoid valves (BOP scope) have qualification documentation for the solenoid coil in the normally deenergized condition. Since BOP valves are similar to NSSS valves in overall configuration, materials used and coil arrangement, it can be extended that they also have similar qualified service life. This is being verified under the ongoing BOP equipment qualification program with C-E per ANPP Letter ANPP-31211-JML/EJD.

These 13 Target Rock solenoid valves are all used in fail-safe designed applications so their failure would not adversely affect the safety functions of the systems in which they are used.

PER 86-11 FOR INFORMATION ONLY Report No. 86-11 PG4
Rev./Date: 0/ 20MY86
Page 3 of 3
Final Report

ITEM 0 4 of 5

Safety Assessment

The safety functions of the MSIVs/MFIVs are to:

a) Isolate the Steam Generator Feedwater line and Main Steam lines in the event of a pipe rupture on the BOP side of the valves, to prevent the blowdown of more than one steam generator.

b) Isolate the containment during a Design Basis Event.

The present circuit design for solenoid coil energization is fail-safe (i.e., valve closes on solenoid coil failure), and thus the failure of the coil will not affect the safety function of the MSIVs/MFIVs. This conclusion is applicable to all three units.

III. REPORTABILITY ASSESSMENT

Based upon the above, this condition is evaluated as not reportable under the requirements of 10CFR50.55(e) and Part 21, since, if left uncorrected, it would not constitute a safety-significant condition.

IV. CORRECTIVE ACTION

Verify that the 12 Target Rock solenoids listed below have suitable qualified service life. Per ANPP-31837-JTC/EJG, June 17, 1985, C-E will provide additional qualification documentation to address the normally energized condition.

HCB-UV-44	SGA-UV-1133	GZD-UV-2
HCA-UV-45	SGA-UV-113A	GAA-UV-2
HCA-UV-46	SGB-UV-1135A	IAA-UV-2
HCB-UV-47	SGB-UV-1135B	
	SGB-UV-113bA	
	SGB-UV-1136B	

V. REFERENCES

1. Qualification and Operability Assurance Report (Log No. M23-A-A-A-9)

2. Environmental Qualification Report - Analysis of Solenoid Valves Manufactured by Skinner (Log No. M23-A-A-A-1)

ANPP

ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

→ Dft 86-11 FOR INFORMATION ONLY Pg 5

DFT 86-11
ATTACHMENT - SKINNER SOLENOID VALVES TAG LIST

Details of Skinner Solenoid Valve, Model No. V5H66600, ADVC Part No. W-30248.

A) Following are the solenoid valves in a continuously energized condition. When MSIVs/MFIVs are in open condition.

ITEM O 5 of 5

MSIVs		MFIVs
Active A	Active B	
1,2,3,SGA-UY-170A	1,2,3,SGB-UY-170E	1,2,3,SGA-UY-176A
1,2,3,SGA-UY-160A	1,2,3,SGB-UY-160E	1,2,3,SGA-UY-177A
1,2,3,SGA-UY-171A	1,2,3,SGB-UY-171E	1,2,3,SGB-UY-132A
1,2,3,SGA-UY-161A	1,2,3,SGB-UY-161E	1,2,3,SGB-UY-137A

B) Following are the solenoid valves in deenergized condition

MSIVs		MFIVs
Active A	Active B	
1,2,3,SGA-UY-170C	1,2,3,SGB-UY-170G	1,2,3,SGA-UY-176C
1,2,3,SGA-UY-160C	1,2,3,SGB-UY-160G	1,2,3,SGA-UY-177C
1,2,3,SGA-UY-171C	1,2,3,SGB-UY-171G	1,2,3,SGA-UY-132C
1,2,3,SGA-UY-161C	1,2,3,SGB-UY-161G	1,2,3,SGA-UY-137C

Note: Status of coil conditions are shown on logic diagrams for MSIVs and MFIVs (Log No. M23AA-60 and 57).

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ENGINEERING EVALUATION REQUEST

PAGE 1 OF 4

EER No. 87-SG-2JC

ITEM R 12pgs

INITIATOR/EXT/STA: DAVID GOODLET / 2856 / 6259 — DATE: 12-8-87

INITIATOR'S DEPT: UNIT 1 WORK CONTROL — SYS: SG — UNIT/LOCATION 1 / M555

COMPONENT ID: MSIV's & FWIV's

REFERENCE DOCUMENTS: WO's 260292 - 260297 & 260221 & 260222

ROOT CAUSE CONCERN INITIATED BY: ( ) Trend ( ) Event ( ) TSCCR (X) N/A

INITIATION

PROBLEM DESCRIPTION:

DUE TO LACK OF SPARE PARTS ~~WE~~ SOLENOID VALVES W-30247 ARE BEING DISASSEMBLED WITH ITS COIL WIRING USED IN SOLENOID W-30248. QC REQUIRES CLARIFICATION ON PART NUMBERS REFERENCED IN MSIV/FWIV TORM MANUAL DWG # E-5158 DWG G

WORK ORDER ATTACHMENT

WORK ORDER # 260221 / ATTACHMENT 6 OF 17

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT

ITEM R 1 of 12

Further engineering evaluation is required to resolve this condition and cannot be handled by the normal work control process.

Initiator's Supervisor: _____ Date: 12-8-87

SUGGESTED RESOLUTION:

TALKED TO FLOYD BENSINGER (717 327-4848) OF ANCHOR DARLING AND PETER INTRCHIALA OF SKINNER VALVE DIV. (203 225-6721) THE PART NO. W-30247 & W-30248 ARE FOR THE COMPLETE SOLENOID VALVE. THE NO's V5H6559D & V5H6560D. ARE THE SKINNER PART NO's FOR COMPLETE SOLENOID VALVES (CONT.)

RESOLUTION

TYPE OF DISPOSITION:

[ ] REPAIR
[ ] ACCEPT AS IS — NON CONFORMANCE
[ ] REWORK
[ ] SCRAP

[X] INFORMATION ONLY
[ ] ROOT CAUSE OF FAILURE

DISPOSITION AFFECTS:

[X] UNIT 1
[ ] UNIT 2
[ ] UNIT 3
[ ] N/A

PRIORITY: 83

TRANSFERRED TO: N/A

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ENGINEERING EVALUATION REQUEST

PAGE 2 OF 4

EER No. 87-SG-210

RESOLUTION

DISPOSITION:

Engineering concurs with suggested disposition. Coils are identical and completely interchangeable.

P C Lindquist 12-9-87

No ECE's, no TM changes, no ... by D, no ..., no SCE, no 50.55 ...

WORK ORDER ATTACHMENT

WORK ORDER #26621 ATTACHMENT 7 OF 17

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT

ITEM R

13 2.f 12

ORGANIZATIONS AFFECTED BY DISPOSITION:

UNITIZED	[ ] OUTAGE MANAGEMENT	[ ] RAD PROT. & CHEM
[ ] OPERATIONS	[ ] CENTRAL MAINTENANCE	[ ] SECURITY
[✓] MAINTENANCE	[ ] RADWASTE SUPPORT	[ ] TRAINING
[ ] WORK CONTROL	[ ] CENTRAL RAD PROTECTION	[ ] MATERIAL CONTROL
[ ] RAD PROTECTION	[ ] PLANT STD & CONTROL	[ ] ENGINEERING
[ ] CHEMISTRY	[ ] OPERATIONS COMPUTER	[ ] ______

APPR'L

SYSTEM ENGINEER/DATE	EE DISCIPLINE SUPERVISOR/DATE
P C Lindquist 12-9-87	[signature] for ... Clyde 12/9/87
EER MANAGER/DATE	**EER COORDINATOR/DATE (CLOSURE)**
N/A	[signature] 12/9/87

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ENGINEERING EVALUATION REQUEST

PAGE 3 OF 4

EER No. 87-SG-210

PROBLEM / SUGGESTED RESOLUTION / DISPOSITION:

BOTH ANCHOR DARLING & SKINNER CONCURRED THAT THE COIL IS INTERCHANGEABLE, THAT THE COIL CAN BE USED IN EITHER NORMALLY OPEN OR NORMALLY CLOSED SOLENOIDS

THEREFORE THE COILS IDENTIFIED IN WORK ORDER PACKAGES CAN BE USED IN EITHER SOLENOID. THE ID NUMBERS ON COILS ARE THE SKINNER PART NUMBER FOR COMPLETE SOLENOIDS AND NOT A COIL PART NUMBER.

WO 324345 WO

4 Packages for completed

ITEM R

3 of 12

WORK ORDER ATTACHMENT

WORK ORDER #324343 ATTACHMENT P OF 17

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT

CONTINUATION PAGE

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

1

ARIZONA NUCLEAR POWER PROJECT
P V N G S WORK ORDER

CM

WO#: 00260221
Reported Date: 11/12/87 Reported Time: 1600 Sys: SG Work Center: MNTC WR#: 762839

Priority: 3A
Due: 11/16/8.

Eq 1JSGEUV0180 VALVOP

Eq Desc SG-1 LN-2 MSIV Loc E3093N10050140

ITEM R 4 of 12

Seismic Cat: 1 Plant Mode: 1234XX7890
Code Class: B Eq Mode: OOS
Valv Cat: A Eq List: N
Safe Class: 2 Eq Qual: Y
Eq Sr: Y
Tech Spec:
Restrict Mode: D
NPRDS Reportable: Y

CREW SIZE/MAN HR ESTIMATE	
Discp	ELEC
Crew Sz	2
Man Hrs	8

ASME Section XI Repair: N

Est Dur Hrs: 4

Problem Desc: SOLENOID VALVES THAT ARE NORMALLY ENERGIZED SHOULD HAVE COILS REPLACED DURING THIS OUTAGE FOR ALL MSIV'S & FWIV'S.

Work Desc: REPLACE COILS ON MSIV & FWIV VALVES PER THE ATTACHED INSTRUCTIONS. PLANNER/COORDINATOR TO UPDATE THE EQUIPMENT QUALIFICATION LOG WHEN WORK IS COMPLETED.

NCR#: N/A
DDC#: N/A

QC Rqrd: Y | Optest Rqrd: Y | Eng Rqrd: N | Safety Rqrd: N | Code/Unq Test Rqrd: Y

Special/Retest Reqmnts: ~~NONE~~ 41P-1SG01 ~~[illegible]~~ 2P-5 [illegible]

SS CONCURRENCE FOR OPERABILITY TEST: [signature]

Clear Rqrd: Y
Clear #: Y7-2431
Clear #:
Clear #:

Sfty Rqrd: N
Scty Prm:

Procedure#: N/A

Confnd Space Rqrd: N
Confnd Space Prmt #:

Drawing#: M234A-56-13

REP Rqrd: N
REP #:

W/B Rqrd: N
W/B Prm:

Matls Rqrd: Y

Tech Man#: M234A-52

Technical Approval / Date 11/17/87 DICK GRACHUS [signature] Ext: 2031	Discipline Supervisor / Date 11/17/87 [signature] Ext: 2840
Work Group Supervisor / Date 12-8-87 [signature] Ext: 2845	Redundant Trains Operable Y, N (N/A)
QA/QC Review / Date 11-?-87 [signature] Ext: 7531	Releasing Organization / Date 12/8/87 [signature] Ext: 1205

Number of Attachments: 17

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

WORK ORDER ATTACHMENT

ANPP ELECTRICAL EQUIPMENT HISTORY

Work Order No. 260221 Attachment 1A-1

ORIGINATOR

V. Moore 2437 2843 12-10-87 1600

1JSGEHV0120E I SG

SOLENOID VALVE COIL ☑ YES ☐ NO ☑ OR ☐ NOR 4500-234

DEFECTIVE COMPONENT INFORMATION

E 06402 A

SKINNER

REF EER 87-SG-210

W30247 USH 65590

M 234A-52

M 234A-SG-13

NORMAL BREAKWAY FULL LOAD LOCKED DOOR

150

Coil Disposed of I.A.W. MISC.88

ITEM R

5 of 12

2543 03-05-88

REPLACEMENT COMPONENT INFORMATION

E 06402 B

SKINNER

REF EER 87-SG-210

W30247 USH 65590

M 234A-52

M 234A-SG-13

NORMAL BREAKWAY FULL LOAD LOCKED DOOR

APPENDIX A OF 73AC-9ZZ?

ANPP

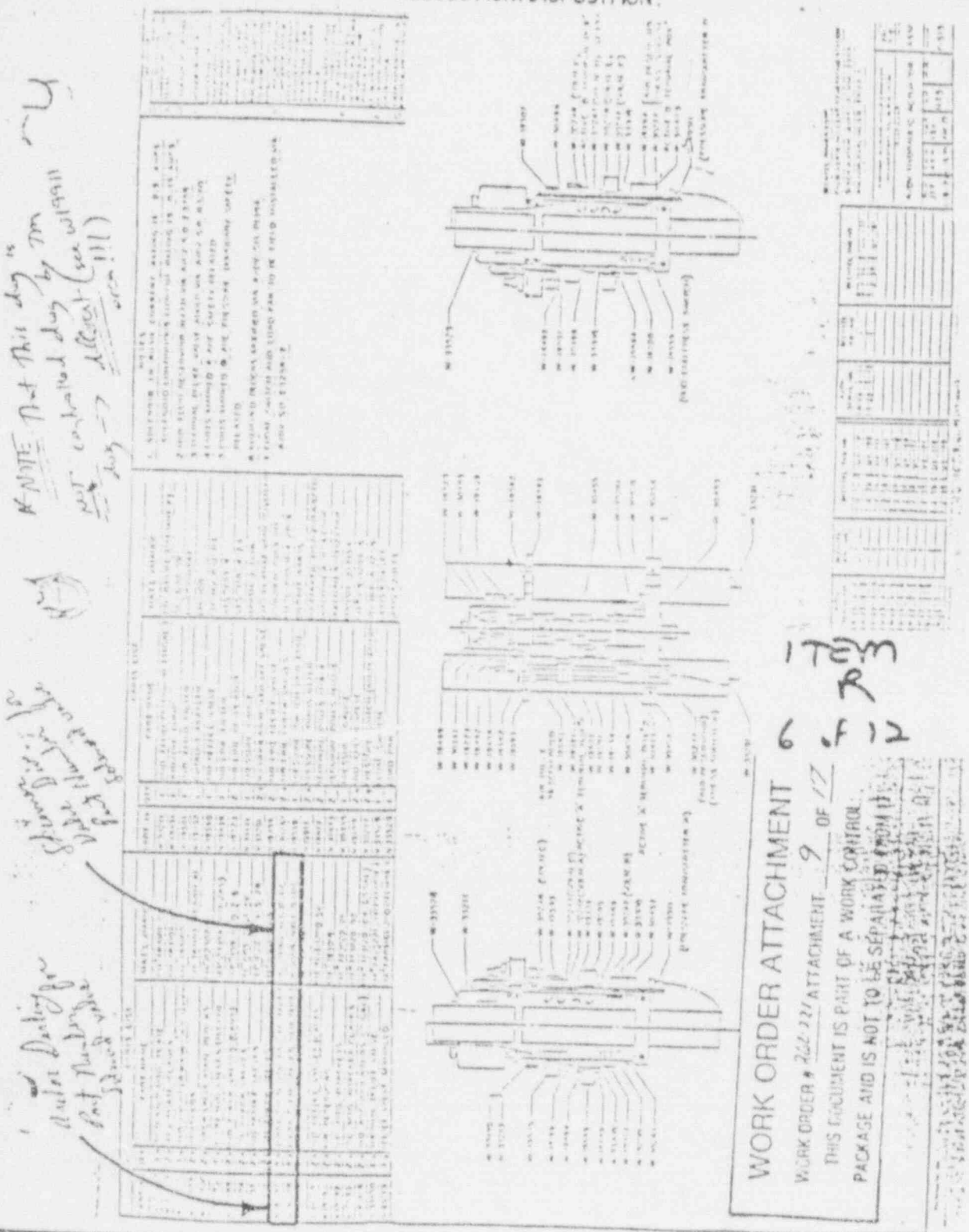
ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:



WORK ORDER ATTACHMENT

WORK ORDER # 242221 ATTACHMENT 9 OF 17

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT.

ITEM R 6 of 12

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

WORK START DATE/TIME: 12-4-87 (0400) WORK COMPLETE DATE/TIME: 0830 2 03-05-88

WORK PERFORMED:

ITEM R 7 of 12

SEE CONTINUATION SHEET

WORK GROUP SUPERVISOR / DATE: James L. [illegible] 03-05-88

RELEASING ORGANIZATION / DATE: [illegible] 7-9-89

ACTUAL CREW SIZE / MAN HRS

DISCP	EM1	EN1					
CREW SZ	2	2					
MAN HRS	4	1					

ACTUAL DURATION (HRS): 2.5

ROS # S: 40029295 40032178 00239231 40032018

M&TE # DESCRIPTION DATE USED

SEE CONT SHT.

BADGE # EMPLOYEE NAME HOURS

SEE CONT. SHT.

COMMENTS/DOCUMENTS ATTACHED: [illegible]

N EQUIPMENT DATA BASE UPDATE REQUIRED N FAILURE INFORMATION ATTACHED

TECHNICAL APPROVAL / DATE: [illegible] 3-20-93

RETEST VERIFICATION / DATE: [illegible]

QA / DATE:

RETEST REFERENCE DOCUMENT:

APPENDIX A OF 73AC-9ZZ29 REV 7

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ____

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND TO BE SEPARATED FROM IT

ATTACHMENT 4 OF 17

(USE A NEW CONTINUATION SHEET EACH SHIFT)

W.O.# 260221 DATE 12-11-87 SHIFT DAY PAGE 2 OF 2

START TIME 0700 STOP TIME 1100

NAME	BADGE #	DISC.	M/HRS	NAME	BADGE #	DISC.	M/HRS
D. Martin	63140	EM-1	.5				
V. Moore	69103	EM-1	.5				

M&TE EQUIP. TAG #	EQUIP. DESCRIPTION	DATE USED	CAL. DUE DATE	FUNC. TEST	RANGE USED
611-0460	CRIMPER	12-11-87	3-6-88	[illegible]	14-16 AWG

ITEM R

8 of 12

FULLY DOCUMENT ALL WORK PERFORMED BELOW

Received and reviewed work order [illegible]. Terminated new coils per [illegible] per [illegible] of work control as a complete functional test will be performed per step #9. Had [illegible] work order [illegible] 87-2475. Ready for retest.

Daniel Martin

Daniel Martin [illegible] 12-11-87

RETEST SUCCESSFULLY PERFORMED ON 03-07-88

WORK ORDER IS COMPLETE.

James R. [illegible] EM1 FRMN 03-08-88

APPENDIX A OF 73AC-9ZZ29 REV 7

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ATTACHMENT 3 OF 17

(USE A NEW CONTINUATION SHEET EACH SHIFT)

W.O.# 260771 DATE 12-9-87 SHIFT DAYS PAGE 1 OF 2

START TIME 0700 STOP TIME 1730

NAME	BADGE #	DISC.	HOURS	NAME	BADGE #	DISC.	HOURS
J. BERMUDEZ	10139	EM1	2				
C. GARCIA	36693	EM1	2				

DATE EQUIP. TAG #	EQUIP. DESCRIPTION	DATE USED	CAL. DUE DATE	FUNCT. TEST	RANGE USED
	N/A				

ITEM R

9 of 12

FULLY DOCUMENT ALL WORK PERFORMED BELOW

RECEIVED & REVIEWED W/ EM1 FOREMAN WALKED DOWN & ACCEPTED CLEARANCE. NOTIFIED EPS & QC PRIOR TO START. QC HAD PROBLEMS WITH PART # ON COILS SO WE HAD ENGINEERING CONTACT VENDOR REP & CONCLUDED THAT COILS WERE INTERCHANGEABLE ACCORDING TO EER# 87-SG-210. INSTALLED NEW COILS, BUT COULD NOT RE-TERMINATE, AS THE STUD SIZE ON LUG WAS THE WRONG SIZE (THEY WERE #8 & WE NEED #10) EM1 FOREMAN TRYING TO LOCATE PROPER LUGS. WHILE INSTALLING COIL FOUND BROKEN TB IN J-BOX 1ESGAJ17 (WROTE WR# 226550). QC (GEFFMAN) SIGNED OFF COIL REPLACEMENT HOLD PT. AS ACCEPTABLE.

Carlos Garcia CG 12-9-87

APPENDIX A OF 73AC-9ZZ29 REV 7

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM R

10 of 12

PLEASE USE BALL POINT PEN — PRESS HARD

REQUEST ON STORES (ROS)
Arizona Nuclear Power Project

MAINT. WORK ORDER NO. 210221 [illegible]

ROS NO. (DOCUMENT) 00239231

REQUIRED DELIVERY DATE 12-6-87

CLASS	ITEM	TRACK NO.	U/I	QUANTITY ORDERED	QUANTITY FILLED	SHELF LIFE DATE	PURCHASE ORDER NO.	DESCRIPTION	STORAGE GRID
[illegible]	284	[illegible]	[illegible]	2	2	N/A	[illegible]	[illegible]	[illegible]

GREEN TAG # 22073

[illegible] 38031 38032, 38033

WORK ORDER ATTACHMENT
WORK ORDER [illegible] ATTACHMENT [illegible] OF 17
THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT

REQUESTED BY: [illegible] EXT. 2868 STA 6255 DATE 12-6-87
DELIVERY LOCATION: C/U
MATERIALS MGMT. APPROVAL: [illegible]
APPROVED BY: [illegible] DATE
RECEIVED BY (PRINT): [illegible] 12-6-87
ISSUED BY: Conrad Rangel

APPENDIX A OF 73AC-9ZZ29 REV 7

ANPP

ENGINEERING EVALUATION REQUEST

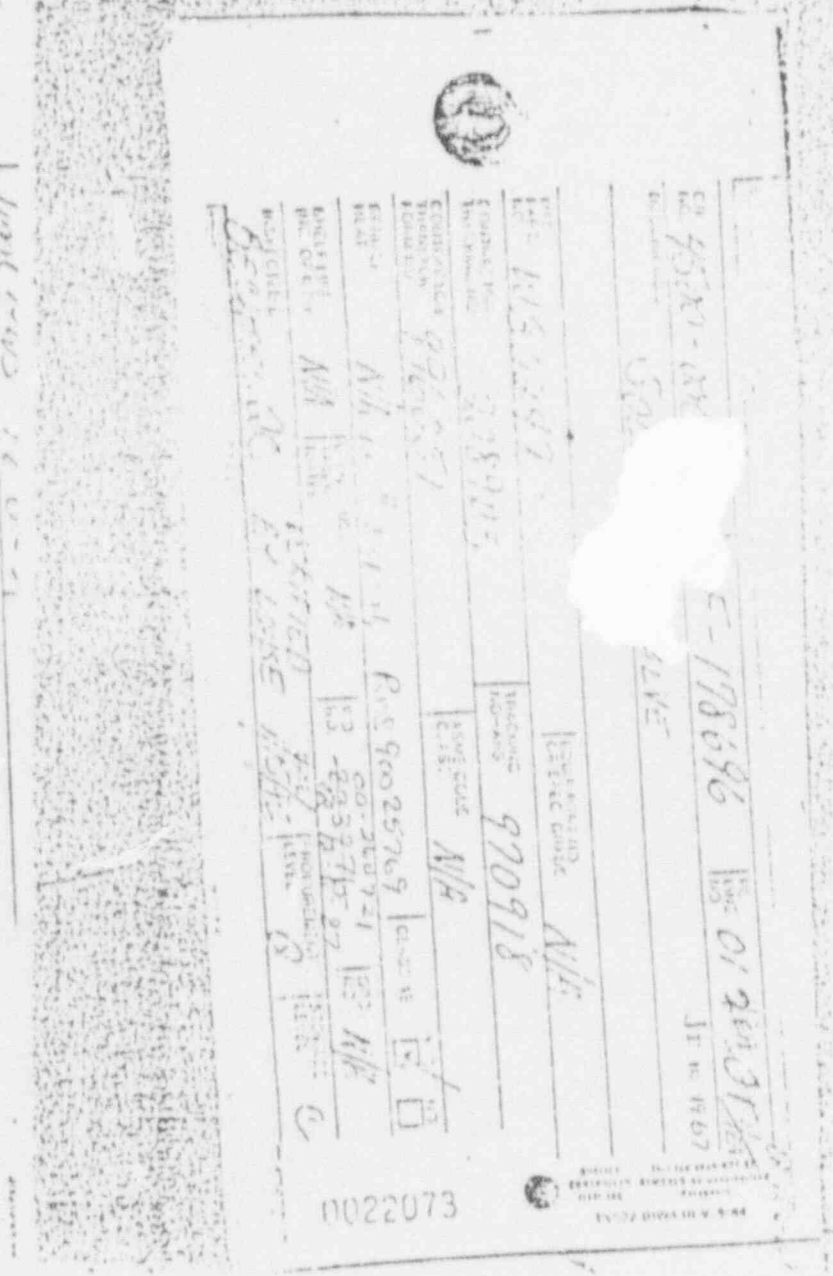
PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM
R
11 of 12



WORK ORDER ATTACHMENT

THIS DOCUMENT IS PART OF A WORK CONTROL PACKAGE AND IS NOT TO BE SEPARATED FROM IT

*APPENDIX A OF 73AC-9ZZ29 REV 7

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ANPP ELECTRICAL EQUIPMENT HISTORY

WORK ORDER ATTACHMENT

Work Order No. 260221 Attachment 11 of 17

ORIGINATOR

K. MOORE 6427 2843 12-10-87 1600

1JSGEUV0130A I SG

SOLENOID VALVE COIL ☒ YES ☐ NO ☒ QR ☐ NQR 4500-284

DEFECTIVE COMPONENT INFORMATION

E 067751 A SKINNER

W 30247 NUR UOR 87-SG-210 USH65570

M234A-52 M 234A-56-13

170

COIL DISPOSED OF I.A.W. MSCC.CC

ITEM R

12 of 12

2543 03-05-88

REPLACEMENT COMPONENT INFORMATION

E 067751 B SKINNER

W 30247 NUR UOR 87-SG-210 USH65590

M234A-52 M 234A-56-13

BREAKAWAY FULL LOAD LOCKED ROTOR

TOP SHEET — ... SECOND SHEET — ... TAG — ...

ITEM AA 1 of 9

AMERICAN NATIONAL STANDARD
REACTOR PLANTS AND THEIR MAINTENANCE

Quality Assurance Requirements for the Design of Nuclear Power Plants

ANSI N45.2.11 - 1974

SECRETARIAT
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

PUBLISHED BY
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
United Engineering Center 345 East 47th Street New York, N.Y. 10017

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AA 2 of 9

CONTENTS

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AA 3 & 9

standard. The issue or edition of the referenced document that is required will be specified either at the point of reference or in Section 12 of this standard.

2. PROGRAM REQUIREMENTS

2.1 Establishment and Documentation

A quality assurance program for design shall be established and documented to comply with the requirements of this Standard.

The program documents shall define the organizational structure within which the program is to be implemented, and shall delineate the authority and responsibility of the persons and organizations involved performing design activities affecting the quality of design.

The program documents shall identify the items and services and the specific activities to which this standard is applied. The design responsibilities and interfaces among the contributing organizations, both internal and external, shall be identified.

Provisions shall be made in the program for periodic audits, review and evaluation of the effectiveness of the program in achieving quality objectives. Correction of deficiencies shall be an integral part of the program.

2.2 Program Procedures

Procedures shall be employed to assure that design activities are carried out in a planned, controlled, orderly and correct manner. Program procedures shall cover the following as applicable:

1. Responsibilities of organizations involved in the program, such as owner, A-E, NSSS supplier and other contractors.
2. Responsibilities within design organizations.
3. Technical information exchanges across external and internal interfaces.
4. Document control including review, approval, release, distribution, and revision.
5. Maintenance and retention of design documents.
6. Management review of status and adequacy of program.
7. Necessary training of personnel performing activities covered by this standard.
8. Identifying appropriate design input.
9. Preparation of design documents.
10. Specifying quality levels, acceptance standards, and record requirements.
11. Performance of design verifications.
12. Conducting audits of design activities, their reporting and followup.
13. Taking corrective action (see Section 9).
14. Making experience reports available to cognizant design personnel.
15. Controlling design changes.
16. Other procedures as required by this standard.

2.3 Factors Considered

Some of the factors to be considered in establishing the program include:

1. Nature of the organization such as the plant owner, manufacturer, or architect-engineer, and the nature of the design interfaces among them.
2. Importance of the design activity to plant safety.
3. State of the art such as experimental, developmental, or standard design.
4. Nature of design activity such as conceptual, preliminary, detailed design, or field engineering.

3. DESIGN INPUT REQUIREMENTS

3.1 General

Applicable design inputs, such as design bases, regulatory requirements, codes and standards, shall be identified, documented and their selection reviewed and approved. Changes from specified design inputs including the reasons for the changes shall be identified, approved, documented and controlled.

The design input shall be specified on a timely basis and to the level of detail necessary to permit the design activity to be carried out in a correct manner and to provide a consistent basis for making design decisions, accomplishing design verification measures, and evaluating design changes.

3.2 Requirements

The design input shall include but is not limited to the following, where applicable:

1. Basic functions of each structure, system and component.
2. Performance requirements such as capacity, rating, system output.
3. Codes, standards, and regulatory requirements including the applicable issue and/or addenda.
4. Design conditions such as pressure, temperature, fluid chemistry and voltage.
5. Loads such as seismic, wind, thermal and dynamic.
6. Environmental conditions anticipated during storage, construction and operation such as pressure, temperature, humidity, corrosiveness, site elevation,

ITEM AA 4 of 9

wind direction, nuclear radiation, electromagnetic radiation and duration of exposure.

7. Interface requirements including definition of the functional and physical interfaces involving structures, systems and components.

8. Material requirements including such items as compatibility, electrical insulation properties, protective coating and corrosion resistance.

9. Mechanical requirements such as vibration, stress, shock and reaction forces.

10. Structural requirements covering such items as equipment foundations and pipe supports.

11. Hydraulic requirements such as pump net positive suction heads (NPSH), allowable pressure drops, and allowable fluid velocities.

12. Chemistry requirements such as provisions for sampling and limitations on water chemistry.

13. Electrical requirements such as source of power, voltage, raceway requirements, electrical insulation and motor requirements.

14. Layout and arrangement requirements.

15. Operational requirements under various conditions, such as plant startup, normal plant operation, plant shutdown, post emergency operation, special or infrequent operation, and system abnormal or emergency operation.

16. Instrumentation and control requirements including indicating instruments, controls and alarms required for operation, testing, and maintenance. Other requirements such as the type of instrument, installed spares, range of measurement, and location of indications should also be included.

17. Access and administrative control requirements for plant security.

18. Redundancy, diversity and separation requirements of structures, systems and components.

19. Failure effects requirements of structures, systems and components, including a definition of those events and accidents which they must be designed to withstand.

20. Test requirements including in-plant tests and the conditions under which they will be performed.

21. Accessibility, maintenance, repair and inservice inspection requirements for the plant including the conditions under which these will be performed.

22. Personnel requirements and limitations including the qualification and number of personnel available for plant operation, maintenance, testing and inspection and permissible personnel radiation exposures for specified areas and conditions.

23. Transportability requirements such as size and shipping weight, limitations, I.C.C. regulations.

24. Fire protection or resistance requirements.

25. Handling, storage and shipping requirements.

26. Other requirements to prevent undue risk to the health and safety of the public.

27. Materials, processes, parts and equipment suitable for application.

28. Safety requirements for preventing personnel injury including such items as radiation hazards, restricting the use of dangerous materials, access provisions from enclosures, and grounding of electrical systems.

4. DESIGN PROCESS

4.1 General

Design activities shall be prescribed and accomplished in accordance with procedures of a type sufficient to assure that applicable design inputs are correctly translated into specifications, drawings, procedures or instructions. Appropriate quality standards shall be identified, documented and their selection reviewed and approved. Changes from specified quality standards including reasons for the changes shall be identified, approved, documented and controlled.

The design activities may be prescribed in job specifications, work instructions, planning sheets, procedure manuals, test procedures, or any other type of written form, which provides adequate control and permits reviewing, checking or verifying the results of the activity by personnel who are experienced in the subject activity.

Methods shall provide for relating the final design back to the source of design input. This traceability shall be documented in accordance with the requirements of Section 10.

The design activities shall be documented in sufficient detail to permit verification and auditing as required by this standard.

4.2 Design Analyses

Design analyses such as physics, stress, thermal, hydraulic and accident, shall be performed in a planned, controlled and correct manner.

Design analyses shall be legible and be in a form suitable for reproduction, filing and retrieving. Analyses shall be sufficiently detailed as to purpose, method, assumptions, design input, references and units such that a person technically qualified in the subject can review and understand the analyses and verify the adequacy of the results without recourse to the originator. Calculations shall be identifiable by subject (including structure, system, or component to which the calculation applies), originator, reviewer and date, or by other data such that the calculations are retrievable. Procedures shall include requirements for:

1. Identifying documents to permit ready reference and retrieval.
2. Defining the objective of the analyses.
3. Definition of design inputs and their sources.

ITEM AA 5 of 9

4. Documenting the results of literature searches or other applicable background data.

5. Documenting assumptions, and identifying those assumptions that must be verified as the design proceeds.

6. Identification of computer calculations, including computer type, code or programming, inputs and outputs.

7. Review and approval.

4.3 Drawings

Procedures shall be established for the preparation and control of drawings. Typical subjects to be covered by such procedures are:

1. Drafting room standards.
2. Standardized symbols.
3. Identification system.
4. Indication of status.
5. Checking methods.
6. Review and approval requirements.
7. Issuance and distribution.
8. Storage and control of originals or master copies.
9. Revisions.
10. As-built drawings.
11. Nonconformance with drawing requirements.

4.4 Specifications

Procedures shall be established for the preparation and control of specifications. Typical subjects to be covered by such procedures are:

1. Format requirements.
2. Identification system.
3. Review and approval requirements.
4. Issuance and distribution.
5. Revisions.
6. Indication of status.
7. Nonconformance with specification requirements.
8. Storage and control of originals or master copies.

4.5 Other Design Documents

Procedures shall be established for the preparation and control of other design documents such as installation instructions and test procedures. Typical subjects to be covered are:

1. Format requirements.
2. Identification system.
3. Review and approval requirements.
4. Issuance and distribution.
5. Revisions.
6. Indication of status.
7. Nonconformance with design document requirements.
8. Storage and control of originals or master copies.

5. INTERFACE CONTROL

5.1 External

5.1.1 Identification of Interfaces. The external interfaces between organizations performing work affecting quality of design shall be identified in writing and shall include those organizations providing criteria, designs, specifications and technical direction.

5.1.2 Responsibilities. Responsibilities for organizations shall be defined and documented in sufficient detail to cover the preparation, review and approval of documents involving design interfaces. Responsibilities may be set forth in tabular form or flow charts accompanied by appropriate text to clarify the intent. Appendices A and B provide examples.

5.1.3 Lines of Communication. Systematic methods shall be established for communicating needed design information across external design interfaces, including changes to the design information as work progresses. Documents shall identify the positions and titles of key personnel in the communication channels and their responsibilities for decision-making, for resolution of problems, for providing and reviewing information, and for taking other action within the scope of this standard.

5.1.4 Documentation. Procedures shall be established to control the flow of design information between organizations. Design information transmitted from one organization to another shall be documented in specifications, drawings or other controlled documents which are uniquely identified and issued by authorized persons. The procedures shall provide that design interface information be transmitted to affected organizations and that any information requested on the design interface transmittal be transmitted back to the originator. Documentation requesting information or action shall be controlled by a system which assures that the response and the request can be retated. Where it is necessary to initially transmit design information orally or by other informal means, the transmittal shall be confirmed promptly by a controlled document.

5.2 Internal

5.2.1 Identification of Interface. Each organization performing work affecting quality of design shall

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM AA 6 of 9

identify in writing its internal design interfaces for managing the flow of design information between organizational units.

5.2.2 Responsibilities. Responsibilities for each organizational unit shall be defined and documented in sufficient detail to cover the preparation, review, approval, distribution and revision of documents involving design interfaces.

5.2.3 Lines of Communication. Systematic methods shall be established for communicating needed design information across the internal design interfaces, including changes to the design information as work progresses.

5.2.4 Documentation. Procedures shall be established to control the flow of design information between organizational units. Design information transmitted from one organizational unit to another shall be documented and controlled. Transmittals shall identify the status of the design information or documents provided and, where necessary, identify incomplete items which require further evaluation, review or approval. Where it is necessary to initially transmit design information orally or by other informal means, the transmittal shall be confirmed promptly by a controlled document.

6. DESIGN VERIFICATION

6.1 General

Measures shall be applied to verify the adequacy of design. Design verification is the process of reviewing, confirming, or substantiating the design by one or more methods to provide assurance that the design meets the specified design inputs.

Design verification shall be performed by any competent individuals or groups other than those who performed the original design but who may be from the same organization. This verification may be performed by the originator's supervisor provided the supervisor did not specify a singular design approach, or rule out certain design considerations and did not establish the design inputs used in the design, or if the supervisor is the only individual in the organization competent to perform the verification. Cursory supervisory actions do not satisfy the intent of this standard. Design verification may vary from spot checking of calculations to actual tests in the field.

The results of design verification efforts shall be clearly documented, with the identification of the verifier clearly indicated thereon, and filed. Documentation of results shall be available against the verification methods identified by the responsible design organization.

6.2 Extent

The extent of the design verification required is a function of the importance to safety of the item under consideration, the complexity of the design, the degree of standardization, the state-of-the-art, and the similarity with previously proven designs. However, the applicability of standardized or previously proven designs, with respect to meeting pertinent design inputs, including environmental conditions, shall be verified for each application. Where the design of a particular structure, system, or component for a particular nuclear power plant has been assessed to a verification process in accordance with this standard, the verification process need not be duplicated for identical designs. However, known problems affecting the standardized design and their effects on other features shall be considered. The original design and associated verification measures shall, however, be adequately documented and referenced in the files of subsequent application of the design.

Where changes to previously verified designs have been made, design verification shall be required for the changes, including evaluation of the effects of those changes on the overall design.

6.3 Methods

The responsible design organization shall identify and document the particular design verification methods to be used. Acceptable verification methods include but are not limited to:

1. Design reviews.
2. Alternate calculations.
3. Qualification testing.

6.3.1 Design Reviews. Design reviews are critical reviews to provide assurance that design documents such as drawings, calculations, analyses or specifications are correct and satisfactory. Design reviews can range from multi-organization reviews to single-person reviews. The depth of review can range from a detailed check of the complete design to a limited check of such things as the design approach and the results obtained. The results of the review shall be documented and measures taken to ensure that the findings are implemented. Whether the review is conducted by one individual or a multi-organization there are a number of basic questions that shall be addressed such as:

1. Were the inputs correctly selected and incorporated into design? (See paragraph 3.2).
2. Are assumptions necessary to perform the de-

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AA 7 of 9

sign activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verification when the detailed design activities are completed?

3. Are the appropriate quality and quality assurance requirements specified?

4. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified and are their requirements for design met?

5. Have applicable construction and operating experience been considered?

6. Have the design interface requirements been satisfied?

7. Was an appropriate design method used?

8. Is the output reasonable compared to inputs?

9. Are the specified parts, equipment, and processes suitable for the required application?

10. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?

11. Have adequate maintenance features and requirements been specified?

12. Are accessibility and other design provisions adequate for performance of required maintenance and repair?

13. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?

14. Has the design properly considered radiation exposure to the public and plant personnel?

15. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?

16. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?

17. Are adequate handling, storage, cleaning and shipping requirements specified?

18. Are adequate identification requirements specified?

19. Are requirements for record preparation review, approval, retention, etc., adequately specified?

6.3.2 Alternate Calculations. Verification of some types of calculations or analyses may be achieved by comparison with alternate methods of calculation or analyses. This shall be performed by a person or persons other than those who performed the original calculation. Where alternate calculations are performed to verify the correctness of the original calculation, a review shall also be performed to address the appropriateness of assumptions, input data, and the code or other calculation method used.

The alternate method used for comparison may be a more simplified approach or less rigorous, such as when a hand calculation is used to check the computer code output. Although the simplified or less rigorous method may not exactly check the original calculation or analysis, it must provide results consistent with the original calculation or analyses.

6.3.3 Qualification Testing. Design verification for some designs or specific design features can be achieved by suitable qualification testing of a prototype or initial production unit.

In those cases where the adequacy of a design is to be verified by a qualification test, the testing shall be identified and documented. Testing shall demonstrate adequacy of performance under the most adverse design conditions. All pertinent operating modes shall be considered in determining these design conditions where it is intended that the test program confirm the adequacy of the overall design. Where the test is only intended to verify a specific design feature, the other features of the design shall be verified by other means. For example, it may be most effective to verify that an instrumentation cabinet is designed to withstand the maximum earthquake-caused vibratory motions by actually subjecting the cabinet and its associated components to shaker tests which correspond to these vibratory motions. The shaker tests will not, however, verify that the circuitry is designed correctly, or that the components in the cabinet will perform its intended function. Other tests or verification means are required to confirm that remaining design functions are adequately performed by the instrumentation and that those components perform the intended functions for the varying design conditions to which they are subjected.

Qualification testing shall be performed in accordance with written test procedures which incorporate or reference the requirements and acceptance limits contained in applicable design documents. The test procedures shall include provisions for assuring that prerequisites for the given test have been met, that adequate instrumentation of the required range and accuracy is available and used, and that necessary monitoring is performed. Prerequisites include such items as calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment and the item to be tested, suitable environmental conditions and provisions for data acquisition. Test results shall be documented and evaluated by the responsible designer to assure that test requirements have been satisfied.

If testing indicates that modifications to the item are necessary to obtain acceptable performance, the modification shall be documented and the item

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM AA 8.f9

change shall require that the documents which reflect the design change be reviewed and approved by the same groups or organizations which reviewed and approved the original design documents. Where an organization which originally was responsible for approving a particular design document is no longer responsible, the plant owner shall designate the new responsible organization which may be the owner's own engineering organization. The designated organization shall have access to pertinent background information, have demonstrated competence in the specific design area of interest and have an adequate understanding of the requirements and intent of the original design.

9. CORRECTIVE ACTION

In addition to correcting a deficiency (or error), corrective action also includes, for significant or recurring deficiencies (or errors), determining the cause and instituting appropriate changes in the design process and the quality assurance program to prevent similar types of deficiencies (or errors) from recurring. A procedure shall be established for providing such corrective action. This procedure shall also contain provisions for reporting the deficiency and corrective action to appropriate levels of supervision and management. The procedure shall also include follow-up actions that cannot be immediately commenced to assure timely resolution and/or completion of the corrective action.

9.1 Detection of Errors

Deficiencies or error in the design or the design quality assurance program may be detected by:

1. Design verification measures.
2. Personnel using the design documents.
3. Audits.
4. Tests conducted.
5. Actual failures during operation.
6. Other means.

9.2 Review of Procedures

Where a significant design change is necessary because of an incorrect design, the design process and verification procedure shall be reviewed and modified as necessary.

10. RECORDS

Design documentation and records which provide evidence that the design and review process was performed in accordance with the requirements of this standard shall be collected, stored and maintained in accordance with the requirements of ANSI N45.2.9.

The documentation shall include not only the final design documents such as drawings and specifications, and revisions thereto but also records of the important steps including sources of design inputs, which support the final design. The records shall be legible, identifiable and retrievable.

Documentation and records will be either of the lifetime or nonpermanent category as defined in ANSI N45.2.9.

11. AUDITS

A comprehensive system of planned and documented audits shall be carried out to verify compliance with all aspects of the Quality Assurance program for design including those procedures developing quality assurance actions required during the design process.

11.1 Personnel

These audits shall be performed in accordance with written procedures or check list by personnel not having direct responsibilities in the areas being audited. For example, the person who performs an audit on design verification should not have been responsible for performing the design verification. The personnel performing audits shall be of a level of competency and have sufficient authority and organizational freedom to make the audit process meaningful and effective.

11.2 Internal Audits

Design organizations performing work in accordance with the requirements of this standard shall be audited to assure that their design quality assurance programs are being implemented. Audits may be conducted internally by the design organization or by a unit independent of the design organization.

11.3 External Audits

Organizations shall conduct or delegate the conduct of external audits of design organizations performing work for them to assure that specified design quality assurance program requirements are being implemented and are effective.

11.4 Audit Control

Audits shall include an evaluation of design quality assurance policies, practices, procedures and instruc-

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AG1

1 of 1

B/ANVC-B-53009
MOC 424674
March 3, 1986

... Valve Company

... Pennsylvania 17701

Mr. T. P. Johnson
Contract Administrator

Subject: Arizona Nuclear Power Project
Bechtel Job 10407
DER No. 86-11
File: MM-234A

Dear Mr. Johnson:

Enclosed please find Deficiency Evaluation Report No. 86-11, which concerns the environmental qualification of the Skinner solenoid valves, Model No. V5H65600, mounted on the hydraulic actuator of the Main Steam Isolation Valves (MSIVs) and Main Feedwater Isolation Valves (MFIVs).

Please provide complete input as to the reportability of these deficiencies so that ANPP can properly disposition the conditions as required by 10CFR50.55(e). This input should include technical disposition which justifies your position and identifies the root cause, and a description of the corrective action to be taken. In addition, please advise as to the impact of this deficiency with respect to 10CFR21.

Your response is requested by March 17, 1986. If you have any questions, please advise.

Very truly yours,

BECHTEL POWER CORPORATION

W. G. Bingham
Project Engineering Manager
Western Power Division

WGB:SGB:21

Enclosure: Deficiency Evaluation Report No. 86-11 (1 page, 1 copy)

cc: ...S/DDC — J. E. Kirby
R. Bynum — A. C. Rogers
J. B. Fasnacht — E. E. Van Brunt, Jr.
All w/enclosure

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

13-M-SGA-105-2 BUCKEYE VERDE CROSS INDEX

ITEM NO.	A/DV S.O. NO.	DESCRIPTION	ORIGINAL P.O.
3896-3	E6374-51A,B	6"-900-GT	10407-13-PM-221B
93-15174	-52	6"-150-GT	
93-15225	-53	6"-900-GT	
93-15228	-54	3"-150-GB	
3655-3	-55	3"-150-GT	
93-15148	-56	4"-150-GT	
93-15167	-57	2½"-150-GT	
WB121308	-60	6"-900-TDC	
WB221459	-65	8"-900-TDC	
WB221468	-101	4"-150-GB	
WB221505	-102	4"-150-FW	
WB221556	-103	3"-900-FW	
WB221557	-105	3"-150-SC	
WB221558	-106	6"-150-FW	
WB221626	-109	3"-150-FW	
WB221629	-110	4"-150-FW	
WB321891	-117	3"-150-GB	
WB321892	-118	6"-900-FW	
WB321946	-119	6"-900-GB	
93-15165	E9023-01A,B	28"x24"x28"-900-DD	10407-13-PM-234A
93-15158	-02A,B	24"x22"x24"-900-DD	
93-15203	-11A,B	24"x22"x24"-900-DD	

ITEM AH1 1 of 5

ATTENTION: PLEASE NOTE THAT DUE TO SPACE LIMITATION, MATERIAL DESIGNATIONS AS SA OR A564-1075, A564-1100 TO BE SA OR A564-630-1075 OR A564-630-1100.

ENGINEERING EVALUATION REQUEST

ANPP

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AH, 2 of 5

07 M299A-105-7 096

VALVE CO — REPLACEMENT PARTS BY SIZE/PRESSURE/TYPE — STATION- PALO VERDE — CUSTOMER- ARIZONA PUBLIC SERVICE CO — LIF 4264

PRESS	TYPE	A/DV S.O.-ITEM NUMBER	VALVE MATL	VALVE CLS	VALVE QTY		PART NAME	NUMBER	QTY/VALVE	QTY/ITEM	MATERIAL	CLASS
0900	DD	E9023-02A	WCC	2	4	CONTINUED	188 S-C PUMP KIT	W30566	20	80	D-VITON	
							189 AIR RESERV. KIT	W30568	1	4	D-VITON	
							193 FILTER ELEMENT	W30570	1	4	D-STEL	
							194 FILTER ELEMENT	W30571	1	4	D-STEL	
							190 4-WAY VALVE KIT	W30572	1	4	VAR	
							191 MANIFOLD KIT	W30573	1	4	VAR	
							192 CYL. SEAL KIT	W30574	1	4	VAR	
							070 RES.SUPPORT BKT	W30705	1	4	D-COMM	
							062 MAN./TANK BLOCK	W30706	1	4	D-COMM	
							065 3-WAY SOL.VALVE	W30964	2	8	D-COMM	
							066 3-WAY SOL.VALVE	W30965	2	8	D-COMM	
							203 ACC.REBUILD KIT	W31168	1	4	D-COMM	
							146 MALE ELBOW	W31429	1	4	D-STEL	
							204 HYD.CHK.VLV.KIT	W31534	1	4	D-COMM	
							206 NEEDLE VLV. KIT	W31536	1	4	D-COMM	
							207 NEEDLE VLV. KIT	W31537	1	4	D-COMM	
							199 REG. REPAIR KIT	W31682	1	4	D-COMM	
							205 FIL.REBUILD KIT	W31875	1	4	D-COMM	
							201 S-O REBUILD KIT	W32964	1	4	D-COMM	
							210 PRECHARGE VALVE	W33063	1	4	D-COMM	
							209 FIT. O-RING KIT	W33092	1	4	D-COMM	
							090 THERM.REL.VALVE	W33190	1	4	D-COMM	
							195 FILTER BOWL KIT	W33198	1	4	D-COMM	
							074 HYD. RESERVOIR	W33212	1	4	D-COMM	
							092 RELIEF VLV.MAN.	W33213	1	4	D-COMM	
							035 TCKE NUT (SPL.)	W33218	4	16	A194-2H	
							078 SHUT-OFF VALVE	W33291	2	8	D-COMM	
							060 MAN.ADAPT.BLOCK	W33309	1	4	D-COMM	
							117 FLOAT SWITCH	W33928	1	4	D-COMM	
							118 LOAD PAN	W33929	1	4	D-COMM	
							197 FIL. REPAIR KIT	W33946	1	4	D-COMM	
							211 REL.VLV.MAN.KIT	W33947	1	4	D-COMM	
							208 RES.REBUILD KIT	W33650	1	4	D-COMM	
							084 AIR CHECK VALVE	W33714	1	4	D-COMM	
							042 ACTUATOR STUD	W4285	4	16	A193-B7	
							097 U.CLAMP C'SCREW	W4320	4	16	A574	
							100 BRT/CYL.C'SCREW	W4320	4	16	A574	
							099 P.MTG. CAPSCREW	W4325	2	8	A574	
							108 TERM. BOX BOLT	W5200	8	32	D-STEL	
							046 L.S. BOLT	W5201	12	48	D-STEL	
							107 MTG. RAIL BOLT	W5221	4	16	D-STEL	
							109 TRANS.MTG.BOLT	W5221	12	48	D-STEL	
							047 BRACKET BOLT	W5222	4	16	D-STEL	
							045 BRACKET BOLT	W5225	2	8	D-STEL	
							049 BKT. LOCKWASHER	W5367	6	24	D-STEL	
							112 LOCKWASHER	W5367	16	64	D-STEL	
							101 REG/BKT.C'SCREW	W5619	4	16	A574	
							110 SWITCH CAPSCREW	W5620	4	16	A574	
							102 BRT/CYL.C'SCREW	W5656	2	8	A574	
							043 CCUP. CAPSCREW	W5662	4	16	A574	
							044 FINGER CAPSCREW	W5667	2	8	A574	
							096 L.CLAMP C'SCREW	W5870	4	16	A574	
							103 ADAPTER PLATE	W5886	4	16	A574	
							098 RES/MAN.C'SCREW	W5930	2	8	A574	
							094 CYL./R.CAPSCREW	W5963	6	24	A574	

ANPP

ENGINEERING EVALUATION REQUEST

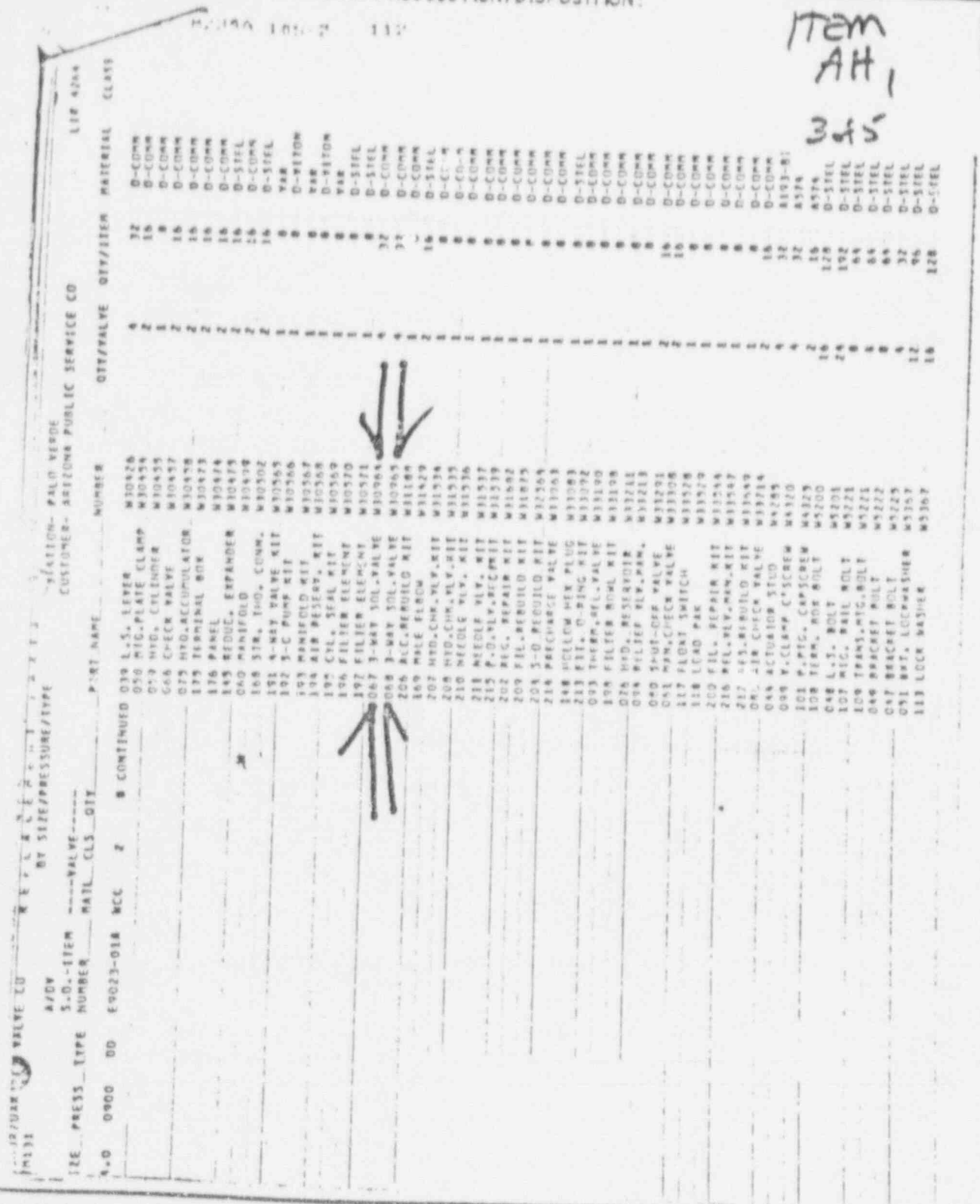
PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

Item AH, 345



ANPP

ENGINEERING EVALUATION REQUEST

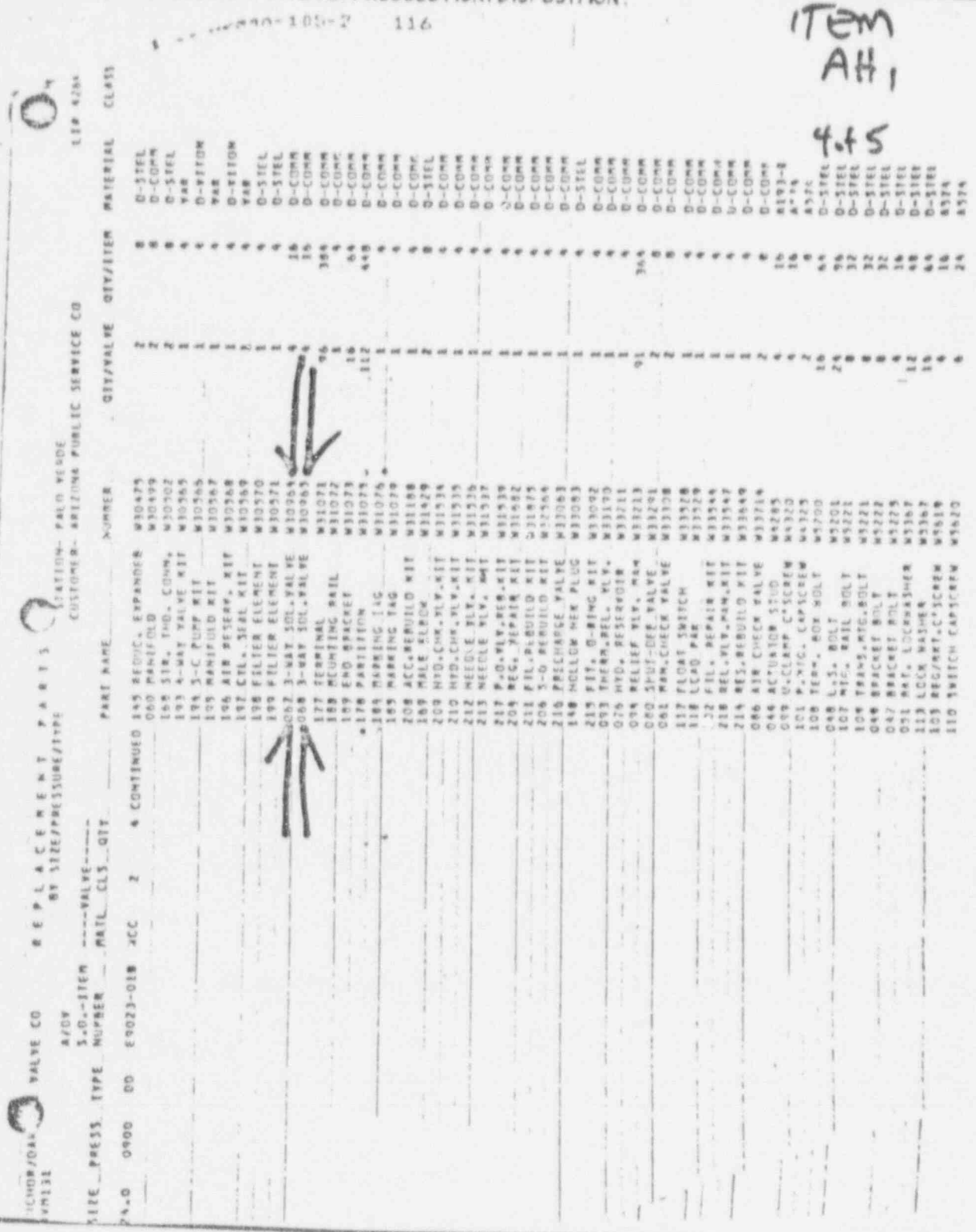
PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

ITEM AH, 4.1.5



ENGINEERING EVALUATION REQUEST

ANPP

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

Arizona Nuclear Power Project

QUALITY CONTROL DEPARTMENT
MONITORING REPORT(S)

Monitoring Report No.(s): AG-88-111346

DATE: 11-7-88

FOLLOWUP DATE: 12/15/88

FOLLOWUP DATE: ____

FOLLOWUP DATE: ____

FOLLOWUP DATE: ____

DISTRIBUTION:

L. G. Papworth	7002
C. N. Russo	6782
L. A. Souza	6782
L. E. Sciers (Trending)	6782
J. D. Montgomery	6782
J. L. McGath	6782
D. L. Gabel	6782
W. R. Bauer	6402
Pat Cable	6425
F. Warriner	6425
A. McCabe	6426

Monitor File

ITEM AG2
1 of 9

includes
WDN 3-496-88
WDN 3-497-88

FROM: L. G. Johnson, QC Foreman, Unit 1
STA.: 6925
EXT.: 2912

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION.

CORPORATE QA/AC - MONITORING REPORT

ISSUING DEPARTMENT/SECTION - QUALITY CONTROL

REPORT NUMBER: MC-88-115 UNIT NO: (X)1 ( )2 ( )3

DATE PERFORMED: 11/07/88 PERFORMED BY: CARL M. NITSCHE

DEPARTMENT AND ACTIVITY: Q/C/WORK CONTROL

PERSONS CONTACTED: PAT CABLE

RESPONSIBLE DEPARTMENT: MAINTENANCE, UNIT 1, I&C.

RESPONSIBLE SUPERVISOR: F. WARRINER STATION #: 6425

REFERENCE PROCEDURE(S)/DOCUMENT(S): 30DP-9WP02 REV.0, WORK PLANNING

WORK ORDER 00324345

CHARACTERISTICS, ITEMS OR OPERATIONS MONITORED: UPON RECIEPT OF A PART REQUIRED TO IMPLEMENT AMENDMENT 9A OF SUBJECT WORK ORDER, THE I&C WGS NOTIFIED QC THAT HE HAD A PART NUMBER CONFLICT.
QC REVIEWED THE FOLLOWING TECH MANUAL AND ASSOCIATED DRAWINGS.
(CONT. PAGE 2)

MONITORING RESULTS: ( ) SAT. (X) UNSAT. ( ) UNSAT./CORRECTED
SUBJECT WORK ORDER INSTRUCTIONS WERE MODIFIED BY THE PLANNER, AND AN ALTERNATE PATH CHOSEN TO CORRECT THE PROBLEM.
SEE ATTACHED AMENDMENT TO WORK ORDER 00324345.

ITEM AG2

2 of 9

PROBLEM RESOLUTION, IDENTIFY PERSONS INVOLVED: PROCUREMENT ENGINEERING WILL FOLLOW UP ON THIS PROBLEM AND ANOTHER MONITORING REPORT WILL BE INITIATED UPON COMPLETION OF THE UPDATE.

TABULATED FOR EFFECTIVENESS REPORT: (X) NO ( ) YES

SCHEDULED FOLLOWUP MONITORING: ( ) NO (X) YES NO. OF ITEMS: 1
SCHEDULED DATE: 12/15/88

ADD. REPORT ISSUED NO X YES __ (CAR# N/A ; NCR# N/A ; EER# N/A)

REVIEWED BY: [signature] DATE: 11/18/88 PAGE 01 OF 02

ANPP

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIM RESOLUTION/DISPOSITION:

CONDUCT RA/AC - MONITORING REPORT
(CONTINUATION SHEET)

REPORT NUMBER: _____

(CHARACTERISTICS,ITEMS OR OPERATIONS MONITORED:CONT.FROM PAGE 1)

ITEM AG2 3.1.9

TECH MANUAL M234A-SS
VF 93-15165 R DNE
VF 93-15155 R PRO
DWG M234A-59 (VF) F-5155-REV 15.
PO 33205577 LINE ITEM 07 (DDN-706-87)

WORK ORDER 00024845 INDICATED C/I# 4500-285 WAS TO BE USED TO REPLACE THE DEFECTIVE SOLENOID VALVE 1JSGBHY0170G.

VENDOR DRAWING M234A-59 REV 15 SHOWS ANCHOR/DARLING PART NUMBER W30240 WHICH IN TURN RELATES TO SKINNER PART NUMBER V5H65600 120 VDC (N.O.). SELECTION OF THE ANCHOR/DARLING PART NUMBER,"W30240" ON THE MMIS IC19A SCREEN, MESSAGE IS, "NO PART NUMBERS FOUND FOR THIS MFG PART NUMBER"

SELECTION OF THE "OLD" ANCHOR/DARLING PART NUMBER "W30965" RELATES TO C/I# 4500-000285,=SKINNER PART NUMBER "V5H65600-120VDC".

UPON RECEIPT OF SUBJECT C/I# 4500-000285,THE I&C WORK GROUP SUPERVISOR CONTACTED QC TO REPORT A PART NUMBER PROBLEM BETWEEN THE ITEM ORDERED AND THE ONE RECEIVED FROM THE WAREHOUSE.

VENDOR PRINT M234A-59 REV 15 INDICATES A P/N V5H65600.
ITEM RECEIVED FROM WAREHOUSE (C/I#4500-285)= V5H66200.

ON MONDAY 11/07/88 THE QUALITY RECEIVING DEPARTMENT WAS CONTACTED TO LOOK INTO THE ABOVE PART NUMBER DIFFERENCE.

ON TUESDAY 11/08/88 THE QUALITY RECEIVING DEPARTMENT REPORTED THAT IN NOVEMBER 1987 A CDN (DOCUMENT DEFICIENCY NOTICE), WAS INITIATED TO DOCUMENT THE PART NUMBER DIFFERENCE AND OTHER PROBLEMS WITH PO 33205577. DDN# 706-87.

PROCUREMENT ENGINEERING HAS BEEN NOTIFIED ABOUT THE LACK OF FOLLOWUP ON THIS DDN.

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ARIZONA NUCLEAR POWER PROJECT PAGE: 4
SIMS WORK ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A WORK CONTROL
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

WO# 00324345 WR# 365834 Work Center MNTC ATTACHMENT ___ OF ___
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST
CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF
WORK.
Eq 1JSCEUV0170 VALVEX
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** J.VELASQUEZ 110688
PAGE 1 OF 3

SCOPE/INTENT: THIS AMENDMENT IS NECESSARY TO PROVIDE INSTRUCTIONS FOR I&C TO CHECK THE WIRING AND/OR COIL ON SOLENOID 1JSCBUY0170G. IF THE WIRING AND/OR COIL ARE FOUND TO BE OPEN, REWORK AS NECESSARY.

THIS AMENDMENT IS TO FOLLOW STEP 9.0 AND STEP 14.0 WILL FOLLOW THIS AMENDMENT.

PREPARER / DATE: EXT:	TECHNICAL APPROVAL / DATE: EXT:
WORK GROUP SUPERVISOR / DATE: EXT:	RELEASING ORGANIZATION / DATE: EXT:
QUALITY REVIEW / DATE:	

ITEM AG2 4.19

9A. INSTRUCTIONS:

INITIAL DATE STEP

9A.1 INITIAL NOTIFICATIONS:

_____ _____ 9A.1 NOTIFY THE SS/CONTROL OPERATOR OF THE WORK TO BE PERFORMED.

_____ _____ 9A.2 ENSURE THE CONTROL OPERATOR IS AWARE THAT DURING THIS WORK "B" TRAIN WILL BECOME INOPERABLE.

9A.2 PRECAUTIONS, LIMITATIONS, OPERATIONAL IMPACT CONSIDERATIONS:

_____ _____ 9A.2.1 125 VDC PRESENT IN THE JUNCTION BOX.

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF ___

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ARIZONA NUCLEAR POWER PROJECT PAGE: 5
SIMS WORK ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A WORK CONTROL
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

WO# 00324345 WR# 365834 Work Center MNTC ATTACHMENT ___ OF ___
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF WORK.
Eq 1JSGEUV0170 VALVEX
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** PAGE 2 OF 3

_____ _____ 9A.2.2 ENSURE PRESSURE IS BLED TO ATMOSPHERE BEFORE OPENING INSTRUMENT LINES.

9A.3 PREREQUISITE, INITIAL CONDITIONS:

_____ _____ 9A.3.1 PRIOR TO STARTING (OR RESUMING) ANY WORK, ENSURE THAT THE EQUIPMENT TO BE WORKED ON IS 1JSGEUV0170.

_____ _____ 9A.3.2 ENSURE THAT ALL MATERIALS, TOOLS, AND TEST EQUIPMENT IS STAGED AND READY TO WORK PRIOR TO PERFORMING ANY INSTRUCTION STEPS.

ITEM A6 2 of 9

9A.4 INSTRUCTIONS:

_____ _____ 9A.4.1 HAVE OPERATIONS ISOLATE THE AIR TO 1JSGEUV0170.

_____ _____ 9A.4.2 DETERMINATE AND REMOVE THE SOLENOID VALVE 1JSGEUV0170G.

_____ _____ 9A.4.3 DETERMINE THE CAUSE OF THE OPEN CIRCUIT. BAG AND TAG DEFECTIVE COMPONENTS FOR EXAMINATION BY OPS ENG.

_____ _____ (QC HOLDPOINT IS REQUIRED) 9A.4.4 REPLACE THE COIL IN UV-170G BY REMOVING THE COIL FROM C/I#4500-284 (P/N W30247). REFERENCE EER# 87-SG-210 AND TECH MANUAL M234A-53, DWG F-5155 PART NO. W30248, 3-WAY SOLN VALVE (N.O.).

QC HOLDPOINT TO VERIFY CORRECT COMPONENT (MATERIAL) PER STEP 9A.4.4.

NAME:_____ DATE:_____

[ ] ACCEPTABLE [ ] UNACCEPTABLE

CORRECTIVE ACTION:_____

CONTINUATION PAGE

ROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ARIZONA NUCLEAR POWER PROJECT PAGE: 7
SIMS WORK ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A WORK CONTROL
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

WO# 00324345 WR# 365834 Work Center MNTC ATTACHMENT ___ OF ___
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST
CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF
WORK.
Eq 1JSGEUV0170 VALVEX
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** PAGE 3 OF 3

_____ _____ (QC HOLDPOINT IS REQUIRED)	9A.4.5	USING AMP CRIMP TOOL MODEL# 59170 CRIMP RING TERMINALS C/I# 4322-31 TO WIRES IAW 13-ENXX01-A006. CRIMP TOOL#_____ CAL DUE:_____
		QC HOLDPOINT TO VERIFY CORRECT COMPONENT, M. & T.E. USED, AND PROPER CRIMP TERMINATIONS IAW STEP 9A.4.5.
		NAME:_____ DATE:_____
		! ! ACCEPTABLE ! ! UNACCEPTABLE
		CORRECTIVE ACTION:_____
_____ _____	9A.4.6	INSTALL THE NEW SOLENOID VALVE AND RETERMINATE WIRING IN JUNCTION BOX.
_____ _____	9A.4.7	HAVE OPERATIONS RETURN THE AIR TO 1JSGEUV0170.
_____ _____	9A.4.8	RETURN TO STEP 14 IN THE MAIN BODY OF THIS WORK ORDER.

MEM AG2 6 of 9

ANPP

ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

[illegible] WDN# 3-496-88 PAGE 1 OF 1

[illegible]: TONY ZALITIS	[illegible]: Q.C.	[illegible]: 5733 [illegible]
[illegible]: -9+1244/624	[illegible]: 6	[illegible]: 11-6-88
[illegible]: NA	P.O. # 33205577	[illegible]: NA
DESCRIPTION: 3WAY SOLENOID VALVE N.O.		[illegible]: NA
SUPPLIER: ANCHOR DARLING		[illegible] [illegible]: NA
MANUFACTURER: SKINNER	MANUFACTURER P/N: VSH-66200	

Payment and Material for this P.O. Line are being held by [illegible] Material Control Department until the following Discrepancy has been acceptably resolved.

DISCREPANCY: P.O. REQUIRES ANCHOR DARLING P/N W30965 AND SKINNER P/N VSH-66200 PER DRAWINGS 93-15158 REV RR3 AND 93-15165 REV BR2. DRAWING LISTS ANCHOR DARLING P/N W30248, SKINNER P/N VSH 65600.

ACTUAL PARTS RECEIVED ARE ANCHOR DARLING P/N W30965, SKINNER P/N VSH-66200

[illegible]

Justification Comments:

WDN # 3-496-88 pg 1 of 1

ITEM AG2 8 of 9

[illegible]

Inventory Control: Original Initiator: First Copy Accounting: Second Copy Purchasing: Third Copy Other: ___ Fourth Copy. A copy each of completed WDN to QSRT and Vendor Quality. A copy of completed WDN to Work Group Supervisor when Conditional Release block is checked.

MASTER COPY

MASTER COPY

ANPP

ENGINEERING EVALUATION REQUEST

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

☒ DR ☐ NCR

ANPP

WAREHOUSE DISCREPANCY NOTICE

WDN# 3-497-88 PAGE 1 OF 1

WDN INITIATOR: JOHN ZALITIS	DEPARTMENT: Q.C.	EXT:	C/N: 4550-334
PACKING #: 871195/178 / ~~[illegible]~~	WDN LINE #: 7	REC DATE: 11-19-88	
PACKING LIST#: NA	P.O. #: 33205577	RELEASE #: NA	
DESCRIPTION: 3 WAY SOLENOID VALVE		CODE #: NA	
SUPPLIER: ANCHOR DARLING		LOCATION:	VALUE: NA
MANUFACTURER: SKINNER	MANUFACTURER P/N: VSH-66190		

Payment and Material for this WDN Line are being held by [illegible] Material Control Department until the following discrepancy has been acceptably resolved.

DISCREPANCY: DATA BASE LISTS NOMINAL COIL VOLTAGE AS 125VDC OF SKINNER SOLENOID VALVE, ANCHOR DARLING P/N AS W30964 AND SKINNER P/N AS VSH-65590/ VSH66190. DRAWINGS REFERENCED IN DATA BASE ARE 93-15165 REV BR2 AND 93-15158 REV BR3

CONTRARY TO THE ABOVE MATERIAL IN STORES IS 120VDC, THE REFERENCED DRAWINGS LIST ANCHOR DARLING P/N AS W30247 AND SKINNER P/N AS VSH-65570

RESOLUTION/VENDOR RESPONSE DATE/[illegible]: | [illegible] ACCEPTABLE ? ☐ YES ☐ NO ☐ N/A

[illegible] SIGNATURE/DATE/[illegible]

DISPOSITION: [illegible]

USE AS IS ☐

REPAIR ☐

[illegible] MATERIAL ☐

[illegible] DATABASE ☐

ENGINEERING ACTION REQUIRED ☐

DISPOSITION: [illegible]

[illegible] ☐ SCRAP ☐

CONDITIONAL RELEASE ☐

RETURN MATERIAL TO VENDOR ☐

[illegible] ☐

Justification Comments:

WDN# 3-497-88 1 of 1

ITEM AG2 9 of 9

DISPOSITIONED BY: (SIGNATURE/DATE/EXT)

DISPOSITIONER SUPERVISOR: (SIGNATURE/DATE/EXT)

[illegible] CONCURRENCE: (SIGNATURE/DATE)

STORES/QC RECEIVING:

MATERIALS CONTROL MANAGER SIGNATURE/DATE

Inventory Control: Original   Initiator: First Copy   Accounting: Second Copy   Purchasing: Third Copy   Other: Fourth Copy   A Copy each of completed WDN to QSFE and Vendor Quality   A copy of completed WDN to Work Group Supervisor when Conditional Release block is checked.

MASTER COPY

MASTER COPY

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ITEM AH3
1 of 1

From Picked up Part

ROS part:
"W30247"
part markings
IVS-H136-P131
model # 30247
box markings:
A/D Valve Co
Customer P.O.# 10407-F175696
P/N 3 way sol. valve
P/N 30247 for
24×22×24 900 AWN
93-15158

Green Tag # 71877
(item 11a)

SKINNER #
V5H-66200
for 120VDC

No PDN on part, box, C/I screen etc.

APPENDIX A OF 73AC-9ZZ29 REV 7

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

WO# 00324345 WR# 365834 Work Center MNTC ATTACHMENT ___ OF ___
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF WORK.
Eq 1JSGEUV0170 VALVEX
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** J.VELASQUEZ 110688
PAGE 1 OF 3

SCOPE/INTENT: THIS AMENDMENT IS NECESSARY TO PROVIDE INSTRUCTIONS FOR I&C TO CHECK THE WIRING AND/OR COIL ON SOLENOID 1JSGEUV0170G. IF THE WIRING AND/OR COIL ARE FOUND TO BE OPEN, REWORK AS NECESSARY.

THIS AMENDMENT IS TO FOLLOW STEP 9.0 AND STEP 14.0 WILL FOLLOW THIS AMENDMENT.

PREPARER / DATE: EXT:	TECHNICAL APPROVAL / DATE: EXT:
WORK GROUP SUPERVISOR / DATE: EXT:	RELEASING ORGANIZATION / DATE: EXT:
QUALITY REVIEW / DATE:	

9A. INSTRUCTIONS:

INITIAL	DATE	STEP	
			9A.1 INITIAL NOTIFICATIONS:
			9A.1 NOTIFY THE SS/CONTROL OPERATOR OF THE WORK TO BE PERFORMED.
			9A.2 ENSURE THE CONTROL OPERATOR IS AWARE THAT DURING THIS WORK "B" TRAIN WILL BECOME INOPERABLE.
			9A.2 PRECAUTIONS, LIMITATIONS, OPERATIONAL IMPACT CONSIDERATIONS:
			9A.2.1 125 VDC PRESENT IN THE JUNCTION BOX.

See step 9A.4.1 .....

Did/does ops isolate air to just B TRAIN, or whole valve 1JSGEUV0170 ???

ITEM AN

ENGINEERING EVALUATION REQUEST

ANPP

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ARIZONA NUCLEAR POWER PROJECT PAGE: 5
SIMS WORK ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A WORK CONTROL
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

WO# 00324345 WR# 365834 Work Center MNTC ATTACHMENT ____ OF ____
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF WORK.
Eq 1JSGEUV0170 VALVEX
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** PAGE 2 OF 3

____ ____ 9A.2.2 ENSURE PRESSURE IS BLED TO ATMOSPHERE BEFORE OPENING INSTRUMENT LINES.

9A.3 PREREQUISITE, INITIAL CONDITIONS:

____ ____ 9A.3.1 PRIOR TO STARTING (OR RESUMING) ANY WORK, ENSURE THAT THE EQUIPMENT TO BE WORKED ON IS 1JSGEUY0170G.

____ ____ 9A.3.2 ENSURE THAT ALL MATERIALS, TOOLS, AND TEST EQUIPMENT IS STAGED AND READY TO WORK PRIOR TO PERFORMING ANY INSTRUCTION STEPS.

9A.4 INSTRUCTIONS:

____ ____ 9A.4.1 HAVE OPERATIONS ISOLATE THE AIR TO 1JSGEUV0170.

____ ____ 9A.4.2 DETERMINATE AND REMOVE THE SOLENOID VALVE 1JSGEUY0170G.

____ ____ 9A.4.3 DETERMINE THE CAUSE OF THE OPEN CIRCUIT. BAG AND TAG DEFECTIVE COMPONENTS FOR EXAMINATION BY OPS ENG.

____ ____ (QC HOLDPOINT IS REQUIRED) 9A.4.4 REPLACE THE COIL IN UY-170G BY REMOVING THE COIL FROM C/104500-284 (P/N W30247). REFERENCE EER# 87-SG-210 AND TECH MANUAL M234A-52, DWG F-5155 PART NO. W302-8, 3-WAY SOLN VALVE (N.O.).

QC HOLDPOINT TO VERIFY CORRECT COMPONENT (MATERIAL) PER STEP 9A.4.4.

NAME:____________ DATE:____________

[ ] ACCEPTABLE [ ] UNACCEPTABLE

CORRECTIVE ACTION:____________

Handwritten margin notes:

9A.4.1 How does This step relate specifically to step 9A.2 ??

type, obvious? (No - direct discussion with PC revealed he wasn't/should have) aware what correct PC was. Point dirt he ly !!!

9A.4.4 I'd truncate The equipment ID also if I wasn't sure what it really was!!

So he retrieved This EER, Tim ...... NOW WHAT?? How apply to This one?

ITEM AN

ITEM AM

ITEM AK

APPENDIX A OF 73AC-9ZZ29 REV 7

ANPP

ENGINEERING EVALUATION REQUEST

PAGE ___ OF

EER# 88-SG-146

CONTINUATION PAGE

PROBLEM/SUGGESTED RESOLUTION/INTERIUM RESOLUTION/DISPOSITION:

ARIZONA NUCLEAR POWER PROJECT
SIMS WORK ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A WORK CONTROL
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

PAGE: 7

WO# 00324345 WR# 365834 Work Center MVTC ATTACHMENT ___ OF ___
Work Desc TROUBLESHOOT AND REPAIR CAUSE OF VALVE NOT FAST CLOSING. REPLACE N1 4-WAY VALVE. NOTIFY SS PRIOR TO START OF WORK.
Eq 1JSGEUV0170 VALVEK
Eq Desc SG-1 LN-1 MSIV Loc E3093N10100140
Work Type CM

** AMENDMENT 9A ** PAGE 3 OF 3

_____ _____ (QC HOLDPOINT IS REQUIRED)

9A.4.5 USING AMP CRIMP TOOL MODEL# 59170 CRIMP RING TERMINALS C/I# 4322-31 TO WIRES IAW 13-ENXX01-A006.
CRIMP TOOL#______________ CAL DUE:__________

QC HOLDPOINT TO VERIFY CORRECT COMPONENT, M. & T.E. USED, AND PROPER CRIMP TERMINATIONS IAW STEP 9A.4.5.

NAME:____________________ DATE:________________

[ ] ACCEPTABLE [ ] UNACCEPTABLE

CORRECTIVE ACTION:______________________________

ITEM AL

See item AF: this correct re component? too

9A.4.6. minor point, technically only coil, lugs were authorized replaced/reconfigured .... how is this reconfiguration documented/tracked?

_____ _____ 9A.4.6 INSTALL THE NEW SOLENOID VALVE AND RETERMINATE WIRING IN JUNCTION BOX.

_____ _____ 9A.4.7 HAVE OPERATIONS RETURN THE AIR TO 1JSGEUV0170.

_____ _____ 9A.4.8 RETURN TO STEP 14 IN THE MAIN BODY OF THIS WORK ORDER.

Arizona Nuclear Power Project
COMPANY CORRESPONDENCE

ID #

DATE

TO: W. E. Ide
Sta. # 6452
Ext. # 2366

FROM: G. W. Sowers
Sta. # 6102
Ext. # 2643

FILE: 88-008-419
SUBJECT: 13 Series Lighting Drawings

Engineering Evaluations Department has been actively pursuing the development of unit specific lighting drawings with Engineering.

Engineering is proceeding with plans for a project to walkdown and verify "as built" conditions in each unit and to provide unit specific lighting drawings. Budget has been approved to accomplish this work in 1989 and 1990.

This department agrees that the 13 series drawings with innumerable N/A FCR's, is a very cumbersome system, but at the present time, this is the only existing documentation. Tagging procedure 40AC-9ZZ15 is being revised to add statement, "When clearance is being developed N/A FCR's must be used." (See ICR No. 00644)

Concern for safety of personnel working in lighting panels lead us to offer the following suggestions:

1) Provide training on basic electric safety emphasize working on these panels cannot be treated casually.
2) De-energize panel before working.

GWS/LM/jgn

cc: E. C. Sterling 7034
J. T. Barrow 7042
L. L. Henson 6078
J. M. Allen 6132
O. J. Zeringue 6915

Release

1

Holophane

N001, N002 Control Bldg
N003, N004 Aux Bldg

YEAR	1N1	1N2	1N3	1N4	2N1	2N2	2N3	2N4	3N1	3N2	3N3	3N
1987		X •		•		X X	X	•	X		X	
1988	X •	•	X	•	•	X •	•	• •	•	X	•	
1989	•		X	•	X X	•	•	X	X •			X
1990		X			X	•	• X	X			X	X

• NRC fnd
X APS fnd

NOV →	U1		U2		U3	
	APS	(NRC)				
1987	1	(2)	2	(3)	2	(2)
1988	2	(3)	1	(1)	1	(1)
1989	1	(4)	2	(4)	2	(3)
1990	1	(3)	3	(4)	2	(3)

Exides

F01, F02

	1F1	1F2	2F1	2F2	3F1	3F2
1987	X					
1988	X	X	X			
1989		X		X	X	X X
1990	X	X	X X X	X X		X

NOV →	U1		U2		U3	
	APS	(NRC)				
1987	1	(1)	0		0	
1988	2	(2)	0		0	(0)
1989	1	(1)	1	(2)	2	(2)
1990	2	(2)	2	(2)	1	(1)

II

3.

IX. EE580 CABLE AND RACEWAY COMPUTER PROGRAM

AN OVERVIEW

CONTROL AND TRACKING SYSTEM (CATS)
EE580 CABLE AND RACEWAY PROGRAM

GENERAL

THE EE580 PROGRAM IS A LARGE DATA BASE, INFORMATION PROCESSING, RANDOM-ACCESS COMPUTER PROGRAM THAT, IN CONJUNCTION WITH SUPPORTING PROCEDURES, WILL IDENTIFY, QUANTIFY, AND STATUS RACEWAY, LOCATIONS, CABLE, TERMINATIONS, AND JUMPERS INFORMATION.

THE EE580 PROGRAM ACCEPTS INPUT, EDITS, VALIDATES, AND STORES THIS INFORMATION AND AUTOMATICALLY PRODUCES REPORTS WHICH IDENTIFY THE RESULT OF THIS INFORMATION ON THE DATA BASE.

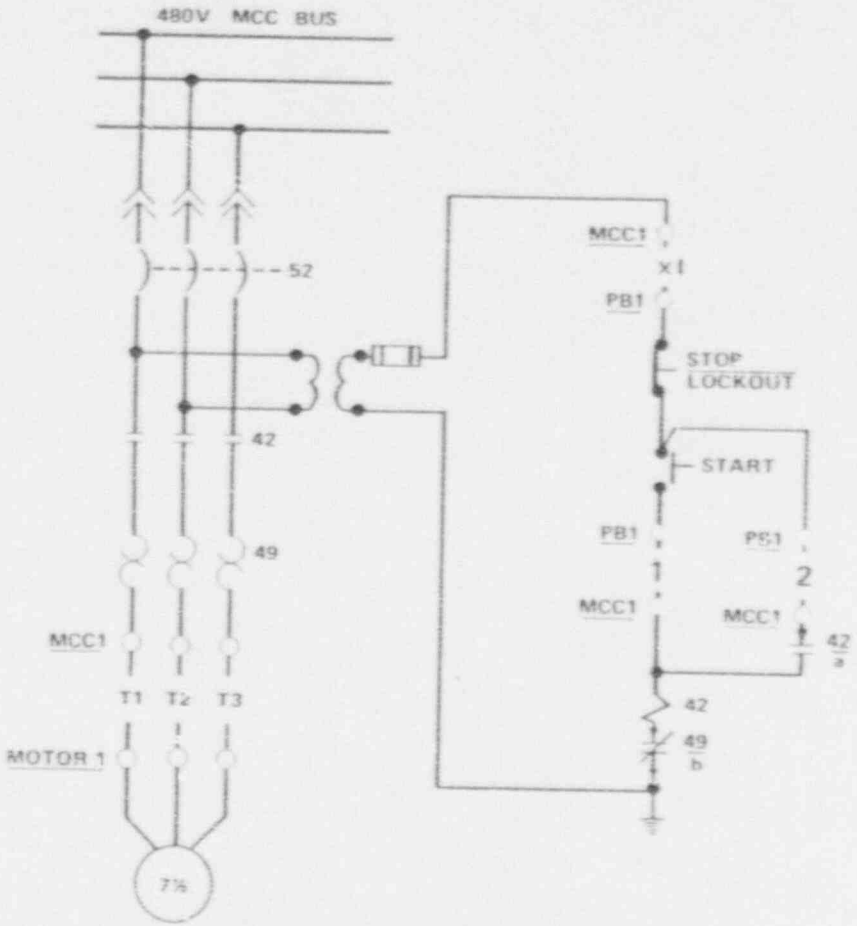
THE INFORMATION THAT IS STORED ON THE PROJECT DATA BASE CAN BE INDEPENDENTLY ACCESSED BY ENGINEERING, CONSTRUCTION, SERVICES, AND PROCUREMENT AS REQUIRED IF TERMINALS ARE PROVIDED AND ACCESS TO THE DATA BASE IS AUTHORIZED.

THE PURPOSE OF THE EE580 PROGRAM, FROM AN ENGINEERING VIEWPOINT, IS TO PROVIDE FIELD CONSTRUCTION WITH TIMELY AND ACCURATE INFORMATION CONCERNING RACEWAY, CABLE AND TERMINATION DESIGN.

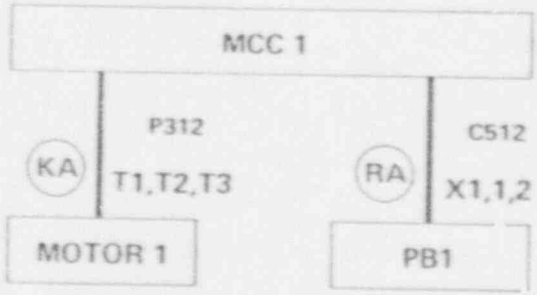
THE FOLLOWING PROVIDES A BRIEF EXPLANATION OF THE PURPOSE AND A DESCRIPTION OF THE EE580 COMPUTER PROGRAM, SHOWS A CABLE AND RACEWAY ARRANGEMENT WHICH IS USED TO DEFINE CERTAIN TERMS USED AND CLOSES WITH A DEFINITION OF TERMS UNIQUE TO THE EE580 COMPUTER PROGRAM.

BASIC TERMS USED

THE DRAWING, CABLE, AND RACEWAY ARRANGEMENT SHOWN IN FIGURES IX-1 AND IX-2 ILLUSTRATE SOME OF THE BASIC TERMS USED WHEN WORKING WITH THE EE580 PROGRAM. THE DRAWING CONSISTS OF A SCHEMATIC DIAGRAM AND A BLOCK DIAGRAM AS SHOWN IN FIGURE IX-1 AND SHOWS EQUIPMENT LOCATION OF EACH DEVICE AND THE CABLE AND CONDUCTORS TO BE INSTALLED BY FIELD CONSTRUCTION. THE CABLE AND RACEWAY ARRANGEMENT SHOWN IN FIGURE IX-2 SHOWS THE PHYSICAL LOCATION OF EQUIPMENT AND RACEWAYS AND RACEWAY NUMBERS. THE EXAMPLE CONSISTS OF A 460-VOLT MOTOR FED FROM A MOTOR CONTROL CENTER WITH A LOCAL CONTROL (PUSH BUTTON) STATION, THREE TRAYS, THREE CONDUITS, A SPECIAL RACEWAY (E.G., A JUNCTION BOX), AND TWO JUMPERS.



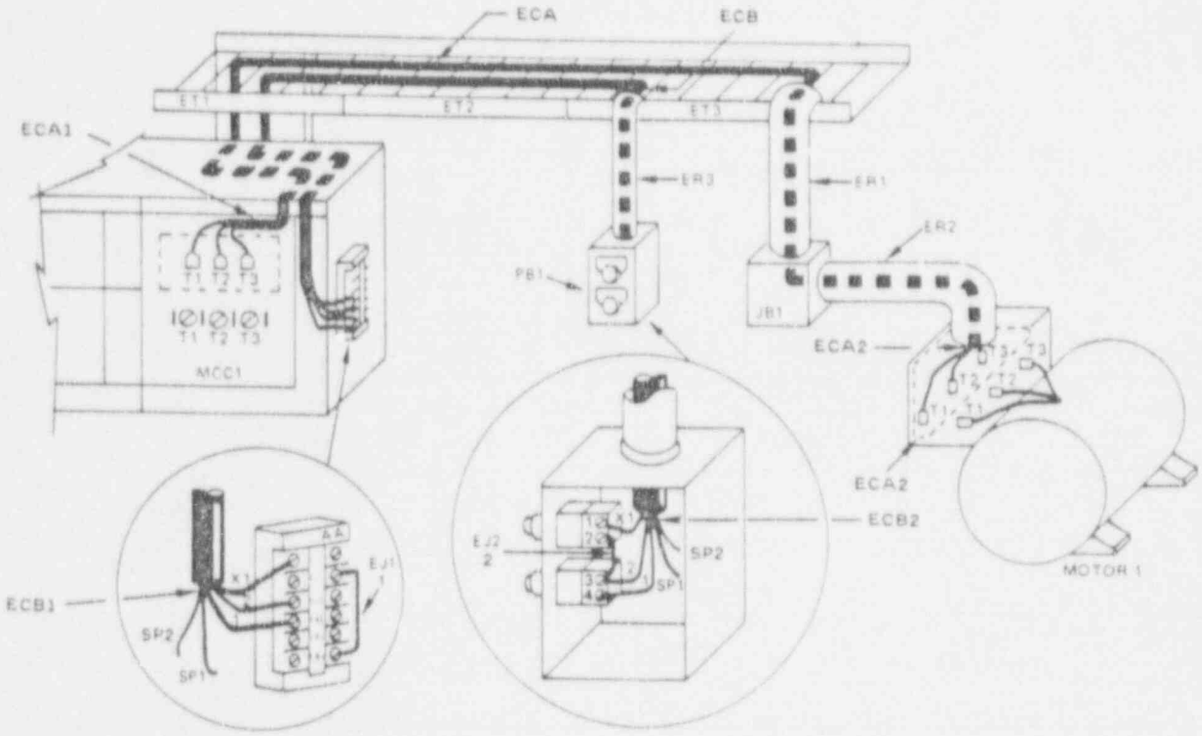
ELEMENTARY DIAGRAM



BLOCK DIAGRAM

DWG. NO. 1E76SM85

SCHEME DRAWING
FIGURE IX-1



	Raceways						
	Conduit	Tray	Special Raceway	Locations	Cable	Termination	Jumper
Commodity Type	ER	ET	EK	E*	EC	EW	EJ
Component ID	ER1 ER2 ER3	ET1 ET2 ET3	JB1	MCC1 MOTOR 1 PB1	ECA ECB	ECA1 ECA2 ECB1 ECB2	EJ1 EJ2
Subcomponent ID				MCC1 T1 T2 T3 AA01 Through AA06		ECA1 T1 BK 1 T2 BK 2 T3 BK 3	EJ1 1
				MOTOR 1 T1 T2 T3		ECA2 T1 BK 1 T2 BK2 T3 BK3	EJ2 2
				PB1 1, 2, 3, 4		ECB1 X1BK 2WH 1RD SP1GR SP2ON	
						ECB2 X1BK 2WH 1RD SP1GR SP2ON	

ILLUSTRATIVE CABLE AND RACEWAY ARRANGEMENT

FIGURE IX-2

COMMODITY TYPES AND COMPONENTS

RACEWAYS

THERE ARE THREE TYPES OF RACEWAYS: CONDUITS, TRAYS, AND SPECIAL RACEWAYS. CONDUITS INCLUDE RIGID, EMT, FLEXIBLE, AND NONMETALLIC CONDUITS; TRAYS INCLUDE ANY TYPE OF TRAY SUCH AS LADDER, SOLID, AND COVERED TRAYS; AND SPECIAL RACEWAYS INCLUDE MANHOLES, JUNCTION BOXES, AND PULL BOXES. ALL THE CONDUITS IN THE PHYSICAL PLANT FROM WHICH THIS EXAMPLE IS TAKEN CONSTITUTE THE CONDUIT COMMODITY. LIKEWISE, ALL THE TRAYS CONSTITUTE THE TRAY COMMODITY, AND ALL THE SPECIAL RACEWAYS THE SPECIAL RACEWAY COMMODITY. FOR PURPOSES OF IDENTIFICATION, EACH COMMODITY IS ASSIGNED A TWO-CHARACTER DESIGNATION, WHICH INDICATES THE DISCIPLINE (E FOR ELECTRICAL) AND THE TYPE OF COMMODITY, CALLED A COMMODITY TYPE. THE COMMODITY TYPE FOR CONDUIT IS ER; FOR TRAY, IT IS ET; AND FOR SPECIAL RACEWAY, IT IS EK.

AS CAN BE SEEN IN FIGURE IX-2, THERE ARE THREE CONDUITS, THREE TRAYS, AND ONE SPECIAL RACEWAY IN THIS EXAMPLE. EACH CONDUIT IS A COMPONENT OF THE CONDUIT COMMODITY. IN LIKE MANNER, EACH OF THE THREE TRAYS IS A COMPONENT OF THE TRAY COMMODITY, AND THE SPECIAL RACEWAY IS A COMPONENT OF THE SPECIAL RACEWAY COMMODITY. THE CONDUITS, TRAYS, AND SPECIAL RACEWAY COMPONENTS IN THIS EXAMPLE ARE ASSIGNED UNIQUE NUMBERS. THE CONDUITS ARE NUMBERED ER1, ER2, AND ER3; THE TRAYS ARE NUMBERED ET1, ET2, ET3; AND THE SPECIAL RACEWAY IS NUMBERED JB1. THESE UNIQUE NUMBERS ARE CALLED COMPONENT IDENTIFIERS (IDS).

LOCATIONS

LOCATIONS ARE USED AS A "FROM" OR "TO" OF A CABLE OR THE DESTINATION OF A RACEWAY. A CABLE HAS ONE END AT A "FROM" LOCATION AND THE OTHER END AT A "TO" LOCATION. IN THIS EXAMPLE, ONE CABLE GOES FROM A CUBICLE OF THE MOTOR CONTROL CENTER TO THE MOTOR, AND THE OTHER CABLE GOES FROM THE MOTOR CONTROL CENTER TO THE LOCAL CONTROL STATION. THE COMMODITY TYPE FOR LOCATIONS IS E*. THE COMPONENT IDS OF THE MOTOR CONTROL CENTER CUBICLE, THE MOTOR, AND THE LOCAL CONTROL STATION ARE MCC1, MOTOR1, AND PB1, RESPECTIVELY.

EACH LOCATION MAY HAVE IDENTIFIED TERMINALS WHERE CONDUCTORS ARE CONNECTED. MCC1 HAS TERMINALS T1, T2, T3, AND AA01 THROUGH AA06; THE MOTOR HAS TERMINALS T1, T2, AND T3; AND THE LOCAL CONTROL HAS CONTACT BLOCKS WITH TERMINALS 1, 2, 3, AND 4. THESE TERMINALS ARE REFERRED TO AS SUBCOMPONENTS. T1, T2, T3; AAC1 THROUGH AA06; AND 1, 2. 3, AND 4 ARE CALLED SUBCOMPONENT IDENTIFIERS (IDS) AT THEIR RESPECTIVE LOCATIONS.

THE TERMINAL CONNECTIONS ARE, FOR THE MOST PART, DESIGNED FROM THE CORRESPONDING VENDORS' DRAWINGS.

CABLES

CABLE(S) ORIGINATE FROM THE CABLING BLOCK DIAGRAM ON THE ELEMENTARY DIAGRAM FIGURE IX-1 WHICH IS A "FROM" AND "TO" DESCRIPTION OF THE FUNCTION ELEMENTARY DIAGRAM.

THE COMMODITY TYPE FOR CABLES IS EC. IN THIS EXAMPLE, CABLE ECA (ECA IS A COMPONENT ID) IS SHOWN ORIGINATING FROM MCC1 AND GOING TO MOTOR1. CABLE ECA HAS A ROUTING OF ET1, ET2, ET3, ER1, JB1, AND ER2. SIMILARLY, CABLE ECB HAS A "FROM" LOCATION OF MCC1 AND A "TO" LOCATION OF PB1 WITH A ROUTING OF ET1, ET2, ET3, AND ER3.

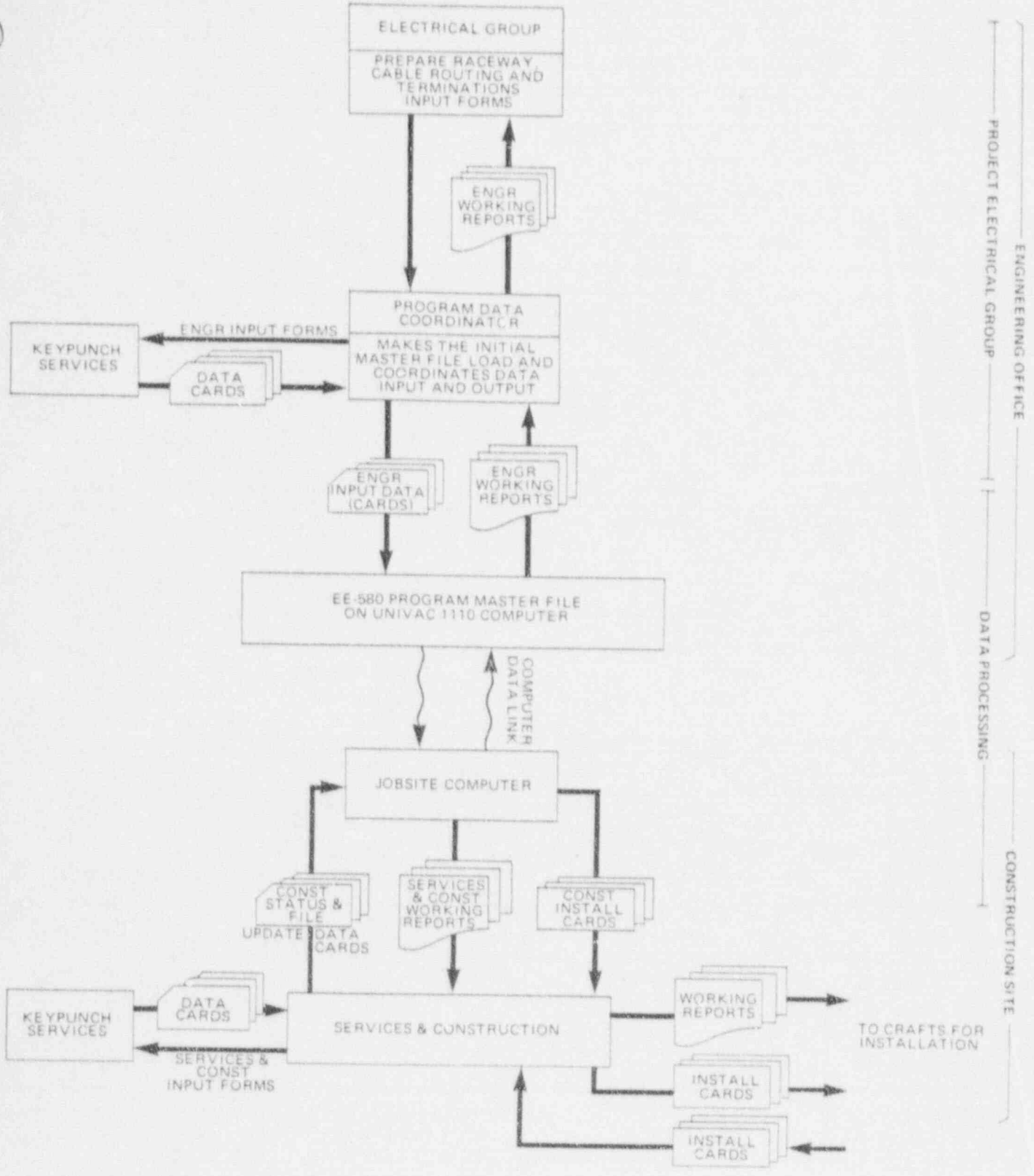
TERMINATIONS

FOR EACH CABLE ENTERED IN THE PROGRAM, TWO TERMINATION IDS ARE AUTOMATICALLY GENERATED. THE COMMODITY TYPE FOR TERMINATIONS IS EW. TERMINATION IDS HAVE THE SAME NUMBER AS THE CABLE, PLUS A SUFFIX OF "1" OR "2". FOR CABLE ECA, THE TERMINATION IDS ARE ECA1 AND ECA2, ONE FOR EACH END OF THE CABLE. SIMILARLY, FOR CABLE ECB, THE TERMINATION IDS ARE ECB1 AND ECB2. ECA1 AND ECA2 ARE ASSOCIATED WITH CONDUCTOR IDS (SUBCOMPONENT IDS) T1, T2, AND T3; AND ECB1 AND ECB2 ARE ASSOCIATED WITH CONDUCTOR IDS X1, 2, 1, SP1, AND SP2.

JUMPERS

JUMPER EJ1 AT LOCATION MCC1 IS CONNECTED BETWEEN TERMINALS AA02 AND AA06. THE COMMODITY TYPE FOR JUMPERS IS EJ. JUMPER EJ1 IS ASSOCIATED WITH CONDUCTOR 1. NOTE THAT CONDUCTOR 1 IS THE ONE AND ONLY SUBCOMPONENT OF EJ1. IF THE LOCATION REQUIRES MORE THAN ONE JUMPER, EJ1 MIGHT HAVE CONDUCTOR IDS OF 1, 2, 3, ETC.

SIMILARLY, JUMPER EJ2 AT LOCATION PB1 HAS ONE CONDUCTOR, CONDUCTOR 2, CONNECTING TERMINALS 2 AND 3.

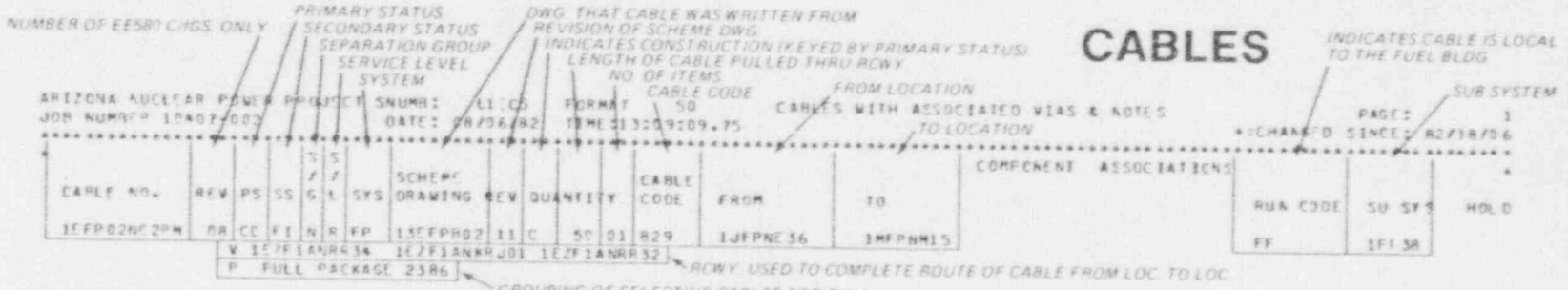


OVERVIEW OF EE580 PROGRAM USE

FIGURE IX-3

EE580 REPORTS

EXHIBIT IX-7



1EHF02AC1KA 16 CC 0R N K HF 13CHF802 01 C 336 01 83C 1ENHNM0412 1MHFNJ01A FF 1HF02
FI
V 1EZF2RNTKFW 1EZF2RNTKFC 1EZF2BNTKFD 1EZF2ANTKFE 1EZF2ANTKFF 1EZF2ANTKFG 1EZF2ANTKFH 1EZF4ANRK07
V 1EZF4ANRK06 1EZF4ANRK01 1EZF4ANKKJ01 1EZF4ANRK02 1EZF4ANKKJ02 1EZF4ANRK08
P PULL PACKAGE 818

1EHF02NC1RC 0B CC 0R N R HF 13EHFR02 01 C 300 01 A28 1ENHNM0412 1MHFNJ01AH FF 1HF02
FI
V 1EZF2RNTRFW 1EZF2RNIRFD 1EZF2ANTRFE 1EZF2ANTRFF 1EZF2ANTRFG 1EZF2RNTRFH 1EZF4ANRR0R 1EZF4ANRR07
V 1EZF4ANRR01 1EZF4ANKKJ01 1EZF4ANRK02 1EZF4ANKKJ02 1EZF4ANRR02
P PULL PACKAGE 818

1EHF0?NC2KA 16 CC 0R N K HF 13EHFR02 01 C 336 01 83C 1ENHNM0413 1MHFNJ01B FF 1HF02
FI
V 1EZF2RNTKFW 1EZF2RNTKFC 1EZF2BNTKFD 1EZF2ANTKFE 1EZF2ANTKFF 1EZF2ANTKFG 1EZF2ANTKFH 1EZF4ANRK07
V 1EZF4ANRK06 1EZF4ANRK01 1EZF4ANKKJ01 1EZF4ANRK03 1EZF4ANKKJ03 1EZF4ANRK09
P PULL PACKAGE 818

1EHF02NC2RC 0B CC 0R N R HF 13EHFR02 01 C 300 01 A28 1ENHNM0413 1MHFNJ01BH FF 1HF02
FI
V 1EZF2RNTRFW 1EZF2RNTRFD 1EZF2ANTRFE 1EZF2ANTRFF 1EZF2ANTRFG 1EZF2ANTRFH 1EZF4ANRR0R 1EZF4ANRR07
V 1EZF4ANRR01 1EZF4ANKKJ01 1EZF4ANRK03 1EZF4ANKKJ03 1EZF4ANRR03
P PULL PACKAGE 818

1EHF04NC1PC 0A CC FI N R HF 13EHFR04 41 C 250 01 829 1EHFNJ10 1ENHNMC430 FF 1HF03
V 1EZF2RNTRFW 1EZF2RNTRFD 1EZF2ANTRFE 1EZF2ANTRFF 1EZF2ANTRFG 1EZF2ANTRFL 1EZF2ANTRFK 1EZF1ANRP39
V 1EZF1ANKRJ02 1EZF1ANRP38
P PULL PACKAGE 2386

1EHF04NC2PC 0A CC FI N R HF 13EHFR04 41 C 250 01 829 1EHFNJ11 1ENHNMC430 FF 1HF03
V 1EZF2RNTRFW 1EZF2RNTRFD 1EZF2ANTRFE 1EZF2ANTRFF 1EZF2ANTRFG 1EZF2ANTRFL 1EZF2ANTRFK 1EZF1ANRP39
V 1EZF1ANKRJ02 1EZF1ANRP38
P PULL PACKAGE 2386

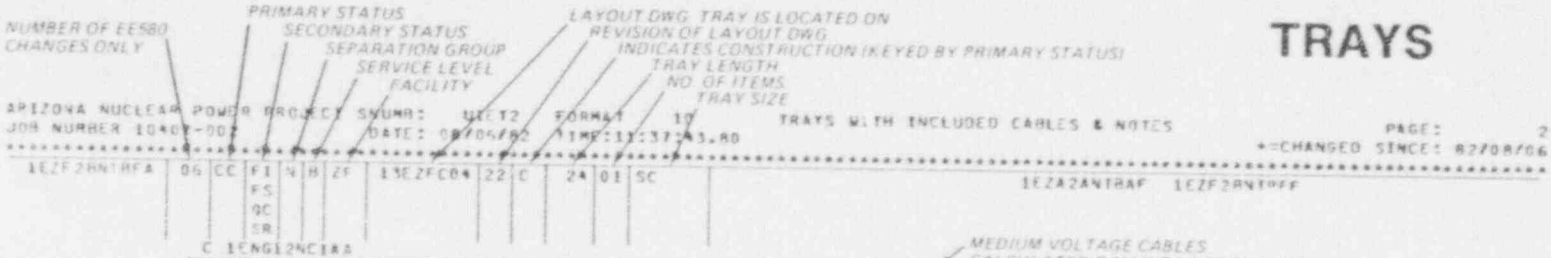
1EHF07AC1PD 0A CC FI A R HF 13EHFR07 01 C 75 01 A271 1EHFAJ01 1JHFAZSH2 FF 1HF01
0C
V 1EZF3RARR03 1EZF3RARR02
P PULL PACKAGE 1583

1EHF07AC1PE 05 CC FI A R HF 13EHFR07 01 C 75 01 A271 1EHFAJ01 1JHFAZSL2 FF 1HF01
0C
V 1EZF3RARR03 1EZF3RARR01
P PULL PACKAGE 1583

1EHF07AC1PH 05 CC FI A R HF 13EHFR07 01 C 49 01 A271 1EHFAJ01 1JHFAZSL1 FF 1HF01

EXHIBIT IX-8

TRAYS



1EZF2RNTRFA 06 CC FI FS QC SR N R ZF 13EZFC04 22 C 24 01 SC 1EZA2ANTRAF 1EZF2RNTRFF

C 1ENG12NC1RA

FILL CALC= 5.12 IN. ALLOW=12.00 IN. MAINT. SPACE 091479

MEDIUM VOLTAGE CABLES CALCULATED @ MAINTAINED SPACING

1EZF1BNTKWJ 00 CC FI FS QC SR N R ZF 13EZFC02 42 C 25 01 SE 1EZF1BNRK07 1EZF1BNTKFK 1EZF2RNTKFK

C 1EPC02NC2KA 1EPC02NC1KA 1ERD03NC2KA 1EPD03NC2RA 1ERD03NC1KA 1ERD03NC1RA 1EFP51NC9RC 1EFP51NC9RD
C 1EFP51NC9RE 1EFP51NC9RF 1EFP51NC9RG 1EFP51NC9RH 1EFP51NC9RI 1EFP51NC9RJ 1EFP51NC9RK 1EFP51NC9RL
C 1EZS01NCARJ 1EZS01NCARK

FILL CALC= .23 IN. ALLOW= 1.15 IN. CABLE DEPTH 070982

480 VOLT POWER & CONTROL CALCULATED @ DEPTH FILL

1EZF1BNTRFK 06 CC FI QC N R ZF 13EZFC02 22 C 22 01 SE 1EZF1BNRQ50R 1EZF1BNTRFL 1EZF1BNTRWJ

C 1EPC02NC1RE 1ERD03NC1RC 1EFP51NC6RH 1EFP51NC6RQ 1ESP03NC3RA 1ESP05NC1RA 1ESP05NC1RB 1ESP05NC1RC
C 1ESP08NC1RF 1ESP09NC1RA 1ESP09NC1RB 1ESP09NC2RA 1ESP09NC2RB 1ESP09NC3RA 1ESP09NC3RB 1ESP09NC3RC
C 1ESP09NC4RC 1EPC02NC2RE 1ESP09NC4RA 1ESP08NC1RD 1ESP08NC2RD 1ESP09NC4RB 1EQK01NC3RM 1EQK01NC3RN
C 1EQF01NC8QF 1EQF01NC8QG 1EQF01NC8QN 1EQF01NC8QP 1EGA01NC1RB 1EGA01NC1RC 1EGA01NC1RD 1EGA02NC1RK
C 1EGA01NC1RE 1EQF01NC3QC 1EQF01NC3QD 1EQK01NC35R

FILL CALC= 6.8 % ALLOW= 40.0 % PERCENT FILL 043082

CONTROL & INSTRUMENTATION CALCULATED @ PERCENT FILL

1EZF1BNTRFL 04 CC FI QC N R ZF 13EZFC02 22 C 15 01 SE 1EZF1BNRR07 1EZF1BNRR09 1EZF1BNTRFK 1EZF1BNTRFM
1EZF1BNRR15 1EZF1BNRR17

C 1ERD03NC1RC 1ESP03NC3RA 1EPC02NC1RE 1EPC02NC2RE 1EFP51NC6RH 1EFP51NC6RQ 1ESP05NC1RA 1ESP05NC1RB
C 1ESP08NC1RC 1ESP08NC1RE 1ESP09NC1RA 1ESP09NC1RB 1ESP09NC2RA 1ESP09NC2RB 1ESP09NC3RA 1ESP09NC3RB
C 1ESP09NC3RC 1ESP09NC4RC 1ESP09NC4RA 1ESP08NC1RD 1ESP08NC2RD 1ESP09NC4RB 1EQK01NC3RM 1EQK01NC3RN
C 1EQF01NC8QF 1EQF01NC8QN 1EQF01NC8QP 1EGA01NC1RB 1EGA01NC1RC 1EGA01NC1RD 1EGA02NC1RK 1EGA01NC1RE
C 1EQF01NC3QC 1EQF01NC3QD 1EQK01NC35R

FILL CALC= 6.5 % ALLOW= 40.0 % PERCENT FILL 043082

1EZF1BNTRFM 04 CC FI QC N R ZF 13EZFC02 22 C 12 01 SE 1EZF1BNRR12 1EZF1BNTRFL 1EZF1BNTRFN

C 1ERD03NC1RC 1ESP03NC3RA 1EFP51NC6RQ 1ESP05NC1RA 1ESP05NC1RB 1ESP05NC1RC 1ESP08NC1RE 1ESP09NC1RA
C 1ESP09NC1RB 1ESP09NC2RA 1ESP09NC2RB 1ESP09NC3RA 1ESP09NC3RB 1ESP09NC3RC 1ESP09NC4RC 1ESP09NC4RA
C 1ESP08NC1RD 1ESP08NC2RD 1ESP09NC4RB 1EFP51NC6RH 1EQF01NC8QE 1EQF01NC8QN 1EQF01NC8QP 1EGA01NC1RB
C 1EGA01NC1RD 1EGA02NC1RK 1EGA01NC1RC 1EQF01NC3QC 1EQF01NC3QD

FILL CALC= 5.0 % ALLOW= 40.0 % PERCENT FILL 042081

1EZF1BNTRFN 04 CC FI QC N R ZF 13EZFC02 22 C 12 01 SE 1EZF1BNRR10 1EZY25NRR01 1EZF1BNTRFM 1EZF1BNTRFP

C 1ERD03NC1RC 1ESP03NC3RA 1EFP51NC6RQ 1ESP05NC1RA 1ESP05NC1RB 1ESP05NC1RC 1ESP08NC1RE 1ESP09NC1RA
C 1ESP09NC1RB 1ESP09NC2RA 1ESP09NC2RB 1ESP09NC3RA 1ESP09NC3RB 1ESP09NC3RC 1ESP09NC4RC 1ESP09NC4RA
C 1ESP08NC1RD 1ESP08NC2RD 1ESP09NC4RB 1EQF01NC8QE 1EQF01NC3QN 1EQF01NC8QP 1EGA01NC1RB 1EGA01NC1RC
C 1EGA01NC1RD 1EGA02NC1RK 1EGA01NC1RE 1EQF01NC3QC 1EQF01NC3QD

FILL CALC= 4.9 % ALLOW= 40.0 % PERCENT FILL 042081

1EZF1BNTRFP 05 CC FI QC N R ZF 13EZFC02 22 C 12 01 SE 1EZF1BNTRFN 1EZF1BNTRFQ

C 1ERD03NC1RC 1EQF01NC8QE 1EQF01NC8QN 1EQF01NC8QP

CONDUITS

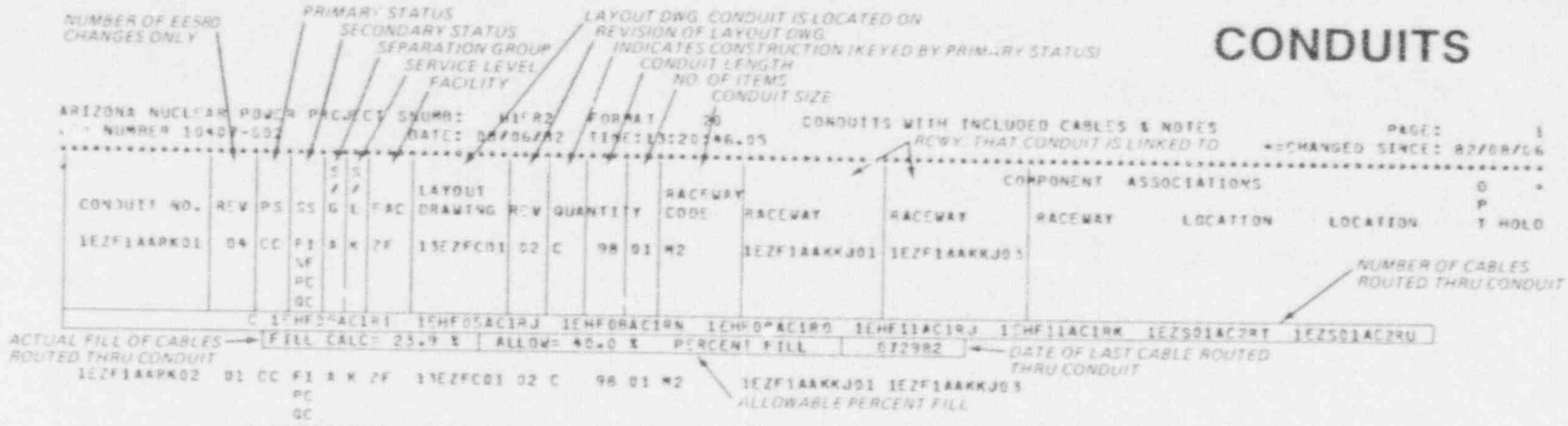


EXHIBIT IX-10

SPECIAL RACEWAYS

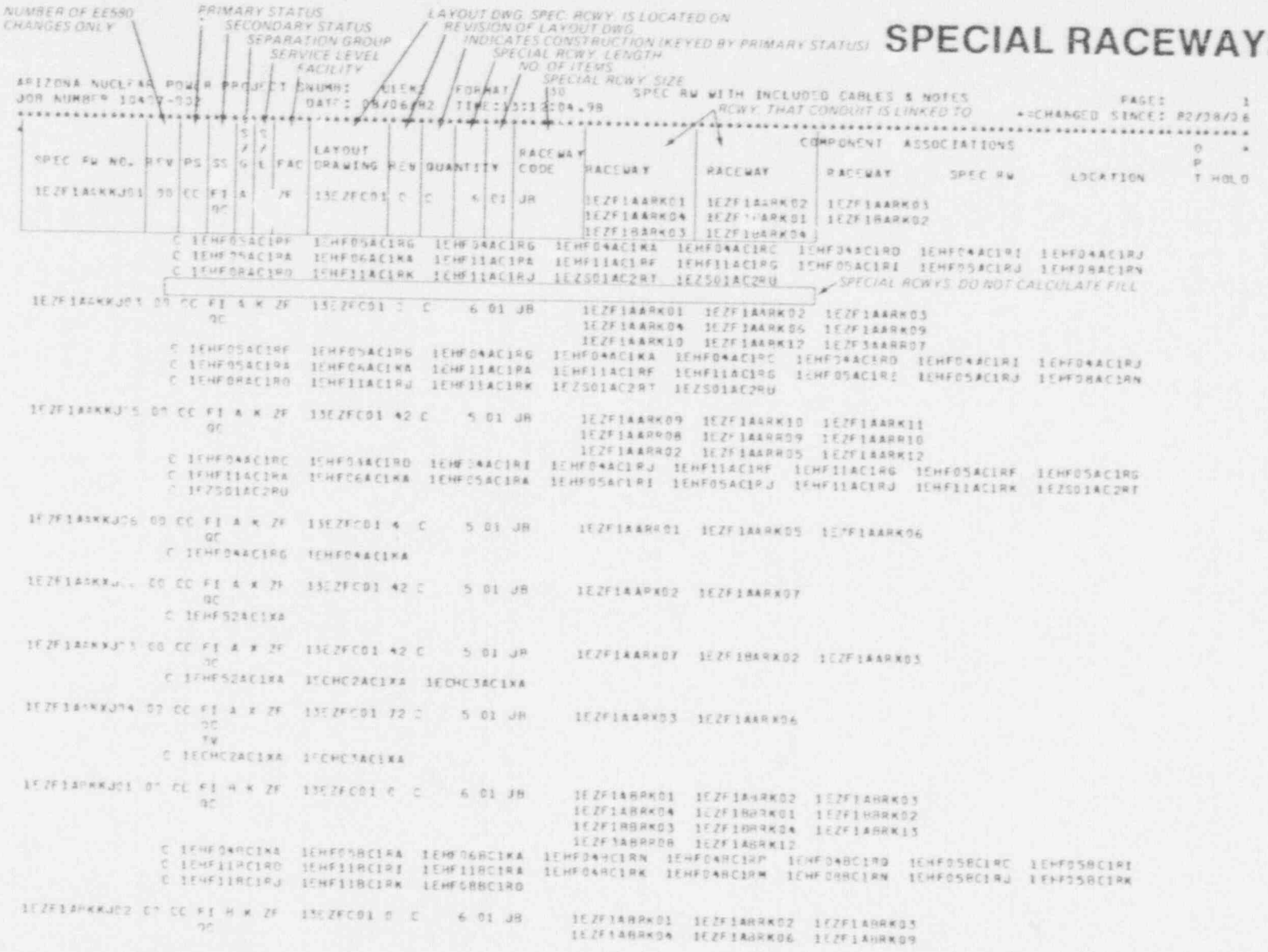
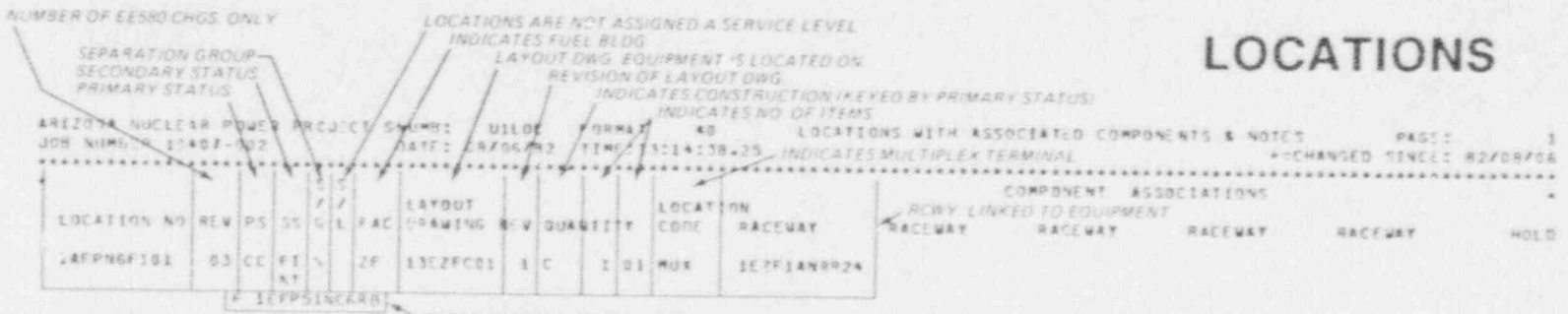


EXHIBIT IX-11

LOCATIONS



1AFPN6F101 03 CC FI NT N ZF 13EZFC01 1 C 1 01 MUX 1EZF1ANRR24

F 1EFPS1NC6RR

1AFPNGF103 03 CC FI NT N ZF 13EZFC01 1 C 1 01 MUX 1EZF1ANRR23

F 1EFPS1NCA7C 1EFPS1NC6RD 1EFPS1NC6RE 1EFPS1NC6RF 1EFPS1NC6RG

1AFPNGF103M 02 CC FI N ZF 13EZFC01 0 C 1 01 LCR 1EZF2ANRK29

I 1EQFSFNC4KA

1AFPNGF104 04 CC FI NT N ZF 13EZFC02 1 C 1 01 MUX 1EZF1BNRR12

F 1EFPS1NC6RH

1AFPNGF1H01 03 CC OR FI NT N ZF 13EZFC02 S2 C 1 01 MUX 1EZF1BNRR10

F 1EFPS1NC6RQ

1AFPNGF1H1 03 CR NT N ZF 13EZFC02 1 E 1 01 MUX

F

1AFPNGF2H01 07 CC I NT N ZF 13EZFC02 S2 C 1 01 JR 1EZF1BNRR11

F 1EFPS1NCTRQ

1AFPNGF2H1 03 ER NT N ZF 13EZFC02 1 E 1 01 MUX

F

1AQFN432A 07 CC FI NT N ZF 13EZFC05 A C 1 01 MUX 1EZF3ANRR01 1EZF3ANRY01 1EZF3ANRK01

T 1EQFS1NC1RJ 1EQFS6NC5KW 1EQFS5NC2FT

1EFPNJ365 02 ER N ZF 13EZFC01 92 E 1 01 JBX 1EZF1ANRR35 1EZF1ANRR36

F 1EFP01NC6RQ 1EFP02NC6RR

T 1EFP01NC2RL

1EHFAJC1 06 CC FI GC TB A ZF 13EZFC06 0 C 1 01 JR01 1EZF3RARR03 1EZF3RARR04 1EZF3RARR05 1EZF3RARR06 1EZF3BARR07 1EZF3BARR13

F 1EHF07AC1RD 1EHF07AC1RE 1EHF07AC1RH 1EHF07AC1RI 1EHF07AC1RJ

J 1EHF01AJ1RA

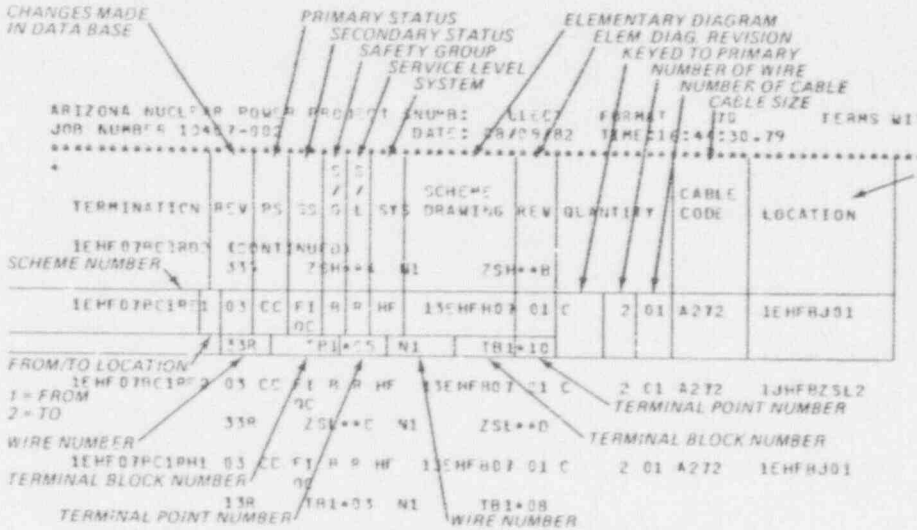
T 1EHF07AC1RA

1 FUEL BLDG

? J-BOX ASSEMBLY DWG 13EZZ5002

EXHIBIT IX-12

TERMINATIONS



TERMINATION	REV	PS	SS	SG	SL	SYS	SCHEME DRAWING	REV	QUANTITY	CABLE CODE	LOCATION	
1EHF07RC1R03 (CONTINUED)												HOLD
33S							ZSH**A N1				ZSH**B	
1EHF07RC1R01	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1EHFBJ01 1HF01
33R							TB1*05 N1				TB1*10	
1EHF07RC1R02	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1JHFBZSL2 1HF01
33R							ZSL**C N1				ZSL**D	
1EHF07RC1RH1	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1EHFBJ01 1HF01
13R							TB1*03 N1				TB1*08	
1EHF07RC1RH2	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1JHFBZSL1 1HF01
13R							ZSL**C N1				ZSL**D	
1EHF07RC1RJ1	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1EHFBJ01 1HF01
13G							TB1*02 N1				TB1*07	
1EHF07RC1RJ2	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1JHFBZSH1 1HF01
13G							ZSH**A N1				ZSH**B	
1EHF07RC1RJ1	03	CC	FI QC	A	R	HF	13EHFR07	01	C	2 01	A272	1EHFBJ01 1HF01
11							TB1*01 N1				TB1*06	
1EHF07RC1RJ2	02	CC	FI NT QC	A	R	HF	13EHFR07	01	C	2 01	A272	1JHFBUY25 1HF01
11							N1					
1EHF08AC1R01	04	CC	DR FI QC	A	R	HF	13EHFR08	01	C	2 01	A271	1EHFAJ02 1HF02
33G							TB1*04 N1				TB1*10	
1EHF08AC1R02	03	CC	FI QC	A	R	HF	13EHFR08	01	C	2 01	A271	1JHFAZSH4 1HF02
33G							ZSH**A N1				ZSH**B	
1EHF08AC1RC1	04	CC	DR FI	A	R	HF	13EHFR08	01	C	2 01	A271	1EHFAJ02 1HF02

EXHIBIT IX-13

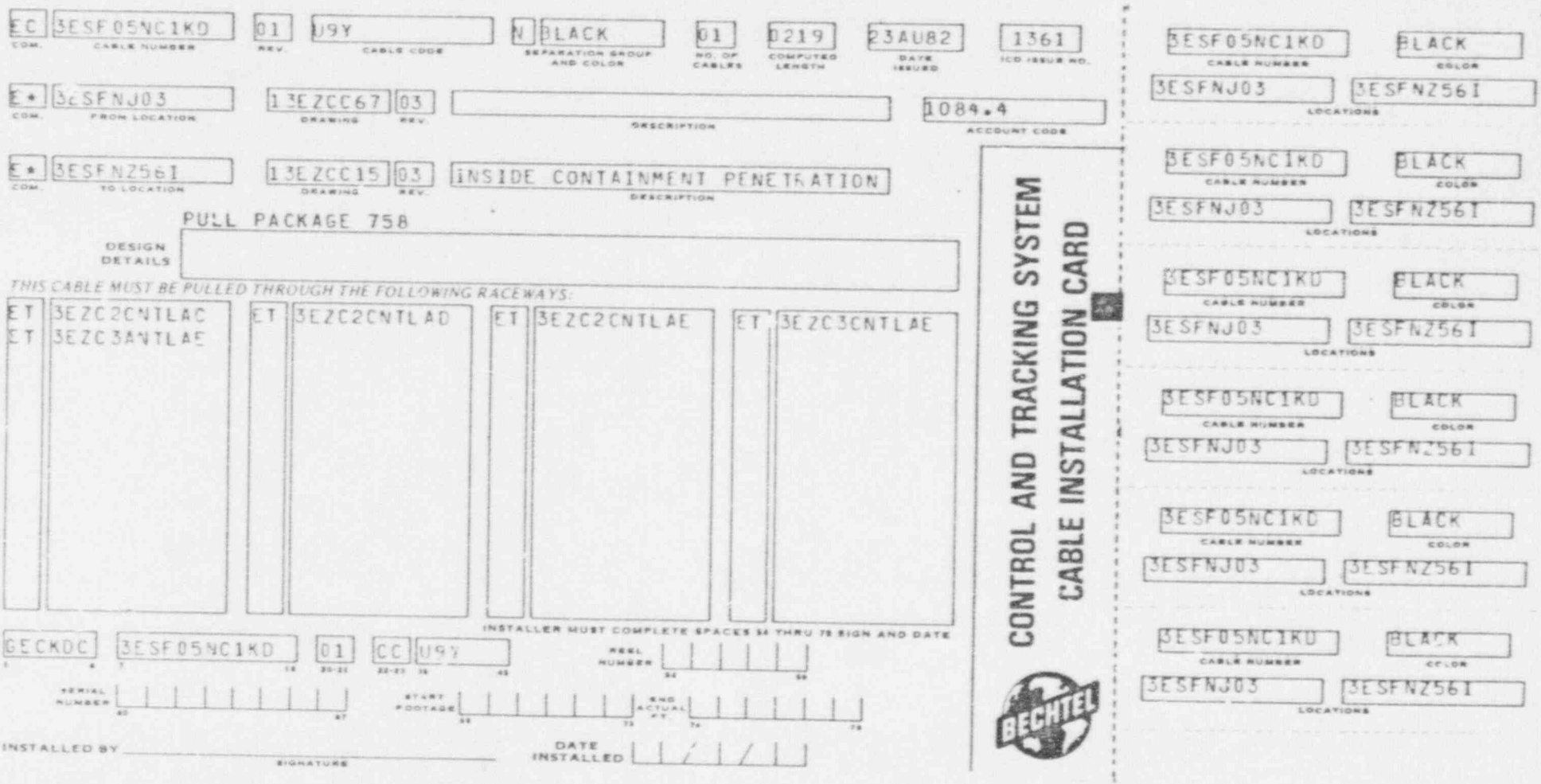


EXHIBIT IX-14

CABLE INSPECTION RECORD

NO.	VERIFICATION DESCRIPTION	RFE	DATE	QCE	DATE	TYPE
1	CABLE ROUTED PER RACEWAYS PRINTED ON FACE OF CARD					
2	CABLE CODE - INSTALLED TYPE CABLE AS ON CARD					
3	SEPARATION - CABLE COLOR CODE AS ON CARD					
4	CABLE PULL SET UP					
5	HOLD POINT					
6	CABLE PULL CALCULATION NUMBER					
7	MAXIMUM ALLOWABLE PULLING TENSION					
8	DYNAMOMETER OR TENSIONOMETER READING					
9	ACTUAL PULLING TENSION					
10	DYNAMOMETER OR TENSIONOMETER S/N-					
	CAL. DATE-					
11	CABLE ENDS SEALED - AS REQUIRED					
12	CABLE ID STUBS FROM CABLE CARD AT EACH END OF CABLE					
13	CABLE SUPPORTED AND SPACED					
14	CABLE LAID IN TRAY BY HAND					
15	CABLE PULLED BY HAND					
****	REMARKS ****					

SIGNATURES	**********	RFE/DATE
		QCE/DATE

EXHIBIT IX-15

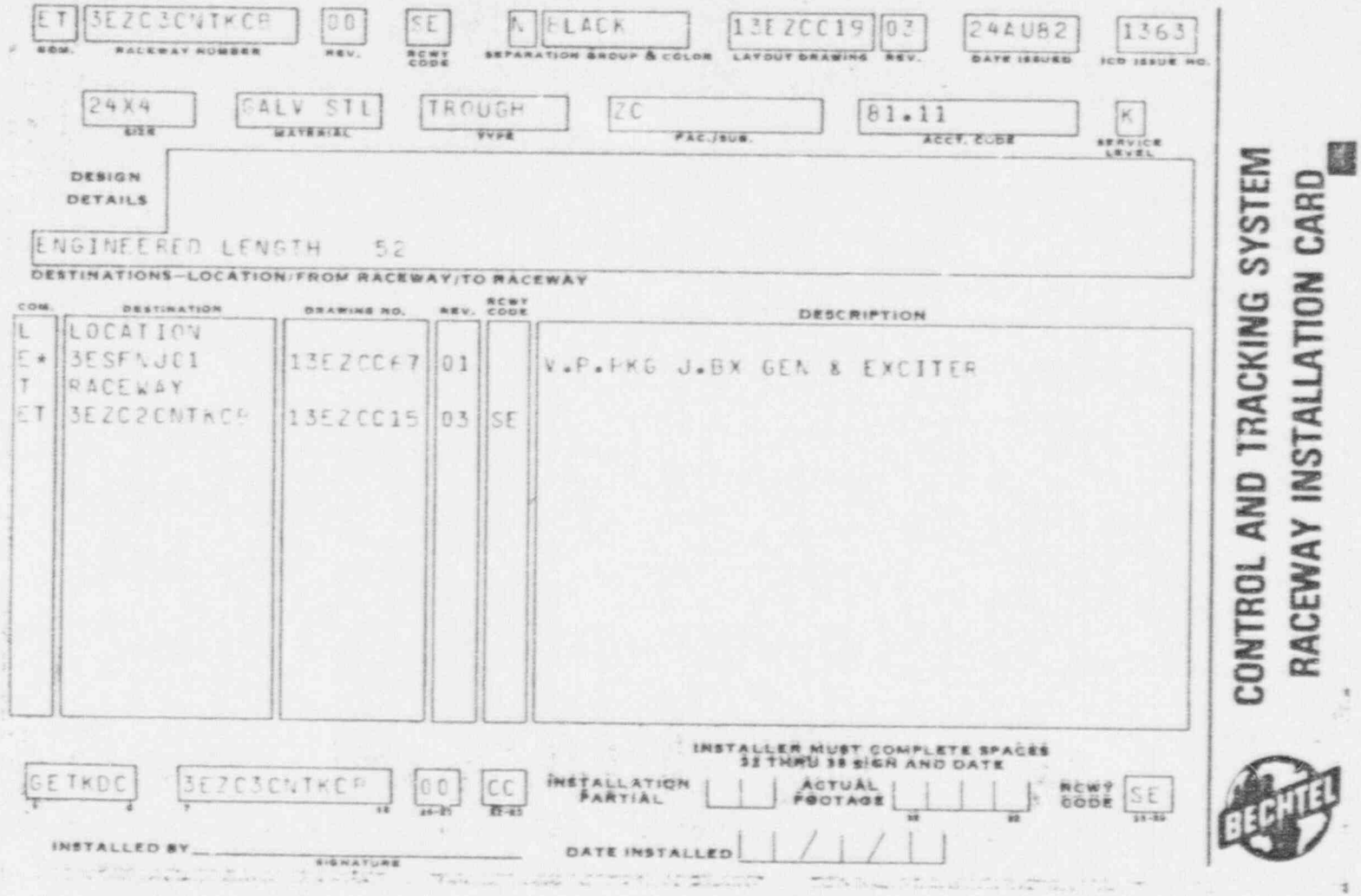


EXHIBIT IX-16

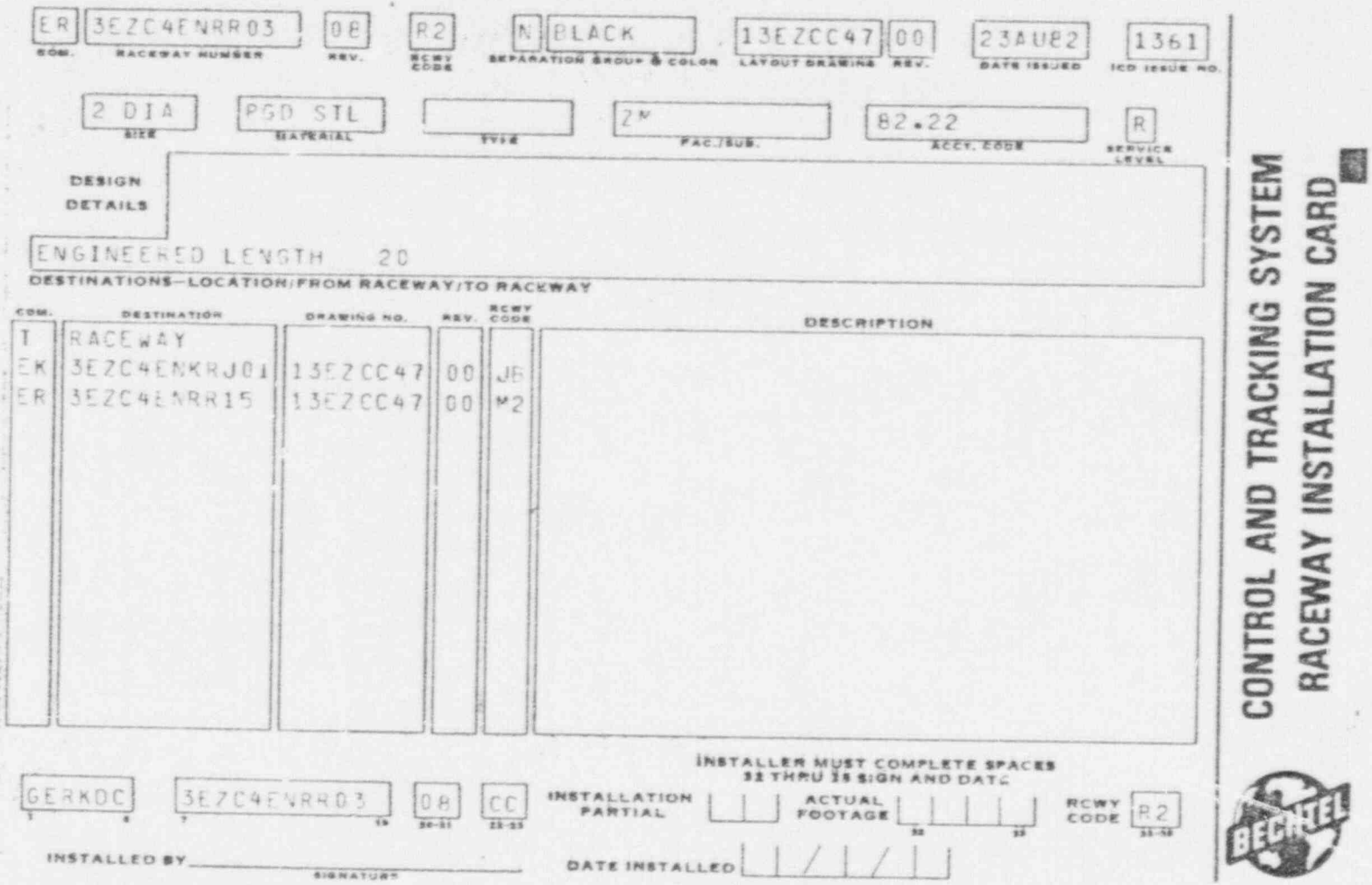


EXHIBIT IX-18

RACEWAY INSPECTION RECORD

NO.	VERIFICATION DESCRIPTION	RFE	DATE	QCE	DATE	TYPE
1	TYPE & SIZE -INSTALLED AS PRINTED ON FACE OF CARD.					
2	INSTALLATION - VERIFIED TO LATEST ENG DESIGNDOCOTS					
3	PULL BOXES - PROPER SIZE & TYPE INSTALLED.					
4	SEPARATION BETWEEN RACEWAY PER LATEST ENGRG. DESIGN.					
5	EXPANSION JOINTS INSTALLED WHERE REQUIRED.					
6	BUSHINGS & PROTECTION INSTALLED.					
7	ID - INSTALLED AS REQUIRED. SPEC. 13-EM-303, REV-					
8	NO SHARP EDGES/SLIVERS.					
9	CONDUIT BENDS - MAX. 360 DEGREES BETWEEN PULL PTS.					
10	* WELDING PER APP/QCI NO. 101.0.					
11	GROUNDING IS PROPERLY INSTALLED.			XXXX	XXXXXXX	XX
12	GRD. FAULT RETURN CABLE PROP. INST.-PWR. TRAYS ONLY.			XXXX	XXXXXXX	XX
13	TRAY SPLICE PLATES PER DWG. 13-E-ZAL-30. T/W S/N-					
	TORQUE WRENCH S/N- CAL DUE DATE-					
14	TRAY SUPP. PER SPEC. 13-EM-302, REV- & APPLIC. DWGS.					
	TORQUE WRENCH S/N- CAL DUE DATE-					
15	CONDUIT & JUNCTION BOX SUPPORTS PER 13-EM-304, REV-					
16	CABLE PROPERLY SUPPORT/RACKED IN MANHOLE					
*	INSPECTION BY APPROPRIATE RFE/QCE.	XXXXXXX	XXXXX	XXXXX	XXXXXXX	XX

REMARKS:

SIGNATURES	SUPERINTENDENT/DATE	RFE/DATE
		QCE/DATE

EXHIBIT IX-19

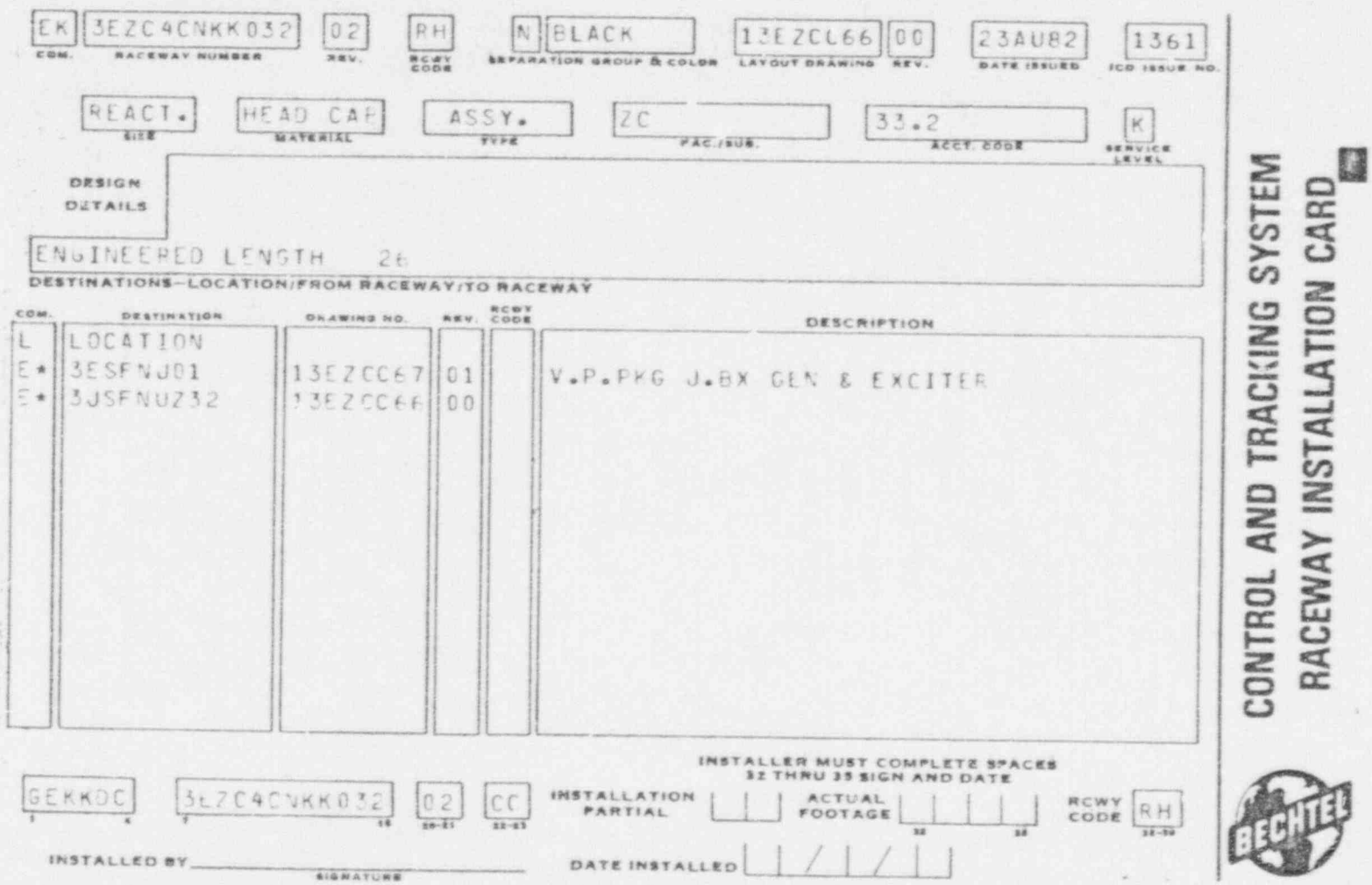


EXHIBIT IX-20

RACEWAY INSPECTION RECORD

NO.	VERIFICATION DESCRIPTION	RFE	DATE	QCE	DATE	TYPE
1	TYPE & SIZE -INSTALLED AS PRINTED ON FACE OF CARD.					
2	INSTALLATION - VERIFIED TO LATEST ENG DESIGNDOCUTS					
3	PULL BOXES - PROPER SIZE & TYPE INSTALLED.					
4	SEPARATION BETWEEN RACEWAY PER LATEST ENGOG. DESIGN.					
5	EXPANSION JOINTS INSTALLED WHERE REQUIRED.					
6	BUSHINGS & PROTECTION INSTALLED.					
7	ID - INSTALLED AS REQUIRED. SPEC. 13-EM-305, REV-					
8	NO SHARP EDGES/SLIVERS.					
9	CONDUIT BENDS - MAX. 360 DEGREES BETWEEN PULL PTS.					
10	* WELDING PER WPP/QCI NO. 101.0.					
11	GROUNDING IS PROPERLY INSTALLED.			XXXXX	XXXXXX	XX
12	GRD. FAULT RETURN CABLE PROP. INST.-PWR. TRAYS ONLY.			XXXXX	XXXXXX	XX
13	TRAY SPLICE PLATES PER DWG. 13-E-ZAL-50. T/W S/N-					
	TORQUE WRENCH S/N- CAL DUE DATE-					
14	TRAY SUPP. PER SPEC. 13-EM-302, REV- & APPLIC. DWGS.					
	TORQUE WRENCH S/N- CAL DUE DATE-					
15	CONDUIT & JUNCTION BOX SUPPORTS PER 13-EM-304, REV-					
16	CABLE PROPERLY SUPPORT/RACKED IN MANHOLE					
*	INSPECTION BY APPROPRIATE RFE/QCE.	XXXXXX	XXXXX	XXXXX	XXXXXX	XX

REMARKS:

SIGNATURES	SUPERINTENDENT/DATE	RFE/DATE
		QCE/DATE

EXHIBIT IX-21

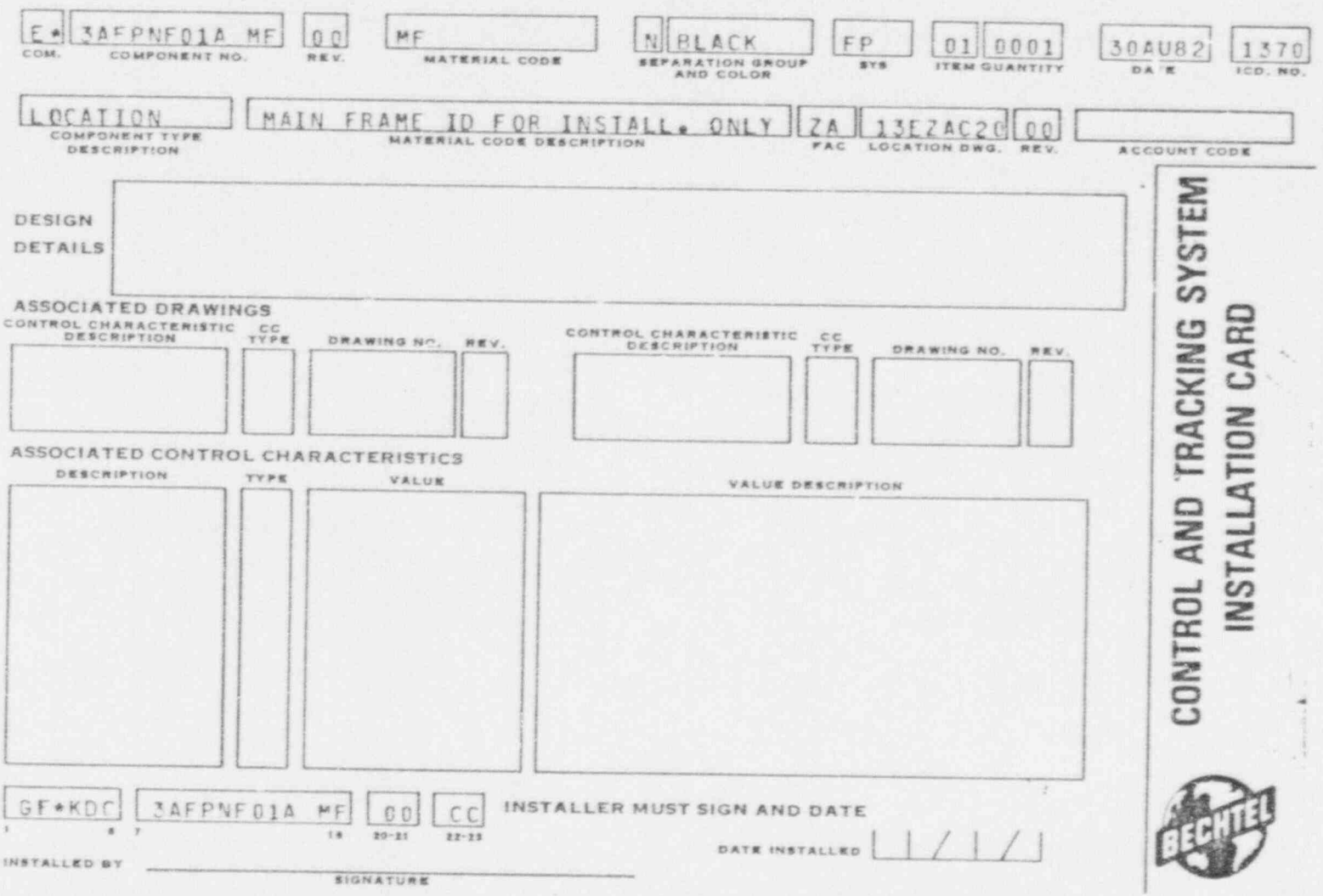
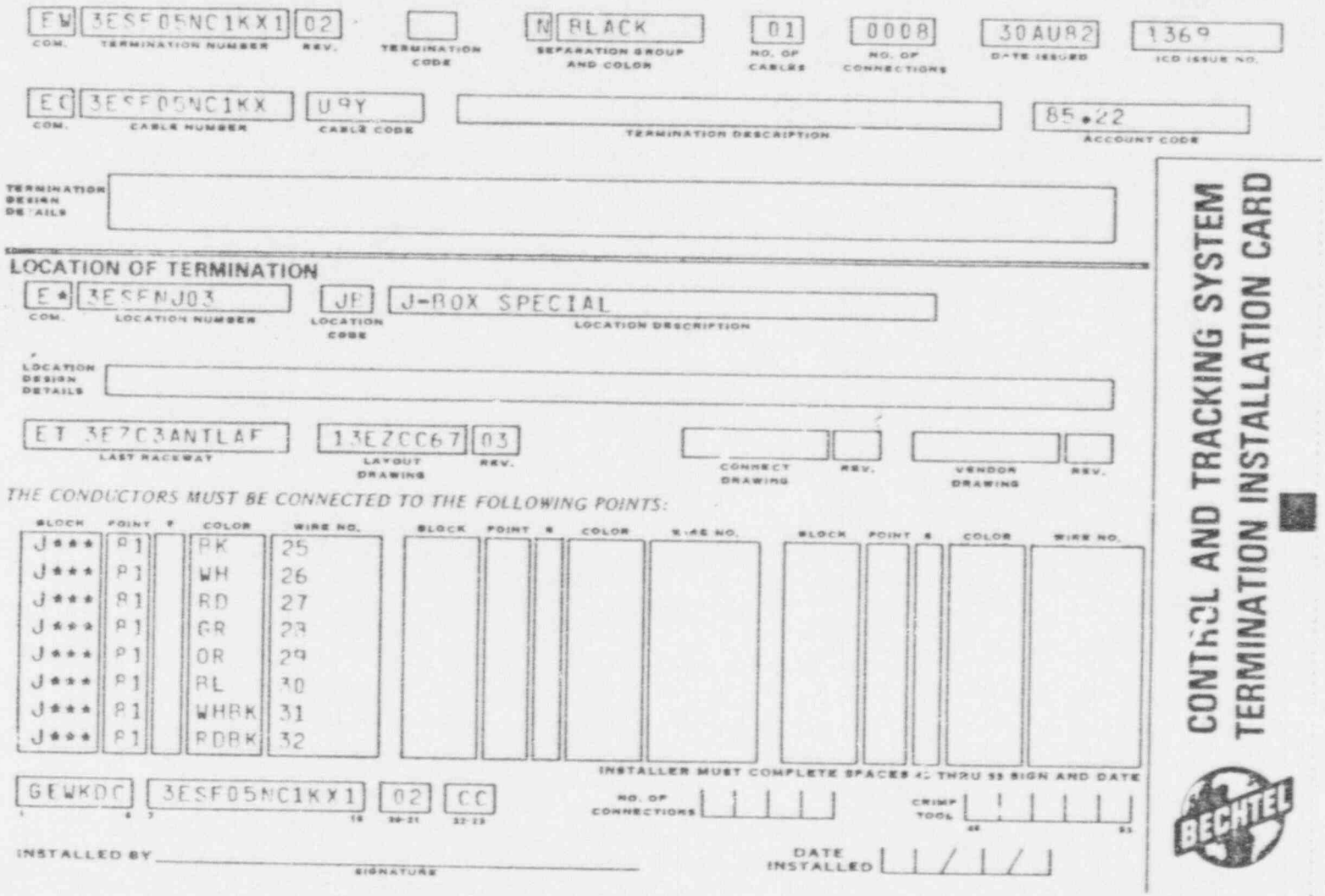


EXHIBIT IX-22



3ESF05NC1KX BL
3ESFNJ03
3ESFNZ56I

3ESF05NC1KX BL
3ESFNJ03
3ESFNZ56I

3ESF05NC1KX BL
3ESFNJ03
3ESFNZ56I

EXHIBIT IX-24

TERMINATION INSPECTION RECORD

NO.	VERIFICATION DESCRIPTION	RFE	DATE	QCE	DATE	TYPE
1.0	FLEX CONDUITS INSTALLED IF REQUIRED.					
2.0	TERMINATION PER -CONTROL AND TRAINING SYSTEM TERMINATION INSTALLATION LABOR-					
3.0	TERMINATION PER SPEC 13-EM-360 REV EXCLUDE TESTING					
4.0	TORQUE WRENCH S/N CALIBRATION DUE					
5.0	CRIMPING TOOL S/N CALIBRATION DUE					
6.0	TERMINATIONS IDENTIFIED PER SPEC 13-EM-303, REV.					
7.0	CABLE TIED, SUPPORTED, AND SEPARATED -IF REQUIRED-					
8.0	GROUNDING IS INSTALLED AS REQUIRED.					

REMARKS

SIGNATURES	SUPERINTENDENT/DATE	RFE/DATE
		QCE/DATE

EXHIBIT IX-25

E J | 3EAF01NJ2XP | 03 | | N BLACK | 01 | 0002 | 30AUG2 | 1359

CON. | TERMINATION NUMBER | REV. | TERMINATION CODE | SEPARATION GROUP AND COLOR | NO. OF CABLES | NO. OF CONNECTIONS | DATE ISSUED | ICD ISSUE NO.

COM.	CABLE NUMBER	CABLE CODE	TERMINATION DESCRIPTION	ACCOUNT CODE
		A17		85.23

TERMINATION DESIGN DETAILS

LOCATION OF TERMINATION

COM.	LOCATION NUMBER	LOCATION CODE	LOCATION DESCRIPTION
E*	3JAFNTE80	TC	THERMOCOUPLE

LOCATION DESIGN DETAILS

LAST RACEWAY	LAYOUT DRAWING	REV.	CONNECT DRAWING	REV.	VENDOR DRAWING	REV.
	13EZCC45	12				

THE CONDUCTORS MUST BE CONNECTED TO THE FOLLOWING POINTS:

BLOCK	POINT	S	COLOR	WIRE NO.	BLOCK	POINT	S	COLOR	WIRE NO.	BLOCK	POINT	S	COLOR	WIRE NO.
GNDB	US		GRAY	GND										
TF**	*N		GRAY	GND										

INSTALLER MUST COMPLETE SPACES 48 THRU 53 SIGN AND DATE

GEJKDC | 3EAF01NJ2XP | 03 | CC

1 6 7 14 20-21 22-23

NO. OF CONNECTIONS | CRIMP TOOL (48 53)

INSTALLED BY _____ SIGNATURE

DATE INSTALLED __/__/__

CONTROL AND TRACKING SYSTEM
TERMINATION INSTALLATION CARD

BECHTEL

3EAF01NJ2XP EL
3JAFNTE80

3EAF01NJ2XB BL
3JAFNTE80

3EAF01NJ2XB BL
3JAFNTE80

EXHIBIT IX-26

TERMINATION INSPECTION RECORD

NO.	VERIFICATION DESCRIPTION	RFE	DATE	QCE	DATE	TYPE
1.0	ELEC CONDUITS INSTALLED, IF REQUIRED.					
2.0	TERMINATION PER -CONTROL AND TRACKING SYSTEM TERMINATION INSTALLATION CARD-.					
3.0	TERMINATION PER SPEC 13-EM-205, REV EXCLUDE TESTING					
4.0	TORQUE WRENCH S/N CALIBRATION DUE					
5.0	CRIMPING TOOL S/N CALIBRATION DUE					
6.0	TERMINATIONS IDENTIFIED PER SPEC 13-EM-303, REV.					
7.0	CABLE TIED, SUPPORTED AND SEPARATED -IF REQUIRED-.					
8.0	GROUNDING IS INSTALLED AS REQUIRED.					

REMARKS:

SIGNATURES	SUPERINTENDENT/DATE	RFE/DATE
		QCE/DATE

EXHIBIT IX-27

ANPP

PVNGS WORK REQUEST

ORIGINATOR

W/	ORIGINATOR NAME:	STA.:	EXT.:	DATE:	TIME:
2399	L. Mitchell	6078	63905	1/8/88	AM

FULL EQUIPMENT TAG NUMBER:	UNIT:	SYSTEM:
1EQBN001, 002, 003, 004	1	QD

EQUIPMENT FUNCTION DESCRIPTION:	LOCATION:	PLANT MODE:
EMERGENCY LIGHTING UPS UNITS	AUX. 120'EL, 100'EL CONTROL BLDG 100'EL	1 2 3 4 5 6 7 8 9 0

PROBLEM DESCRIPTION:

PER LER 86-059-00 (ATTACHED) ANPP COMMITTED TO PERFORM AN ANNUAL 8 HOUR BURN TEST ON EMERGENCY LIGHTING SYSTEM TO ENSURE THE SYSTEM MEETS FSAR. THE ABOVE UPS UNITS WERE DUE APP. DEC. 14, 1987. UPS UNIT 1EQBN004 NEEDS WORK PER W.O. 234339 PARA. 7 OF UNIT 1 OPER. LICENSE STATES IN PART, APS SHALL MAINTAIN IN EFFECT FSAR AMEND. 14 & SER SUP. 8 - PARA. 9.5.1.4 STATES 8 HR. EMERGENCY LIGHTS ARE PROVIDED IN ALL AREAS OF SAFE SHUT DOWN

RECOMMENDED ACTION:

PERFORM WORK ON 1EQBN004 AND DO PM TASKS FOR 8 HR. BURN TEST ON 1EQBN001, 002, 003 & 004 TO PROVE SYSTEM IS OPERABLE

STATUS AT FAILURE ____
EFFECT ON SYSTEM ____ ____
EFFECT ON PLANT ____ ____ ____
FAILURE DETECTION ____ ____
PLANT FAILURE MODE ____
RESTRICT MODE ____

ORIGINATING SUPERVISOR:	EXT.:	DATE:	PRIORITY: / NEED DATE:
RELEASING ORG. SUPV.:	EXT.:	DATE:	PRIORITY: / NEED DATE:

COMMENTS: LICENSE COMMITMENT

REPORTABLE REVIEW

REPORTABLE:

☐ Yes ☐ No REVIEWER SIGNATURE _____ DATE _____

MCC

RECEIVED BY: _____ DATE: _____ TIME: _____

DISPOSITION (✓):

☐ WORK ORDER ISSUED
WO NO.: _____
PRIORITY: _____
☐ BLANKET WORK ORDER
WO NO.: _____
☐ PCR REQUIRED
☐ EER INITIATED
☐ WR NOT APPROVED
DISCIPLINE ASSIGNED _____

COMMENTS:

TECHNICAL APPROVAL: _____ EXT.: _____ DATE: _____

PV419-07BA Rev. 9-85 ORIGINAL COPY — MCC • DUPLICATE COPY — ORIGINATOR

- Nuclear Engineering-Electrical is assigned the overall responsibility for the project, to plan schedule and coordinate the efforts in accomplishing the corrective actions.

  - EAR 87-1919 & 87-1928
    Nuclear Engineering to review the site Mod and FCR procedures and issue change documents as necessary by November 10.

  - EAR 87-1920
    Nuclear Engineering to review EE-580 related procedures listed below and prepare change documents as necessary by 12-31-87. Cable and raceway control (7N414.04.00), PCP procedure (7N412.01.00), technical review for site Mods (73AC-9ZZ-31), policy for plant change (7P412.00.00), work control (30A-9ZZ.01), EE-580 configuration control (IP5.30), design change package (I412.01.02), PCR procedure (7N412.02.00).

  - EAR 87-1921
    Nuclear Engineering to prepare EE-580 training curriculum and submit to MTC. MTC to coordinate with training department to plan and schedule training. Training plan and material to be ready by December 31, 1987. MTC to coordinate with training department to hold training classes for OPS I&C, Electrical and Mechanical Engineers, Nuclear Construction Engineers, Technical Support Engineers, Outage Management, Nuclear Engineering, Maintenance Planner Coordinators, I&C Systems Engineers, Nuclear Process Chemistry Engineers. To be completed by February 28, 1988.

  - EAR 87-1922
    Nuclear Engineering to coordinate the efforts to check the installation cards against database (CCl dump) for *C discrepancies and update the database.

  - EAR 87-1922
    Nuclear Engineering to perform walkdowns and retrofit IC cards if there are any IC cards missing.

- NED's Progress report is as follows:

  - Issued 4 EAR's (87-1919, 87-1920, 87-1921, 87-1922) to track and resolve the corrective actions.

  - Prepared administrative change request for FCR procedure PM01.03 Reference EAR 87-2128.

  - Prepared administrative change request for Cable and Raceway Control and Tracking System, ES03.03 (was 7N414.04.00) Reference EAR 87-1920.

- Prepared Administrative Change Request for Design Change Package Instruction 7I412.01.02. Reference EAR 87-1920.

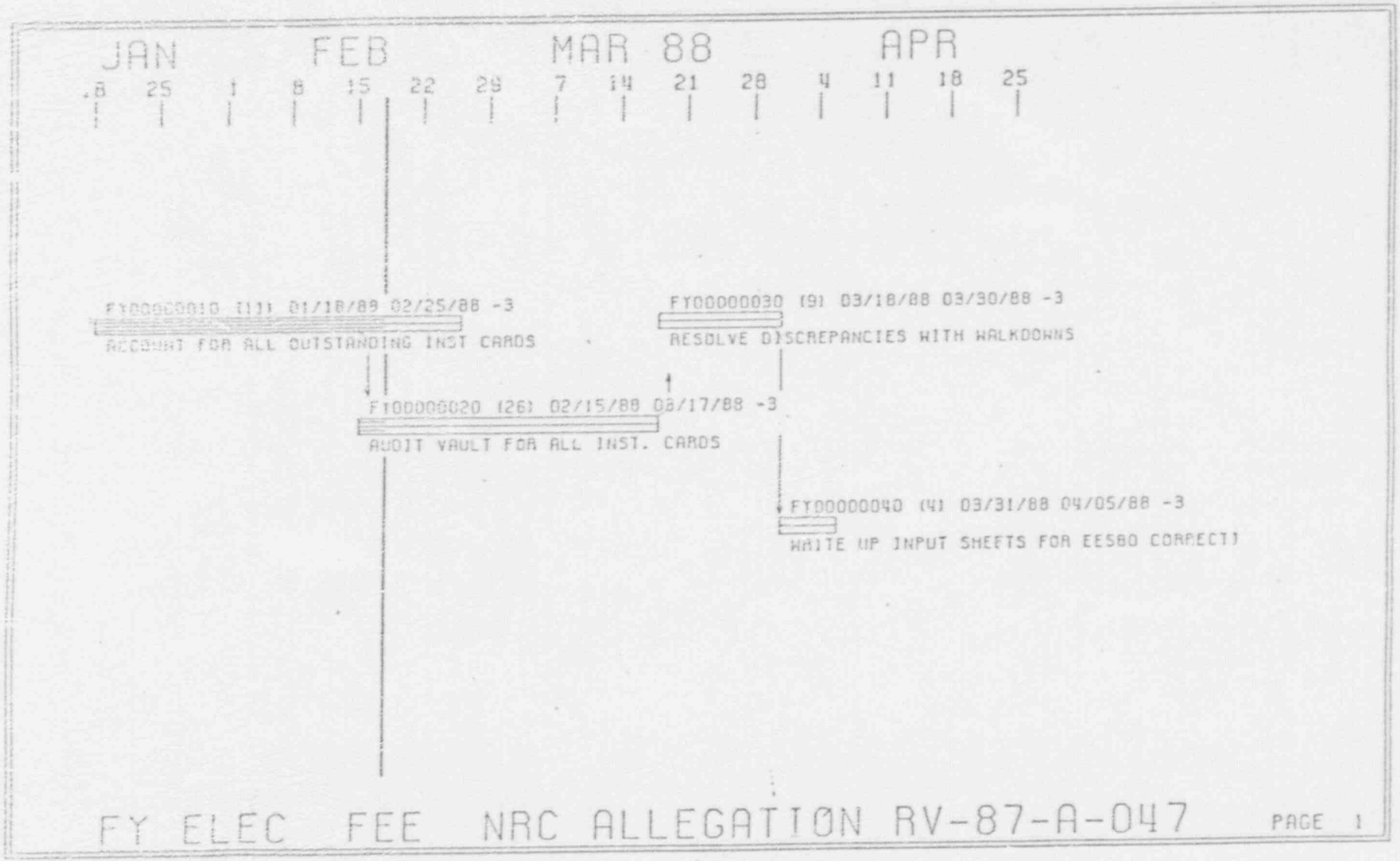
- Prepared administrative change request for practice for plant changes PM01.01 was 7N412.01.00. Reference EAR 87-1920.

- Jobsite task force for investigation and resolution of installation card discrepancies began activities on January 19, 1988. Reference EAR 87-1922.

- Detailed jobsite task force progress report attached. Reference EAR 87-1922.

FE 02/24/88

JBJ 2/25/88


JAN
FEB
MAR 88
APR
18 25 1 8 15 22 29 7 14 21 28 4 11 18 25
FY00000010 (11) 01/18/88 02/25/88 -3
ACCOUNT FOR ALL OUTSTANDING INST CARDS
FY00000030 (9) 03/18/88 03/30/88 -3
RESOLVE DISCREPANCIES WITH WALKDOWNS
FY00000020 (26) 02/15/88 03/17/88 -3
AUDIT VAULT FOR ALL INST. CARDS
FY00000040 (4) 03/31/88 04/05/88 -3
WRITE UP INPUT SHEETS FOR EES80 CORRECT)
FY ELEC FEE NRC ALLEGATION RV-87-A-047
PAGE 1

Arizona Nuclear Power Project

COMPANY CORRESPONDENCE

201-00163-RJA/CED

DATE March 24, 1988

TO Distribution

Sta #

Ext #

FROM L.L. Henson/C.E. Day

Sta #	6078	6070
Ext #	2657	3543

File: 88-001-403

SUBJECT: Control and Use of Installation Cards Associated With the EE-580 Cable and Raceway Tracking System

On March 22, 1988 the Plant Standards and Control Department contacted D. Smyers and M. Eskinazi concerning the lack of adequate controls in place for the EE-580 Cable and Raceway Tracking System. Procedure ES030.03 does not provide adequate instruction for the Maintenance Department in the use and control of the installation cards associated with the EE-580 tracking system.

Maintenance has in the past utilized a department directive, (MDD-05) to govern how the installation cards are utilized and completed for design changes at Palo Verde. Since the reorganization, it is necessary to provide the new procedural controls to direct maintenance activities in this area. It is the opinion of the Plant Standards and Control Department that this procedure should fall under the Engineering series of plant procedures. Concurrence was obtained from D. Smyers and M. Eskinazi of the Engineering Evaluations Department and Nuclear Engineering respectively.

Engineering, with Plant Standards and Control support, will develop a new procedure to address, when an installation card is to be utilized, how to complete the cards, the mechanism for requesting cards, the mechanism for transmitting completed cards, etc. The Engineering Evaluations Department has agreed to dedicate one Engineer to develop the procedure. Nuclear Engineering has agreed to provide an Engineer to review the completed procedure and revise ES03.03 as necessary to meet the needs of the EE-580 program. Plant Standards and Control has agreed to provide one consultant to assist in the development of the new procedure to ensure the concerns of all Maintenance Departments and Nuclear Construction are addressed.

The new proposed procedure will expand upon ES03.03 to ensure consistent utilization of the installation cards associated with the EE-580. This procedure will provide direction on when to use the installation cards, how to request cards, how to complete cards, and how to forward cards to the responsible department upon completion of work.

cc:	E.C. Sterling	7024	R.M. Butler	6102
	G.W. Sowers	6102	J.T. Barrows	7042
	R.J. Adney	6070		

NEW COURSE NUMBER NNE36-00

COURSE OVERVIEW

TITLE: Requirements for Control of the EE-580 Program REQUIRED BY: D

PURPOSE/OBJECTIVES: Review NRC Allegation RV-87-A-047
Review Procedural Changes

DESIGNED FOR: PVNGS Site Engineering, Construction, Maintenance, Work Control

PREREQUISITES: N/A

METHODS/MEDIA: Lecture, Overhead slides

LENGTH: 1 Hours

HOW SCHEDULED: 4 1-hour sessions

CLASS SIZE: Min. 5-10 Op. 12-16 Max. 20-40

MEASUREMENT/EVALUATION/TESTS:

Yes, NRC Allegation, Basic design and review process, important points to EE-580
No Exam

MAJOR TOPICS/CONTENT:

NRC Allegation RV-87-A-047

Corrective Action

Engineering Preparation Review Process per ANSI N45.2.11

Procedural Changes

EE-580 Brief Description

CONTACT:

Debra Groom
Name

3/18/88
Date

NTC Specialist
Position

ANPP-Bldg. B - Station 7011
Location

4610 or 4566
Phone

Palo Verde Nuclear Generating Station
Arizona Public Service Company

I. TITLE

Lesson Number: NNE36-00-XC-001-00
Course Title: Requirements for Control of the EE-580 Program
Lesson Title: Requirements for Control of the EE-580 Program
Duration: 1 Hour (4 1-hour sessions)

Revision Number: 0
Revision Date: 3/18/88
Author: Debra Groom
Approval: Frank Prawlocki

II. INITIATING DOCUMENT(s)

NRC Allegation RV-87-A-047

III. TOPIC REQUIREMENTS

Allegation
Response to Allegation
Procedural Changes
Stress Issues

IV. CONTENT REFERENCES

N/A

V. MATERIALS REQUIRED

Overhead projector and slides

PV403 00AB (11-84)
4196 920124 (PK:250)

Arizona Nuclear Power Project

167-02099-JTB/EC
DATE: March 15, 1988

TO: Rich Badsgard
Sta.# 6772
Ext. 7216

Prepared by:
Signature E. Chan
Name/Ext./Sta. E. Chan/4228/7042

Reviewed By:
Signature M. E. Eskinazi 3-11-88
Name/Ext./Sta. M. Eskinazi/4313/7042

Approved by:
Signature J. T. Barrow 3/15/88
Name/Ext./Sta. J. T. Barrow/4051/7042

SUBJECT: File: 88-008-419
Cancellation of PCR #87-13-QD-004

Please cancel the subject PCR based on the reasons below. Linda Mitchell has been informed of this action. She concurs with it. JTB/jt 3/15/88

System Engineer: Linda Mitchell
PCR Requestor: Linda Mitchell

Justification:

- Records of previous work orders for the emergency lights in Unit 2 MSSS indicate three emergency units having problems with deformed lense rings and heads, and bad printed circuit boards. The problem was resolved by replacing the deformed lense rings and heads with parts made to withstand higher temperatures, and changing the printed circuit boards.

- Failures of the printed circuit boards were not confined only to the MSSS but have occurred throughout the plant. Therefore, high temperatures and moisture can be ruled out as the exclusive cause of the printed circuit board problem. The information regarding where the printed circuit boards are being replaced was obtained from T. J. Fitzpatrick, Unit 2 electrical foreman.

- All emergency lighting units in Unit 2 MSSS successfully passed the "burn test".

- Because of the above, there is no economic justification to replace all of the existing emergency lighting units in the MSSS with new units designed to provide protection against corrosion, splashing water and hose directed water (NEMA 4X). This work is considered to be a betterment item with an associated priority of D.

Should you have any questions, please contact Ed Chan at extension 4248.

ECS/EC/deh

cc: Linda Mitchell

I/6 gb1

ANPP
PCR CANCELLATION REQUEST

PCR NO. 87-13-QD-004

SYSTEM ENGINEER	EXT.	PCR REQUESTOR	EXT.
L. Mitchell	6327	L. Mitchell	6327

CANCELLATION REQUEST INITIATOR	ORGANIZATION	EXT.	DATE
John Barrow	E.E.	4051	3-23-88

JUSTIFICATION FOR CANCELLATION REQUEST: See letter # 167-02099- JTD/EC (attached)

CANCELLATION: YES [✓] NO [ ]
REMARKS:

CANCELLED BY D.V. ENG.-

PCR cancelled Per System Engineer
3.25-88
mw

L. Mitchell
SYSTEMS ENGINEER SIGNATURE

3-24-88
DATE

NOTE: PLEASE RETURN SIGNED ORIGINAL TO APS PCR COORDINATOR

CANCELLATION NOTIFICATION:
APS PCR COORDINATOR TO ADVISE _____ EXT. _____
WITH REGARD TO ACTION TAKEN.

I/7

ANPP

PLANT CHANGE REQUEST

1 PCR NO. 87-13-QD-004

PRIORITY

2 UNIT 1 ☑ UNIT 2 ☑ UNIT 3 ☐ OTHER ☐ COMMON ☐ WRF ☐

3 SYSTEM QD

EQUIPMENT NO. EMERG. LIGHTS IN MSSS

4 COMPLETION DATE

REQUIRED ☑ DESI

5 STRUCTURE(S), SYSTEM(S), AND/OR COMPONENT(S) AFFECTED:

EMERGENCY LIGHTS IN MSSS, SCL-72A-14-081-12, SCL-72A-14-081-11, SCL-72A-14-081-02, SCL-72A-14-081-01, ZCL-72A-14-100-04, ZCL-72A-14- SCL-72A-14-120-06, SCL-72A-14-120-14, SCL-72A-14-120-05, SCL-72A-14-12 ZCL-72A-14-132-08, ZCL-72A-14-132-07, ZCL-72A-14-140-09 & ZCL-72A-14-140-10

DWGS. 13-E-ZCL-007 & 008

6 DESCRIPTION:

LIGHTS IN MSSS ARE FAILING DUE TO HIGH TEMPERATURE AND EXCESS HUMIDITY. THE LIGHTS IN MSSS AREA WERE NOT DESIGNED TO BE PUT IN AN AREA WITH HIGH TEMPERATURES AND MOISTURE.
PLASTIC HEADS ARE MELTING, BOARDS INSIDE LIGHTS ARE MELTING AND W INSIDE LIGHTS IS CAUSING CORROSION AND FAILURE OF LIGHTS.
MANY OF THESE LIGHTS ARE IN THE SAFE SHUTDOWN PATH AND MUST BUR FOR 8 HOURS PER APPENDIX R AND FSAR REQUIREMENTS - (MOUNT LIGH SEISMIC CAT II.)

7 JUSTIFICATION FOR CHANGE:

EER 86-QD-037

SAFE SHUTDOWN LIGHTS IN EL. 81' & 120' EL. MUST BURN 8 HRS PER FS & APP. R REQUIREMENTS

CONSIDERABLE MAINTENANCE SAVINGS

8 REGULATORY COMMENT: YES ☑ NO ☐ IF "YES" IDENTIFY COMMITMENT: SAFE SHUTDOWN LIGHTS FSAR 9.5.3 & 14B.10

9 REQUESTED BY: L. Mitchell (SIGNATURE) DATE: 1/16/87 ORGANIZATION: OPS ENG EXT.: 6327 STA.: 607

10 APPROVED BY DEPARTMENT HEAD: [signature] for E. Sowers DATE: 1/22/87

11 PRIORITY RECOMMENDATION: B1/N2 (PRIORITY) REVIEWED BY: L. Mitchell (ENGINEERING) DATE: 1/16/87

12 PAPER CHANGE ONLY: DATE: DATE:

SAFETY REVIEW

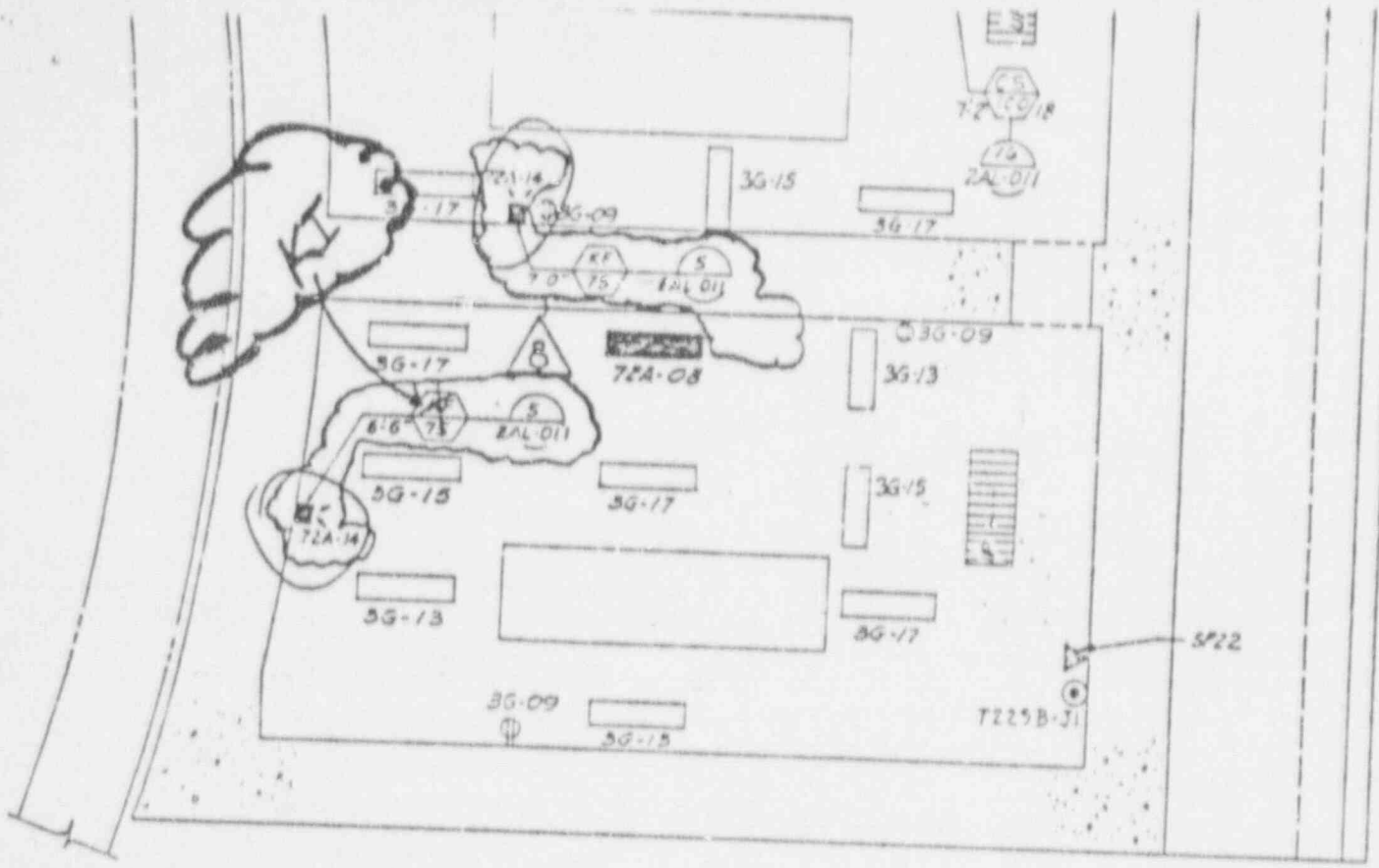
PRB

DRAWING UPDATED

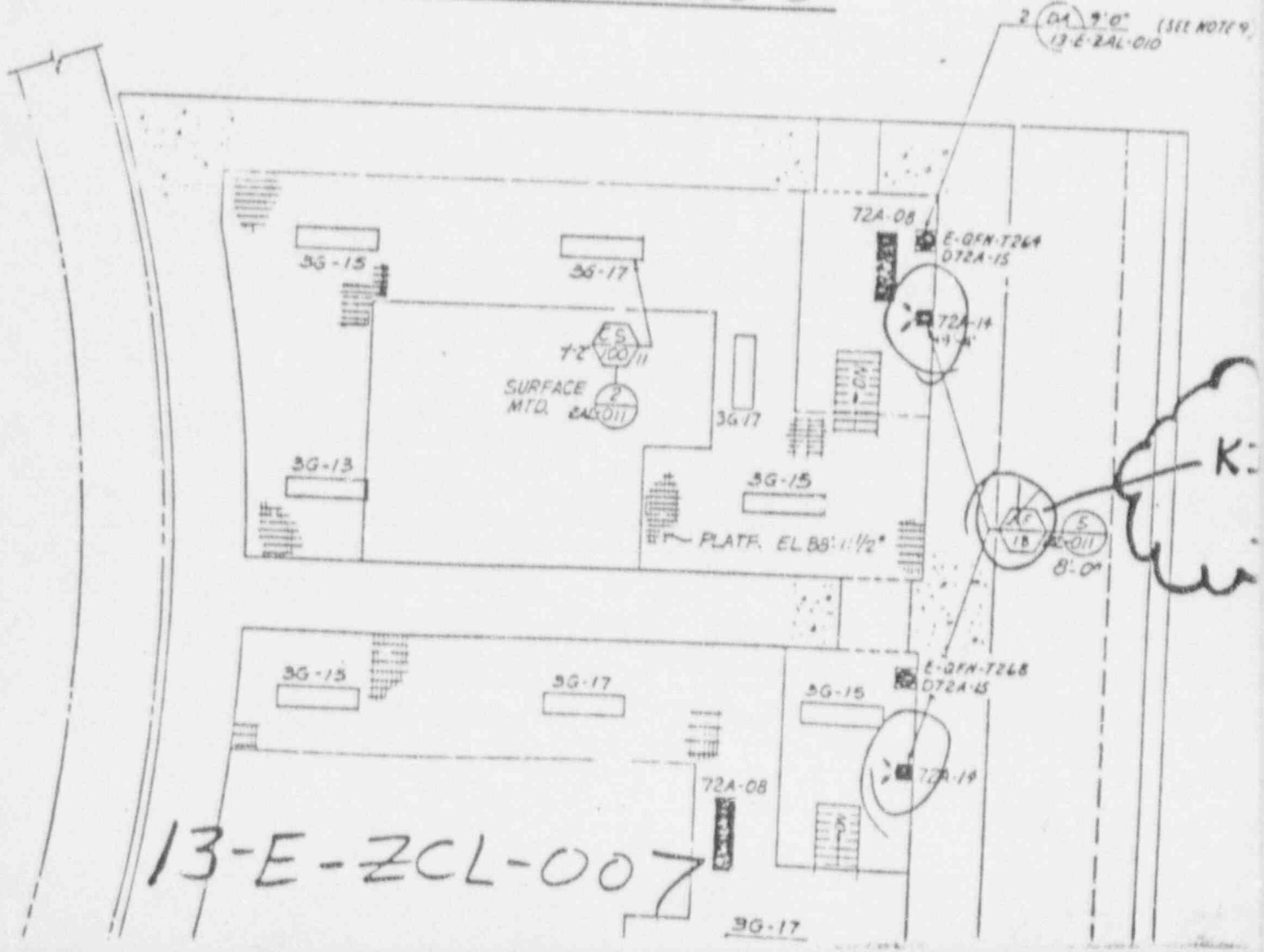
PVNGS PLANT MANAGER

PV41#-90A (Rev 1-85)

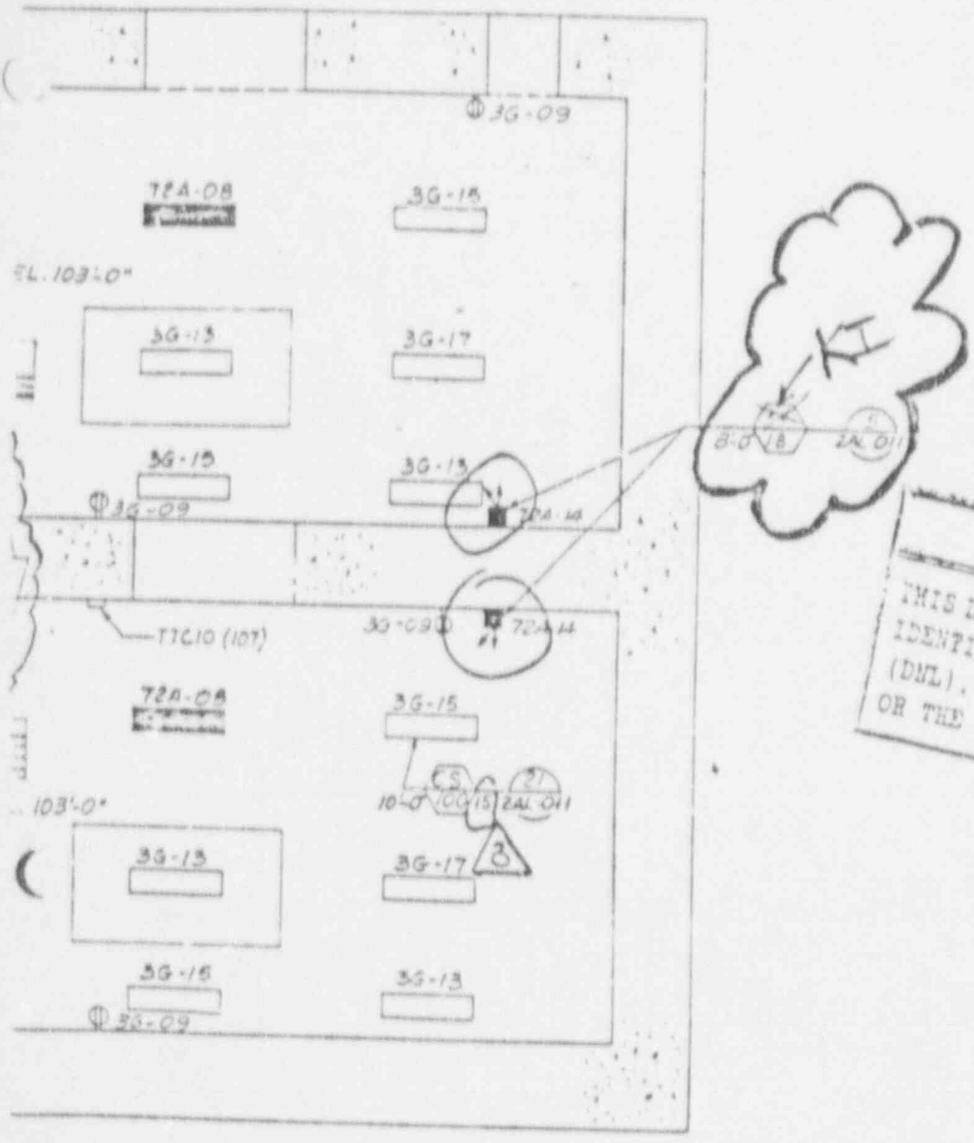
OE-269

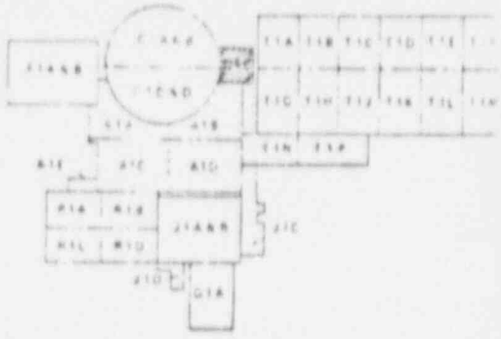


LOWER FLOOR PLAN - EL 81'-0"



13-E-ZCL-007





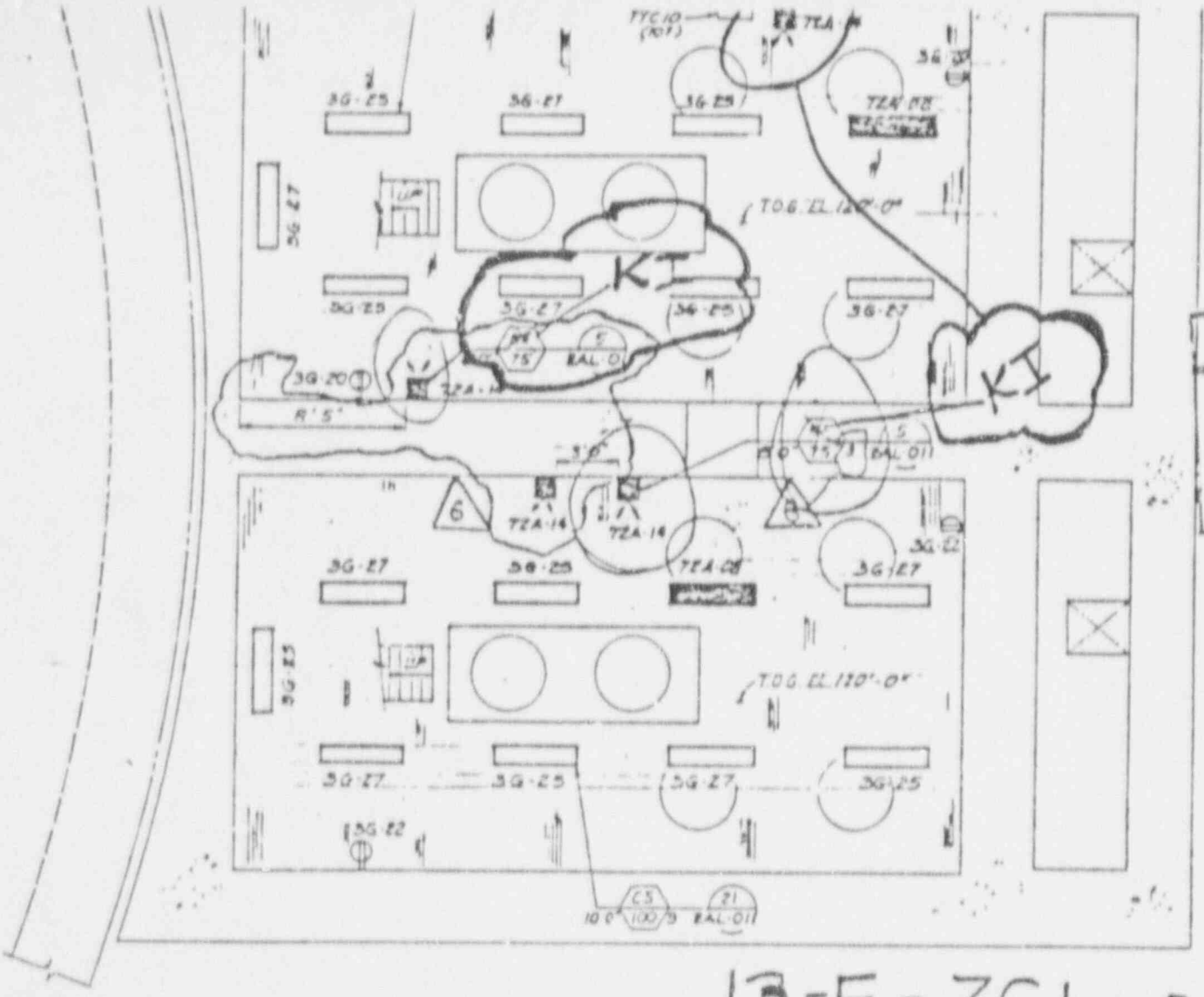
KEY PLAN

.OOR PLAN-EL 100'-0"

13-E-ZCL-007

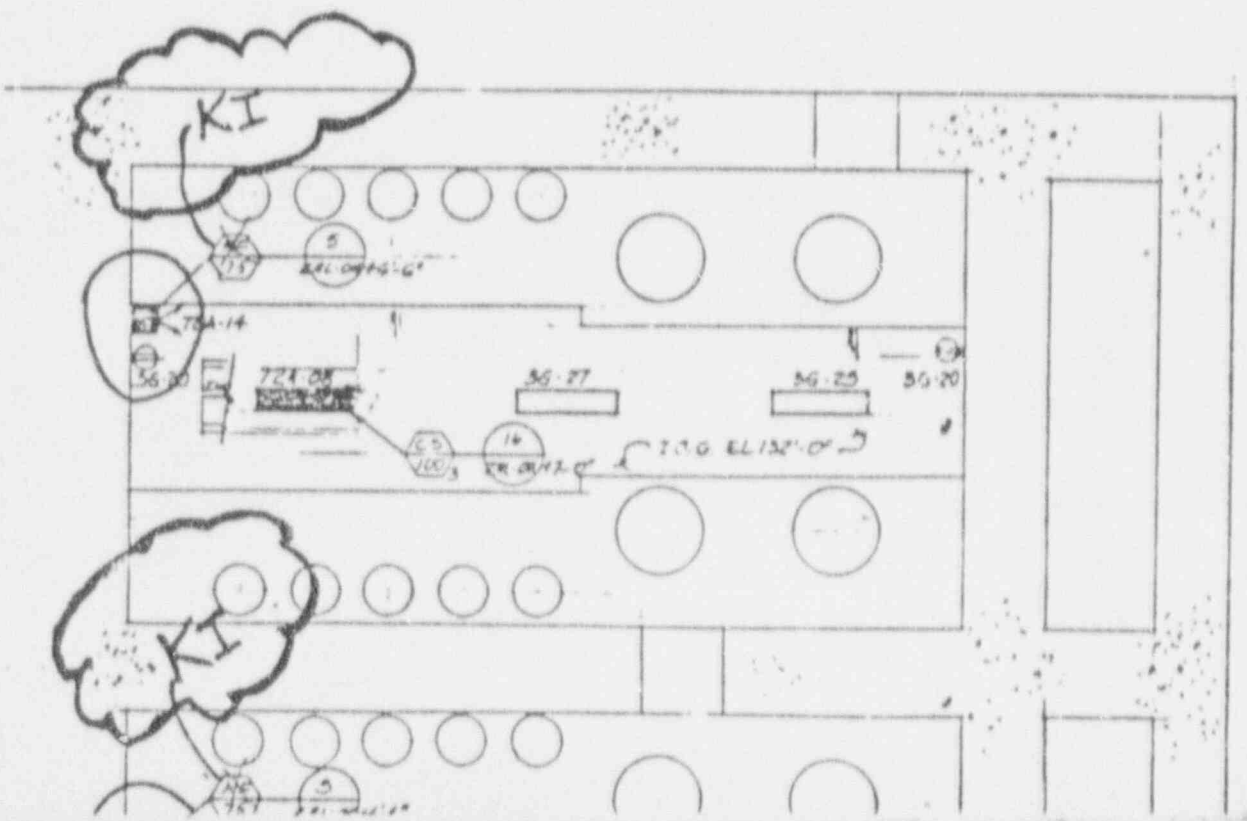
NOTES:

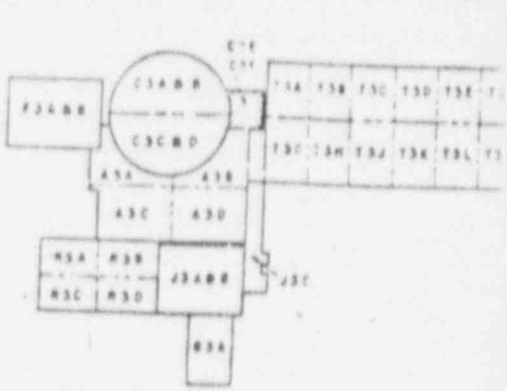
1. FOR ELECTRICAL SYMBOLS, FIXTURE SCHEDULE AND NOTES SEE DWG. 13-E-ZAL-010.



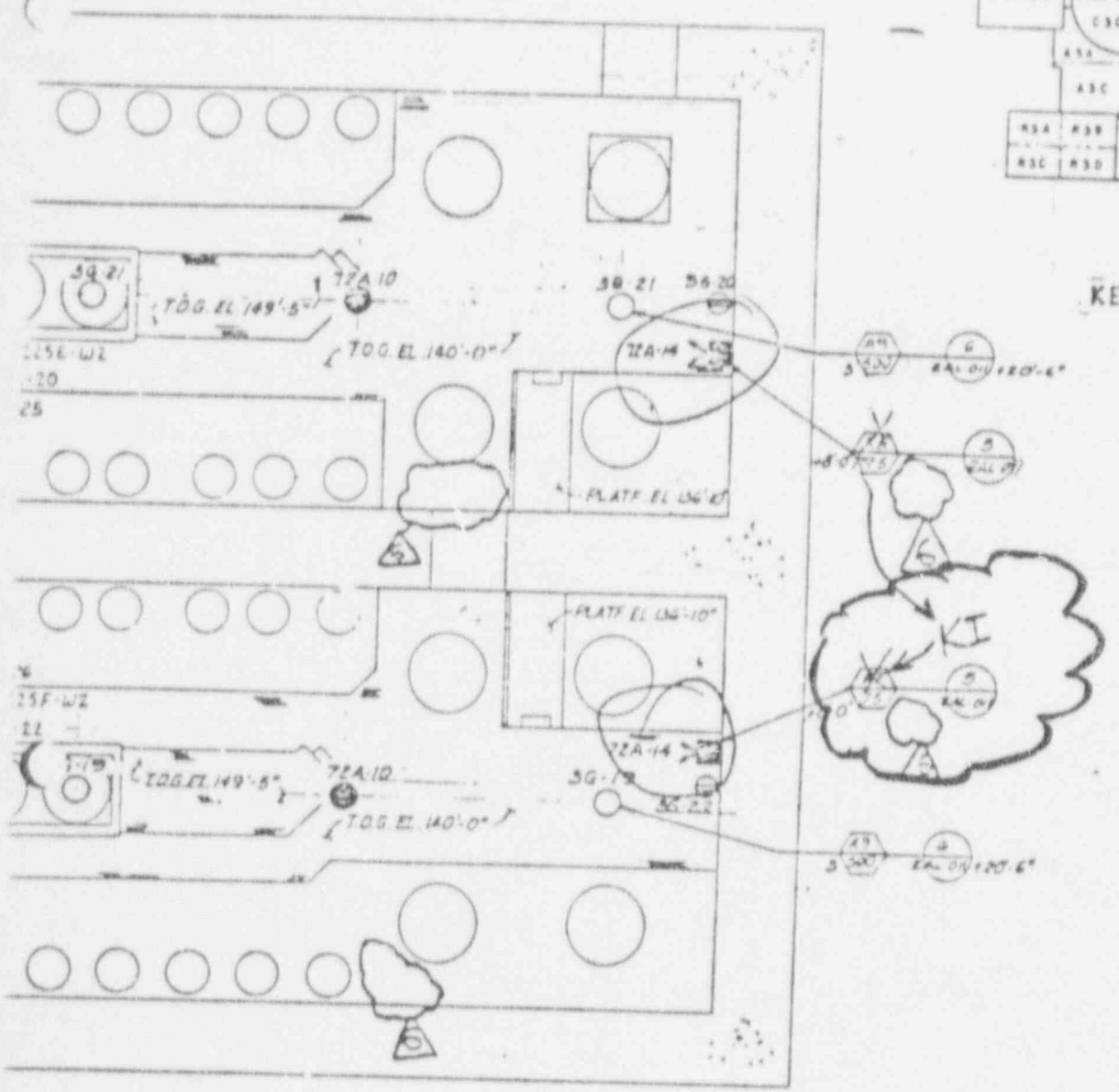
13-E-ZCL-00

FLOOR PLAN EL. 120'-0"

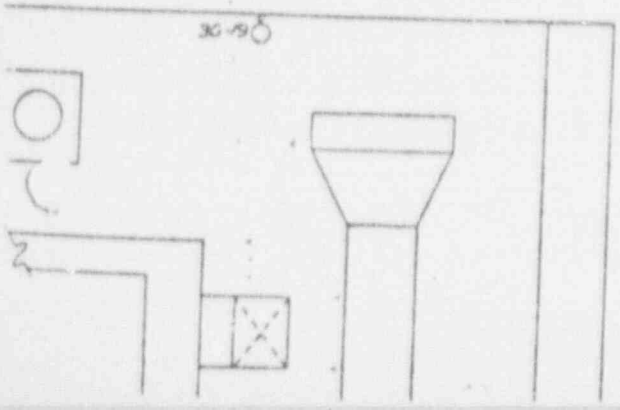




KEY PLAN



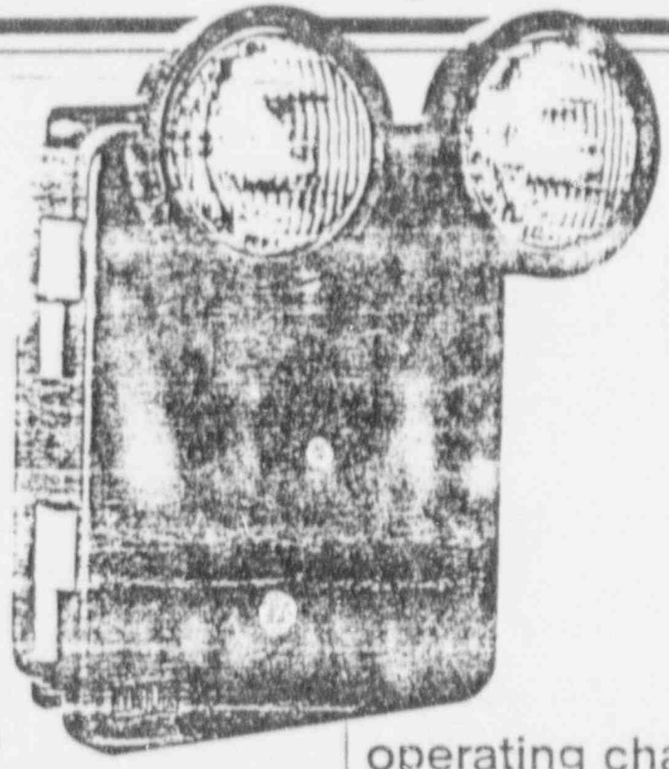
FLOOR PLAN EL. 140'-0"



13-E-ZC-008

NEMA 4X Series

Compact, sealed and gasketed emergency lighting units with remote capability feature oil, water, and dust-tight construction with a NEMA 4X rating.



features

- Completely self-contained
- Fully automatic operation
- NEMA 4X rating
- Sealed and gasketed construction
- Sealed maintenance-free long life lead batteries
- Standard with two glare-free sealed beam PAR 36 lamps
- Case constructed of fiberglass reinforced polyester in gray finish
- Sealed and gasketed test switch and charge rate indicator light
- Lamp terminals, head, and swivel are sealed with construction grade RTV silicon sealant
- Range of capacities to power from two to seven heads
- Solid state charger
- Automatic Low Voltage Disconnect (LVD) protects battery from deep discharge
- Universal transformer allows 120 or 277 VAC operation
- Units provided with pre-drilled mounting flanges for wall or column mounting
- Provisions for top and/or side conduit entry for power and remotes
- 6 or 12 volt flexibility

applications

Ideal for use in industrial facilities with harsh or corrosive environments where a sealed and gasketed maintenance-free unit with oil-, water-, and dust-tight construction is required.

operating characteristics

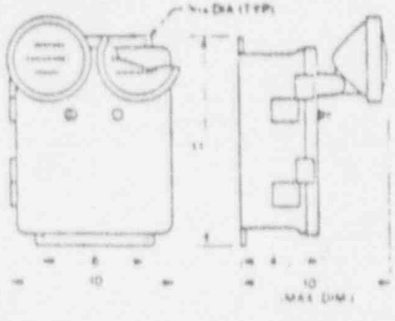
Model No.	Watts for 1½ hrs.	Total Connected Heads/Fixtures(1) Voltage	4 hrs.	2 hrs.	1½ hrs.(2)	½ hr.
4x2	16	6	—	—	2	4
4x4	32	6	—	3	4	13
4x7	56	6	3	6	7	22
4x5-12V	41	12	2	4	5	16

(1) Figures based on 7.2 watt glare-free lighting heads.
(2) NEC 84 requires 1½ hours of emergency lighting.

ordering information

Order model 4X2, 4X4, 4X7, or 4X5-12V
For matching remote heads, order Model EXT-P5-4X

dimensions



Arizona Nuclear Power Project

COMPANY CORRESPONDENCE

ID#: 022-00801-LGP/TCS

DATE April 8, 1988

TO E. C. Sterling
Sta # 7034
Ext # 4176

FROM L. G. Papworth
Sta # 7002
Ext # 4011
File: 88-001-350

SUBJ. CT EE580 Training

Quality Investigations has completed a follow-up of the recent EE580 training presented on March 22/23, 1988. As you know, this training was to satisfy a commitment to the U. S. Nuclear Regulatory Commission. (Reference Letter No. 022-00595-EEVB/WEI/TCS.) Per QA Hot Line File No. 87-075, (Attachment to 022-00595-EEVB/WEI/TCS), Quality Investigations substantiated that numerous administrative deficiencies had occurred in processing of electrical design changes and supplemental training in the EE580 program was required. Nuclear Engineering was tasked the responsibility to review the procedures, completed revisions and prepare the training material. It is the position of the authors of the above referenced correspondence - W. E. Ide and T. C. Stewart - that the required training to meet our commitment was to be detailed and user-specific in nature.

Quality Investigations contacted several of the user group managers and personnel who attended the class. Their comments are included in Attachments A and B. Quality Investigations has concluded that the training was very general and did not provide the necessary depth and/or detail to satisfy the identified need for training. We are requesting a formal response which addresses what corrections/actions you will consider in this matter and the dates those actions shall be completed. A timely response would be appreciated as this issue has very high visibility at this time. If I can be of any assistance, please contact me.

LGP/TCS/kw

cc: E. E. Van Brunt (7040)
J. E. Allen (7106)
L. A. Souza (6795)
T. C. Stewart (6780)

ATTACHMENT A

Manager Comments Summary
Note: These notes are verbal. Written comments have been requested.

D. Fasnacht - 15 Attended

The subject was broad in scope and the instructor was unable to answer many questions asked by the engineers. The class was generally good though.

John Dennis - 7 Attended

The class was geared toward Engineering - generally good. More training is needed for others who use EE580. We didn't expect much when the class was due to an allegation.

Henson - 20 Attended (Linda Mitchell responded on his request.)

The procedure is in conflict with the FCR procedure and the Work Control procedure. There are several areas inconsistent. The present EE580 procedure is bad. They did not incorporate our comments. They wouldn't let us have any input. They wouldn't talk to us about how the procedures have to flow. There's nothing to tell the people in the field how to fill out EE580 cards, MD05 used to but there's nothing now. We were hoping to get a good procedure when CAR 126 was issued a couple of years ago but it still hasn't happened. Everyone who attended the class thought it was a waste of time.

Minnicks - 3 Attended

The course needs to be more detailed. There should be other classes geared toward user groups.

ATTACHMENT B

Notes on Training Summary

Several individuals who attended the class were contacted.

F. Stewart - (Manager - Fasnacht - Unit 91.57)

Summary: The class was okay but the procedures need revised.

K. Leroy - (Manager - Minnicks - Unit 84.22)

Summary: Class was not of much value. It should be geared to work control. Class was too small. Needs to address specialized needs.

P. Gibbons - (Manager - Henson - Unit 86.25)

Summary: No thought went into the class. The instructor didn't know much; didn't understand his point of view. Class was over in about 15 minutes. Really bad - didn't show or tell anything.

M. Vandop - (Manager - Henson - Unit 86.25)

Summary: The class talked about the future more than what's going on now. Instructor didn't know enough to properly answer questions. The class lacked the big picture. Peacemeal, bandaid type training. Procedures need to be better organized. People who work with EE580 on a daily basis need to be involved.

D. Edwards - (Manager - Henson - Unit 86.25)

Summary: The class was bad. It caused more problems than it solved. It doesn't work the way they explained it. Procedure was not reseerched well. Class out of control, instructor not knowledgeable.

Nuclear Engineering-Electrical is assigned the overall responsibility for the project, to plan schedule and coordinate the efforts in accomplishing the corrective actions.

- EAR 87-1919 & 87-1928
  Nuclear Engineering to review the site Mod and FCR procedures and issue change documents as necessary by November 10. (Closed)

- EAR 87-1920
  Nuclear Engineering to review EE-580 related procedures listed below and prepare change documents as necessary by 12-31-87. Cable and raceway control (7N414.04.00), PCP procedure (7N412.01.00), technical review for site Mods (73AC-9ZZ-31), policy for plant change (7P412.00.00), work control (30A-9ZZ.01), EE-580 configuration control (IP5.30), design change package (I412.01.02), PCR procedure (7N412.02.00). (Closed)

- EAR 87-1921
  Nuclear Engineering to prepare EE-580 training curriculum and submit to MTC. MTC to coordinate with training department to plan and schedule training. Training plan and material to be ready by December 31, 1987. MTC to coordinate with training department to hold training classes for OPS I&C, Electrical and Mechanical Engineers, Nuclear Construction Engineers, Technical Support Engineers, Outage Management, Nuclear Engineering, Maintenance Planner Coordinators, I&C Systems Engineers, Nuclear Process Chemistry Engineers. To be completed by February 28, 1988. (Closed)

  Engineering missed the scheduled completion date due to:
  - late review and approval of E503.03
  - late arrival of EE580 user manuals.
  - re-evaluation of training items due to findings of IC investigation task force at site.
  - training rescheduled to be complete by March 25, 1988.
  - Training completed March 23, 1988. (Closed)

- EAR 87-1922
  Nuclear Engineering to coordinate the efforts to check the installation cards against database (CC1 dump) for AC discrepancies and update the database.

- EAR 87-1922
  Nuclear Engineering to perform walkdowns and retrofit IC cards if there are any IC cards missing.

I/9

NED's Progress report is as follows:

- Issued 4 EAR's (87-1919, 87-1920, 87-1921, 87-1922) to track and resolve the corrective actions.

- Prepared administrative change request for FCR procedure PM01.03 Reference EAR 87-2128.

- Prepared administrative change request for Cable and Raceway Control and Tracking System, ES03.03 (was 7N414.04.00) Reference EAR 87-1920.

- Prepared Administrative Change Request for Design Change Package Instruction 71412.01.02. Reference EAR 87-1920.

- Jobsite task force for investigation and resolution of installation card discrepancies began activities on January 19, 1988. Reference EAR 87-1922.

- Jobsite task force has expanded scope which now includes components with unresolved design revisions (approximately 19,880), resolution to be complete by May 14, 1988

- Detailed jobsite task force progress report attached. Reference EAR 87-1922.

FE 4/22/88

JTB/1 4/22/88

Job Order No. 172
EE580 Verification Weekly Progress Report
Week Ending April 14, 1988

The following is a list of activities for the week:

Outstanding Installation Card Task (Original Scope)

1. In the process of removing the *C from the appropriate components to clean up the EE580 data base.
2. Received final * C Report identifying engineering resolution/ walkdown components.
3. Cards requiring further review are being analysed using the same criteria as the components with outstanding design revisions, e.g.,
   a. Paper change only
   b. Engineering cleanup, for example, components on hold, spare cables etc.

   Based on the above a determination will be made as to those installations which require field-walkdowns/verification.

Total Activities related to outstanding cards (*C) to date.

1.	Number of items reviewed	20,087
2.	Number of items no action required	8,084
3.	Number of cards identified as not outstanding (No *C)	2,046
4.	Number of items requiring further review	3,684
5.	Remove *C	6,282

Review of all Cards in Vault (Original Scope)

1. Continuing to review class IE file against cards in the vault to determine if the latest revision is in the vault.
2. Completed review of Unit 1 class IE file.
3. Completed review of Unit 2 class IE file.

The following are results of the above tasks

1.	No. of cards with Eng. Res/walkdown	5,592
2.	No. of cards no action required	46,169
3.	No. of cards reviewed	51,761

Components with Outstanding Design Revisions (expanded scope)

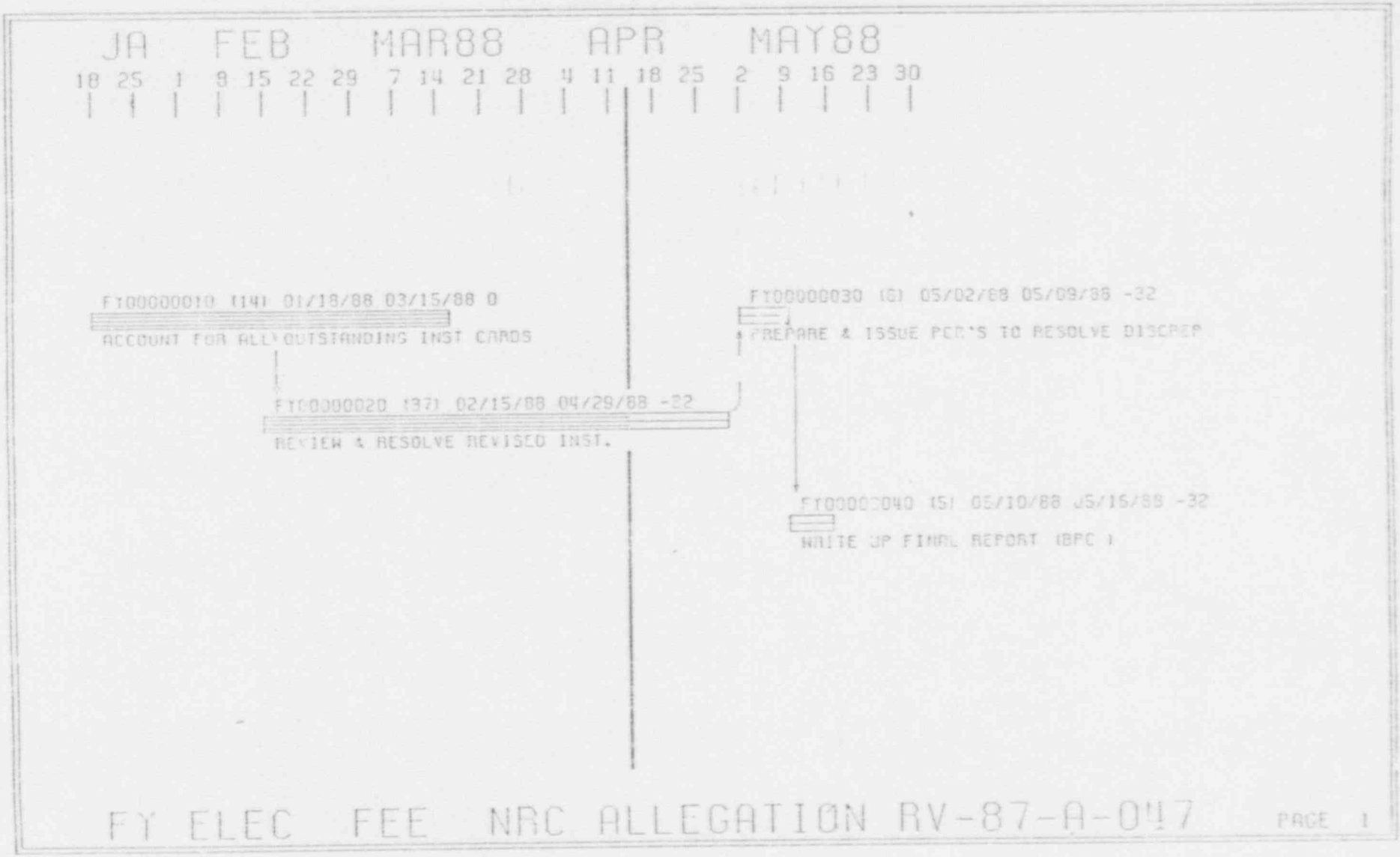
1. Completed review of the DR file for Unit 1.
2. Completed review of Units 2 & 3 DR file and preparing to resolve the report for final components.

The following are results of the above tasks

1.	No. of cards with Eng. Rev./Walkdown	1,353
2.	No. of cards, paper change only	1,893
3.	No. of cards, no action required	385
4.	Total cards reviewed	3,631

Total Activities related to outstanding Design Revisions (DR)

1.	No. of cards, Eng. Rev./Walkdown	3,524
2.	No. of cards, paper change only	16,189
3.	No. of cards, no action required	1,726
4.	Total cards reviewed	21,439


JA FEB MAR88 APR MAY88
18 25 1 8 15 22 29 7 14 21 28 4 11 18 25 2 9 16 23 30
FY00000010 (14) 01/18/88 03/15/88 0
ACCOUNT FOR ALL OUTSTANDING INST CARDS
FY00000020 (37) 02/15/88 04/29/88 -22
REVIEW & RESOLVE REVISED INST.
FY00000030 (6) 05/02/88 05/09/88 -32
PREPARE & ISSUE PCR'S TO RESOLVE DISCREP
FY00000040 (5) 05/10/88 05/16/88 -32
WRITE UP FINAL REPORT (BPC)
FY ELEC FEE NRC ALLEGATION RV-87-A-047
PAGE 1

NRC Allegation RV-87-A-047
April 4, 1988

° Nuclear Engineering-Electrical is assigned the overall responsibility for the project, to plan schedule and coordinate the efforts in accomplishing the corrective actions.

- EAR 87-1919 & 87-1928
  Nuclear Engineering to review the site Mod and PCR procedures and issue change documents as necessary by November 10. (Closed)

- EAR 87-1920
  Nuclear Engineering to review EE-580 related procedures listed below and prepare change documents as necessary by 12-31-87. Cable and raceway control (7N414.04.00), PCP procedure (7N412.01.00), technical review for site Mods (73AC-9ZZ-31), policy for plant change (7P412.09.00), work control (30A-9ZZ.01), EE-580 configuration control (IP5.30), design change package (I412.01.02), PCR procedure (7N412.02.00). (Closed)

- EAR 87-1921
  Nuclear Engineering to prepare EE-580 training curriculum and submit to MTC. IC to coordinate with training department to plan and schedule training. Training plan and material to be ready by December 31, 1987. MTC to coordinate with training department to hold training classes for OPS I&C, Electrical and Mechanical Engineers, Nuclear Construction Engineers, Technical Support Engineers, Outage Management, Nuclear Engineering, Maintenance Planner Coordinators, I&C Systems Engineers, Nuclear Process Chemistry Engineers. To be completed by February 28, 1988. (Closed)

  Engineering missed the scheduled completion date due to:
  ° late review and approval of E503.03
  ° late arrival of EE580 user manuals
  ° re-evaluation of training items due to findings of IC investigation task force at site.
  ° training rescheduled to be complete by March 25, 1988.
  ° Training completed March 23, 1988. (Closed)

- EAR 87-1922
  Nuclear Engineering to coordinate the efforts to check the installation cards against database (CCI dump) for IC discrepancies and update the database.

- EAR 87-1922
  Nuclear Engineering to perform walkdowns and retrofit IC cards if there are any IC cards missing.

NED's Progress report is as follows:

- Issued 4 EAR's (87-1919, 87-1920, 87-1921, 87-1922) to track and resolve the corrective actions.

- Prepared administrative change request for EAR procedure PM01.03 Reference EAR 87-2128.

- Prepared administrative change request for Cable and Raceway Control and Tracking System, ES03.03 (was 7N414.04.00) Reference EAR 87-1920.

- Prepared Administrative Change Request for Design Change Package Instruction 71412.01.02. Reference EAR 87-1920.

- Jobsite task force for investigation and resolution of installation card discrepancies began activities on January 19, 1988. Reference EAR 87-1922.

- Jobsite task force has expanded scope which now includes components with unresolved design revisions (approximately 19,88), resolution to be complete by May 14, 1988

- Detailed jobsite task force progress report attached. Reference EAR 87-1922.

FE 4/5/88

JBJ 4/8/88

Job Order No 172
EE580 Verification Weekly Progress Report
Week Ending March 31, 1988

The following is a list of activities for the week:

Outstanding Installation Card Task (Original Scope)

1. In the process of removing the *C from the appropriate components to clean up the EE580 data base.

2. Cards requiring further review are being analyzed using the same criteria as the components with outstanding design revisions, e.g.,
   a Paper change only
   b. Engineering cleanup, for example, components on hold, spare cables etc.
   Based on the above a determination will be made as to those installations which require field-walkdowns/verification.

Total Activities related to outstanding cards (*C) to date.

1.	Number of items reviewed	14,123
2.	Number of items no action required	8,084
3.	Number of cards identified as not outstanding (No *C)	2,046
4.	Number of items requiring further review	3,684
5.	Remove *C	318

Review of all Cards in Vault (Original Scope)

1. Initiated review of Unit 1 class IE file against cards in the vault to determine if the latest revision is in the vault.

The following are results of the above tasks

1.	No. of cards with Eng. Res/walkdown	3,628
2.	No. of cards no action required	20,137
3.	No. of cards reviewed	23,765

Components with Outstanding Design Revisions (expanded scope)

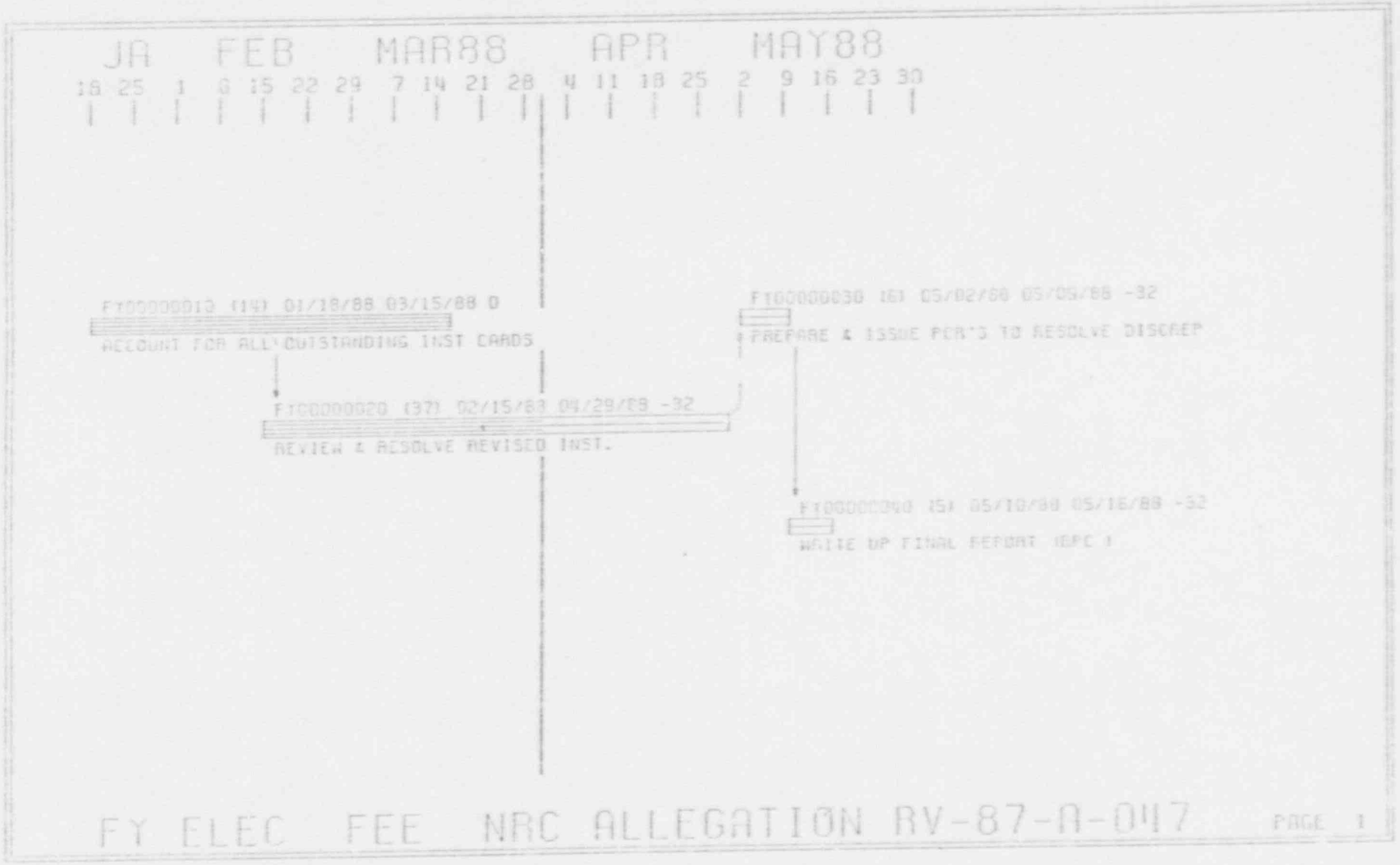
1. Continuing to review the DR file for Unit 1.
2. Completed review of Units 2 & 3 DR file and preparing to resolve the report for final components.
3. Due to shortage of personnel in RMCS, obtaining copies of Unit 1 cards for the DR file is slowing down.

The following are results of the above tasks

1.	No. of cards with Eng. Res./Walkdown	508
2.	No. of cards, paper change only	3,443
3.	No. of cards, no action required	969
4.	Total cards reviewed	4,922

Total Activities related to outstanding Design Revisions (DR)

1.	No. of cards, Eng. Res./walkdown	1,302
2.	No. of cards, paper change only	12,021
3.	No. of cards, no action required	669
4.	Total cards reviewed	14,052


JA FEB MAR88 APR MAY88
18 25 1 8 15 22 29 7 14 21 28 4 11 18 25 2 9 16 23 30
FY00000010 (14) 01/18/88 03/15/88 0
ACCOUNT FOR ALL OUTSTANDING INST CARDS
FY00000030 (6) 05/02/88 05/05/88 -32
PREPARE & ISSUE PCR'S TO RESOLVE DISCREP
FY00000020 (37) 02/15/88 04/29/88 -32
REVIEW & RESOLVE REVISED INST.
FY00000040 (5) 05/10/88 05/16/88 -32
WRITE UP FINAL REPORT (EFC)
FY ELEC FEE NRC ALLEGATION RV-87-A-047
PAGE 1

Arizona Nuclear Power Project

ID#: 167-02291-FCP/RLC
DATE: May 3, 1988

TO: L. G. Papworth
Sta.# 7002
Ext. 4011

Prepared by:
Signature: R L Copyak
Name/Ext./Sta.: R. L. Copyak/4178/7011

Reviewed By:
Signature: F C Prawlocki Jr.
Name/Ext./Sta.: F. C. Prawlocki/4523/7011

Approved by:
Signature: Edd I Ster
Name/Ext./Sta.: E. C. Sterling/4176/7034

SUBJECT: File: 88-003-350; 88-001-350:
EE580-Activities Associated with the NRC Allegation

References:

1) L. G. Papworth letter to E. C. Sterling, EE580 Training, File: 88-001-50 dated April 8, 1988.

2) L. L. Henson/C. E. Day letter to Distribution, Control and use of Installation Cards associated with the EE-580 Cable and Raceway Tracking System, File: 88-001-403, dated March 24, 1988.

3) E. C. Sterling letter to Distribution, Training on the Requirements for control of the EE-580 Program, File: 88-001-762, dated March 16, 1988.

4) Quality Talks - Weeks No. 44 & 45, dated November 9, 1987.

5) D. Smyers letter to J. G. Haynes, PVNGS Configuration Control File: 87-022-206 dated October 21, 1987.

6) E. E. Van Brunt letter to Mr. Dennis F. Kirsch, Nuclear Regulatory Commission, File: 022-00595-EEVB/WEI/TCS dated October 12, 1987.

Per your request, this letter is in answer to the follow-up investigations of the training on the EE580 procedure changes and revisions resulting from the EE580 NRC allegation. The procedure changes and revisions are the product of the planned activities identified in reference (6). As outlined on the attached ANPP Electrical/E.Q. Unit status report, the tasks and activities that were planned and agreed to have been implemented. The training, as shown on the attached copy of the scope and course outline, was provided and addressed the corrective actions of the allegation commitment. If, in this case, there is a feeling "that the training was very general and did not provide the necessary depth and/or detail to satisfy the identified need for training (on the use of EE580 and its data)," then this should be and is being addressed separately as a topic of concern beyond the original documented commitments.

When in September 1987 (before the allegation) in-depth technical training in EE580 was conducted, the level of participation and number in attendance was not indicative of high interest except by only a few individuals. If technical training is found to be technically justifed and is requested by the impacted departments, the technical training can be conducted again.

As shown in the attached letter, an effort has been organized and support provided to improve the usage of EE580. Engineering actively supports these plans to consolidate the different procedures currently in use for EE580, as well as to work with Bechtel to address ANPP's needs related to configuration control. Training will be provided on the integrated program at the conclusion of this effort.

When the training was concluded in reference to the NRC allegation, there were several comments which indicated that additional technical training on the EE580 program was in order. Specifically, Engineering was tasked with the responsibility to review the procedures, complete revisions, and prepare training material relative to the NRC allegation. Correspondingly, as shown by the material presented in the training classes, this activity must be considered complete.

I can understand your feeling that additional work is needed in regards to the EE580 usage, and I request your support of the continued effort going on with EE580 and your assistance in addressing the additional actions taken as a result of the feedback received.

ECS/RLC/ec

Enclosure

cc: E. E. Van Brunt, Jr. (7040)
J. E. Allen (7106)
L. A. Souza (6795)
T. C. Stewart (6780)
J. T. Barrow, Jr. (7042)

Arizona Nuclear Power Project

COMPANY CORRESPONDENCE

Dan
Herb
Doug

ID # 110-00371-WMS

DATE June 13, 1988

TO: Distribution
Sta. # Various
Ext # Various

Please provide representation

Jack
Jerry

FROM: William Simko
Sta. # 6077
Ext # 2659

FILE: 88-010-026
SUBJECT: EED/MATERIAL CONTROL INTERFACE MEETING

A meeting has been scheduled with Jim Tench on Wednesday, June 15, in Annex Building EOF Conference Room at 9 A.M. - 11 A.M. for discussions on EED/Material Control interface problems. An efficient interface between the two groups needs to develop.

The meeting agenda will revolve around the questions exchanged between the two groups during the past month. (Attached). In preparation for this meeting, Jim Hebison and myself recently attended a similar meeting between Jim Tench and Unit 3 Work Control Department.

In order for the meeting to be productive with efficient exchange of information, I request that you limit your participants to those who have a working knowledge of the interface problems. A list of corrective actions will be developed from these meetings.

WS/rb

cc:
J. N. Tench	6325
R. M. Butler	6102
V. H. Kluge	6077
T. P. Engbring	6077
L. R. Perea	6077
T. E. Hall	6077
C. D. Churchman	6915

Distribution:
G. W. Sowers	6102
L. L. Henson	6078
R. A. Kropp	6086
D. F. Hoppes	6099
M. L. Clyde	6096
C. A. Cooper	6078

Wen Lee
STA. 6257

6-15-88

Neal Howard
Al Ettinge
Wen Lee - P
Mike Cauntry

Bill Lemke
Tim Hall
Jim Hetenser
Craig Cooper
Steve Sappey
"
Chuck
Jude
Linda
Mike
Paul
Gene Oavis
Lou

WDN - Started 2 weeks -

RC)

Rv 403 (Rev 11-84)
4190-900124 (PK/250)

Arizona Nuclear Power Project

ID#: 226-00195-GWS/LLH/LM
DATE: September 16, 1988

TO: C. Stevens
Sta.# 7006
Ext. 4081

Prepared by:
Signature L. Mitchell
Name/Ext./Sta. L. Mitchell/3647/6078

Reviewed By:
Signature L. Henson
Name/Ext./Sta. L. Henson/2657/6078

Approved by:
Signature G. Sowers
Name/Ext./Sta. G. Sowers/2643/6102

File: 88-002-419
SUBJECT: TRENDING FOR SYSTEMS QB AND QD

Battery and inverter problems identified in Systems QB (Essential Lighting) and QD (Emergency Lighting) need to be trended.

At my verbal request some time ago, your group began trending these systems. I have found this information useful and greatly appreciate your support.

I would like to request that this trending please continue. These systems have safe shutdown (Appendix R) equipment involved, so it is important that they be trended.

GS/LH/LM/sc

I/16

Arizona Nuclear Power Project

COMPANY CORRESPONDENCE

ID # 022-00972-LGP/TCS/NWL

DATE September 27, 1988

TO E. C. Sterling
Sta # 7034
Ext # 4176

FROM L. G. Papworth
Sta # 7002
Ext # 4011

FILE 88-001-350

SUBJECT Additional Training to Enhance User Capability on the EE580 System - QA Hot Line File No. 87-075

Reference: E. C. Sterling letter to L. G. Papworth, EE580-Activities Associated with the NRC Allegation dated May 3, 1988.

In response to the recommendation identified in Reference 1), the Quality Investigations Department contacted the various EE580 System user groups to aid in determining whether additional training was needed in this area. The following training recommendations were provided by various user managers and are provided to Engineering for follow-up action.

Unit 1, 2 and 3 Maintenance Managers (A. McCabe, D. Phillips, and J. Minnicks) indicated that additional EE580 training was needed to clarify the following areas:

1. The proper use of and Administrative Controls governing the EE580 card.

2. The difference between verification/installation, i.e., what do you fill out on the EE580 card for each evolution?

3. Explanation of the detail notes on the back of the EE580 cards and the proper method for filling them out.

4. How to read a CC1 dump.

5. Can EE580 cards still be handwritten.

6. Explain each type of EE580 card and the proper way to complete them.

Unit 1, 2, and 3 Work Control Managers (J. Dennis, J. Scott, and C. Churchman) indicated that additional EE580 training was needed to clarify the following areas:

I/17

9.

1. Electrical Engineers (EED) should be provided with detailed training on the EE580 computer system use.

2. The "when/when not" that a design change they are working on involves EE580 usage.

3. The proper method for revising the EE580 data base.

4. Examples of bad practices should be provided on "How not to complete EE580 cards".

5. Training should utilize flow charts to help personnel understand the proper sequence of events associated with the EE580 system and this should be common to all three Units.

The Central Maintenance Manager (P. Brandjes) and Engineering Evaluation Manager (G. Sowers) indicated that all of the above responses were applicable to their groups. The Engineering Evaluations Department also requested that any additional training be reviewed and approved by their Department prior to implementation.

The Construction Manager (D. Fasnacht) indicated that no additional training was required by his Department.

The following additional comments not specifically related to the subject training recommendations were provided by the identified departments:

Unit Maintenance Managers:

1. When is QC required to observe/sign EE580 cards?

Unit Work Control Managers:

1. The training instructor should adequately address all questions asked.

2. Electrical Engineers should be afforded access to the EE580 computer system.

3. MOD05 and ES03.03 need to be incorporated into one procedure. The procedure needs to be more extensive, specific and to the point. Procedures are too loose and do not provide enough information to the user groups at the present time.

You are requested to take appropriate and timely action to satisfy the above EE580 users needs so that the EE580 program can be more

effectively implemented. Should you have any questions concern this subject, please contact Clyde Stewart at extension 6701.

LGP/TCS/MGK/kw

Attachment

cc: D. B. Kerner (7040)
J. M. Allen (6532)
W. E. Ide (6452)
O. J. Zeringue (6915)
J. D. Driscoll (6125)
A. J. McCabe (6426)
D. C. Phillips (6920)
J. F. Minnicks (6915)
J. W. Dennis (6259)
J. J. Scott (6920)
C. D. Churchman (6915)
P. L. Brandjes (6310)
G. W. Sowers (6102)
D. B. Fasnacht (6775)

PV403 JOAB (11 84)
192 900124 (PK/250)

(C)

3

Arizona Nuclear Power Project

I.D.: 167-03049-ECS/JTB
DATE: November 21, 1988

TO: L. G. Papworth
Sta.# 7002
Ext. 4001

Prepared by:
Signature S.D. Schroeder / [signature]
Name/Ext./Sta. S. D. Schroeder/4191/7042

Reviewed By:
Signature J. T. Barrow, Jr.
Name/Ext./Sta. J. T. Barrow, Jr. 4051/7042

Approved by:
Signature [signature]
Name/Ext./Sta. E. C. Sterling,4176/7034

File: 88-001-350
SUBJECT: Additional EE580 Training Needs (QA Hotline File # 87-075)

Reference A) Memo 167-02291-FCP/RLC, 5/3/88
B) Memo 022-00972-LGP/TCS/NWL, 9/27/88
C) Phone Conversation, J. T. Barrow, Jr. with D. W. Smyers on 10/4/88
D) Phone conversations, J. T. Barrow, Jr. with Mike Mann & Clyde Stewart 10/24/88 through 11/4/88
E) Phone conversations, J. T. Barrow, Jr. with Peggy McCullough (NRC) of 11/3 and 11/4/88.

Thank you for this training input (Reference B), which would be in addition to that training provided in response to NRC Allegation RV-87-A-047.

We have reviewed and discussed it with EED (Reference C), and have the following observations:

1. Much of this appears to be the type of training that needs to be given on a periodic basis to maintenance electricians, technicians, auxiliary operators, etc. (Items 2., 3., 4., 5., 6., of the first group and 4. and 5. of the second group).

2. Some of it appears to be needed to explain principles of EE580 data/program operations to Management in order to ensure proper direction to subordinates (Items 1. and 4. of the first group; 2., 3., and 5. of the second; 1. (Maintenance); and 2. and 3. (Work Control).

3. Additionally, some of it may be incorrect (Item 1. of the first group and 2. (Work Control)).

I/30

15.

Per Reference C), NED plans to take the following actions:

1. Dedicate an NED LRE for this subject; Steven D. Schroeder (done).

2. Meet with EED in order to determine the validity/invalidity of these observations, whether EED can assist in the development/ performance of this training, and exactly what training is necessary.

3. Investigate whether some or all of this training could/should be performed by the PVNGS Training Department.

4. Coordinate with the PVNGS Training Department to develop an EE580 training course which addresses deficiencies identified in 2. above, if necessary.

5. Implement the training in whatever format is ultimately determined to be required.

6. Issue a final memo response to Reference B) following completion of all of these activities (interim reports will routinely be made available through the NED Major Projects Report and STAR Program reports).

In the interim, please contact Steven Schroeder at extension 4191 directly, concerning the status of this effort.

This training will, in any case, be temporary, as all procedures/ practices/training will be subject to radical change as we bring the Cable and Raceway Tracking System (CARTS) on board in 1989, to replace the EE580 program. However, it will be supplanted by the appropriate procedures/practices/training at the appropriate time.

Per References D) and E), we have committed to have this training initially completed by February 28, 1988. Some of it may evolve into periodic retraining, which will run continuously as needed.

ECS/JTB/cbs

cc:

J. E. Allen	(7106)
J. M. Allen	(6932)
P. L. Brandjes	(6310)
C. D. Churchman	(6915)
J. W. Dennis	(6259)
J. D. Driscoll	(6125)
D. B. Fasnacht	(6775)
L. L. Henson	(6078)
M. L. Hypse	(7042)
W. E. Ide	(6452)
D. B. Karner	(7040)
M. O. Mann	(6780)
A. J. McCabe	(6426)
J. F. Minnicks	(6915)
D. C. Phillips	(6920)
S. D. Schroeder	(7042)
J. J. Scott	(6920)
D. W. Smyers	(6078)
G. W. Sowers	(6102)
T. C. Stewart	(6780)
O. J. Zeringue	(6915)
Peggy McCullough	(NRC)

5

Arizona Nuclear Power Project

COMPANY CORRESPONDENCE

ID # 226-00272-GWS

DATE December 12, 1988

TO Distribution
Sta #
Ext #

FROM G. W. Sowers
Sta # 6102
Ext # 2643

FILE 88-008-419
SUBJECT DESIGN MODIFICATION PROGRAM

In an effort to reduce the Design Modification backlog, the Unit Work Control Departments, Engineering Evaluations Department (EED), and Nuclear Engineering Department (NED) have started regularly scheduled meetings to discuss ways to improve the existing Design Change Program and evaluate/schedule proposed Design Modifications. As a result of these meetings, the Unit Work Control Departments, EED and NED have concurred on the following plan of action:

1. Establish the Plant Modification Committee (PMC) composed of the following members:

   a) Engineering Evaluations Manager (Chairman)
   b) Nuclear Engineering Manager (Co-Chairman)
   c) Operations Computer Systems Manager
   d) All three Unit Work Control Managers
   e) Central Maintenance Manager (non-unit)
   f) Construction Manager
   g) Budgets and Costs Manager

The purpose of this committee is to review all Plant Modifications to assure safety issues are addressed, NRC commitments are met and projects necessary for achievement of ANPP Goals and Objectives receive an adequate priority for resource allocations. The committee is also responsible for reviewing, approving/disapproving and prioritizing/scheduling all modifications within budget that propose a change to the existing design of PVNGS.

The PMC concept and its Charter are scheduled to be developed for approval by December 23, 1988.

2. The Work Control Departments will evaluate and schedule, for implementation, all backlog modifications by February 13, 1989.

I/21

331

3. A Plant Modification moratorium is in effect until the Work Control backlog schedule is completed. In the interim, only those modifications which meet the following criteria will be considered by the PMC:

   a. Modifications required to assure Health and Safety of all Plant personnel and/or the Public.

   b. Modifications required by the Regulatory Commitment.

   c. Modifications required to assure continued operation of PVNGS.

Attached is the Executive Summary of Plant Modifications and Budgetary Control Plan for your information.

GWS/sm

Attachment(s)

Distribution:

J. G. Haynes	(6125)	L. G. Papworth	(7002)
D. B. Karner	(7040)	J. M. Allen	(6132)
R. M. Butler	(6102)	W. E. Ide	(6452)
J. E. Allen	(7106)	O. J. Zeringue	(6915)
J. N. Tench	(6325)	P. F. Crawley	(7434)
J. E. Kirby	(6163)	L. G. Papworth	(7002)
W. F. Quinn	(7035)		

cc: E. C. Sterling (7034)
J. J. Scott (6920)
C. D. Churchman (6915)
J. W. Dennis (6259)
P. L. Brandjes (6310)
D. B. Fasnacht (6775)
J. F. Schmadeke (6096)

EXECUTIVE SUMMARY
OF
PLANT MODIFICATION AND BUDGETARY CONTROL PLAN

I PROBLEM

1. PLANT MODIFICATIONS OVER / UNDER BUDGET, INEFFECTIVE FISCAL ACCOUNTABILITY ON CAPITAL IMPROVEMENT AND O&M BUDGETS. EQUIPMENT PURCHASED PRIOR TO ENGINEERING EVALUATIONS AND DESIGN DEVELOPMENT, CAUSING UNEXPECTED BUDGET AND MANPOWER IMPACT ON ENGINEERING.

2. BACKLOG OF PLANT MODIFICATIONS WAITING FOR IMPLEMENTATION.

3. BACKLOG OF PLANT MODIFICATIONS IN DESIGN.

4. EACH UNIT INSTALLING DIFFERENT MODIFICATIONS AT DIFFERENT TIMES :

    1. OVERLOADS ENGINEERING AS ALL MODS ARE REQUIRED FOR THE FIRST NEED DATE BY THE FIRST UNIT REQUESTING THAT MOD.
    2. ADDS TO THE IMPLEMENTATION BACKLOG. (SOME MODS ARE SCHEDULED YEARS APART)
    3. LOSS OF CONFIGURATION CONTROL BETWEEN UNITS (AND SIMULATOR)

5. DIFFERENT DEPARTMENTS USE DIFFERENT DATA BASES AND INCOMPATIBLE TRACKING SYSTEMS. OUTAGE MANAGEMENT, WORK CONTROL, BUDGETS AND COST, PLANNING AND SCHEDULING, AND ENGINEERING, USE NON -INTERCONNECTED SYSTEMS.

II GOALS

1. CONTROL CI AND O&M BUDGETS BY INTER DEPARTMENT LONG TERM PLANT MODIFICATION PLANNING.

2. FIRST REDUCE, THEN ELIMINATE LONG TERM PLANT MOD IMPLEMENTATION BACKLOG. (HIGH VISIBILITY AREA WITH INPO AND NRC)

3. MINIMIZE CONFIGURATION DIFFERENCES BETWEEN UNITS. (AND THE SIMULATOR)

4. LOAD LEVELIZE IMPLEMENTATION SCHEDULES

5. LOAD LEVELIZE DESIGN EFFORTS

6. PROVIDE UPPER MANAGEMENT STATUS, MAKE RECOMMENDATIONS, AND OBTAIN APPROVALS.

III PLAN

1. EED EVALUATE AND PRIORITIZE ALL EXISTING MODIFICATIONS.

2. UNIT WORK CONTROL MANAGERS REVIEW ALL EED RECOMMENDATIONS FOR UNIT NEEDS AND IMPLEMENTATION DATES

3. REVIEW 1989 CI BUDGET AND RESOLVE DIFFERENCES BETWEEN BUDGETED AND WORKING DESIGNS.

4. HOLD REGULAR ENGINEERING SUPERVISORS MEETINGS AT THE SITE TO PROVIDE A FORUM TO RESOLVE EED/NED INTERFACE ISSUES ON WORKING AND PLANNED DESIGNS.

5. CREATE A PLANT MODIFICATION COMMITTEE TO EVALUATE AND RECOMMEND TO MANAGEMENT, APPROVAL OF, ALL PROPOSED PLANT CHANGES, USING UNIT REQUIREMENTS, BUDGET RESTRAINTS, ENGINEERING LOADING, IMPLEMENTATION RESTRAINTS, AND BACKLOG AS GUIDELINES, IN ADDITION TO RESOLVING THE CURRENT WORK PLAN.

   THE COMMITTEE MEMBERS ARE:

   *ENGINEERING EVALUATIONS MANAGER (CHAIRMAN)
   *NUCLEAR ENGINEERING MANAGER(ALTERNATE CHAIRMAN)
   *ALL THREE UNIT WORK CONTROL MANAGERS#
   *OCS MANAGER
   CENTRAL MAINTENANCE MANAGER (NON UNIT)
   NUCLEAR CONSTRUCTION MANAGER
   BUDGETS DEPARTMENT REPRESENTATIVE
   * VOTING MEMBERS
   # REPRESENTING OPERATIONS AND MAINTENANCE INPUT

6. CREATE A TWO PART INTEGRATED IMPLEMENTATION SCHEDULE CONSISTING OF A THREE YEAR DETAIL SCHEDULE AND A FIVE YEAR OVERVIEW SCHEDULE, PROVIDING THE FOLLOWING DATA:

   1. EACH UNITS IMPLEMENTATION DATES IN RELATION TO THE OTHER TWO UNITS. (PROVIDES ABILITY TO PLAN SIMILAR IMPLEMENTATION SCHEDULES, MINIMIZING WORK LOAD SPIKES IN ENGINEERING DESIGN, AND MINIMIZES IMPLEMENTATION BACKLOGS CAUSED BY LARGE GAPS BETWEEN IMPLEMENTATIONS IN DIFFERENT UNITS
   2. DESIGN STATUS OF MODS.
   3. BUDGET CATEGORY AND AMOUNT. AIDS IN RESCHEDULING MODS AND EARLY DETECTION OF POSSIBLE BUDGET CARRYOVER
   4. IMPLEMENTATION CATEGORY. (REFUELING, SYSTEM, OR NON-SYSTEM)

7. PROVIDE AN INTEGRATED IMPLEMENTATION SCHEDULE TO THE VP OF NUCLEAR PRODUCTION, CAPITAL IMPROVEMENT DIRECTOR, PLANT MANAGERS, AND ALL OTHER DIRECTORS, FOR THEIR REVIEW AND APPROVAL.

8. PROVIDE ONE COMMON, USER FRIENDLY DATA BASE (INFORMATION EXCHANGE SYSTEM) FOR ALL INVOLVED DEPARTMENTS WITH INPUT FROM ENGINEERING, BUDGETS AND COST, PLANNING AND SCHEDULING, AND WORK CONTROL, WITH THE CAPABILITY TO PROVIDE THE REPORTS / SCHEDULES EACH DEPARTMENT REQUIRES TO MAKE INFORMED SCHEDULING DECISIONS.

IV STATUS

COMPLETE

1. EED / WORK CONTROL, EXISTING MODIFICATIONS LIST DEVELOPMENT.
2. 1989 CI BUDGET REVIEW OF ENGINEERING CATEGORIES AND BLDG./TOOLS/EQUIP. DISCREPANCIES.
3. ESTABLISH REGULAR ENGINEERING SUPERVISORS MEETINGS
4. INVOLVE BUDGETS IN DESIGN DECISIONS AND PROCEDURE REVISIONS.
5. DRAFT IMPLEMENTATION SCHEDULE PROVIDED TO WORK CONTROL.
6. PLANT MODIFICATION COMMITTEE MEETINGS BEING HELD

IN PROGRESS

1. PLANT MODIFICATION COMMITTEE (PMC) CHARTER BEING FORMALIZED
2. IDENTIFICATION OF REQUIRED PROCEDURAL CHANGES
3. BUDGET AND SCHEDULING INTERFACE
4. WORK CONTROL REVISION OF THE THREE YEAR DETAIL SCHEDULE
5. COMPUTER DEPARTMENT IS DEVELOPING THE INFORMATION AND EXCHANGE SYSTEM TIES, SOFTWARE, AND REPORTS REQUIRED.
6. THE PMC IS MEETING WEEKLY TO DETERMINE OVERALL PROGRESS AND ADDRESS BACKLOG ITEMS.

PLANNED

1. DEVELOP THE FIVE YEAR LOOK AHEAD SCHEDULE. THIS WILL MINIMIZE THE SHOCK WAVE EFFECT. (LARGE BACKLOG OF MODS DUE TO APPROVING MORE MODS THAN CAN BE REALISTICALLY BUDGETED OR IMPLEMENTED IN THREE YEARS)
2. DEVELOP UPCOMING CI BUDGETS FROM THE THREE YEAR DETAIL SCHEDULE AND SEIS.
3. DEVELOP, DEFINE, AND ALLOCATE A SPECIFIC PORTION OF THE O&M BUDGET FOR PLANT MODIFICATIONS BASED ON THE THREE YEAR DETAIL SCHEDULE.
4. FACTOR THE RESULTS OF THE ABOVE INTO THE CAPITAL IMPROVEMENT PROGRAM/PROCESS.

BECAME A HOTLINE ITEM.

BOP MECH/CIVIL GROUP CONSOLIDATION OF CONCERNS

MIKE MANN -X3697-

12/19/88
Bill Simko
X2518

MANAGEMENT STYLE/DIRECTION

The proactive planning to "dump" EER's on NED was non-existent by our Manager. The dump was done and no agreement had been reached between Sowers/Sterling on how to cope with it. We are being redirected "to cook the meat" before we present it. Sowers/Sterling need to do the same thing before it causes more confussion at the working level. We now have to bail out our mismahagement. The associated NED system engineers did not know (from their management) that EER's were being transferred, B4 priorities are not being worked or scheduled, outside contractors being hired at high cost to do low priority work. EED/NED management need to reach agreement before we act and this agreement clearly conveyed to the work group.

Most Engineers are paid fair wages when compared to industry standards. However, Engineering vs. Work Control responsibilities are confusing which leads to more comparisons or relative pay scales, PC requires only GED. Evaluate job function vs. job description vs. pay between the two groups. Level III SE mid-point is 3689/mo. Level III Planner Schedular midpoint is approximately 3700-3900/mo.

EED personnel are getting very little feedback from upper management on what is going on. Lately, supervision has started but it seems like they are having trouble understanding their goals job expectations. Engineering expectations, directions, goals, priorities are unclear from upper management to the SE level. Recommend - Improved communications between management and SE, and between Director/Manager to Plant Management expections (make megawatts, turnaround EER's, support the Units from PDS meeting). The Units are becoming disappointed in our lack of support due to our state of confusion. Request improved direction/feedback from Director/Manager to the SE level.

DEPARTMENTAL EFFICIENCIES

The telephone answering system is poor. System Engineers are turned into clerks for other engineers in the field. With contractor reduction, efficiency must be at the highest level. Recommendation: Immediately purchase individual answering machines so that individual messages can be left depending on the situation. Alternately, purchase a network system.

More campaign promises on another shuffle of the 2nd floor Annex. Now the new floor plan will reduce the office size to 64 sq. ft./engr. The only thing that has been reality is more Sections in a smaller space. What is this new plan and what are the benefits to efficiency?

Much time is spent by the SE's playing clerk (i.e., walking documents around for signature). It takes time to take S-Mod/DCP's around to QS&E (N. Annex) and to 3 Units. If there are comments, you get to do it again. Need solution - especially with staff reduction. Need dedicated departmental runners.

1/22

Paperwork was completely stalled once it got to the Managers office. It is better now. Need to reduce signature levels/paper flow.

SYSTEM ENGINEER PROGRAM

The Engineering Excellence Program appears to be a commitment to a full professional program vs. the SE program. Lately, it seems like the last two months are a crisis affair to "hurry up" and jam it through before INPO gets here. Is this another mirage to make it look good on the surface? Need better direction and commitment. The whole thing seems like it is a piece meal and fragmented. Expectations were big and results little. Need a quality program instead of going downtown for two weeks and then sign everything off.

Training seems to focus more on basic principles of the subject than on much needed application training. A lot of money is spent on what was previously taught in school. The INPO courses are geared to the lowest level person throughout the multi-departmental staff. Training required of the SE needs to be concise and focused specifically for our needs. Consulting firms have many specific applications/troubleshooting courses for our needs (such as NORT) the training personnel don't have much technical background. The SE is expected to provide highly specialized technical support on his systems. This training has not been provided.

The SE program document leaves the SE overwhelmed with the feeling he has responsibility for everything but with no authority. Now that we have had time to digest it, it needs to be revisited to ensure what we think it says is really what was intended. Each SE has interpreted the program differently and functions based on personal preference or discussions with fellow SE's. Maybe a select group should be responsible for Sect. 3.4 (Performance Monitoring) and a different group for Sect. 3.6 (Maintenance Support). We keep getting hammered for lack of support to the Units and lack of time to do Performance Monitoring. Confusison still exists on the SE role vs. Planner Coordinator/Scheduler. Based on lessons learned, the SE Program needs to be reviewed to clarify confusing wording and ensure expectations are clearly stated. Also, reinforcement is required to ensure SE understands his duties based on the wording.

Hall

Consolidation of Concerns

SYSTEM ENGINEER PROGRAM

The subject nature of the qualification process leaves open many questions as to the auditability of the program to show that the program does in fact meet the requirements.

The demand to "QUALIFY" to the program without any incentive for the extra time and level of knowledge increase that the System Engineer will have done (i.e. bonus).

There is a lack of Engineers to perform all the required work to include the Performance Monitoring and Trending in a timely manner without extensive use of overtime (25% or more).

The System Engineers have been and are being used in the support of maintenance activities almost like surrogate foreman. TRUE

Plans are currently being made to utilize an outside contractor for the Unit 1 containment work. PVNGS is the only operating plant in the US that has CE-KSB pumps. Another unique tool is the multi-stud tensioner from Germany. Based upon the other outages, any problems encountered will cause the unit to go 'limp' and the System Engineer will have to expend inordinate amount of exposure and overtime to assist (i.e. hard-hold) in the recovery. This will cause undue pressure on the System Engineer and he/she will lose much of the required 'as-built' data the System Engineer Program requires to be logged each outage.

The System Engineers are using a large amount of time walking documents around the site for signatures (managers, QA, Unit managers). This time is not reflected in the System Engineer Program. TRUE INDEED TRUE

It takes much too long to obtain the Unit Managers signatures on Engineering work documents.

The over-time Tech Spec (6.2.2.2) has been used and still continues today as a tool to limit over time hours. The applicability of the Tech Spec to System Engineers is in question due to the wording. The present budget for 1989 allows for only 12% over time while the normal overtime for the group has been at least 33%. This budget is also for a three unit outage in which the System Engineers are required to monitor the progress of changes, close out packages in a timely manner for operability, and to record as-built dimensions for critical equipment during the outage which goes on for 24 hours a day until completion. There will not be enough Engineers to cover the outage and meet the requirements of the System Engineer Program.

MANAGEMENT STYLE

Senior positions within the department are not being filled from within the company.

Open positions requests are taking too long to fill.

Why is the Employee Opinion survey and D. Karner statements of promotion only being given lip service.

Management does not seem committed to the System Engineer Program by setting up an organization without personnel to fill the positions, no promoting from within, and setting a visible priority.

System Engineers are frequently bypassed by upper management as to problems associated with the System Engineer's assigned system. EXAMPLES

* EED Manager and PLant Manager decide not to test MOV's to determine if a potential damaging fault existed.
* Resolution of requirements to set/reset torque/limit switches
* Statement regarding planned incident investigation team that the System Engineer will only be included if Engineering input is requested

Communications on engineering documents that required manager review and approval is too distant. Return of the documents through two layers of supervision with notes attached does not allow the System Engineer to clarify the thought process and, does not allow the manager the opportunity to become informed on the problem and to pass his managerial concerns directly to the individual System Engineer.

Correspondence going outside the Department is constrained to pass through the Manager or Director. This then requires the document to include substantial background information which would not be required when the document is to be between working levels.

Mr. Jerry Haynes gives the impression that he is too good to talk to the troops. He won't even acknowledge a 'civil' good morning in passing.

Vertical communications flow is poor in the downhill direction. If the System Engineer requests work to be done in a Unit, and the Unit doesn't agree, they have been known to call the manager and convince him that the work shouldn't be done without involving the System Engineer.

The management requirement to 'off-load' the EER's to NED has resulted in the re-prioritizing of the System Engineers' priority by NED.

ENGINEERING INTERFACE

As indicated by management, the System Engineer is responsible for the commitment dates set by NED. If their date slip and the System Engineer does not agree with the new date, the problem is then elevated to the next level of management. The new date agreed to leaves the System Engineer out of the approval process, and only knows when contacted by phone (which is infrequent).

TRUE

MISCELLANEOUS

Some of the System Engineers would like to go to school to get a degree or improve formal education credentials. The System Engineers do not have time to do this with present overtime requirements.

If contract Engineers are brought on for the outage, they come on at short notice and then leave at the end of the outage. HOw is the System Engineer Program qualification or qualification for System Engineer work products apply to the contractors.

SECT/YR/SEQ
ELECT/88/02

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

When departmental policies and practices related to overtime, training (on and off site), work activities, seminars etc.: why are they not applied uniformly for the entire department? It appears each group works for a different department manager since each group interpretes the policy or practice to their liking.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/03

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

A group of the Plants System Engineers who have a wide base of nuclear experience but do not have a BS in Engineering from an accredited school see the future as very bleak. When there was a Maintenance Engineering group we had a career path: but that group was dissolved and our present positions are at a dead end. This is compounded by the fact that promotions and hiring come from outside the company or from onsite contractors leaving our avenues of advancement stopped (i.e., Promotion of a contractor to I&C Supervisor and the disqualification of the System Engineers for P/C jobs. I need assurance that the requirements for the job of System Engineer will not change in mid jog leaving us with even less of a career path as well as possibly a job we are not ever interested in. Also is ANPP willing to support us in our attempt to secure degrees thus augmenting the present technical base.

DEPT/GROUP OF CONCERN:

Engineering Evaluations.Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/04

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

I have never worked for a more egotistical autocratic group of people than at PVNGS when it comes to Sowers, Butler and Haynes. Their closed door policy and direct line management techniques have been directly responsible for the destruction of morale and the loss of line communication between the work force and management. Any individual who has been here during the Fynum versus Haynes days can see the loss of the group cohesiveness is directly due to the change in management styles as well as PVNGS slide from the best to the worst. This power plant is about to have a serious loss of its experience base if this management style is not turned around soon.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/05

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Moral in EED is at an all time low. The majority of people feel management doesn't care about them or their future. This feeling is fueled by managements' isolationist attitude (closed door policy) toward their employees. management must understand that they are no better or no worse than the performance of their employees and that management can not excel if their employees do not excel. I feel management does not grasp this concept at this time.

DEPT/GROUP OF CONCERN:

REFERENCES/ATTACHMENTS:

Engineering Evaluations/Electrical Systems Engineering

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/06

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Another factor contributing to the moral problem is the use of contracting personnel in permanent jobs. Its hard to pin-point the advantages of being an ANPP employee versus being a contractor. You work side-by-side with a contractor, doing the same type work, but he makes twice as much and has been here twice as long. He also works as much overtime as he wants and that is said to be O.K. because it comes from a different budget. Where are the advantages?

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/TR/SEQ
ELECT/88/07

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

The System Engineer training program seems to be more of a window dressing for INPO and the NRC than a training tool. If not, why did 75% of my training have no bearing what so ever on my day to day activities, for instance, I never intend to perform a rod worth calc. or draw a xenon curve.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/08

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

I would like to know why the present spouse policy for hiring was adopted.

DEPT/GROUP OF CONCERN:

Engineering Evalustions/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/09

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Why should I be expected to follow rules or ethics when my management example does not?

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/10

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Why is management all of a sudden concerned about our welfare and morale?

Is this just a way of pacifying us to prevent concerns going to INFO that would embarrass management?

TRUE

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/11

DED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

What has management ever done to foster morale or concerns of our group in the past?

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical Systems Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/12

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Current management does not address equipment concerns which the System Engineer is suppose to pro. actively identify. Paper work has been properly prioritized and required dates assigned and yet either (1) the proposed S-MOD or PCR is rejected in PCR court; or (2) the current engineering manager does not actively pursue paper work required from Nuclear Engineering.

References: 87-ZZ-109
87-ZZ-110
88-QM-011

ANPP per justification to correct wiring deficienties and CW valves CWUV005, 6, 7, 8.

System Engr has no say in work to be done

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineer

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

NAME:

SECT/YR/SEQ
ELECT/88/14

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Managements attitude (egotistical and autocratic) and style (close door) has driven a superior group to a morale level that is beyond recovery. Present management has lost its credibility and the respect of the employees. Present management has made the employees feel worthless and stupid.

AND HOW !

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineer

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Replace current management with new management that will have "open door policy" and which conveys the attitude that will increase morale and productivity by making people feel important and that their work is important. Present management has gone too far to recover. Most of the people would rather quit or transfer than continue to work for them.

Do an independent survey to determine present morale of EED.

This same problem existed at Deer Valley before the reorganization.

NAME:

SECT/YR/SEQ
ELECT/88/15

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

The system engineering program seems to be in a state of disarray. Our SE program says one thing and the Units go by something else. Management does not stand behind their employees, they always knuckle under to every whim made by the Units (WOG in particular) regardless of the engineer's stand. This leads to selective use of the SE program; when the heat is on, management abandons the program and we work to management directive or memo, which is more often than not in complete conflict with the SE program. If we are to have a program let's stick to it!!

System Engineering Program is just a piece of paper to please NRC and INPO. TRUE!

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

To actually implement program, the rest of procedures and policies would have to be revised to reflect system engineering responsibilities.

The staff would have to be increased greatly.

TRUE

NAME:

SECT/YR/SEQ
ELECT/88/16

EED EMPLOY[illegible] SURVEY

DESCRIPTION OF CONCERN:

I challenge two people to do a non-Q material substitution EER and agree on what forms are needed to be filled out and what the disposition is.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Revise EER procedure. Say "do this, if this" type format or use chart.

NAME:

SECT/YR/SEQ
SLECT/88/17

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

I feel that management needs to decide if supporting the Units is top priority. Now, engineers with no authority status work items but can not push or establish each engineers priorities. If support is a priority send the managers/supervisors to the meetings to demonstrate it.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Send supervisors and above to morning meetings. Sowers/Butler to attend at least 1 per unit each week.

NAME:

SECT/YR/SEQ
ELECT/88/18

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Design equivalent change of EER procedure is vague and used for many different things to fit the occasion. PCR procedure to me is not right. Yes, we have a scheduling problem; but, I think Work Control is making engineering decisions. If a MOD is technically justified and approved by engineering, the work should be scheduled and completed.

TRUE

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Management take stronger stand on engineer recommended items.

WHY HIRE MORE (3 PE) John & ALLEN when the MANAGEMENT DOES NOT LISTEN TO THEM

NAME:

SECT/YR/SEQ
ELECT/88/19

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

Too many rumors cause me not to feel comfortable about my job. I think management needs to convey to the troops they are on our side.

DEPT/GROUP OF CONCERN:

Engineering Evaluations/Electrical System Engineering

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Bi-weekly meeting with each department updating engineers on status.

NAME:

SECT/YR/SEQ

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

The square footage of the new modular furniture floorplan is said to be 64 ft^2 for senior Engineers. This does not seem to be adequate in order to perform my job. Our group has specialized testing equipment that must be controlled. This equipment is in a storage locker in my office. Also our group interfaces with vendors, the new floorspace of the office would not allow this. It seems that the money would be better spent by building another building that would give us the floorspace Alloted in the manual.

DEPT/GROUP OF CONCERN:

EED

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

Build a new building instead of buying furnature. This would house 500 people in 100 ft^2 cubes at double the cost ($50 ft^2). The space vacated by EED leaving the Annex would be filled by the trailers to the plant East of the Annex.

SECT/YR/SEQ

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

MORALE SEEMS TO BE LOWER THAN EVER AT FVNS
(" " " " HIGHER " " " " DV.)
ENGINEERING (EED) SEEMS TO HAVE NO POLITICAL POWER
" " " SEEMS TO BE ON SHORT END.
EXAMPLES: MAINT AND SECURITY DEPTS GET WHAT THEY WANT - TRUCKS, WORK AREAS ETC.
NEW PARKING LOT AREAS ARE WAY TOO SMALL
- SMOKING MUST BE BANNED FROM INSIDE BUILDING - LET SMOKERS GO OUTSIDE TO SMOKE
WITH THE HUNDREDS OF SECURITY GUARDS HERE, A NEW ENTRY/EXIT POINT TO THE PARKING LOT SHOULD BE USED - CLOSE TO THE ADMIN ANNEX BUILDING - IF MANAGERS HAD TO WALK THE PRESENT JAKE, A NEW GATE WOULD APPEAR THE NEXT DAY.

DEPT/GROUP OF CONCERN:

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

TAKE THE OBVIOUS, EASY STEPS TO RAISE WORKER MORALE AND OTHER PROBLEMS WILL DISAPPEAR.

NAME:

SECT/YR/SEQ

EED EMPLOYEE SURVEY

DESCRIPTION OF CONCERN:

1. MANAGEMENT IS ALLOWING MAINTENANCE TO BE RESPONSIBLE FOR NDE. THIS IS CONTRARY TO ALL PREVIOUS DECISIONS MADE. MAINTENANCE HAS CONSTANTLY BUNGLED EVERYTHING. WHERE AS, EED ISI HAS ALWAYS MET OR EXCEEDED SCHEDULES AND BUDGETS. COSTS FOR THIS DECISION COULD EASILY DOUBLE THE NDE COSTS FOR EACH UNIT.

2. ANPP OFFICE SPACE SHOULD BE EQUAL TO OR LARGER THAN APS. THERE SHOULD BE A STANDARD.

3. REALISTIC DUE DATES SHOULD BE ESTABLISHED AND THEN PEOPLE HELD ACCOUNTABLE FOR BEING LATE AND REWARDED FOR BEING EARLY. (ie, look at this letter)

4. REVIEW AND PASS ON MAIL IN A TIMLEY MANNER. MANY TIMES ASSIGNMENTS ARE RECEIVED AFTER THERE DUE.

5. VERY LITTLE MANAGEMENT RECOGNIZATION OR VISABILITY IS STILL A CONCERN. THE AVERAGE ENGR BARELY KNOWS THEIR MANAGEMENT, AND PROBABLY NEVER GETS TO TALK OF HAVE A MEETING WITH THEM. THIS IS NOT TO PROMOTE THE NUCLEAR EXCELLENCE AWARDS, BUT TO PROMOTE MANAGEMENT INVOLVEMENT WITH INDIVIDUALS.

DEPT/GROUP OF CONCERN:

REFERENCES/ATTACHMENTS:

RECOMENDATIONS (OPTIONAL):

T=1

Arizona Nuclear Power Project
COMPANY CORRESPONDENCE

ID # 167-03199-ECS/JTB

DATE December 30, 1988

TO T. J. Thompson
Sta # 6772
Ext # 7980

FROM J. T. Barrow, Jr.
Sta # 7042
Ext # 4051

FILE 88-010-419.8, E.60.01.72
SUBJECT NRC Allegation RV-87-A-047 Final Report Supplement, Reflecting EE580 Open Items to ANPP and Data Files

Reference: Conversations J. T. Barrow, Jr. with T. J. Thompson of October, November and December 1988

Thanks to the excellent job performed by Bechtel, from December 15, 1987 to October 28, 1988, reflected by the subject documents, which are enclosed, we have only 6,184 cases to research in the units, out of an original quantity of 106,000.

Although this reduction has been performed by documentation research and analysis, it would probably be prudent to investigate these one more time, utilizing ANPP resources, prior to commencing walkdowns in the units, so as to minimize impact on their operation/outages.

Also, enclosed is an original EAR (88-0829), which is not listed in STAR and appears to be very delinquent. Perhaps this was written at the start of the Bechtel Phase 2 activities, the product of which was the subject supplement report, and then abandoned when Bechtel started up. M. L. Hypse is not available during these holidays to resolve this, so I am transmitting it to you with the following requests:

1. Please determine the status of this EAR with M. L. Hypse and either resurrect and revise it, or cancel it and prepare a new one to plan/track this completion activity.

2. Please review the subject data and prepare a plan and tentative schedule for the activity of resolving the remaining 6,184 items.

1605A/2306A

I/23

131

3. Please establish a Requirements Analysis Scheduled Completion Date of January 24, 1988, on or before which time you should be able to establish a conservative but firm schedule for task completion.

4. Please recommend to me any resources which you may need to assist in completion of this activity in a timely manner.

5. Please meet with the three PVNGS unit work control managers, while developing the plan and schedule, so as to integrate with their outage schedules. An appropriate place/time would be immediately at the end of the Tuesday PMC meetings, presently scheduled to be held on the 3rd, 10th, 17th and 24th of January. I will be at the one of the 3rd, for your information. Please advise me of which you will be attending and I will plan to be there.

6. Please prepare an official ANPP memo, from you to me, on or about the 30th of each month, transmitting status on this task, with a copy to Mike Mann in Q.A. He will use this "status report" to track his open item for L. G. Papworth. Once all 6,184 items are dispositioned, the last "status report" memo should state closure of the activity and transmit the closed-out EAR.

These are all generally per the referenced conversations; the purpose of this memo being to document, for the record, the commencement of final, confirmatory, closeout of this allegation follow-up activity.

Please call me with any questions you may have and communicate directly with Mike Mann, if solicited, as he should remain the EAR requestor.

JTB/dlm

Enclosure

J J Barnes, Jr.

cc: J. E. Allen
E. C. Sterling
L. G. Papworth
R. A. Badsgard
M. Mann
M. L. Hypse
M. Eskinazi

JB

Project No: 10
Data Date: 01/15/89

I. Project Title: CARTS Project - Replace EE580 Circuit and
000226 Raceway Program

PCR No: None DCP No: None

Priority: B1 QR/NQR: QR

II. Executive Summary:

By contract, the EE580 data base, which represents the electrical configuration of PVNGS, will be turned over in the form of computer tapes and tabulated reports. This project will specify, procure and install a system which replaces the existing Bechtel Circuit and Raceway Program (EE580) currently being leased. The EE580 is an antiquated, hierarchical type, bulk-run, user-unfriendly program, that requires massive data input for changes and large CPU costs per run.

III. Regulatory Requirement:

None

IV. Project Organization:

Lead Responsible Engineer:	Steven Schroeder
Responsible Operations Engineer:	Larry Henson
Responsible Construction Engineer:	N/A
Planner:	Delores Healey

V. Funding:

Type of Expense: [ ] O & M [ ] Capital Improvement
[X] Initial Construction

Schedule Status:	ANPP Approval	E&O Approval
	06/16/87	N/A

Commitments and Expenditures: ($000)

	Total Amount	Commitments To Date	Expenditures To Date	% Complete
Prel. Engr.	$ TBD			
Detail Design	TBD			
Procurement (Eng.)	TBD			
Implementation	TBD			
Total Job	TBD			

I/24

151

VI. Planning Status:

Phase	Plan	Approved
Trend	Y	Y
Detail Design	Y	Y
Procurement (Engr)	Y	Y
Implementation	Y	Y
Close-out	Y	Y

VII. Schedule Performance:

	Milestone	Scheduled Complete Date	Actual Complete Date	Comments
	CARTS project			
1.	Issue Requirements Document	06/17/88	06/15/88	
2.	CUC Presentation	10/14/88	10/11/88	
3.	Execute Contract	02/15/89		
4.	Data Conversion/Application Modification Completed	06/11/89		
5.	Acceptance Testing	07/20/89		
6.	Update Database and Complete Training	09/07/89		

VIII. Procurement:

No activity.

IX. Current Activities and Future Activities:

* Recommended vendor being scheduled to test proposed product on ANPP's new 6210 Intergraph Vax to ensure compatibility. This effort must be completed prior to executing the contract.

X. Major Problems and Actions to Resolve:

None

Steven D. Schroeder — LRE
N/A — Planner
[signature] 1/10/89 — RS
[signature] for E C Sterling 1/11/89 — NEM

PV401 0068 (11-84)
4190-900124 (PK/250)

Arizona Nuclear Power Project

ID#: 167-03416-JTB/SDS
DATE: February 20, 1989

TO:
Sta.#
Ext.

DISTRIBUTION

Prepared by:
Signature S. D. Schroeder 2/20/89
Name/Ext./Sta. S. D. Schroeder/4191/7042

Reviewed By:
Signature M. L. Hypse 2/20/89
Name/Ext./Sta. M. L. Hypse/4053/7042

Approved by:
Signature J. T. Barrow, Jr.
Name/Ext./Sta. J. T. Barrow, Jr./4051/7042

SUBJECT:

File: 89-001-350
EE580 Retraining
(QA Hotline File No. 87-075)

Reference: Memo 022-00972-LGP/TCS/NJL

In response to the request for additional EE580 training (see Reference above), EE580 Retraining classes will be held on February 27 and 28 in the North Annex. The training is based on previous meetings with the Work Control and Maintenance organizations. Representatives from the unit organization provided input at these meetings upon which the retraining has been based. Please have personnel attend the EE580 Retraining classes based on the scheduling identified in Attachment 1. If there are any questions, please contact Steven Schroeder at extension 4191.

JTB/SDS/jle

Attachment

I/26

14.

ATTACHMENT 1

CLASSES WILL BE 1-1/2 HOUR DURATION

Organization	Contact	#	NORTH ANNEX - MAIN CONF. ROOM					NORTH ANNEX - R.E. CONF. ROOM			
			02/27/89 12:15 PM	02/27/89 2:00 PM	02/28/89 12:15PM	02/28/89 2:00 PM	02/28/89 5:00 AM	02/27/89 7:30 AM	02/27/89 9:15 AM	02/28/89 7:30 AM	02/28/89 9:15 AM
Unit 1 Maint.	M. Powell	3	3								
	F. Warriner	21	6		15						
Unit 2 Maint.	M. Stewart	14	5		2	3	4				
	S. Grove	28	7	6	7	6	2				
Unit 3 Maint.	K. LeRoy	8	4		4						
	J. Reynolds	32		6	12	12	2				
Central Maint.	G. Olson	25	10	10			5				
Unit 1 Work Con.	C. LaPeter	12		6		6					
Unit 2 Work Con.	B. Gardner	10	4			6					
Unit 3 Work Con.	M. Beyer	17		7		6	4				
WRF	B. Greenspan	5						5			
Elect. Maint. Standards	C. Day	6							3		3
OCS	R. Trager	5							2		4
	V. Marshall	6							3	3	
	S. Burns	8						4		4	
EED	L. Henson	14						4		3	7
	J. Summy	12							6	6	
Resident Engr.	T. Thompson	3							1		2
	TOTAL	229	39	35	40	39	17	13	15	16	15

cc:

J. L. Allen	(7106)	M. Powell	(6427)
J. M. Allen	(6932)	F. Warriner	(6425)
P. L. Brandjes	(6310)	M. Stewart	(6454)
C. D. Churchman	(6915)	S. Grove	(6450)
J. W. Dennis	(6259)	K. LeRoy	(6474)
D. B. Fasnacht	(6775)	J. Reynolds	(6475)
L. L. Henson	(6078)	G. Olson	(6442)
M. L. Hypse	(7042)	C. Lapeter	(6259)
W. E. Ide	(6452)	B. Gardner	(6902)
D. B. Karner	(7040)	M. Beyer	(6915)
M. O. Mann	(6780)	B. Greenspan	(6215)
A. J. McCabe	(6426)	C. Day	(6070)
J. F. Minnicks	(6915)	R. Trager	(6096)
D. C. Phillips	(6920)	V. Marshal	(6096)
S. D. Schroeder	(7042)	S. Burns	(6096)
J. J. Scott	(6920)	J. Summy	(6078)
D. W. Smyers	(6078)	T. Thompson	(6772)
G. W. Sowers	(6102)	T. C. Stewart	(6780)
O. J. Zeringue	(6915)	Peggy McCullough	(NRC)
E. C. Sterling			

EE580 AT PVNGS

- Bechtel Circuit and Raceway Program

  - o Cables
  - o Locations
  - o Terminations
  - o Jumpers
  - o Conduits
  - o Trays
  - o Special Raceways
  - o Dummy Commodities

- Design Documents Required for Revision

  - o Design Change Packaces
  - o Site Modifications
  - o Paper Change Only PCRs
  - o FCRs

- EE580 Database Record Types

  o CC1 --- Component Identifiers (IDs)/Commodity Types

    EC---------- , Cable
    EW---------- , Termination
    EJ---------- , Jumper
    E*--------, Location
    ER---------- , Conduit
    ET---------- , Tray
    EK---------- , Special Raceway
    ZZ------- , Dummy Commodities

  See 81AC-0CC09 "Plant Numbering System" for interpretation of component tag number.

  o CC2 --- Component Characteristics (CCs) and Values

    B1 for Location Codes
    B2 for Cable Codes
    B3 for Raceway Codes
    D1 for Scheme Drawings
    D2 for Layout Drawings
    D4 for Vendor Wiring Dra. ;c
    E1 for Design Options
    E2 for Cable Reels
    E3 for Crimp Tools
    G1 for Systems
    G2 for Start-up Systems
    G3 for Facilities
    G4 for Firezones

- EE580 Database Record Types (Continued)

  - CC2 --- Component Characteristics (CCs) and Values (Continued)

    G5 for Safety Groups
    G6 for Prime Status
    G7 for Secondary Status
    G9 for Service Levels
    H1 for Cable Run Codes
    H5 for Responsible
    H6 for Change Doc's other than DCP
    H7 for TMI Tasks
    H8 for DCP numbers
    X1 for Account Codes
    ZH for Computer Generated Holds

  - CC3 --- Linkage Code Values

    F From
    T To
    C Cable
    J Jumper
    W Termination
    L Location
    R Raceway
    V Vias

- EE580 Database Record Types (Continued)

o CC4 --- Associated Components

E*	FTJRW
EC	FTW
EJ	L
ER	FTCL
ET	FTCL
EK	FTCL
EW	CL
ZZ	C

o CC5 --- Component Notes

o CS1/CS2 --- Subcomponent Record Sets

EW, EJ, E lists terminations as a subcomponent record sets.

- EE580 Data Extraction

o EE580 Consist of Three Data Bases

Unit 1 - Unit 1, Water Rec. & Common Commodities
Unit 2 - Unit 2, Commodities
Unit 3 - Unit 3, Commodities

o Individual Component Reports (ICRs)

* To access the databases for standard ICRs type

"@ ADD U1*U1." (Unit 1)
"@ ADD U2*U2." (Unit 2)
"@ ADD U3*U3." (Unit 3)

* To customize content of ICRs, type "CHANGE".

The following queues will be displayed (one at a time) for your response:

Enter desired CC types (up to 5), ALL or CR
Enter desired link code(s), ALL or CR <CC3/CC4>
Do you want notes <CC5> (Y or N CR) ?
Do you want subcomponents <CS1/CS2>
(Y or N CR) ?

* Type "SIGNOFF" to exit the database

- EE580 Data Extraction (Continued)

  o Multiple ICRs

    * Command is "@ADD - EE580*REPORT.ICR-XX"

      Database Qualifiers: - EE580KD (Unit 1)
      EE580KD2 (Unit 2)
      EE580KD3 (Unit 3)

      Customization Queues:

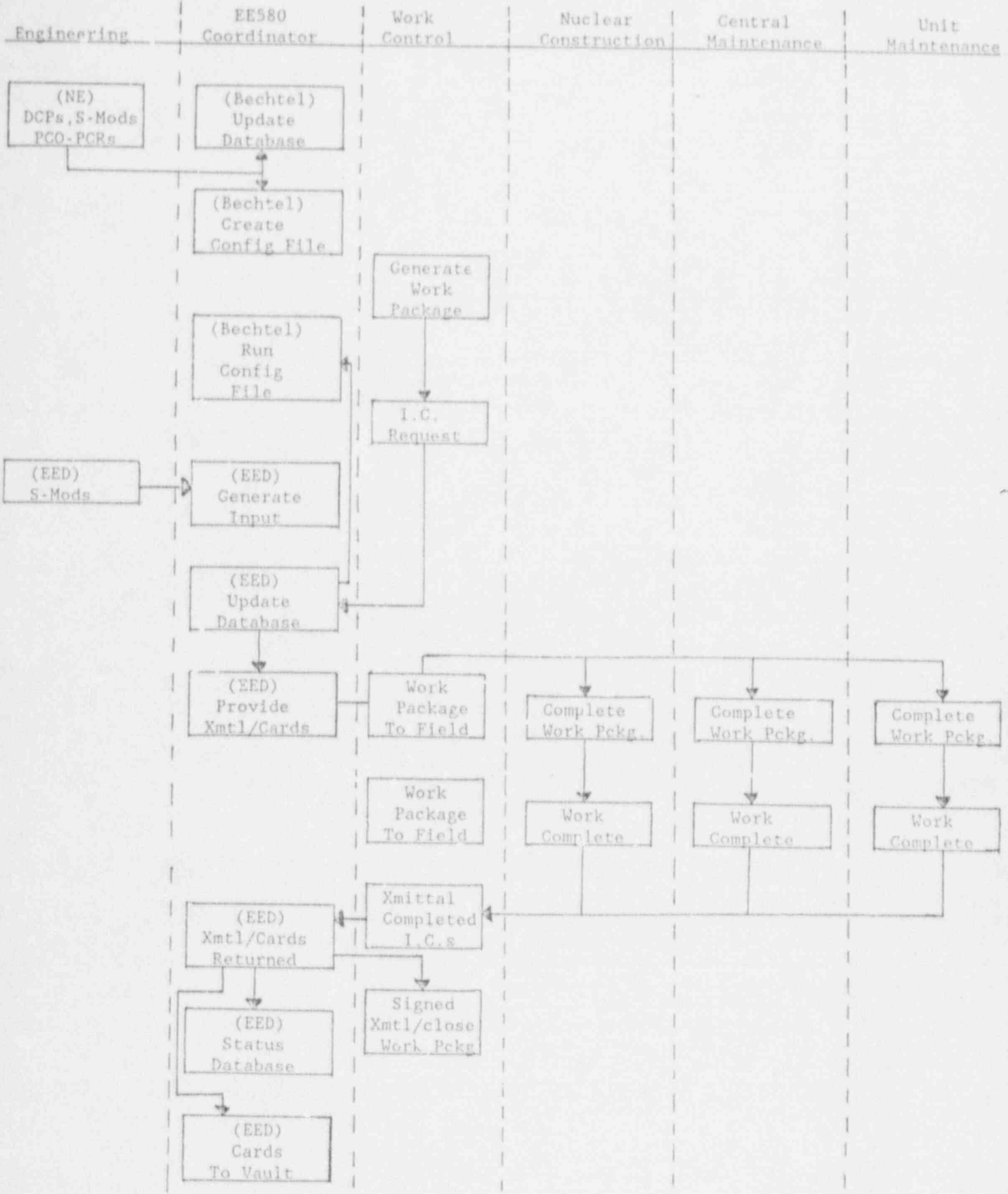
      ENTER SELECTION METHOD 'CC','ID','CCFILE' OR
      'IDFILE'
      ENTER '?' FOR MORE INFO
      ENTER DESIRED COMMODITY TYPE(S) OR ALL
      ENTER UNIT NUMBER(S) OR ALL
      ENTER FIRST SELECTION
      NOTE: CR = CARRIAGE RETURN
      ENTER DESIRED CC TYPES (UP TO 5),ALL OR CR
      ENTER DESIRED LINK CODE(S),ALL OR CR
      <CC3/CC4>
      DO YOU WANT NOTES (CC5) (Y OR N<CR>) ?
      DO YOU WANT SUBCOMPONENTS (CS1/CS2)
      (Y OR N CR) ?
      DO YOU WANT TO SPECIFY AN OPTIONAL COMPONENT
      ID SORT ?
      ENTER 'Y' OR 'N' (ENTER '?' FOR MORE INFO)

- EE580 Data Extraction (Continued)

```
DO YOU WANT TO RUN THIS REPORT IN BATCH
 (Y OR N)  ?
DO YOU WANT THE DUMP SAVED IN A FILE
 (Y OR N<CR>)   ?

TYPE "@ADD RUN." TO START REPORT
```

EE580 REVISION



- Current EE580 Related Procedures

  o EE580 Revision and Status

    *81AC-0CC07 - Cable and Raceway Control & Tracking System

  o EE580 Work Implementation Procedures

    *30AC-9ZZ01 Work Control
    *51CT-9ZZ29 Installation of Raceway, Cable Trays, Conduits, J-Boxes and Associated Supports
    *51CT-9ZZ31 Cable Installation, Repairs & Testing
    *51CT-9ZZ34 Cable Terminations

  o EE580 Contacts

    * Steven Schroeder - Engineering
    * Pat Gibbons - EED EE580 Coordinator
    * Simon Serhan - Bechtel EE580 Coordinator

WAITING

```
------------------------------
                                                             02/23/89  13:52:54.70

       AREA            COMPONENT      UNIT  REV     REV      M I L E S T O N E   D A T E S
                       IDENTIFIER     CODE  DATE    NO      (1)       (2)       (3)       (4)       (5)
---- ------------------------------------------------------------------------------------------------
CC1 EE580M1455         EW2ERD09NC2KA1  2   801024  02     800828    801024    820614    000000    000000
  CC2                  B2839          820614100030100030100030l
  CC2                  D113ERDR09     7807051001
  CC2                  E3EB9999       8206140
  CC2                  G1RD           7807050
  CC2                  G22RD09        8108140
  CC2                  G5N            7807050
  CC2                  G6CC           8206140
  CC2                  G7FI           8206140
  CC2                  G9K            7807050
  CC2                  H1FY           7912010
  CC2                  X185.22        8001120

  CC3                  C
    CC4                EC2ERD09NC2KA 01W000

  CC3                  L
    CC4                E*2ENHNM0432  07W000
NO CC5 RECORDS.

  CS1                  A         CS2  07E*2ENHNM0432  1P000A

  CS1                  B         CS2  07E*2ENHNM0432  1P000B

  CS1                  C         CS2  07E*2ENHNM0432  1P000C

ENTER COMPONENT IDENTIFIER:
>
```

DATE 4/03/89

SITE MOD NUMBER	MOD NO.	SYSTEM ENGINEER	DESCRIPTION	STATUS	ORIGINAL DATE	DATE DWG ORIGINAL REC FROM ORIGN	WORK ORDERS	DATE FROM FIELD TO S E	DWG FROM SYS ENG	CLOSURE DATE
SM-SP-005	1 2 3	HALLAS	EXTEND DISCHARGE LINES DOWN TO END 3" BELOW THE TECH SPEC LOW LIMIT FOR POND WATER DEPTH. INSTALLATION MAY EITHER REPLACE ENTIRE VERTICAL PIECE OF PIPE, OR USE A COUPLING WITH A SHORT PIECE OF PIPE TO ATTACH TO	A: U1: CL U2: BLUE U3: A	A: U1: 01/22/88 U2: 01/26/88 U3: 01/20/88	A: U1: 05/11/88 U2: 11/14/88 U3:	A: U1: 286934 U2: 323912 U3:	A: U1: 05/31/88 U2: U3:	A: U1: 06/01/88 U2: U3:	A: U1: 07/13/88 U2: U3:
SM-SP-006	1 2 3	HALLAS	INSTALL NALCO CHEMICAL ADDITION SKID. POWER IS 480V FROM CONTROL CENTER 1E-NAN-M5B WITH UNDER GROUND CONDUIT PER 13-EM-335, SKID TO BE GROUNDED TO EXISTING GROUND PAD NEAR STAIRWAY TO SP PUMP HOUSE.	A: U1: P U2: P U3: P	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:
SM-SP-007	1 2 3	HALLAS	REPLACE SUMP WALKWAY COVER PLATE WITH OPEN GRATING PER 13DONR33R. GRATING EDGES ARE TO BE BEVELED & BANDED TO MINIMIZE TRIPPING HAZARD. DRILL & TAP SUMP COVER FOR GRATING SADDLE CLIP BOLTS. ETC	A: U1: P U2: P U3: P	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:
SM-SP-008	1 2 3	HALLAS	REVISE HIGH LEVEL ALARM SET POINT FROM 14'2.4" TO 14'8".	A: U1: CL U2: RET U3: CL	A: U1: 10/24/88 U2: 10/24/88 U3: 10/24/88	A: U1: 11/03/88 U2: 11/28/88 U3: 11/03/88	A: U1: 323844, 323845 U2: 325197 U3: 323101	A: U1: 11/04/88 U2: 11/29/88 U3: 11/04/88	A: U1: 11/14/88 U2: 12/09/88 U3: 11/04/88	A: U1: 05/05/89 U2: U3: 01/04/89
SM-SP-009	1 2 3	HALLAS	SPRAY POND FILTER SYPHON BREAKER	A: U1: P U2: P U3: P	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:
SM-SD-001	1 2 3	VOBORIL	REPLACE RV-1 OUTLET SOLENOID ISOLATION VALVE W/MANUAL BALL VALVE	A: U1: CL U2: CL U3: CL	A: U1: 09/15/86 U2: 09/15/86 U3: 09/15/86	A: U1: U2: U3:	A: U1: 180186 U2: 180345 U3: 176234	A: U1: 02/24/87 U2: 10/21/87 U3: 10/21/87	A: U1: 03/03/87 U2: 10/21/87 U3: 10/21/87	A: U1: 03/25/87 U2: 10/29/87 U3: 10/23/87
SM-SD-002	1 2 3	CAMPBELL	REMOVE INTERPOSING RELAY FROM GASEOUS RADIATION MONITOR LOW FLOW ALARM CIRCUIT.	A: U1: CL U2: CL U3: CL	A: U1: 03/15/86 U2: 03/15/86 U3: 03/15/86	A: U1: U2: U3:	A: U1: 176838 U2: 178212 U3: 176900	A: U1: 12/03/ U2: 10/21/87 U3: 04/22/87	A: U1: 12/04/86 U2: 10/21/87 U3: 04/22/87	A: U1: 03/02/87 U2: 10/29/87 U3: 05/02/87
SM-SD-003	1 2 3	CAMPBELL	THIS MOD REPLACES THE HI-HI RAD LEVEL TRIP RELAY WITH A TIME DELAY RELAY THAT WILL REDUCE THE SPURIOUS TRIPS ASSOCIATED WITH JOGRUNNATA.	A: U1: V U2: CL U3: CL	A: U1: 10/02/86 U2: 10/02/86 U3: 10/02/86	A: U1: U2: U3:	A: U1: 182167 U2: 182177 U3: 182178	A: U1: 01/13/88 U2: 01/30/87 U3: 01/20/87	A: U1: 01/15/88 U2: 02/03/87 U3: 01/22/87	A: U1: U2: 02/12/87 U3: 02/12/87
SM-SD-004	1 2 3	BEAUCHRINE	1- FABRICATE TWO (2) ISOKINETIC NOZZLES. 2- INSTALL THE TWO (2) NOZZLES FROM ITEM 1 ABOVE. 3- REMOVE THE EXISING TUBING BETWEEN THE HRH AND HRN SKIDS. 4- INSTALL 1/4" TUBING BETWEEN THE HRH SKID AND THE NOZZLES	A: U1: A U2: A U3: A	A: U1: 06/26/87 U2: 06/26/87 U3: 06/26/87	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:
SM-SD-005	1 2 3	SEMPER		A: U1: VOID U2: VOID U3: VOID	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:	A: U1: U2: U3:

8

rel
work order

-- 04/13/89 09:56:20.4

W/O 178234

```
                     COMPONENT     UNIT  REV    REV       M I L E S T O N E   D
E S          JR        DATE
   AREA              IDENTIFIER    CODE  DATE   NO      (1)      (2)      (3)
   (5)       FLAG    STORED
-------------------------------------------------------------------------------
------------------------------------
EE580M1506           E*3JSQBRU01     3   800511  01    790625  791105  860423  0
0  000009     1         791105
C2                   B1INS            860421100010100010100010l
C2                   D113EPHA04       790625103
C2                   C213EZAC16       8101130
C2                   G1SQ             7906250
C2                   G20NODC          8604210
C2                   G23SQ01          8312290
C2                   G3ZA             8010180
C2                   G5B              7906250
C2                   G6CC             8604230
C2                   G7FI             8604211FOR SUMMARY PURPOSE ONLY
C2                   G7DC             8604211FOR SUMMARY PURPOSE ONL
C2                   G7TD             8005100
C5                   3RAD MONITOR CTMT BLDG ATMOSPHERE

S1                   K103L2      CS2  06EW3EPH04BC1KP2B

S1                   K103L3      CS2  06EW3EPH04BC1KP2C

S1                   K103L1      CS2  06EW3EPH04BC1KP2A

S1                   T10604      CS2  06EW3ESQ01BC1RD2U18

S1                   T10603      CS2  06EW3ESQ01BC1RD2X13

S1                   T10702      CS2  06EW3ESQ01BC1RO1N

S1                   T10701      CS2  06EW3ESQ01BC1RO1P

S1                   T10704      CS2  06EW3ESQ01BC1RP1P

S1                   T10705      CS2  06EW3ESQ01BC1RP1N

S1                   T10703      CS2  06EW3ESQ01BC1RP1*SHLD
```

I/28

ER COMPONENT IDENTIFIER:
3JSQNRU09

w/o 00182178

T E S	AREA (5)	JR FLAG	COMPONENT IDENTIFIER STORED	UNIT CODE	REV DATE	REV NO	MILESTONE (1)	(2)	(3)	D
1 EE500M1505			E*3JSQNRU07A	3	870330	04	800510	800511	800501	0
000 000000			800510							
CC2			81INS	860423100010100010100101						
CC2			D113ES0601	8005101101						
CC2			G213EZA001	8005101122						
CC2			G1SQ	8005100						
CC2			G20NOCD	8604240						
CC2			G23SQ01	8312270						
CC2			G2ZA	8101130						
CC2			G3N	8005100						
CC2			G6CC	8605010						
CC2			G7PA	8703300						
CC2			G7F1	8605010						
CC2			G7TD	8005100						
) CC5 PECCA-1										
CS1			T10803	CS2	06EW3EAS02NC1RS2P1					
CS1			T10801	CS2	06EW3EAS02NC1RS2I1					
CS1			T10407	CS2	06EW3ESQ01NC2RY16					
CS1			T10412	CS2	06EW3ESQ01NC2RY19					
CS1			T10402	CS2	06EW3ESQ01NC2RY12					
CS1			T10401	CS2	06EW3ESQ01NC2RY11					
CS1			T10406	CS2	06TW3ESQ01NC2RY15					
CS1			T10405	CS2	06E.3ESQ01NC2RY14					
CS1			T10403	CS2	06EW3ESQ01NC2RY13					
CS1			T10409	CS2	06EW3ESQ01NC2RY17					
CS1			T10410	CS2	06EW3ESQ01NC2RY18					
CS1			T10703	CS2	06EW3ES001NC2RS1*SHLD2					
CS1			T10701	CS2	06EW3ESQ01NC2RS1P					
CS1			T10704	CS2	06EW3ESQ01NC2RS1P1					
CS1			T10705	CS2	06EW3ESQ01NC2RS1N1					
CS1			T10702	CS2	06EW3ESQ01NC2RS1N					
CS1			T11003	CS2	06EW3ESQ01NC2RR2X03					
CS1			T11004	CS2	06EW3ESQ01NC2RR2X04					
CS1			T10602	CS2	06EW3ESQ01NC2RQ2N1					

5.

W/O 00178900

04/13/89 08:36:48.0

T & S	AREA (5)	JR FLAG	COMPONENT DATE IDENTIFIER STORED	UNIT CODE	REV DATE	REV NO	MILESTONE (1)	(2)	(3)	D
EE580M1506			E*3JSQNRU09		870330	02	790625	791105	860501	0
000 000000		1	791105							
C2			B1INS		860423100010100010100101					
C2			D113ENHA13		790625103					
C2			D213EZAC12		8101130					
C2			G1SQ		7906250					
C2			G20NOCD		8604240					
C2			G23S001		8312270					
C2			G3ZA		7906250					
C2			G5N		7906250					
C2			G6CC		8605010					
C2			G7DA		8703000					
C2			G7FI		8605010					
C2			G7TD		8005100					
C5			RAD MONITOR AUX BLDG LO LVL VENT EXH							
S1			K103L3	CS2	06EW3ENH13NC1K02C					
				CS2	06EW3ESQ01NC7KB2C					
S1			K103L2	CS2	06EW3ENH13NC1K02B					
				CS2	06EW3ESQ01NC7KB2B					
S1			K103L1	CS2	06EW3ENH13NC1K02A					
				CS2	06EW3ESQ01NC7KB2A					
S1			T10702	CS2	06EW3ESQ01NC2RK1N2					
S1			T10701	CS2	06EW3ESQ01NC2RK1P2					
S1			T10703	CS2	06EW3ESQ01NC2RK1*SHLD2					
S1			T10705	CS2	06EW3ESQ01NC2RK1N1					
S1			T10704	CS2	06EW3ESQ01NC2RK1P1					
S1			T10603	CS2	06EW3ESQ01NC2RJ2X09					
S1			T10604	CS2	06EW3ESQ01NC2RJ2U09					
S1			T10403	CS2	06EW3ESQ01NC2RI2*SHLD1					
S1			T10402	CS2	06EW3ESQ01NC2RI2N1					
S1			T10401	CS2	06EW3ESQ01NC2RI2P1					
S1			T10404	CS2	06EW3ESQ01NC2RI2P2					
S1			T10405	CS2	06EW3ESQ01NC2RI2N2					
S1			T10403	CS2	06EW3ESQ01NC2RK1*SHLD1					

R COMPONENT IDENTIFIER:
JSQNRU10

04/13/89 08:35:51.9

W/O 00178900

		COMPONENT IDENTIFIER	UNIT CODE	REV DATE	REV NO	MILESTONE (1)	(2)	(3)	D
S AREA (5)	JR FLAG	DATE STORED							
EE580M1506		E*3JSQBRU30	3	800511	01	790625	791105	860423	0
00 000000	1	791105							
C2		B1INS	860421100010100010100101						
C2		D113EPHA04	790625103						
C2		D213EZJC13	8101130						
C2		G1SQ	7906250						
C2		G20NOQC	8604210						
C2		G23SQ01	8602210						
C2		G3ZJ	8010180						
C2		G5B	7906250						
C2		G6CC	8604230						
C2		G7F1	8604211FOR SUMMARY PURPOSE ONLY						
C2		G7QC	8604211FOR SUMMARY PURPOSE ONLY						
C2		G7TD	8005100						
C5		3RAD MONITOR CONT ROOM VENT B							
S1		K103L1	CS2	06EW3EPH04BC1KM2A					
S1		K103L3	CS2	06EW3EPH04BC1KM2C					
S1		K103L2	CS2	06EW3EPH04BC1KM2B					
S1		T10702	CS2	06EW3ESQ01BC1RE1N					
S1		T10701	CS2	06EW3ESQ01BC1RE1P					
S1		T10704	CS2	06EW3ESQ01BC1RF1P					
S1		T10705	CS2	06EW3ESQ01BC1RF1N					
S1		T10603	CS2	06EW3ESQ02BC1RM2X18					
S1		T10604	CS2	06EW3ESQ02BC1RM2U18					
S1		T10703	CS2	06EW3ESQ01BC1RF1*SHLD					

FR COMPONENT IDENTIFIER;
3JSQBRU01

NTER COMPONENT IDENTIFIER:
E*3JSQARU29

W/O 00178900

---------------------------- 04/13/89 08:35:07.6

T E S	AREA	JR	COMPONENT DATE IDENTIFIER STORED	UNIT CODE	REV DATE	REV NO	M I L E S T O N E (1)	D (2)	(3)
A)	(5)	FLAG							

```
C1 EE580M1506          E*3JS. RU29    3   800511  01    790625  791105  860422  0
0000  000000    1        791105
 CC2                   B1INS          8604211000101000101000101
 CC2                   D113EPHA01     790625104
 CC2                   D213EZJC13     8101130
 CC2                   G1SQ           7906250
 CC2                   G20NOQC        8604210
 CC2                   G23S001        8506120
 CC2                   G3ZJ           8010180
 CC2                   G5A            7906250
 CC2                   G6CC           8604220
 CC2                   G7FI           860421170R SUMMARY PURPOSE ONLY
 CC2                   G7QC           8604211FOR SUMMARY PURPOSE ONLY
 CC2                   G7TD           8005100
 CC5                   3RAD MONITOR CONT ROOM VENT A

 CS1                   T10604     CS2  06EW3ESQ01AC1RM2U18

 CS1                   T10603     CS2  06EW3ESQ01AC1RM2X18

 CS1                   T10701     CS2  06EW3ESQ01AC1RD1P

 CS1                   T10702     CS2  06EW3ESQ01AC1RD1N

 CS1                   K103L2     CS2  06EW3EPH01AC1KM2B

 CS1                   K103L1     CS2  06EW3EPH01AC1KM2A

 CS1                   K103L3     CS2  06EW3EPH01AC1KM2C

 CS1                   T10704     CS2  06EW3ESQ01AC1RE1P

 CS1                   T10705     CS2  06EW3ESQ01AC1RE1N

 CS1                   T10703     CS2  06EW3ESQ01AC1RE1*SHLD
```

NTER COMPONENT IDENTIFIER:
E*3JSQARU30

OMPONENT NOT FOUND: E*3JSQARU30   04/13/89 08:35:35.8

NTER COMPONENT IDENTIFIER:
E*3JSQBRU30

ENTER COMPONENT IDENTIFIER:
>E*3JSQNRU34

W/O # 00178900

COMPONENT NOT FOUND: E*3JSQNRU34 04/13/89 08:38:20.9
4

ENTER COMPONENT IDENTIFIER:
>E*3JSQBRU34

----
5 04/13/89 08:38:28.3

```
                          COMPONENT     UNIT  REV     REV        M I L E S T O N E   D
A T E S          JR        DATE
       AREA                IDENTIFIL    CODE  DATE    NO       (1)       (2)       (3)
(4)    (5)       FLAG      STORED
----------------------------------------------------------------------------------------
CC1 EE580M1506             E*3JSQBRU34    3   791105  00     790625    791105    860423  0
00000  000000     1          791105
 CC2                       B1INS          8604211000101000101000101
 CC2                       D113EPHA04     790625103
 CC2                       D213EZAC26     8101130
 CC2                       G1SQ           7906250
 CC2                       G20NOQC        8604210
 CC2                       G23SQ01        8602040
 CC2                       G3ZA           8010180
 CC2                       G5B            7906250
 CC2                       G6CC           8604230
 CC2                       G7FI           8604211FOR SUMMARY PURPOSE ONLY
 CC2                       G7QC           8604211FOR SUMMARY PURPOSE ONLY
 CC2                       G7TD           8005100
 CC5                       3RAD MONITOR CTMT BLDG PURGE EXH

 CS1                       K103L1      CS2  06EW3EPH04BC1K02A

 CS1                       K103L3      CS2  06EW3EPH04BC1K02C

 CS1                       K103L2      CS2  06EW3EPH04BC1K02B

 CS1                       T10604      CS2  06EW3ESQ01BC1RC2U18

 CS1                       T10603      CS2  06EW3ESQ01BC1RC2X18

 CS1                       T10702      CS2  06EW3ESQ01BC1RM1N

 CS1                       T10701      CS2  06EW3ESQ01BC1RM1P

 CS1                       T10704      CS2  06EW3ESQ01BC1RN1P

 CS1                       T10705      CS2  06EW3ESQ01BC1RN1N

 CS1                       T10703      CS2  06EW3ESQ01BC1RN1*SHLD
```

NTER COMPONENT IDENTIFIER:

FER COMPONENT IDENTIFIER:
*3JSQNRU15

W/O #00178900

04/13/89 [redacted] 7:51.2

E S	AREA (5)	JR FLAG	COMPONENT DATE IDENTIFIER STORED	UNIT CODE	REV DATE	REV NO	MILESTONE (1)	(2)	(3)	D
EE580M1506			E*3JSQNRU15	3	791105	00	790720	791105	860501	0
00	000000	1	791105							
C2			B11NS	860423100010	1P00101000101					
C2			D113ESQB01	811020101						
C2			D213EZRC10	7906201012						
C2			G1SQ	7907200						
C2			G20NOCD	8604240						
C2			G23SQ01	8312270						
C2			G3ZR	7907200						
C2			G5N	7907200						
C2			G6CC	8605010						
C2			G7FI	8605010						
C2			G7TC	8005100						
C5			1RADWASTE BLDG							
C5			3LATER							
S1			K103L2	CS2	06EW3ENH14NC1KP2B					
S1			K103L1	CS2	06EW3ENH14NC1KP2A					
S1			K103L3	CS2	06EW3ENH14NC1KP2C					
S1			T10704	CS2	06EW3ESQ01NC2SN1P1					
S1			T10705	CS2	06EW3ESQ01NC2SN1N1					
S1			T10702	CS2	06EW3ESQ01NC2SN1N					
S1			T10703	CS2	06EW3ESQ01NC2SN1*SHLD2					
S1			T10701	CS2	06EW3ESQ01NC2SN1P					
S1			T10603	CS2	06EW3ESQ01NC2SM2X07					
S1			T10604	CS2	06EW3ESQ01NC2SM2U07					
S1			T10403	CS2	06EW3ESQ01NC2SL2*SHLD1					
S1			T10404	CS2	06EW3ESQ01NC2SL2P2					
S1			T10402	CS2	06EW3ESQ01NC2SL2N3					
S1			T10401	CS2	06EW3ESQ01NC2SL2P3					
S1			T10403	CS2	06EW3ESQ01NC2SN1*SHLD2					
S1			T10405	CS2	06EW3ESQ01NC2SL2N2					

04/13/89 08:37:1

a/o 00178900

T C S	AREA (5)	JR FLAG	COMPONENT DATE IDENTIFIER STORED	UNIT CODE	REV DATE	REV NO	MILESTONE (1)	(2)	(3)	D
4)										
1 EE580M1506			E*3JSQNRU10	3	870330	02	790522	791105	860501	0
000 000000		1	791105							
CC2			B1INS	860423100010100v101000101						
CC2			D113ENHA28	790522103						
CC2			D213EZAC73	8101130						
CC2			G18Q	7905220						
CC2			G20NOCD	8604240						
CC2			G238Q01	8312270						
CC2			G3ZA	7905220						
CC2			G5N	790522U						
CC2			G6CC	8605010						
CC2			G7DR	8703300						
CC2			G7FI	8605010						
CC2			G7TD	8005100						
CC5			1LATEK							
CC5			3AUX BLDG UPPER LVL VENT EXH RAD MONITOR							
CS1			T.0705	CS2	06EW3ESQ01NC2RH1N1					
CS1			T10704	CS2	06EW3ESQ01NC2RH1P1					
CS1			T10702	CS2	06EW3ESQ01NC2RH1N2					
CS1			T10701	CS2	06EW3ESQ01NC2RH1P2					
CS1			T10703	CS2	06EW3ESQ01NC2RH1*SHLD2					
CS1			T10604	CS2	06EW3ESQ01NC2RG2U09					
CS1			T10603	CS2	06EW3ESQ01NC2RG2X09					
CS1			K103L3	CS2	06EW3ENH28NC1KM2C					
				CS2	06EW3ESQ01NC7KG2C					
CS1			K103L2	CS2	06EW3ENH28NC1KM2B					
				CS2	06EW3ESQ01NC7KG2B					
CS1			K103L1	CS2	06EW3ENH28NC1KM2A					
				CS2	06EW3ESQ01NC7KG2A					
CS1			T10403	CS2	06EW3ESQ01NC2RE2*SHLD1					
CS1			T10405	CS2	06EW3ESQ01NC2RE2N2					
CS1			T10403	CS2	06EW3ESQ01NC2RH1*SHLD1					
CS1			T10404	CS2	06EW3ESQ01NC2RE2P2					
CS1			T10402	CS2	06EW3ESQ01NC2RE2N1					
CS1			T10401	CS2	06EW3ESQ01NC2RE2P1					

********** UF-300 ******** -JOURNAL PRINT- ********** DATE 02/05/1990 *** TIME 15:15 **********

NO.	COM	DOC	DURATION	X/R	IDENTIFICATION	DATE	TIME	DIAGNOSTIC
32	OK	03	00:02'51	XMT	3rd FLOOR MU	02/05	15:12	840480287600

-US NRC PALO VERDE -

************************** -PANAFAX- ********************** - 602 396 2738- **********

APPENDIX A TO INSPECTION REPORT 528/90-25

1. As referrenced in paragraphs 3.A and 4 of Inspection Report 528/90-25, the following provisions establish, in part, the requirements for providing reliable emergency lighting units for support of safe plant shutdown in the event of a fire:

License No. NPF-41, Condition 2.C(7) for Palo Verde Unit 1, License No. NPF-51, Condition 2.C(6) for Palo Verde Unit 2 and License No. NPF-74, Condition No. 2.F for Palo Verde Unit 3, provide in part:

"APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (FSAR) for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision: APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of fire."

FSAR Appendix 9B, Table IV.J, requires emergency lighting units with at least 8-hour battery power supplies in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto (all lighting units that are the basis for this violation and those that follow are required by Table IV.J).

FSAR Appendix B, Safety Design Basis Eighteen, states in part: "Emergency lighting systems shall be provided in accordance with the guidance provided in NRC Branch Technical Position (BTP) APCSB 9.5-1...Batteries for emergency lighting shall be rated for a minimum of 8 hours...Applicable codes and regulations of...the National Fire Codes of the National Fire Protection Association...have been used as guidance in the development of the plant fire protection system.

NRC BTP APCSB 9.5-1, Appendix A, recommends suitable fixed emergency lighting with 8-hour minimum battery power supplies for safe shutdown equipment and in access and egress routes thereto. In response to this recommendation, FSAR Table 9B.3-1(D-5) states, in part: "Lighting and two way voice communications are provided. See FSAR Sections 9.5.2 and 9.5.3...."

FSAR Section 9.5.3.1.3 states: "Design and installation of the plant lighting systems use the guidance provided by the National Electrical Code (NFPA No. 70-1975/ANSI C1-75)" (hereinafter cited as "NFPA").

NFPA Article 410-4 requires that emergency lighting fixtures and equipment installed in "wet or damp locations" be "approved for the purpose," and be marked "Suitable for Damp Locations." Damp

locations include "partially protected locations under canopies, marquees, roofed open porches and the like ..."

NFPA Article 100 defines "Approved" as "acceptable to the authority having jurisdiction," and "Approved for the Purpose" as "approved for a specific purpose, environment or application described in a particular Code requirement."

NRC BTP APCSB 9.5-1 defines "Approved" as "tested and accepted for a specific purpose or application by a nationally recognized testing laboratory."

2. As referrenced in paragraph 3.E of Inspection Report 528/90-25, the following provisions establish, in part, the requirements for implementing Quality Assurance Program controls for Appendix R emergency lighting systems:

License No. NPF-41, Condition 2.C(7) for Palo Verde Unit 1, License No. NPF-51, Condition 2.C(6) for Palo Verde Unit 2, and License No. NPF-74, Condition No. 2.F for Palo Verde Unit 3, provide in part:

APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (FSAR) for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision: APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of fire.

FSAR Table 9B.3-1(C) requires the development and implementation of a Quality Assurance Program to satisfy the guidance of BTP 9.5-1 for design, procurement, installation, testing, and administrative controls for the fire protection program for safety related areas. The table sets forth eleven criteria, including those requiring adequate corrective actions and test controls.

BTP 9.5-1 defines the term "Fire Protection Program" as "the integrated effort involving all components, procedures, and personnel utilized in carrying out all activities of fire protection. It includes system and facility design, fire prevention, fire detection, annunciation, confinement, suppression, administrative controls, fire brigade organization, inspection and maintenance, training, quality assurance, and testing."

FSAR Section 17.2.2.2 provides: "the Operations QA program, as described in the Operations Quality Assurance Criteria Manual, shall be applied to fire protection program activities associated with those fire protection systems and equipment used or installed in areas housing safety related equipment, and other areas where an unsuppressed fire could potentially damage safety-related structures, systems or components."

GL 86-10 FPP not SR. Appx B not required.

The original Palo Verde SER dated November 1981 provides that the licensee will implement the fire protection program consistent with the provisions of the NRC staff's guidance in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," dated August 29, 1977, including those provisions concerning quality assurance. Supplement 6 of this staff guidance recommends a quality assurance program that applies, among other things, to emergency lighting.

a. The following Quality Assurance Program controls are specifically applicable to corrective actions:

APS Operations Quality Assurance Manual, Criterion 16, Revision No. 5, Section 16.4.7, "Corrective Action," implements FSAR Table 9B.3-1(C.8), and requires appropriate evaluation to determine the cause and prevent recurrence of failures that have an effect on, or influence safe operation of the plant in an adverse manner. Under Section 16.4.8, a documented evaluation is required to support any decision to permit the use of installed equipment that is nonconforming.

b. The following Quality Assurance Program controls are specifically applicable to testing:

FSAR Table 9B.3-1(C.5) requires that a test program be established to assure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. APS Operations Quality Assurance Manual, Revision No. 5, Criterion 14, implements the provisions of FSAR Table 9B.3-1(C.5).

FSAR Section 9.5.3.4 requires that the emergency lighting system be inspected and tested periodically to ensure operability of the automatic switches and other components in the system. The test procedures are required to measure appropriate design parameters to demonstrate system design and readiness requirements.

3. As referrenced in paragraph 3.C of Inspection Report 528/90-25, the following provisions establish, in part, the requirements for review of Post-Fire Safe Shutdown Procedures:

Technical Specification 6.8.2 requires that programs and procedures of Specification 6.8.1 be reviewed periodically as set forth in administrative procedures. Specification 6.8.1 requires that written procedures be implemented governing the Fire Protection Program. APS Administrative Procedure No. 01AC-0AP02, section 3.6.6, implementing the Fire Protection requirements of Technical Specification 6.8.2, requires that the Pre-Fire Strategies Manual be reviewed at least once every 12 months to determine whether any changes are necessary.

4. As referrenced in paragraph 5 of Inspection Report 528/90-25, the following provisions establish, in part, the requirements for notifying the NRC of Appendix R emergency lighting violations:

Technical specification 6.9.3 for Palo Verde Units 1, 2 and 3, provides that: "Violations of the requirements of the Fire Protection Program described in the FSAR which would have adversely affected the ability to achieve and maintain safe shutdown in the event of a fire shall be reported in accordance with 10 CFR 50.73.

License No. NPF-41, Condition 2.C(7) for Palo Verde Unit 1, License No. NPF-51, Condition 2.C(6) for Palo Verde Unit 2, and License No. NPF-74, Condition No. 2.F for Palo Verde Unit 3, provide in part: "APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (FSAR) for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision: APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of fire."

FSAR Section 9.5.3.1.1 (Safety Design Basis Two) provides that: "The lighting system, comprised of normal, emergency, and essential subsystems, shall be designed so that a single failure of any subsystem or electrical component of a subsystem, assuming loss of offsite power, cannot terminate the system's ability to illuminate areas occupied during a reactor shutdown or emergency."

"APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (FSAR) for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision: APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of fire."

FSAR Appendix 9B, Table IV.J, requires emergency lighting units with at least 8-hour battery power supplies in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

MEETING ATTENDEES

DATE: 7-10-90 Time: 0830

NAME	TITLE
D. Kirsch	NRC, RV; CH., RSB.
FR Huey	NRC, RV
T.L. Chan	NRC/NRR
C. Ramsey	NRC RV Reactor Inspector
David Notley	NRC/NRR
Mary H. Miller	NRC/RV
Lynn T. Larkins	NRC/NRR/PD-V
Sheri R. Peterson	NRC/NRR/PDV
Robert Marsh	NRC/OI
[illegible]	NRC Region /
[illegible]	NRC Region V
D. H. COE	NRC Senior Res. Insp.
Howard J. Wong	NRC: Section Chief: RV
Ben B. Hayes	NRC OI
Richard A. Bernier	APS Licensing
[illegible]	[illegible]
E. C. Firth	TRNG MANAGER - ARIZ PUBLIC SERV.
G.R. Overbeck	APS DIR. SITE TECH SUPPORT
A.H. Gutterman	Newman & Holtzinger, P.C.
W.F. Quinn	APS Director Licensing
E. Simpson	APS, V.P. Nuc. Engr. & Const.
Jim Levine	APS, VP Nuc. Production

I/33

10.

NAME	TITLE
JN BAILEY	VP Nuc Safety + Lic
WF Conway	EVP - Nuclear
GW Sowers	Tech Assistant STS
E.C. STERLING	MANAGER, N LIC. ENG.
B.E. Ballard Sr	DIRECTOR - QA
A. D. Johnson	NRC - Enf. Officer

PALO VERDE EMPLOYEE NEWS BULLETIN

PALO VERDE COMMUNICATIONS DEPARTMENT ◆ STA. 6345 ◆ EXT. 82-5702

Wednesday, November 7, 1990 90-107

SECTION 2.206 PETITION PARTIALLY DENIED

In a recent decision, the NRC has denied, in part, a petition filed by an employee. The petition, filed on May 22, 1990, pursuant to Section 2.206 of Title 10 of the Code of Federal Regulations, sought modification, suspension or revocation of the Palo Verde operating licenses.

Thomas E. Murley, Director of the NRC Office of Nuclear Reactor Regulation, stated in his decision that a proceeding to "modify, suspend, or revoke the NRC licenses held by APS is not warranted" regarding emergency lighting and fire protection. "This decision is based on the corrective actions initiated by APS to deal with the concerns. There is reasonable assurance that PVNGS can be operated with adequate protection of the public health and safety, pending completion of ongoing corrective actions," Murley stated.

Those corrective actions include designation of emergency lighting as "quality augmented," consistent with the Palo Verde QA Criteria Manual; upgrade of preventive maintenance (PM) programs; and revision of test procedures. Corrective actions addressing immediate concerns of APS and the NRC have been completed, while ongoing activities are being monitored by the NRC.

The petition also alleged that individuals employed by APS and the NRC were involved in wrongdoing and requested that appropriate actions be taken. The allegations of APS wrongdoing in the area of emergency lighting and fire protection are currently under investigation by the NRC Office of Investigations and will be the subject of a future decision. Allegations of improprieties by NRC personnel have been referred to the Office of the Inspector General and are under investigation.

SUPPORT THE CLEAN TEAM...RECYCLE THIS BULLETIN AND ALL OTHER WHITE PAPER.
FOR DAILY PLANT STATUS, CALL PALO VERDE UPDATE AT EXT. 82-6397

PLEASE SHARE WITH FELLOW EMPLOYEES

Exit Meeting Emergency lighting Follow up

Attendance Sheet

August 31, 1990

Name	Title
Gary Clyde	Senior Licensing Engr.
Bert Simpson	V.P. Engr. & Const.
John E. Aller	Director, Nuclear Engr. & Support Services
Chuck Stevens	Supervisor NEA
Randy Hoey	NRC Region V

IB6

8.

fcl

NRC/APS Meeting 8/28/90

Name	Org	Title
FR Huey	NRC RII	Engr Chief
DICK BERNIAR	APS LICENSING	LEAD LICENSING ENGR.
Yousaf Lodhi	APS Nuclear Analysis	Principal Consultant
Chuck Stevens	APS Nuclear Eng Analysis	Supervisor
Shawn Rodgers	APS Nuclear Eng Analyses	Sr. Engr.
Bill Quinn	APS Licensing	Director
Thomas H. Cogburn	APS Nuclear Production	Tech Asst.
Craig A. Cooper	APS System Eng Dept	System Eng
WADELLA, JOHN R.	APS NUCLEAR ENG. ANAL.	NPEDS/FDT
AD Johnson	NRC RII	Enf Offrcr

I/35

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

October 11, 1989

NRC INFORMATION NOTICE NO. 89-70: POSSIBLE INDICATIONS OF MISREPRESENTED VENDOR PRODUCTS

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is intended to alert addressees to possible indications of misrepresented vendor products and to provide information related to detection of such products. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. Suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

The NRC is concerned about what appears to be an increased number of instances of misrepresented vendor products being supplied to the nuclear industry. Equipment procured as new is assumed to meet all procurement documentation requirements, applicable plant design requirements, and original manufacturer's specifications. However, on many occasions such equipment has not conformed to these requirements and specifications. The NRC has published numerous bulletins and information notices regarding specific instances of misrepresented products in the last two years. These are listed for reference in Attachment 1.

Detecting misrepresented products is difficult because most quality assurance programs are not designed for detecting counterfeit or fraudulent practices. The criteria used to confirm the quality of products during receipt inspection and testing generally have assumed vendor integrity and are not focused on identifying an intent to deceive. This information notice summarizes possible indications of counterfeit or fraudulent material that have been discovered by licensees during inspection and testing and by the NRC staff during inspections, along with information provided by concerned vendors. The NRC staff believes this information will be helpful to licensees in detecting misrepresented vendor products.

Attachment 2 lists some common characteristics of misrepresented products.

Release - this is an APS document

CONCERN 1:

The National Electrical Code (NFPA 70-1975/ANSI C1-75), Article 400-4, requires that emergency lighting fixtures and equipment be designed, tested and accepted for a specific purpose or application by a nationally recognized laboratory. The various types of battery powered emergency lighting units installed to support operator actions to achieve safe shutdown in the event of a fire at Palo Verde were tested and accepted by Underwriters Laboratories Inc., for use in environments with ambient temperatures of 77 degrees F, as specified in APS Material Requisition No. 13-EM-041B, referencing Underwriters Laboratory (UL) Standard No. 924.

(E.1.a, p. 4)

DISCUSSION:

The specific article of the National Electrical Code (NFPA 70-1975) which covers these emergency lighting units is Article 700.

Article 700-3 states that all equipment shall be "approved" for use on emergency lighting systems.

However, the NEC states in Article 700 that other applicable articles of this code shall apply. If we classify these emergency lighting units as "lighting fixtures", Article 410 may be used as guidance.

Article 410-4 states that fixtures installed in wet locations shall be "approved for the purpose". The following is the APS interpretation of these articles and our compliance:

a) The definition of "approved for the purpose" as defined in the NEC Article 100 is "Approved for a specific purpose, environment or application described in a particular Code requirement.

b) The definition of "approved" as defined in NEC Article 100 is "Acceptable to the authority having jurisdiction".

c) The authority having jurisdiction in our case is the NRC.

d) The BTP 9.5.1 describes an acceptable emergency light as :

"Fixed, self-contained lighting consisting of fluorescent or sealed-beam units with individual eight-hour minimum battery power supplies should be provided in areas that must be manned for safe shutdown and for access and egress routes to and from all fire areas."

Where the BTP requires approval or testing by an outside organization it specifically states that requirement in the BTP. For instance, SCBA's require approval by the NIOSH, as specifically stated in the BTP, Section 4.d.(7).

I/31

5/15/90

In summary, neither BTP nor the NEC require emergency lights to be tested or approved by any outside organization to demonstrate compliance with design requirements. APS Engineering used vendor data and engineering judgement to confirm the acceptability of the units in the applications for which they were designed.

CONCERN 2:

The various battery manufacturer's literature state that the manufacturer's warranty is invalidated if the batteries are operated in ambient temperatures above 110 degrees F., or if the batteries are not maintained in accordance with the National Electrical Code. FSAR Table 9.4.2 specified the maximum operating space temperatures for certain areas.

(E.1.a, p. 4)

DISCUSSION:

There are four emergency lighting vendors which supply Appendix "R" required lighting in various applications throughout PVNGS. These applications, including the worst case temperature environment from UFSAR Table 9.4.2, are as follows:

Vendor	Buildings	UFSAR Temperature
Dual-Lite Self contained	All Areas	122 F (Turbine Bldg) 140 F (DG Bldg/DG running)
Holophane	Control Auxiliary	104 F (Aux Bldg)
Emergi-Lite	MSSS Breezeway	120 F (MSSS)
Exide	Control Room	85 F (Battery rooms)

Dual-Lite

The Dual-Lite emergency lights are wall mounted, self-contained, battery powered emergency lighting units. These units are located in every building at PVNGS. They are used in both 8-hour and 1-1/2 hour applications.

The Dual-Lite units have two 7.2 watt heads and operate at 6-volts. This equates to a 2.4 amp load over the 8-hour discharge period or a required 19.2 amp-hour capacity at the 8-hour discharge rate.

Each emergency lighting unit has a long-life Nickel-Cadmium battery. There are three manufacturers of the batteries used in Dual-Lite units, these manufacturers are Sab-Nife, ALCAD and Varta.

The Dual-Lite warranty states that the batteries are not to be used in ambients above 110 F. However, correspondence from Dual-Lite and the battery vendors for Dual-Lite have demonstrated that adequate capacity and life is available even at the higher ambient temperatures.

Sab-Nife: The Sab-Nife batteries are model EDE-30. From vendor data, the EDE-30 has a capacity of 32 amp-hours at the 8-hour rate. From the manufacturer curves, the available capacity at 122 F and at 140 F is 100%. Hence sufficient capacity exists to supply the 19.2 amp-hour load. The battery life, also from the curves, at a continuous 122 F is 12 years. (down from 25)

ALCAD: The ALCAD batteries are model VB-5. These batteries are Nickel Cadmium with a 40.8 amp-hour capacity at the 8-hour discharge rate. The vendor has provided a curve that shoes at 122 F, 85% capacity is available and at 140 F, 75% capacity is available. Since there is 53% margin in design capacity, the higher temperatures are not considered a problem.

At a continuous temperature of 122 F, from vendor curves, life reduction of 40% can be expected. The design service life of the battery at 80 F is 25 years. Hence, at 122 F the service life of the battery is expected to be 15 years.

Varta: Varta has their engineering offices located in Germany, therefore communication with Varta has been difficult. However, it is known that Varta batteries are also Nickel-Cadmium, similar to those supplied by the other two vendors. The capacity at 77 F at the 8-hour discharge rate is 38 amp-hours. Hence, as is the case with the other vendors, there is considerable margin between the battery design capacity and the load requirements.

Emergi-Lite

Emergi-Lite wall mounted units are used in the MSSS at the 140' elevation for the ADV's and in the Turbine Building Breezeway (the access/egress path for the MSSS).

Each Emergi-Lite unit is supplied with a sealed Polytemp Nickel-Cadmium battery manufactured by SAFT and is warranted for 15 years. These batteries are designed specifically to give long life under high temperature environments.

SAFT has recently provided APS a curve showing that at a continuous temperature of 120 F, the cell life of the battery would be four to five years. This capacity, per SAFT, would be capable of delivering 8-1/2 hours total run time at 120 F.

In addition, the Emergi-Lite chargers are temperature compensated to automatically adjust float voltages for high temperatures. This will avoid over-charging of the batteries and hence extend the life.

Holophane

In the Control Building and Auxiliary Building where a broader source of light was needed to illuminate switchgear and relay panels, a modular AC power stations are used. These power stations supply numerous fluorescent fixtures from each power station. The units each contain their own lead-acid battery enclosed in a separate compartment of the power station.

In the Auxiliary Building, these units are exposed to a worst case temperature of 104 F. Recent correspondence from the vendor has shown that at that higher temperature, continuously, with an uncompensated charger, as used at Palo Verde, the expected life of the battery is 1.4 years.

This is the absolute worst case, since we know in actual application the temperatures are not near this value continuously year round.

The Holophane batteries are maintenance free, lead-acid type batteries with a warrantee based on battery temperature.

It should be noted that the capacity of these batteries would increase at higher temperatures.

Exide

The Exide units have their batteries located in the Class 1E battery rooms. Since this is a very controlled environment with an absolute maximum temperature of 85 F. The temperature concern is not a factor.

CONCERN 3:

The battery powered emergency lighting units installed to support operator actions to achieve safe shutdown in these areas apparently were not tested and accepted for operation in the maximum space temperatures experienced in these areas.

(E.1.a, p. 4)

DISCUSSION:

Refer to Concern 1 and Concern 2 discussion.

Concern 4:

The emergency lighting units that were installed in June 1989 in the MSSS, and in access and egress routes thereto, apparently have not been tested and approved for use in outdoor wet locations, or the high ambient outdoor temperature environments experienced at Palo Verde during summer months.

(E.1.a, p. 4)

Discussion:

The Emergi-Lite emergency lighting units are designed and tested for outdoor use by the manufacturer.

The Emergi-Lite KS series emergency lighting unit is contained in a NEMA 4X cabinet which by NEMA standards is defined as:

> Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure.

A letter dated 5/1/89 obtained from the QC Manager of Emergi-Lite confirmed that the Emergi-Lite equipment purchased at PVNGS had been designed and tested to meet the NEMA 4X weatherability requirements.

The Emergi-Lite units contain sealed Nickel-Cadmium batteries as manufactured by SAFT America Inc. The batteries are designed to support a wide temperature range.

The Emergi-Lite units have temperature compensated chargers which adjust charging current based on battery ambient temperature. This feature helps extend the life of the battery in elevated temperatures by preventing overcharging.

These emergency lights meet the requirements of BTP 9.5.1.

These lights are not required to be tested (See Concern 1). The temperature issue is addressed in Concern 2.

① Vendor has no test data - in - firm NEMA 4x
② APS had units delivered that were not water tight
③ APS needs to re eval to ensure meet NEMA 4x.

Not Appx R - ADV one

Dw in other Appx R areas + access paths

Originally bought non qual (non Appx R enhancement lts) but - upgrade all to Qual class.

CONCERN 5:

Regarding Johnson Controls Model 6VHC-96, Dynasty GC-12V-100 and 12UPS-300 lead-acid and gel-cel batteries supplying power to fluorescent emergency lighting fixtures in the Auxiliary Building, the battery capacity ratings do not appear to provide the power needed to sustain 8 hour emergency lighting for loads in Units 1 and 2. According to the licensee's Procurement Specification No. 13-EM-041B, the battery cells are required to be of the proper rating to meet 125 percent of the battery load profile requirements at a minimum battery temperature without the battery voltage dropping below 1.75 volts per cell, to ensure adequate capacity at the end of the battery's useful life in accordance with U.L. Standard No. 924. The end of the battery's useful life is defined in the specification as the point where the battery has reached 80 percent of its 8 hour discharge rating.

(E.1.a, p. 4-5)

DISCUSSION:

13-EM-041B is a Purchase Order number, not a Procurement Specification, and is not the Purchase Order for the Holophane UPS batteries. The Purchase Order for the Holophane UPS is 13-EM-036A. The 125% sizing criteria for the batteries is only imposed in Specification 13-EM-050, the specification for large station batteries. The 125% sizing criteria is not applicable to the Holophane UPS batteries and was not specified when the units were purchased. The Holophane UPS batteries meet the UL 924 guidance of supplying connected load for a minimum of 8 hours with the voltage not dropping below 87.5% of rated voltage.

The current battery type configurations are as follows:

Unit 1

1EQBN001 - All batteries are GLOBE 6VHC96
1EQBN002 - 2 batteries are DYNASTY GC12V100, the rest are GLOBE 6VHC96
1EQBN003 - All batteries are GLOBE 6VHC96
1EQBN004 - 1 battery is DYNASTY UPS 12-300, the rest are GLOBE 6VHC96

Unit 2

2EQBN001 - All batteries are DYNASTY UPS 12-300
2EQBN002 - All batteries are DYNASTY GC12V100
2EQBN003 - All batteries are DYNASTY UPS 12-300
2EQBN004 - All batteries are GLOBE 6VHC96

Unit 3

3EQBN001 - All batteries are GLOBE 6VHC96
3EQBN002 - All batteries are GLOBE 6VHC96
3EQBN001 - All batteries are GLOBE 6VHC96
3EQBN002 - All batteries are GLOBE 6VHC96

The ratings for each type of battery at an 8-hour discharge rate are GLOBE 6VHC96 96 amp-hour, DYNASTY UPS 12-300 88 amp-hour, and DYNASTY GC12V100 73 amp-hour.

To calculate the required battery amp-hour capacity for an 8-hour discharge, the following formula is used:

([[(Watts(load) / Inverter efficiency) / Nominal VDC] / Number of strings of batteries] x Discharge time) where:

Watts(load) = rated output load
Inverter efficiency = 80.5%
Number of strings of batteries = 4
Discharge time = 8 hours

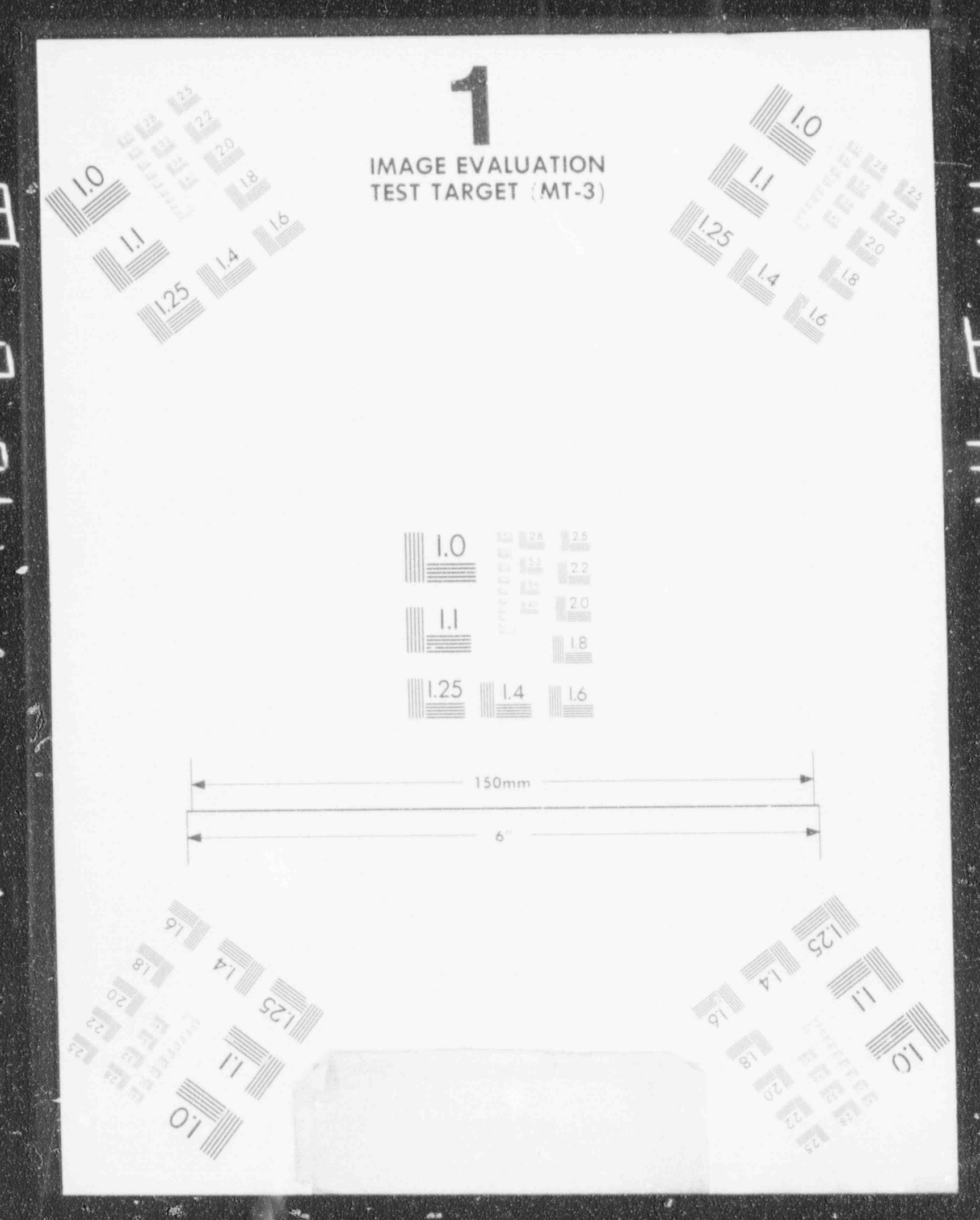
Using 900 watts (rated connected output load for 1EQBN001) as an example, the result will be:

([[(900 / .805) / 24] / 4] x 8)
= 93.17 amp-hour

Tabulating the amp-hour capacity using the same methodology for various output load is shown below:

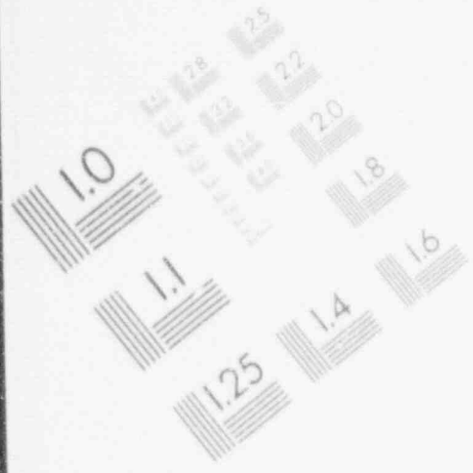
Rated Load	Minimum amp-hour capacity required
400 watts	41.40 amp-hour
500 watts	51.76 amp-hour
600 watts	62.11 amp-hour
700 watts	72.40 amp-hour
800 watts	82.80 amp-hour
900 watts	93.17 amp-hour

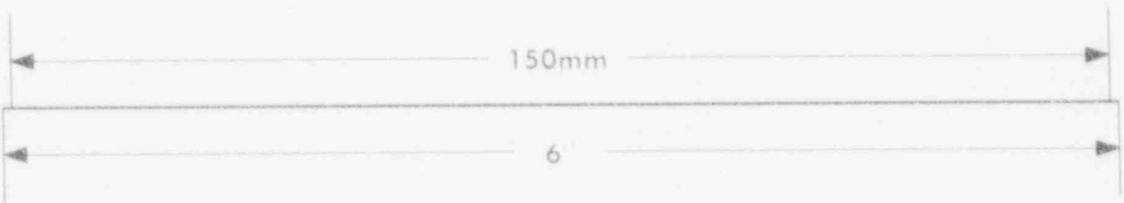
Using the information above and the rated output load connected, each UPS can be evaluated for compliance against the minimum amp-hour capacity for the type of battery installed.

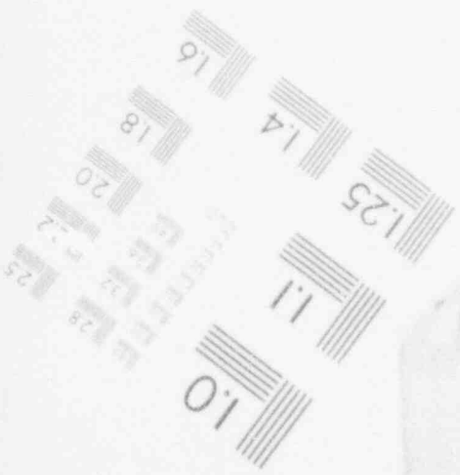

1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

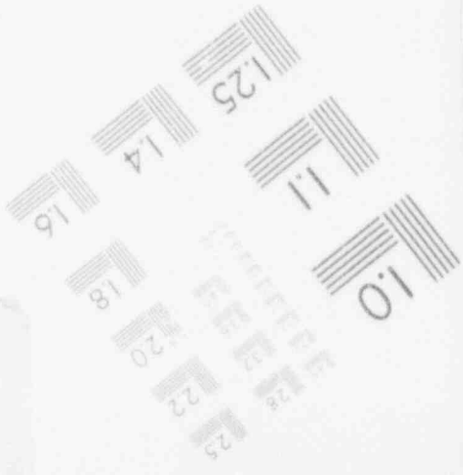
1

IMAGE EVALUATION
TEST TARGET (MT-3)



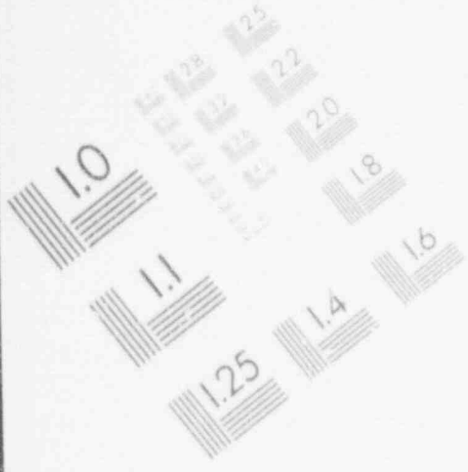


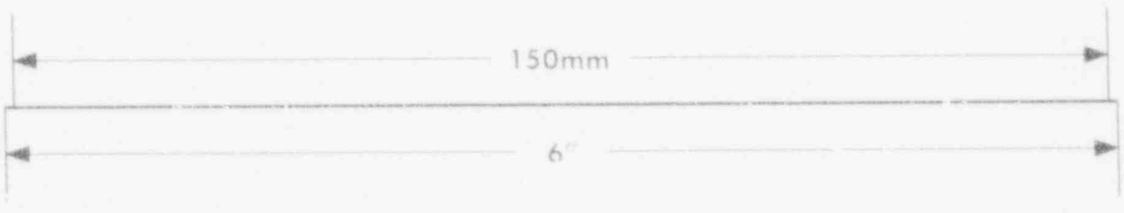


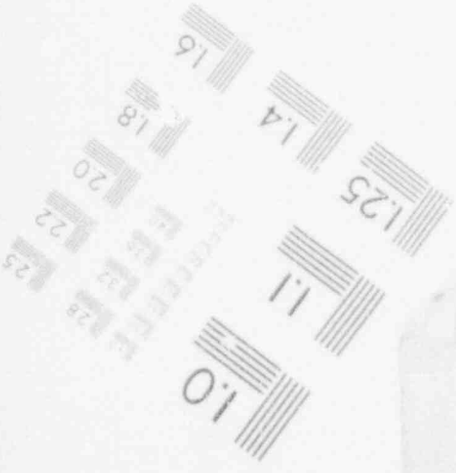


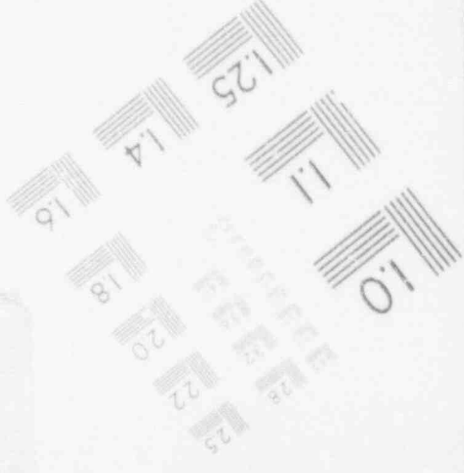
1

IMAGE EVALUATION TEST TARGET (MT-3)









Tag Number	Rated Load	a-h required	a-h installed
1EQBN001**	900 watts	93.17 amp-hour	96 amp-hour
1EQBN002**	700 "	72.40 "	73 " *
1EQBN003**	900 "	93.17 "	96 "
1EQBN004**	400 "	41.40 "	88 " *
2EQBN001**	600 watts	62.11 amp-hour	88 amp-hour
2EQBN002**	700 "	72.40 "	73 "
2EQBN003**	600 "	62.11 "	88 "
2EQBN004	400 "	41.40 "	96 "
3EQBN001**	900 watts	93.17 amp-hour	96 amp-hour
3EQBN002	700 "	72.40 "	96 "
3EQBN003	900 "	93.17 "	96 "
3EQBN004**	400 "	41.40 "	96 "

* The least amp-hour capacity battery installed was assumed to be installed for all the batteries in the UPS.

** Test results provided to verify adequacy.

As shown by the calculation performed, the batteries installed in the Holophane UPS is adequate to provide 8 hours of illumination without the voltage dropping below 87.5% of rated voltage, in accordance with UL 924 guidance.

CONCERN 6:

Article 700-6 of NFPA 70-1975 and Section 37.1 of U.L. Standard No. 924 requires that the batteries have a capacity rating to supply and maintain not less than 87.5 percent of the nominal battery voltage for the total load of the circuit supplying emergency lighting. The load profile for lighting fixtures supplied by Battery Nos. QBN001 and QBN003 in Units 1 and 3 requires 86 amp/hours. However, all of these existing batteries in Unit 1 and two of the batteries in Unit 3, are only rated for 73 amp/hours (GC12V-100) and 88 amp/hours (12UPS-300). These batteries were replacements for the original batteries (6HVC-96), which had a 96 amp/hour rating.

(E.1.a, p. 5)

DISCUSSION:

Refer to Concern 5 discussion.

CONCERN 7:

According to the battery vendor, the optimum temperature for maximum battery efficiency is 77 degrees F. At higher and lower temperatures, the battery capacity is decreased. The original batteries (6VHC-96) were designed to operate in an optimum temperature range of 60 degrees F to 85 degrees F.

(E.1.a, p. 5)

DISCUSSION:

Refer to Concern 2 discussion.

CONCERN 8:

According to EER No. 89-QD-034, regarding Saft America Inc. emergency lighting batteries installed in the MSSS, which are also designed to operate in accordance with U.L. Standard No. 924, the batteries are provided with a disconnect switch, which will disconnect the lighting circuit at 87.5 percent of the nominal battery voltage.

(E.1.a, p. 5)

DISCUSSION:

The Emergi-Lite batteries have a nominal voltage rating of 24 VDC. During discharge, the battery voltage is allowed to lower to 20 VDC. At 20 VDC, the charger is designed to cut-out to protect the battery from a potentially harmful deep discharge.

The EER 89-QD-034 requested a modification to the Emergi-Lite units to adjust the cut-out voltage down to a lower value or defeat this feature entirely. The emergency lighting units were cutting-out at a higher than design voltage of 23 VDC. The request of the EER was denied to avoid deep discharging of the batteries and a recommendation was made to return the charging boards, which were cutting-out at 23 VDC, to Emergi-Lite. This EER also referenced EER 89-QD-015, which essentially dealt with the same issue except it also asked for an evaluation of higher than 24 VDC charger voltages.

The time versus voltage profile that was mentioned in the EER is in reference to the discharge characteristics of the battery. As the battery discharges over time the voltage will go down to the cut-out voltage of 20 VDC.

The Emergi-Lite units have sealed Nickel-Cadmium batteries, hence electrolyte evaporation is not a problem at higher charge rates.

CONCERN 9:

Based on the total emergency lighting load profiles (86 amp/hours) for Battery Nos. QBN001 and QBN003 in Units 1 and 2, it does not appear that the original batteries (6VHC-96), or existing batteries (12 UPS-300) are capable of providing 125 percent of the battery load profile requirements at the optimum temperature for maximum battery efficiency, or at higher and lower temperatures, where the battery efficiency is lower.

(E.1.a, p. 5)

DISCUSSION:

Refer to Concern 1, 2, and 5 discussions.

CONCERN 10:

There does not appear to be sufficient margin in the GC 12-100 battery capacity to supply power to the lighting fixtures for 8 hours. Further, it appears that two of the batteries installed in Unit 2 with the lower load profiles have never been tested, and one other failed the 8 hour discharge test on March 6, 1990.

(E.1.a, p. 6)

DISCUSSION:

The statement "... two of the batteries installed in Unit 2 with the lower load profiles have never been tested..." is a misinterpretation of the APS self-imposed testing report. The two UPS' in question, 2EQBN002 and 2EQBN003, were unavailable for testing for not passing the monthly acceptance criteria for open circuit voltage of a battery. The defective batteries were replaced and 8-hour discharge tests were performed and all acceptance criteria met. UPS 2EQBN001 did fail its 8-hour discharge test, the batteries were replaced and the 8-hour discharge test re-performed and all acceptance criteria were met.

CONCERN 11:

At the time of the inspection, it appeared that appropriate corrective actions had not implemented to preclude emergency lighting battery failures and recurrences as evidenced by emergency lighting battery failure data shown in a February 20, 1990 Failure Data Trending computer printout for the period 1988 through 1989, and a high volume of new battery usage as shown in a March 20, 1990 Procurement Materials Management Information System computer printout for the period 1986 through 1990. During the period of May 1987 to October 1989, 70 of approximately 480 emergency lighting unit batteries had failed. Approximately fifty of the failed batteries were required to support safe shutdown. However, appropriate evaluation of the failures to determine cause and prevent recurrence apparently had not been initiated or documented.

(E.2, p. 6)

~15%

$\frac{50}{480} \approx 10\%$

DISCUSSION:

There were 79 incidences involving some type of corrective action per the Failure Data Trending (FDT) database since 1987. There were only 13 battery failures for Appendix R emergency lights and 12 battery for Non-Appendix R emergency lights. To compensate for component replacements under the PM program, the MMIS Material Activities Report dated March 20, 1990 was used to extract battery failures not identified in the FDT database for Dual-Lite supplied batteries. There were an additional 24 Appendix R battery failures and 12 Non-Appendix R battery failures. Of the 24 Appendix R battery failures, 15 were batteries used in the NEMA 4X7 Dual-Lite fixture which precipitated the issuance of DCP 1,2,3FE-QD-022 (Emergi-Lite units). The remaining 9 Appendix R failures per MMIS and the 13 battery failures in FDT represents only a 5% failure rate for 440 Appendix R emergency lighting units for a 30 month time period.

RCF EER are generated whenever the System Engineer identifies sufficient increase in failures. RCF EER 90-QD-002 was generated based on the fourth quarter FDT report due to the increase in failures of charging cards.

① No calls were received on Appx R lights.

② Most of 22 failures were in 1987, trend is down.

9
2

CONCERN 12:

EER No. 87-QD-004, dated January 28, 1987, identified and documented problems associated with batteries for the emergency lighting units as follows: "High temperatures inside Containment during operation cause loss of electrolyte in all fixtures; total loss in many, varying amounts in the rest. Salt accumulates on battery posts and vent caps and is discarded during PM cleaning. Continual repeated electrolyte loss with demin water replacement will cause premature battery failure". The same batteries (Dual-Lite Model EDE-30) used for Containment emergency lighting are used for safe shutdown emergency lighting in the Auxiliary Building, Control Building and Diesel Generator Building.

(E.2.a, p. 6-7)

DISCUSSION:

EER 87-QD-004 identifies a concern with repeated replenishment of electrolyte by adding demineralized water to the batteries in Containment. Temperatures in containment and excessive float voltages are only some of the contributing factors of electrolyte loss. The major cause of electrolyte evaporation is the lack of quarterly PM's for the Containment emergency lighting. For emergency lights in Containment, PMs are currently performed only once per fuel cycle (during refueling outage). Access to Containment is restricted during plant operation for the performance of other than the cycle PM's. The time between the performance of the cycle PM's can vary from 1 year to 2 years. Varying amounts of electrolyte loss is expected with total loss of electrolyte expected if the last performance of the cycle PM's is over a year. Lights installed outside Containment are not subject to the same environment and have PM's performed on a quarterly basis. The performance of the PM's ensures that the light will perform its intended function. No battery plates have been uncovered for units outside of Containment if quarterly PM's were performed. The only exceptions were lights that were inadvertently left out of PM's (non-Appendix R lights).

The quarterly PM's for outside Containment emergency lights are adequate to ensure that the lights are maintained in accordance with Dual-Lite's recommended maintenance criteria. The lights in Containment are not required for safe shutdown and have their cycle PM's performed during the refueling outage.

CONCERN 13:

The disposition of EER No. 87-QD-004 regarding the boiling and evaporation of Containment emergency lighting battery electrolyte apparently provided for float voltage adjustment, to a reduced battery float voltage, to an unspecified value. The modification to allow adjustment of the float voltage was apparently made to Appendix R emergency lighting units installed outside of the Containment. It appears that the modification was made to the lighting units without using the appropriate design change and maintenance work order processes. It further appears that the EER disposition was not provided with the appropriate engineering evaluation of the effects of reduced float voltage on the battery discharge capacity during emergency use.

(E.2.b, p. 7)

DISCUSSION:

EER 87-QD-004 was not used for the adjustment of float voltages for lights outside of Containment. Quarterly and cycle PM tasks for the Dual-Lite fixtures provide the instructions on adjusting the float voltages. The values used in the PM's are in accordance with the vendor's tech. manual. Modifications to the lighting units to facilitate the adjustment required by the PM tasks was authorized by EER's 85-QD-022 and 86-QD-034.

CONCERN 14:

The disposition to EER No. 87-QD-004 also provided for replacement of the electrolyte in the batteries with distilled water, topped with mineral oil; again apparently without appropriate engineering evaluation of the effects of this disposition. It appears that mineral oil had, also, been added to lead-acid batteries installed in Appendix R applications, in addition to Nickel-Cadmium batteries. NRC discussions with battery vendors have indicated that the deposits of mineral oil on the plates of lead-acid batteries, and all battery cells, adversely affects battery capacity and performance, and is not approved. Given the temperature extremes in certain locations, there appears to be a high probability that mineral oil would be deposited on plates.

(E.2.c, p. 7)

DISCUSSION:

Mineral oil was not added to any lead-acid batteries used for emergency lighting, Appendix R applications. The only lead-acid batteries currently installed are for the Control Room emergency lighting system (EQDNF01 and EQDNF02). An inspection performed by EED verified that no mineral oil was added to the electrolyte in lead-acid batteries.

The cycle PM tasks for the Containment emergency lights contain the statement to add mineral oil. A review, of the PM tasks for emergency lights outside of Containment, determined that the PM's do not have a statement to add mineral oil to inhibit electrolyte evaporation.

CONCERN 15:

Certain batteries have demonstrated a continuing failure history (Failure Data Trending). For example, 15 percent (70 failures of approximately 480 Appendix R emergency lights installed in all 3 units) failed over a 30 month period (May 1987 to October 1989). The NRC is concerned that Appendix R emergency lighting preventive maintenance tasks have not been designed to optimally assure a continued capability of Appendix R lighting units to operate for the required eight hours. Furthermore, apparently, timely preventive maintenance completion has not been aggressively pursued because, in about 84 instances, the required annual capacity test and quarterly electrolyte level checks were overdue in Unit 3 as of March 23, 1990.

(E.2.d, p. 7)

DISCUSSION:

Refer to Concern 11 discussion for Failure Data Trending information.

PMs are developed based upon manufacturers' recommendations. Schedule dates are established based on the periodicity of the PM. PMs may be delayed past their due date without management approval under the following conditions:

Meets criteria for delaying specified in procedure 30AC-9MP02.

Does not exceed the grace period (25% of maintenance interval).

PMs can be delayed past their grace period with the written concurrence from the Maintenance Manager (or designee) on the Preventative Maintenance Task Disposition Report.

The grace period has been tabulated below for the different periodicity of PMs:

4W - + 7 days
12W - + 21 days
24W - + 42 days
48W - + 84 days
1Q - + 23 days
1M - + 8 days
1S - + 46 days
1A - + 92 days
1R - No firm due date, must be completed during the refueling outage (Ref. 3.7.1.2 of 30AC-9MP02)

Majority of the PMs have been performed prior to the due date or during the grace period, as allowed by procedure 30AC-9MP02. All Dual-Lite discharge PM tasks were performed prior to the overdue date (prior to end of grace period). Manpowe restraint caused by having 3 units in an outage along with the Unit 3 Main Transformer event (January 1990) depleted the available manpower resources to perform emergency lighting PM tasks. Currently there are no PM tasks past their grace period (5/8/90).

CONCERN 16:

The licensee's EER No. 89-QD-034 documents excessive failures of MSSS installed emergency lighting when the battery input voltage was found to be greater than the rated 21 VDC. The batteries are required to operate at 24 VDC rated voltage. However, the EER disposition was apparently based on the erroneous reference to a time versus voltage profile which indicated that the excessive voltage had no adverse effect on the batteries, when, in fact, the excessive charging voltage is a direct contributor to electrolyte evaporation.

(E.2.e, p. 8)

DISCUSSION:

Refer to Concern 8 discussion.

CONCERN 17:

It appears that prompt and technically sufficient evaluations and corrective actions of the considerable, observed emergency lighting deficiencies were not implemented.

(E.2.f, p. 8)

DISCUSSION:

At the completion of the installation of the Emergi-Lite units per DCP's 1,2,3 FE-QD-022, each Emergi-Lite unit was tested for initial acceptance. Numerous failures were noted during this testing, as stated in the inspection report. Defective boards and a bad batch of batteries were the main cause of the failures. The defective boards and bad batteries were replaced and each light was successfully tested before the DCP was closed. Subsequent failures, mainly boards, required the frequency of the PM task to be revised from a quarterly PM to a monthly task.

See APS' response to NRC Inspection Report, Notice of Violation 50-530/90-08-02, dated April 20, 1990 (102-01674) and Plant Guideline 13 for the evaluation of prioritization of corrective maintenance for the emergency lighting system.

The Emergi-Lite units will be replaced per DCP 1,2,3 FE-QD-025, with Holophane centralized AC modular power stations (2 stations/unit).

CONCERN 18:

At the time of the inspection, it appeared that the Pre-Fire Strategies Manual had not been reviewed since the original licensing of Unit 1 in December 1984 to determine the adequacy of operator actions specified to achieve post-fire safe shutdown for fires occurring outside of the Control Room.

(E.3, p. 9)

DISCUSSION:

The Pre-Fire Strategies Manual is controlled by the Site Fire Department as it has been since its original development. Some changes were made at the direction of the Fire Protection Supervisor, but the manual was not controlled document. The first formal review and update by Engineering was performed on April 18, 1988 (167-02213/ECS/JDO) at the request of the Site Fire Department. This action was required as part of the resolution of CAR #CE-86-0203. The following summarizes actions taken with respect to the Pre-Fire Strategies Manual to close this CAR.

1) The manual was established as a controlled document and distributed by Document Control.

2) DCP and technical input and review checklists were revised to address impact to the manual and the Spurious Actuation Studies. These revisions were also incorporated into the new Plant Design Change Program (81DP-0DC03).

3) Procedure 01AC-0AP02 was revised, requiring annual update of the manual.

4) Engineering reviews "Engineering Output Data" as part of the annual review.

NOTE: Last annual update by Engineering was requested on 6/8/89. Update is complete with the exception of the Spurious Actuation Evaluation Concerns Section.

CONCERN 19:

The Pre-Fire Strategies Manual operator actions appeared to be inconsistent with the Outside Control Room Fire Spurious Actuation Study (Studies 01-NS-110, 02-NS-110 and 03-NS-110) for Fire Zones 47A, 47B, 72, 73, 74A and 74B, regarding operator actions to interchange instrument air header pressure transmitters.

(E.3, p. 9)

DISCUSSION:

The Spurious Actuation Study for fires outside the Control Room has a section called "Compensatory Measures" for each Fire Zone. These measures are not always necessarily local manual operator actions but may be Plant modifications such as installation of raceway fire barriers. The Pre-Fire Strategies Manual, which is based on the study, only describes manual operator actions.

For Fire Zones 47A and 47B, no manual actions or plant modifications are associated with interchange of instrument air header pressure transmitters.

In Zones 72, 73, and 74A of the Spurious Actuation Study a compensatory measure is called out to move the instrument air header pressure transmitters. This permanent plant modification was necessary because the "A" train transmitter was on the "B" side of the room and visa versa. This modification was made by DCP 10J-SG-129. Hence, since no operator action is required, the Pre-Fire Strategies Manual is correct by not describing this action. The Spurious Actuation Study, however, was not revised as a result of this DCP.

For Zone 74B the compensatory measures that require an operator to take manual actions are identical between the Spurious Actuation Study and Pre-Fire Strategies Manual.

CONCERN 20:

At the time of the inspection, it appeared that licensed and non-licensed operators were directed to perform manipulation of equipment, by the Pre-Fire Strategies Manual, to achieve post-fire safe shutdown. It was not apparent that the personnel had been trained to perform the required actions.

(E.4, p. 9-10)

DISCUSSION:

An extensive training program was developed and provided to all licensed operators that may be assigned the task of Fire Team Advisor which covered a wide range of topics including the Pre-Fire Strategies Manual. The training included workshops specifically on the Spurious Actuation Evaluation Concerns Section. Practical exercises were conducted where students performed manual actions under impaired vision to manipulate electrical breakers and valves and maintain effective communications. These exercises were conducted with full protective equipment.

The Fire Team Advisor training was an "initial" training course with no plans or actions regarding recurrent training in the future. New operators will be provided the initial training prior to being assigned duties of Fire Team Advisor.

With respect to non-licensed operators there is no specific training for Pre-Fire Strategies Manual identified actions.

Operations Procedure 4XAO-XZZ44, shutdown outside the Control Room is included in the Annual Procedure Review for all licensed operators. Job Performance Measures (JPM's) are administered for actions outside the Control Room. JPM's are administered on a common and random basis; therefore, a student could potentially receive only classroom training in a given year. All but 29 of the operator actions identified in the Pre-Fire Strategies Manual are included in Procedure 4XAO-XZZ44. These 29 actions have been reviewed by Operations and it has been determined that no specialized training is required for the operators to perform these actions.

Fire Team Advisor training was also provided during 1987, 1988 and 1989 by the Fire Department Training Officer.

CONCERN 21:

Regarding Fire Zones 47A, 47B, 72, 73, 74A and 74B, the Pre-Fire Strategies Manual directed operators to locally operate switches and valves in areas which may not be accessible to the operators in the event of a fire. It was not clear whether operators were required to enter these areas during the fire to accomplish manual actions or to wait until the fire had been extinguished. In either case, it was not apparent that the appropriate personnel had been trained in safety and protective measures necessary to accomplish such actions.

(E.4, p. 9-10)

DISCUSSION:

During a review of the Pre-Fire Strategies Manual by the Corporate Fire Protection Engineer it was discovered that a local manual compensatory action was required within a zone that was affected by the fire (QDR-0125). Hence, this manual action could not realistically be taken credit for.

The activity identified in the QDR involved two Fire Zones which required the opening of a disconnect switch within an auxiliary relay cabinet in Fire Zones 47A and 42B to prevent the spurious opening of the reactor vent valves. A review of the Spurious Actuation Study for outside the control room revealed that the Pre-Fire Strategies Manual was consistent with the Study. Both were in error. The Spurious Actuation Study has been revised by Engineering to state an alternate location for removing power to the valve and hence preventing spurious actuation. An update to the Pre-Fire Strategies Manual has been performed.

In Zones 72, 73, and 74A of the Spurious Actuation Study, a compensatory measure is called out to move the instrument air header pressure transmitters. This permanent plant modification was necessary because the "A" train transmitter was on the "B" side of the room and visa versa. This modification was made by DCP 10J-SG-129. Hence, since no operator action is required, the Pre-Fire Strategies Manual is correct by not describing this action. The Spurious Actuation Study, however, was not revised as a result of this DCP.

The Spurious Actuation Study is currently under review by the EEP Fire Protection Design Basis Review Group. As a result of this an action has been scheduled to perform a complete engineering review of the spurious actuation studies.

CONCERN 22:

For a fire inside the Control Room, the licensee's Spurious Actuation Study 13-NS-109 requires operators to provide makeup to the Essential Chilled Water System, Essential Cooling Water System and Emergency Diesel Generator Surge Tanks by providing water from the Fire Water System. It was not apparent that operators had been trained to perform these actions.

(E.4, p. 9-10)

DISCUSSION:

The manual actions associated with makeup water to the surge tanks are addressed in Procedure 4XAO-XZZ44. Appendix F, Section 2.2 and Appendix J, Section 2.0 address DG Jacket Water Surge Tank. Appendix J, Sections 3.0 and 4.0 address Essential Chilled Water Surge Tank and Essential Cooling Water Surge Tank respectively.

Operations Procedure 4XAO-XZZ44 is included in the Annual Procedure Review for all licensed operators. Job Performance Measurers (JPM's) are administered for actions outside the Control Room. JPM's are administered on a common and random basis. Therefore, a student could potentially receive only classroom training in a given year.

An extensive training program was developed and provided to all licensed operators that may be assigned the task of Fire Team Advisor which covered a wide range of topics including the Pre-Fire Strategies Manual. The training included workshops specifically on the Spurious Actuation Evaluation Concerns Section. Practical exercises were conducted where students performed manual actions under impaired vision to manipulate electrical breakers and valves and maintain effective communications. These exercises were conducted with full protective equipment.

The Fire Team Advisor training was an "initial" training course with no plans or actions regarding recurrent training in the future. New operators will be provided the initial training prior to being assigned duties of Fire Team Advisor.

With respect to non-licensed operators there is no specific training for Pre-Fire Strategies Manual identified actions. None of the actions required to be performed are outside those actions normally expected to be performed by a non-licensed operator.

CONCERN 23:

The licensee's October 29, 1984 submittal to the NRC indicated that NUREG 0700 was used as the design basis for the control room and the remote shutdown panel emergency lighting illumination levels. NUREG 0700 requires a minimum of 10 foot candles in these areas. However, the licensee's acceptance criteria for the control room and the remote shutdown panel emergency lighting illumination levels is 6 foot candles in peripheral areas and 3 foot candles at control board instruments.

(E.6.a, p. 11)

DISCUSSION:

For inside the Control Room, APS used 6 foot candles in the horseshoe area and 3 foot candles on the panel areas. This commitment is as stated in UFSAR Section 14B. NUREG-0700 provides guidance for Control Room lighting illumination levels. The guidance provided in NUREG-0700 concerning Control Room emergency lighting is 10 foot candles. The referenced letter of October 29, 1984, states that the guidance of NUREG-0700 was used, as applicable, to perform the required DCRDR. No commitments were made in the letter concerning Control Room emergency lighting illumination levels.

NRR confirm
3/6 ft candle is OK.

CONCERN 24:

Thirteen lighting level readings were taken at various locations outside the control room in Unit 3 with a photometer (Spectra Photometer Model FC-200, Serial number 476, NRC Equipment Number 000393, with the next calibration due date of 7/26/90). The locations were the stairwell outside the control room, the essential chiller surge tank level and valves, the chiller room stairwell exit, and the Emergency Diesel Generator rooms. The photometer readings ranged from 0.03 to 0.75 foot-candles with an exception of 1.3 foot-candles at the emergency diesel control panel.

(E.6.b, p. 11)

DISCUSSION:

For Appendix R lighting, APS used the guidance of Generic Letter 86-10, which states that illumination levels shall be sufficient to perform the shutdown function. Emergency lighting has been walked down to confirm this.

CONCERN 25:

Orientation of the lamps on a lighting unit in the stairwell outside the control room were found to be not directed toward the access/egress pathway.

(E.6.b, p. 11)

DISCUSSION:

Incorrect lamp orientation noted during recent NRC inspection was an isolated occurrence due to construction work on the adjacent Unit 3 Operation Support Building. Adequate lighting for access/egress existed even though the lamps were not directed toward the access/egress pathway. Inspection team members were able to access/egress the stairwell.

Lamp orientation is verified when performing quarterly preventive maintenance (PM). Quarterly PM's provide instructions to orientate the lamps.

Covered in OCP checklist

AKIN, GUMP, STRAUSS, HAUER & FELD
ATTORNEYS AT LAW
A PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS
1333 NEW HAMPSHIRE AVENUE, N.W.
SUITE 400
WASHINGTON, D.C. 20036
(202) 887-4000
FAX (202) 887-4288

4100 FIRST CITY CENTER
1700 PACIFIC AVENUE
DALLAS, TEXAS 75201-4618
(214) 969-2800

65 AVENUE LOUISE P.B. NO 7
1050 BRUSSELS, BELGIUM
(011) 32-2-535 29 11

2100 FRANKLIN PLAZA
111 CONGRESS AVENUE
AUSTIN, TEXAS 78701
(512) 499-6200

1500 NCNB PLAZA
300 CONVENT STREET
SAN ANTONIO, TEXAS 78205
(512) 270-0800

1900 PENNZOIL PLACE, SOUTH TOWER
711 LOUISIANA STREET
HOUSTON, TEXAS 77002
(713) 220-5800

4558

WRITER'S DIRECT DIAL NUMBER (202) 887-_____

December 21, 1990

BY HAND DELIVERY

FREEDOM OF INFORMATION ACT REQUEST
FOIA-90-570
Rec'd 12-24-90

Donnie H. Grimsley, Director
Division of Freedom of Information &
Publications Service
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Grimsley:

This is a request pursuant to the Freedom of Information Act, 5 U.S.C. 552, and 10 CFR Part 9 for NRC documents relating to Palo Verde Units 1, 2 & 3, and more particularly described below.

For the purpose of this request, the term "document" means all memoranda, letters, filings, testimony, exhibits, contracts, transcripts, minutes, notes, drafts, studies, analyses, reports, maps, diagrams, charts, books, articles, pictures, printouts, tapes, or other written, graphic, or computerized information in any form which constitutes agency records under the Freedom of Information Act.

The documents we are requesting can more particularly be described as:

1. All documents which relate in any way to the $125,000 civil penalty issued to the Arizona Public Service Company on October 16, 1990 and related to emergency lighting requirements at the three Palo Verde nuclear plants.

2. All documents dated after 1/1/88 reporting, discussing, analyzing, summarizing or in any other form addressing investigations, inquiries, inspections, or other federal government exploration of issues directly or indirectly related to the emergency lighting system at the Palo Verde nuclear Plants.

Pursuant to 5 U.S.C. § 552(a)(6), a response to this request is required in ten days. We are willing to pay all necessary search and copy fees associated with this request. Please notify

the undersigned at (202) 887-4558 if these fees are expected to exceed $450.00. If any portion of this request is denied, please provide a detailed explanation of the reasons for the denial, as required by 5 U.S.C. § 552(a)(6).

Sincerely,

Bradley W. Jones

Bradley W. Jones