TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

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(Final Report)

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Revision 2

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Preface

This subcategory report is one of a series of reports prepared for the Employee Concerns Special Program (ECSP) of the Tennessee Valley Authority (TVA). The ECSP and the organization which carried out the program, the Employee Concerns Task Group (ECTG), were established by TVA's Manager of Nuclear Power to evaluate and report on those Office of Nuclear Power (ONP) employee concerns filed before February 1, 1986. Concerns filed after that date are handled by the ongoing ONP Employee Concerns Program (ECP).

The ECSP addressed over 5800 employee concerns. Each of the concerns was a formal, written description of a circumstance or circumstances that an employee thought was unsafe, unjust, inefficient, or inappropriate. The mission of the Employee Concerns Special Program was to thoroughly investigate all issues presented in the concerns and to report the results of those investigations in a form accessible to ONP employees, the NRC, and the general public. The results of these investigations are communicated by four levels of ECSP reports: element, subcategory, category, and final.

Element reports, the lowest reporting level, will be published only for those concerns directly affecting the restart of Sequoyah Nuclear Plant's reactor unit 2. An element consists of one or more closely related issues. An issue is a potential problem identified by ECTG during the evaluation process as having been raised in one or more concerns. For efficient handling, what appeared to be similar concerns were grouped into elements early in the program, but issue definitions emerged from the evaluation process itself. Consequently, some elements did include only one issue, but often the ECTG evaluation found more than one issue per element.

Subcategory reports summarize the evaluation of a number of elements. However, the subcategory report does more than collect element level evaluations. The subcategory level overview of element findings leads to an integration of information that cannot take place at the element level. This integration of information reveals the extent to which problems overlap more than one element and will therefore require corrective action for underlying causes not fully apparent at the element level.

To make the subcategory reports easier to understand, three items have been placed at the front of each report: a preface, a glossary of the terminology unique to ECSP reports, and a list of acronyms (terms formed from the first letters of a series of words).

Additionally, at the end of each subcategory report the reader will find at least two attachments. The first is a Subcategory Summary Table that includes the following information: the concern number, a brief statement of the concern, and a designation of nuclear safety-related concerns. The second attachment is a listing of the concerns included in each issue evaluated in the subcategory.

The subcategories are themselves summarized in a series of eight category reports. Each category report reviews the major findings and collective significance of the subcategory reports in one of the following areas:

- management and personnel relations
- industrial safety
- construction
- material control
- operations
- quality assurance/quality control
- welding
- engineering

A separate report on employee concerns dealing with specific contentions of intimidation, harassment, and wrongdoing will be released by the TVA Office of the Inspector General.

Just as the subcategory reports integrate the information collected at the element level, the category reports integrate the information assembled in all the subcategory reports within the category, addressing particularly the underlying causes of those problems that run across more than one subcategory.

A final report will integrate and assess the information collected by all of the lower level reports prepared for the ECSP, including the Inspector General's report.

For more detail on the methods by which ECTG employee concerns were evaluated and reported, consult the Tennessee Valley Authority Employee Concerns Task Group Program Manual. The Manual spells out the program's objectives, scope, organization, and responsibilities. It also specifies the procedures that were followed in the investigation, reporting, and closeout of the issues raised by employee concerns.

ECSP GLOSSARY OF REPORT TERMS*

classification of evaluated issues the evaluation of an issue leads to one of the following determinations:

Class A: Issue cannot be verified as factual

Class B: Issue is factually accurate, but what is described is not a problem (i.e., not a condition requiring corrective action)

Class C: Issue is factual and identifies a problem, but corrective action for the problem was initiated before the evaluation of the issue was undertaken

Class D: Issue is factual and presents a problem for which corrective action has been, or is being, taken as a result of an evaluation

Class E: A problem, requiring corrective action, which was not identified by an employee concern, but was revealed during the ECTG evaluation of an issue raised by an employee concern.

collective significance an analysis which determines the importance and consequences of the findings in a particular ECSP report by putting those findings in the proper perspective.

concern (see "employee concern")

corrective action steps taken to fix specific deficiencies or discrepancies revealed by a negative finding and, when necessary, to correct causes in order to prevent recurrence.

criterion (plural: criteria) a basis for defining a performance, behavior, or quality which ONP imposes on itself (see also "requirement").

element or element report an optional level of ECSP report, below the subcategory level, that deals with one or more issues.

employee concern a formal, written description of a circumstance or circumstances that an employee thinks unsafe, unjust, inefficient or inappropriate; usually documented on a K-form or a form equivalent to the K-form.

evaluator(s) the individual(s) assigned the responsibility to assess a specific grouping of employee concerns.

findings includes both statements of fact and the judgments made about those facts during the evaluation process; negative findings require corrective action.

issue a potential problem, as interpreted by the ECTG during the evaluation process, raised in one or more concerns.

K-form (see "employee concern")

requirement a standard of performance, behavior, or quality on which an evaluation judgment or decision may be based.

root cause the underlying reason for a problem.

*Terms essential to the program but which require detailed definition have been defined in the ECTG Procedure Manual (e.g., generic, specific, nuclear safety-related, unreviewed safety-significant question).

Acronyms

AI	Administrative Instruction
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BFN	Browns Ferry Nuclear Plant
BLN	Bellefonte Nuclear Plant
CAQ	Condition Adverse to Quality
CAR	Corrective Action Report
CATD	Corrective Action Tracking Document
CCTS	Corporate Commitment Tracking System
CEG-H	Category Evaluation Group Head
CFR	Code of Federal Regulations
CI	Concerned Individual
CMTR	Certified Material Test Report
COC	Certificate of Conformance/Compliance
DCR	Design Change Request
DNC	Division of Nuclear Construction (see also NU CON)

DNE	Division of Nuclear Engineering
DNQA	Division of Nuclear Quality Assurance
DNT	Division of Nuclear Training
DOE	Department of Energy
DPO	Division Personnel Officer
DR	Discrepancy Report or Deviation Report
ECN	Engineering Change Notice
ECP	Employee Concerns Program
ECP-SR	Employee Concerns Program-Site Representative
ECSP	Employee Concerns Special Program
ECTG	Employee Concerns Task Group
EEOC	Equal Employment Opportunity Commission
EQ	Environmental Qualification
EMRT	Emergency Medical Response Team
EN DES	Engineering Design
ERT	Employee Response Team or Emergency Response Team
FCR	Field Change Request
FSAR	Final Safety Analysis Report
FY	Fiscal Year
GET	General Employee Training
HCI	Hazard Control Instruction
HVAC	Heating, Ventilating, Air Conditioning
II	Installation Instruction
INPO	Institute of Nuclear Power Operations
IRN	Inspection Rejection Notice

L/R	Labor Relations Staff
M&AI	Modifications and Additions Instruction
MI	Maintenance Instruction
MSPB	Merit Systems Protection Board
MT	Magnetic Particle Testing
NCR	Nonconforming Condition Report
NDE	Nondestructive Examination
NPP	Nuclear Performance Plan
NPS	Non-plant Specific or Nuclear Procedures System
NQAM	Nuclear Quality Assurance Manual
NRC	Nuclear Regulatory Commission
NSB	Nuclear Services Branch
NSRS	Nuclear Safety Review Staff
NU CON	Division of Nuclear Construction (obsolete abbreviation, see DNC)
NUMARC	Nuclear Utility Management and Resources Committee
OSHA	Occupational Safety and Health Administration (or Act.)
ONP	Office of Nuclear Power
OWCP	Office of Workers Compensation Program
PHR	Personal History Record
PT	Liquid Penetrant Testing
QA	Quality Assurance
QAP	Quality Assurance Procedures
QC	Quality Control
QCI	Quality Control Instruction

QCP	Quality Control Procedure
QTC	Quality Technology Company
RIF	Reduction in Force
RT	Radiographic Testing
SQN	Sequoyah Nuclear Plant
SI	Surveillance Instruction
SOP	Standard Operating Procedure
SRP	Senior Review Panel
SWEC	Stone and Webster Engineering Corporation
TAS	Technical Assistance Staff
T&L	Trades and Labor
TVA	Tennessee Valley Authority
TVTLC	Tennessee Valley Trades and Labor Council
UT	Ultrasonic Testing
VT	Visual Testing
WBECSP	Watts Bar Employee Concern Special Program
WBN	Watts Bar Nuclear Plant
WR	Work Request or Work Rules
WP	Workplans

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EXECUTIVE SUMMARY

CONSTRUCTION CATEGORY

SUBCATEGORY REPORT 15100 DAMAGE/CONSTRUCTION CONTROL

SUMMARY OF THE ISSUES

This report addressed ten issues, containing 30 concerns. Nine of these issues are Safety Related which addressed 25 safety related concerns. Eight issues were determined, through evaluations, to present conditions which were neither deficient nor discrepant in their "as found" condition or had been corrected before this evaluation. The issues about damage during construction and their findings were:

Floor Drains - Factual and Corrected
Electrical Penetrations - Factual and No Problem
Electrical Cabinets - Not Factual
Conduit - Factual and Corrected *
Flex Hose Connections - Factual and Corrected
Insulation - Suggestion and Not Applicable
Electrical Cables and Cable Trays - Factual and Corrected
Piping and Pipe Flushing - Factual and Needs Correction *
Instrumentation Tubing and Instruments - Factual and Corrected
Valves - Factual and Corrected

Some concerns within the above listed issues were found to be not factual and are discussed in the body of the report. Two issues (indicated with an asterisk) had a concern of potential major importance and are discussed below.

MAJOR FINDINGS

Two areas of discolored spots (possibly caused by flame cutting) were found on conduit at WBN. This condition's cause (excessive heat applied to the conduit) could have damaged the insulation of the cable inside of conduits - 2-2PM-292-6474-D and 0-4PLR-292-1383 at WBN. A megger test was performed on the cable and proved acceptable, but to be absolutely positive that insulation was not damaged, CATD 15100-WBN-01 was written to have cable pulled back and inspected.

A lack of control of flush activities was discovered to be factual at Bellefonte Nuclear Plant. Procedures to correct this deficiency were in the approval cycle at the time of this evaluation.

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COLLECTIVE SIGNIFICANCE OF MAJOR FINDINGS

These ten issues represent a vast area of work scope, covering varied work procedures, policies, craft disciplines, engineering units, inspection units and specifications. The findings indicate TVA acted responsibly and effectively in 80 percent of the issues. Even the two issues which required corrective action were preliminarily determined to be acceptable. One of these issues (conduit) was caused by personnel not implementing the precautionary methods stated in the controlling documents. Therefore, the conclusion . . . TVA's performance in the work areas covered by this report is acceptable . . . is a correct conclusion.

CAUSES OF THE MAJOR FINDINGS

Violations of procedures and policies by workers created a condition of potential deficiencies in and about the named conduit.

Inadequate procedures governing control of flushing activities created a condition which could compromise the cleanliness integrity of the subject piping.

CORRECTIVE ACTION ON MAJOR FINDINGS

Cable insulation inside conduits 0-4PLR-292-1383 and 2-2PM-292-6474-D are to be inspected for damage. This requires the "pull-back" of these cables. See CATD 15100-WBN-01

Procedures BNP-CTP-4.4 Rev. 3 and BNP-CTP-6.1 Rev. 7 have been approved. No further action required. Reference CATD 15100-BLN-01

Executive Summary Table # 1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
I. Clogged Floor Drains	X		Four concerns were evaluated in the issue.				
			A. Two of the concerns dealt with clogged floor drains. Any clogged drains in the unit 1 Reactor Building and Auxiliary Building were corrected by Preoperational Test TVA-44A.	A. Blockages were caused by debris in the system.	A. None required	The issue was non-significant.	No collective significance
			B. One of the concerns dealt with a flood in the Turbine Building which occurred due to clogged drains. A flood did occur in the Turbine Building in the time-frame noted but it was due to a misaligned valve-not blocked floor drains.	B. The Turbine Building flood was caused by a misaligned valve.	B. None required		
			C. Another concern dealt with blocked floor drains in the Reactor Building. The problem was found to be with a sump backing water into the floor drain system. This problem was found to have also occurred at SQN.	C. One sump had water backed up into the floor drain system because the sump level	C. The level transmitters were scheduled for replacement.		

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
I Clogged Floor Drains (continued)				alarm and transmitter failed to signal the water level.			
II. Bent Electrical Penetration Covers	X		Approximately 80 percent of the sheet metal electrical penetration covers evaluated were found to be damaged at WBN. No problem was found at SQN.	Penetration cover damage occurred from ongoing construction activities.	The damage was to be corrected by DNC through the process of transferring the equipment to ONP.	No significance-the damage was confined to WBN and was being addressed through the existing program for transferring equipment.	No collective significance
III. Water Soaked Electrical Cabinets	X		This evaluation revealed that there are provisions for protecting electrical equipment during flushing activities. There was no indication that electrical equipment in WBN's unit 2 pipe chase (EL 713) had ever been saturated.	No cause	No corrective action	No significance	No collective significance
IV. Conduit or Cable Damage	X		There were four concerns evaluated. A. No instances of water entering conduit at floor level were uncovered. Water had been found in conduit but it had entered through open junction boxes or con-	A. No cause	A. No corrective action	Conduit damaged by welding operations was considered a significant occurrence which had not been evaluated. The other concerns were	No collective significance

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
IV. Conduit or Cable Damage (continued)			duit openings.			either not factual or were isolated instances.	
			B. Two discolored spots on conduit were found at WBN that could have been made by heat from welding or cutting operations made near the conduit.	B. The damaged conduit was due to unconscientious work practices.	B. Cables in conduits 2-2PM-292-6474-D and O-4PLR-292-1383 were to be reinspected and tested.		
			C. The flexible conduits mentioned in the concern were inspected and heat damage was noted. The damage was due to the fact that the flex hoses and supporting bracket were being used as part of a welding ground path.	C. The heat damage was due to improper grounding of welding leads.	C. The damage was corrected on MR A-477393. The proper method of grounding welding leads was covered in the March 31, 1986 DNC Safety Meetings.		
			D. An instance where concrete was removed from PVC conduit was factual. The condition did not create an unacceptable final condition. The cables were inspected for damage and were accepted.	D. No cause	D. No corrective action		

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
V. Flex Hose Connections Damaged	X		Flex hose had been found to be a problem and DNC had taken corrective action. The specific example given in the concern had been corrected. QCI-1.36 had been revised requiring monthly surveillances of flex hose installations. Caution signs had been installed to inform employees of flex hose damage. Protection had been placed around some vulnerable installations. No problems were noted at SQN, BFN, or BLN.	Procedures and programs to limit the amount of damage to flex hose were inadequate at the time the concern was expressed.	DNC had taken corrective action on flex hose damage due in part to June 1985 INPO findings. The specific example in the concern had been corrected. QCI-1.36 had revisions requiring monthly surveillance of flex hose installations. Caution signs had been posted to inform employees of flex hose damage. Protection was added around some installations. Employees had been informed of flex hose damage through safety bulletins.	No significance-the damage had been addressed by additional employee training and employee awareness bulletins.	No collective significance

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
VI. Insulation Damage		X	The concern consisted of a suggestion that the type insulation used in two places be changed. DNC stated that the insulation on heat traced pipe was specified by the manufacturer. The suggested replacement was heavier and hanger load capacity would have to be considered. The insulation at the sewage treatment plant had been replaced. To preclude further damage, signs had been placed reminding individuals not to walk on the insulation. QCI-1.36 and AI-1.8 had provisions for inspections of plant areas for damage to permanent plant equipment.	No cause	No corrective action required.	No significance	No collective significance
VII. Cable Tray Housekeeping and Cut Cable	X		Two areas were evaluated in this issue. A. NSRS report I-85-535-WBN documented the findings concerning cable trays being left uncovered, being used as walkways, and being subjected to damage from welding operations at WBN. This report revealed that cable trays had been used as walkways. No cable damage was dis-	A. Lack of employee awareness of the need for good cable tray housekeeping.	A. At WBN, employees were retrained on QCI-1.36 and on proper protection of cable trays during construction. At BLN, employees were notified of the requirement to keep clean cable trays and signs	No significance-the employees had been retrained to the requirements to protect cable trays.	No collective significance

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
VII. Cable Tray Housekeeping and Cut Cable (continued)			covered. Employees were retrained to QCI-1.36 and training for the proper protection of cable trays. At BLN poor cable tray housekeeping was uncovered in several NRC violations. The trays have been cleaned, employees have been notified to maintain clean cable trays, and signs were posted in strategic locations reminding employees to keep debris out of the trays.		were posted in various locations to keep debris out of the trays.		
			B. TVA drawing 48N406 and FSAR table 6.2.4-1 were reviewed for information on penetration X-54. This penetration was a thimble penetration and would be flanged closed during plant operation. Also cables running through X-54 were temporary cables. No condition adverse to quality could be assigned to cutting a cable running through this penetration.	B. No cause	B. No corrective action required.		
VIII. Piping Damage and Pipe Flushing Status Control	X		A. At WBN, the procedures and field conditions existing at the time of the evaluation indicated	A. No cause	A. No corrective action	No significance-DNC management at BLN has been effective in revising the control-	No collective significance

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
VIII. Piping Damage and Pipe Flushing Status Control (continued)			no problem existed with welding leads being wrapped around pipe. No instances were identified in walkdowns of the plant.			ling procedures and methods to bring the Flushing Unit into compliance with QA and NRC mandated requirements.	
			B. At BLN, it was apparent that DNC was not complying with procedural requirements. The responsible units spent 6 months establishing a manageable control procedure emphasizing post-flushing entry and contamination of safety-related systems is documented. BNP-CTP-6.1 R5 was issued as a result.	B. Inadequate controlling procedures caused the problem of poor system cleanliness status documentation.	B. BNP-CTP-4.4 and 6.1 must be approved in order to ensure that the procedure deficiencies have been addressed.		
IX. Instrumentation Tubing and Instrument Damage	X		A. Several concerns dealt with damaged instrument lines at WBN. An example was noted in accumulator room 4 in NSRS report I-85-212-WBN. This damage was to be repaired. QCI/QCP-1.36 do contain provisions for surveillances for instrument line damage. Caution signs are in	A. Procedures and programs to limit the amount of damage to instrument lines were in-	A. DNC has intiated programs to minimize the amount of instrument line damage. DNC has placed signs, added a surveillance program, informed employees through safety bulletins, and initiated the Employee Involve-	No significance-instrument line damage is an ongoing problem at WBN and BLN. Employees have been made aware of this problem through training, awareness bulletins, and caution signs posted at the work sites.	No collective significance

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
IX. Instrumentation Tubing and Instrument Damage (continued)			place to warn about damage to permanent equipment. Safety Bulletins have been issued on the subject. The observations of instrument lines at SQN and BFN revealed no problem with instrument line damage. At BLN, the consensus opinion among all interviewees was that instrument line tubing was an ongoing problem. Training was in place for engineers and craft for preferred methods of tubing installation. Safety precautions consisting of barriers, caution signs and protective devices and awareness programs are all highly visible throughout the power house.	adequate at the time the concerns were expressed.	ment Program. A specific example of instrument line damage was noted and is to be repaired under workplan GA043LB.		
		B.	No uncoupled radiation monitoring lines were found inside unit 1 security on elevation 713 in the Auxiliary Building.	B. No cause	B. No corrective action		
		C.	No damage to system 31 instruments was uncovered. QCI/QCP-1.36	C. No cause	C. No corrective action		

Executive Summary Table #1

ISSUES	SR	NS	FINDINGS	CAUSE	CORR ACT.	SIGNIFICANCE	COLLECTIVE SIGN.
IX. Instrumentation Tubing and Instrument Damage (continued)			contain provisions for surveillances for instrument damage.				
			D. No evaluation could be conducted on the concern which dealt with a damaged temperature device because of the limited information available.	D. No cause	D. No corrective action		
X. Valve Damage	X		A. For the perceived problem of valve damage caused by the use of a pry bar to manually open the valve, two valves were damaged because of pry bar usage. The valves were repaired as routine maintenance and no CAQ was identified.	A. No cause	A. The two valves were repaired on routine maintenance MRs.	No significance	No collective significance
			B. For the perceived problem of valve damage caused by ERCW mortar flakes, an investigation by the NSRS did not identify any valves that had been damaged from mortar flakes from the pipe lining.	B. No cause	B. No corrective action		

1.0 CHARACTERIZATION OF ISSUES

1.1 Introduction

This subcategory report addresses 30 concerns dealing with various aspects of component damage occurring during construction. These concerns were grouped as follows by their respective similarities.

1.1.1 Floor drains may have been stopped up.

1.1.2 Protective covers on unit 2 Reactor Building (RB) electrical penetrations may have been damaged.

1.1.3 Electrical cabinets may have been water soaked during pipe flushing activities.

1.1.4 Water may have entered electrical conduits. Heat may have damaged flexible conduits and cable insulation inside rigid conduits. Polyvinyl Chloride (PVC) conduit may have been broken and sharp objects left inside the conduit.

1.1.5 Training may be needed on the protection of flex hose connections.

1.1.6 Soft pipe insulation may have been damaged and possibly should be replaced by a more rigid type.

1.1.7 Because of poor housekeeping of cable trays, damage may have occurred to cables. Cable through unit 2 penetration 54 was cut and used to tie up welding leads and drop cords for lights.

1.1.8 Stainless steel piping may have been damaged by welding leads and electrical cords wrapped around the pipe. A lack of clean piping system status control may have existed at BLN.

1.1.9 Fifteen to twenty system 31 instruments may have been damaged. Instrumentation tubing lines may have been damaged. A radiation monitoring line may have been uncoupled. A temperature device in Turbine Building (TB) was repeatedly broken.

1.1.10 A valve may have been damaged by using a pry bar to operate the valve. Essential raw cooling water (ERCW) piping elbow and valves may have been damaged by cement mortar lining flakes.

1.2 Description of Issues

1.2.1 Floor Drains

Four concerns were evaluated with respect to floor drains being stopped up with debris. They are as follows:

Concern	Abbreviated Concern Statement
IN-85-814-001	Floor drains in all buildings were inadequately protected and became filled with debris.
IN-86-140-001	Unit 2 TB flooded on August 20, 1985 because of blocked floor drains.
IN-86-158-004	Floor drains in the RB were stopped up.
IN-86-158-005	Water was backed up on the RB floor.

1.2.2 Electrical Penetrations

Concern	Abbreviated Concern Statement
IN-85-346-002	Sheet metal electrical penetration covers inside unit 2 RB were damaged by being walked on.

1.2.3 Electrical Cabinets

Concern	Abbreviated Concern Statement
IN-85-328-001	Electrical equipment was water soaked during flushing activities in the unit 2 pipe chase on elevation 713.

1.2.4 Conduit

Concern	Abbreviated Concern Statement
IN-86-158-001	Water running through conduit.
IN-86-158-007	Welds and cuts close to conduit.
IN-86-169-001	Heat damage to flexible conduit.
IN-86-259-003	PVC conduits broken in Diesel Generator Building (DGB).

1.2.5 Flex Hose Connections

Concern	Abbreviated Concern Statement
IN-85-449-001	Flex hose protection training needed to avoid damage to flex hose during work activities.

1.2.6 Insulation

Concern	Abbreviated Concern Statement
EX-85-088-001	Soft insulations that are frequently walked on should be replaced with calcium silicate.

1.2.7 Electrical Cables and Cable Trays

Concern	Abbreviated Concern Statement
IN-85-396-001	Electrical cables were not covered properly to protect them from welding.
IN-85-198-001	Cable trays were left uncovered. Cables were walked on and subject to damage from welding operations.
OW-85-007-008	Cables were damaged from overhead welding operations. Remainder of the concern statement was evaluated in ECTG report number 19200.
IN-85-935-001	Cable was not protected from damage during construction activities. Remainder of the concern statement was evaluated in ECTG report number 10900.
IN-85-138-005	Cable coming out of unit 2 penetration 54, was cut and used to tie up welding leads and drop cords for lights.

1.2.8 Piping and Pipe Flushing

Concern	Abbreviated Concern Statement
OW-85-007-009	Stainless steel piping was damaged by having energized electrical cords and welding leads wrapped around them.

BNP-QCP-10.35-8-36	Lack of control of status within BLN Flush Engineering unit on clean systems could lead to placing dirty systems into service.

1.2.9 Instrumentation Tubing/Instruments

Concerns	Abbreviated Concern Statement
IN-86-200-006	Instrumentation tubing unprotected/bent.
IN-85-119-002	Instrumentation lines damaged.
IN-85-618-004	Instrumentation tubing unprotected/damaged.
IN-85-119-003	Radiation monitoring lines uncoupled.
IN-85-962-001	Instruments damaged.
HI-85-069-N05	Tubing hung but couplings not installed.
IN-85-163-003	Temperature device in TB repeatedly broken. Remainder of the concern statement was evaluated in ECTG report number 71500.
IN-86-198-002	Wrecking scaffolding may have caused damage to instrument lines and other equipment. Remainder of the concern statement was evaluated in ECTG report number 90900.

1.2.10 Valves

Concerns	Abbreviated Concern Statement
IN-85-221-001	A pry bar was used to operate a valve which caused valve damage.
IN-86-158-002	Valves may have been damaged by concrete debris. Remainder of the concern statement was evaluated in ECTG report number 22300.
IN-86-205-001	Pipe elbow and valve were replaced because of wear caused by loose flakes of mortar from the pipe lining. Remainder of the concern statement was evaluated in ECTG reports 10100 and 17100.

2.0 SUMMARY

2.1 Summary of Issues

Note: All concerns were expressed for WBN except pipe flush status control which was a BLN concern.

2.1.1 The four concerns on floor drains were evaluated as the following three perceived problems:

A. Floor drains in the RB were stopped up causing water to back up.

B. Floor drains in the TB were stopped up causing a flood on August 20, 1985.

C. Floor drains in all buildings were stopped up because they were neglected and became filled with debris.

2.1.2 One concern was evaluated on Conax sheet metal coverings used on unit 2 RB electrical penetrations. The concern was that the covers may have been damaged by being walked on.

2.1.3 One concern was evaluated on the perceived problem of energized electrical cabinets and open conduits being water soaked during pipe flushing activities. This was supposed to have occurred in Watts Bar Nuclear Plant (WBN) unit 2 pipe chase at elevation 713.

2.1.4 The four concerns on conduits were evaluated as the following four perceived problems:

A. Conduits (both units) may have had water running through them and possibly into control panels. Water released on the floor may have entered conduits that were flush with the floor surface. Many conduits may have not been plugged.

B. Welders had supposedly made cuts very close to conduit. The conduit contained cable which experienced high temperatures; therefore, the cable insulation was possibly damaged.

C. A piece of flexible conduit may have had extensive heat damage.

D. Five-inch PVC conduit in the Diesel Generator Building may have been broken when concrete was chipped out from inside the conduit. Sharp objects may have been left in the conduit.

2.1.5 One concern was evaluated on the perceived problem that personnel may need training on the protection of flex hose connections.

2.1.6 One concern was evaluated on damage to soft insulation. The concern was in the form of a suggestion that soft insulation which is frequently walked on should be replaced with calcium silicate insulation. Two specific areas were given as examples.

2.1.7 The five concerns on damage to electrical cables and cable trays were evaluated as the following two perceived problems:

A. Cable trays, being left uncovered, not kept clean, and used as walkways, subjected cables to damage.

B. A cable running through WBN unit 2 penetration 54 was cut and used to tie up welding leads and drop cords for lights.

2.1.8 The two concerns on damage to piping were evaluated as the following two perceived problems:

A. Stainless steel piping was damaged by having energized electrical cords and welding leads wrapped around them.

B. A lack of clean system status control within Bellefonte Nuclear Plant (BLN) Flush Engineering Unit could lead to placing dirty systems into service.

2.1.9 The eight concerns on damage to instrumentation tubing and instruments were evaluated as the following four perceived problems:

A. Instrumentation tubing line damage may be occurring during construction.

B. A unit 1 radiation monitoring line elevation 730 may have been uncoupled at WBN.

C. Fifteen to twenty system 31 instruments on unit 2 Auxiliary Building (AB) elevation 692 may be damaged at WBN. Reference Construction Category Deterioration report number 10500 for further evaluation of this concern.

D. A temperature device in WBN TB may have been repeatedly broken.

2.1.10 The three concerns on damage to valves were evaluated as the following two perceived problems:

A. A pry bar was used to operate a valve which may have damaged the valve.

B. Valves and a pipe elbow may have been damaged by loose mortar lining flakes in the WBN ERCW system.

2.2 Summary of Evaluation Process

The evaluation methodology used for this subcategory was:

- Reviewed various drawings, document specifications, procedures, Nuclear Safety Review Staff (NSRS) reports, and line organization responses.
- Interviewed individuals that were personally involved with areas covered by this subcategory.
- Performed field evaluations as required.

Except for one concern, all concerns listed in this subcategory originated at WBN. One was a BLN specific concern. The evaluation methodology was applied to all the concerns. All ten issues were evaluated at WBN. Four issues (instrumentation tubing/instruments, electrical penetrations, flex hose connections, and floor drains) were evaluated at SQN. Two issues (flex hose connections and instrumentation tubing/instruments) were evaluated at BFN. Four issues (instrumentation tubing/instruments, flex hose connections, cables and cable trays, and piping and pipe flushing) were evaluated at BLN.

2.3 Summary of Findings

2.3.1 Floor Drains

All blocked floor drains had been corrected by Preoperational Test TVA-44A. A side issue which arose during the concern evaluations was that one sump had water backed up into the floor drain system because the sump level alarm and transmitter failed to signal the water level. ([Corrective Action Tracking Document] CATD 15100-WBN-03) Since similar sumps and level transmitters existed at Sequoyah (SQN), this side issue was evaluated at SQN. At both WBN and SQN, the level transmitters were scheduled to be replaced. Blocked floor drains were not identified as a programmatic problem and was not evaluated at the other sites. |R2

2.3.2 Electrical Penetrations

Damage to electrical penetration covers in WBN unit 2 RB was found to be factual. The damage was documented and scheduled for repair by DNC. (CATD 15100-WBN-02) No additional corrective action was required. This issue was considered to be generic to SQN. The electrical penetration covers at SQN were made from a heavier gauge material and had sustained no documented damage.

2.3.3 Electrical Cabinets

No electrical control cabinets are installed in the WBN unit 2 pipe chase. Control panels inspected in the pipe chase showed no evidence of water damage.

2.3.4 Conduit

A. Water entering conduit at floor level was not found to be factual at WBN at the time of this evaluation. No corrective action was necessary at WBN and this issue was not evaluated at the other nuclear plant sites.

B. Two discolored spots were found on conduit at WBN that could possibly have been caused by flame cutting operations occurring near the conduit. No cable insulation damage was determined from megger tests on cable within conduit 0-4PLR-292-1383. No corrective action has been taken for cable inside conduit 2-2PM-292-6474-D. Determination of cable insulation damage requires pulling the cable back for inspection. (CATD 15100-WBN-01)

C. Heat damage to flexible conduit was found to be factual for the specific case stated in the concern. The damage was considered to be caused by improper grounding of a welding lead. Mechanical Maintenance repaired the damage by MR A-477393. The corrective action taken by WBN DNC was to re-emphasize correct grounding of welding leads at March 31, 1986 safety meetings. This was an isolated incident and therefore was not evaluated at other nuclear plant sites.

D. Removal of concrete from a 5" ø PVC conduit at the Diesel Generator Building during an isolated 1979 incident was found to be factual. Concrete had entered the conduit during embedment of the conduit. The cables had been inspected for abrasion after concrete removal and the final condition was determined acceptable. Since this was an isolated WBN incident, no evaluation was conducted for other nuclear plants.

2.3.5 Flex Hose Connections

Damage to flex hose connections was found to have been a problem at WBN. DNC had taken adequate corrective action by informing employees of the existing problem and the need for flex hose damage prevention. Potential damage to flex hose connections was considered generic to all nuclear plant sites and was evaluated at each of the other sites. No flex hose connection damage problem was found to exist at BLN, BFN or SQN.

2.3.6 Insulation

The concern on damage to pipe insulation was in the form of a suggestion. The suggestion was that the use of different insulation material would help minimize insulation damage. The suggested replacement insulation was not found by DNE to be an acceptable substitute. The suggested replacement is a heavier material. The insulation type presently used was specified by the manufacturer of the heat trace system installed on the pipe. No corrective action was necessary for this concern.

2.3.7 Electrical Cables and Cable Trays

A. Statements on electrical cables and cable trays being left uncovered, being used as walkways, and subjected to damage from welding operations were found to be factual at WBN and BLN. Poor cable tray housekeeping had been noted by NRC at BLN and had been corrected before it was addressed by the ECTG. This issue applies only to nuclear plants under construction and was not evaluated at SQN and BFN.

B. All cables running through WBN RB penetration X-54 are temporary and cutting one of these cables would not cause an operational safety problem.

2.3.8 Piping and Pipe Flushing

A. No indications were found at WBN of damage to pipe from being wrapped with welding leads or electrical cords. The concern was considered to be site specific to WBN.

B. Lack of flush status control for piping systems was a BLN specific concern. Lack of flush status control was found to be factual at BLN. (CATD 15100-BLN-01)

2.3.9 Instrumentation Tubing and Instruments

Damage to instrument lines was found to be a problem at WBN and was evaluated at each of the other nuclear plants. Uncoupled radiation monitoring lines were not found to be factual at WBN. Damage to the specific system 31 instruments noted by the concern at WBN was found to be not factual. Reference Construction Category Deterioration report number 10500 for further evaluation of system 31 instruments.

2.3.10 Valves

A. Two valves at WBN sustained damage from the use of a pry bar to operate them. The valves were repaired and subsequent inspection gave no indication of a nonconforming condition.

B. Pipe elbow and valve damaged by ERCW pipe mortar lining flakes was not found to be factual. This issue is site specific to WBN.

2.4 Summary of Collective Significance

The ten issues in this subcategory report cover a wide variety of work procedures, policies, craft disciplines, engineering and inspection units, and specifications. In eight of the ten issues, TVA acted responsibly and effectively. Of the two remaining issues one (conduit) was caused by personnel not implementing the precautionary methods stated in the controlling documents. The other issue (piping and pipe flushing) dealt with inadequate flushing procedures at BLN which had been noted by DNC management before the evaluation of the concern. No collective significance could be derived from these diverse issues.

2.5 Summary of Causes

A variety of causes were determined for the factual issues associated with damage during construction activities. Causes noted were equipment failure, error in judgment, and the need of equipment protection not realized until after damage occurred. Inadequate procedures and lack of employee awareness concerning potential damage were causes identified during the evaluation.

2.6 Summary of Corrective Action

In most instances DNC management had already instituted corrective actions. These areas were in flex hose connections, electrical cables and cable trays, and instrumentation tubing/instruments. In all these areas there were ongoing problems with damage to equipment due to construction activities. The corrective actions had consisted of retraining, increased awareness of damage in plant walkdowns, procedure revisions, and safety bulletins. In the floor drain area, the problem with the sump level transmitter at WBN was to be corrected by replacing the transmitters on ECN 6005. At SQN, the replacement was to be by DCR SQ-DCR-P-2242. The damaged electrical penetration covers were to be corrected prior to transfer of the penetrations. In the conduit area, the potentially damaged cables in conduits O-4PLR-292-1383 and 2-2PM-292-6474-D will be tested on MR A596114 and WP FB001MB, respectively. In the instrumentation tubing and instruments area, the specific instrument subassembly discovered to have been damaged was to be repaired using WP GA043LB. In the pipe flush status control area BNP-CTP-4.4 Revision 3 and BNP-CTP-6.1 Revision 7 have been approved. BNP-CTP-4.4 Revision 3 and BNP-CTP-6.1 Revision 7 should correct all BLN flush status control problems identified by QA and this evaluation.

3.0 EVALUATION PROCESS

3.1 General Methods of Evaluation

The evaluation methodology used for this subcategory was:

- Reviewed various drawings, document specifications, procedures, NSRS reports, and line organization responses.
- Interviewed individuals that were aware of the aspects of this subcategory.
- Performed field evaluations as required.

Except for one concern, all concerns listed in this subcategory originated at WBN. One was a BLN specific concern. The evaluation methodology was first applied at WBN for the concerns. Issues that were found to require corrective action at WBN and were generically applicable to other nuclear plant sites were then evaluated at those sites.

3.2 Requirements or Criteria Established for Individual Issues

3.2.1 Floor Drains

3.2.1.1 WBN

Preoperational Test TVA-44A, revision 0, "Liquid Waste Drains, Collection and Transfer Facilities Test," was reviewed for evidence of verifying flow rates through the unit 1 RB, Additional Equipment Building (AEB), and AB.

A cognizant Mechanical Maintenance engineer was interviewed concerning the Preventive Maintenance Program for floor drains.

The TB Auxiliary Unit Operator (AUO) log was reviewed for August 20, 1985, to establish evidence of a flood.

The Maintenance Request (MR) log was reviewed for the timeframe, January 1, 1982 to May 14, 1986, for any MRs dealing with plugged drains.

The AUO on duty in the TB on August 20, 1985, was interviewed concerning details of the flood addressed by concern IN-86-140-001.

NSRS report I-85-509-WBN and the Project Manager's Office (PMO) responses to concern IN-86-158-004 were reviewed for information and concurrence.

The cognizant WBN Division of Nuclear Construction (DNC) Startup and Coordination engineer was interviewed concerning any information on the flush packages for the unit 1 RB, AEB, TB, and AB.

The cognizant WBN Unit Operator (UO) was interviewed concerning information on a daily pump down of the pocket sump (a small sump built inside the larger RB floor and equipment drain sump for leak detection inside the crane wall).

3.2.1.2 SQN

Reviewed WBN Element Report, Floor Drains (C015101), to determine applicability to SQN.

Reviewed the NSRS report I-85-509-WBN to determine applicability to SQN.

Interviewed knowledgeable instrumentation maintenance personnel on the subject of level transmitters to determine if damage to subject level transmitters has resulted from personnel having access to the area.

3.2.2 Electrical Penetrations

3.2.2.1 WBN

A walkdown inspection of electrical penetrations was performed in WBN unit 2 personnel portal, around annulus from elevation 702 to 730, around raceway, accumulator rooms, and cooler rooms.

Damage to electrical penetration covers in WBN unit 2 RB was discussed with cognizant individuals in the Construction Electrical Engineering Unit, DNE Electrical Engineering Branch, and DNE Civil Engineering Branch.

3.2.2.2 SQN

Reviewed the SQN Generic Concern Task Force (GCTF) Report, "Electrical Penetrations to Containment," for information applicable to the evaluation and to determine the adequacy of its findings and conclusions.

3.2.3 Electrical Cabinets

3.2.3.1 WBN

Determined if plant procedures adequately addressed the subject of protection of electrical equipment during flushing of fluid handling systems.

Performed walkdowns of AB, elevation 713 pipe chase.

Interviewed cognizant Start-up and Coordination Unit personnel to determine how flushes are handled.

Interviewed cognizant Electrical Engineering Unit personnel to determine what is done if electrical equipment gets wet.

3.2.4 Conduit

3.2.4.1 WBN

Conduit joints were assumed to have been assembled to be water tight as specified in General Construction Specification G-40. A walkdown of several AB and Control Building (CB) areas was made for observation of open conduits at floor level. The unit operator's Daily Journal was reviewed for information on water in conduits. Electrical and mechanical maintenance personnel and construction personnel were interviewed for information concerning water in conduits.

General Construction Specification G-40 for conduit installation was reviewed.

NSRS report I-85-679-WBN, DNC response, and ONP response were reviewed.

NSRS report I-85-474-WBN and DNC responses were reviewed.

NSRS report I-85-581-WBN was reviewed. Cognizant individuals in DNC Electrical Engineering Unit were interviewed.

3.2.5 Flex Hose Connections

3.2.5.1 WBN

DNC response to IN-85-449-001 was reviewed.

DNC 1985-86 Safety Bulletins and Newsletters were reviewed.

QA Surveillance Report C03S840223-X01 and audit number WB-E-82-04 on flex hose conduit installation were reviewed.

WBN-QCI-1.36, revision 13, and WBN-QCP-1.36, revision 10, on "Storage and Housekeeping," were reviewed.

June 1985, INPO findings and TVA responses were reviewed.

Walkdown of plant areas observing caution signs dealing with damage to permanent equipment was performed.

AI-9.2, revision 17, "Maintenance Requests and Equipment Maintenance History," was reviewed.

Standard Operating Procedure (SOP)-46, revision 0, "Employee Involvement Program," was reviewed.

Discussions were held with DNC Instrument Engineer, DNC Preventive Maintenance Supervisor, ONP Electrical Maintenance Supervisor, QA evaluator, ONP and DNC Safety Engineer Supervisor, ONP Maintenance Supervisor, DNC Employee Involvement Unit Supervisor, ONP Modifications Supervisor, DNC Electrical Engineering Supervisor, Instrument Tubing Special Projects Supervisor, and ONP Maintenance Superintendent.

3.2.5.2 SQN

Cognizant Instrumentation Maintenance Unit personnel were interviewed about damage to flex hoses and about programs designed to preclude component damage.

A walkdown of AB elevations 669, 690, and 734 was performed observing flex hose and flex hose connections for damage.

Standard Practice SQMZ, "Maintenance Management System," Revision 18 was reviewed.

3.2.5.3 BFN

Cognizant Instrumentation Maintenance unit personnel were interviewed concerning damage to flex hose and about programs to prevent damage.

A walkdown of the TB and RB was performed observing flex hose and flex hose connections for damage.

Standard Practice BF-7.6, "Maintenance Request and Tracking," Revision 1, was reviewed.

3.2.5.4 BLN

Comprehensive tours throughout BLN unit 1 RB, CB, AB, and TB were taken to provide visible evidence of tubing or flex hose damage.

BNP-QCP-4.3, Revision 13, and BNP-QCP-6.20, Revision 5, for "Instrument Tubing Installation" and "Flexible Metal Hose Assemblies," were reviewed.

BLN Awareness Bulletins were reviewed.

"Outstanding Work Item List Master Status Report," for BLN unit 1 was reviewed.

BNP-QCP-10.50, "QA Training Program for Engineering Personnel," records were reviewed.

Instrument Craft Training Module dated October 24, 1985, "General Tubing Installation With Emphasis On Compression Fitting Make-up and Routing Lines To Prevent Damage," was reviewed.

Discussions were held with DNC Instrumentation Quality Control (QC) Group Leader, DNC Instrument Engineer Group Leader, DNC Instrumentation Engineering Aides, DNC Completions Unit System Engineer and DNC mechanical engineers.

Reviewed Nonconformance Report (NCR) Log for period of September 25, 1984 through September 5, 1986.

3.2.6 Insulation

3.2.6.1 WBN

The DNC response to EX-85-088-001 was reviewed for information and concurrence.

The cognizant DNC WBN Mechanical Engineer was interviewed for further information on the DNC response.

3.2.7 Electrical Cables and Cable Trays

3.2.7.1 WBN

Reviewed NSRS response I-85-535-WBN to concern IN-85-198-001 to determine if the concern had been fully addressed and if the response addressed other concerns within this element.

Reviewed Technical Specification 3.6.1.1, TVA drawing 48N406, and FSAR table 6.2.4-1 for information on WBN RB penetration X-54.

Reviewed NRC report number 50-391/85-36-04 for information on housekeeping of cable trays.

3.2.7.2 BLN

Reviewed BLN response to NRC violations 438, 439/85-15-01 on failure to follow procedure for housekeeping (RIMS L44 850813 810).

Reviewed NRC report numbers 50-438/85-06, 50-439/85-06, 50-438/85-15, and 50-439/85-15 for information on violations concerning cable tray housekeeping.

3.2.8 Piping and Pipe Flushing

3.2.8.1 WBN

Construction Specification G-29M and WBN QCI-1.36 were reviewed.

Contacted cognizant individual concerning memorandum issued addressing the handling of welding leads and electrical cords.

Walked down area in the AB and RB to identify electrical cords in contact with stainless steel pipe.

Reviewed the following memorandums:

From C. H. Jetton to All Construction Employees, dated February 20, 1985 (WBN 850222 200)

From C. H. Jetton to All Craft Employees, dated August 22, 1985 (C24 850822 200)

From Ben F. Painter to All Craft Supervisors and Foreman, dated January 16, 1986 (C24 860116 200)

3.2.8.2 BLN

BNP CTP-4.4, revisions 2 and 3 draft (in procedure review)

BNP-CTP-6.1, revisions 6 and 7 draft (in procedure review)

BNP-CTP-7.6, revision 5, BNP-QCP-10.46 revision 1, and BNP-QCP-10.36, Revision 3, for "Flushing Packages," "Hydro Packages," "Review of test documents and Sequence Control," were reviewed.

NCR 2991 was reviewed.

TVA Nuclear Licensing Final Report on Disposition of NCR 2991 and "Action Taken to Prevent Recurrence," was reviewed.

Deviation Report BL-5-85-093-D01 was reviewed.

All available interoffice memorandums concerning deviation BL-5-85-093-D01 were reviewed.

BNP-QCP-10.1, attachment I, requesting a revision to BNP-CTP-6.1, revision 4, was reviewed.

DNE response to violations documented in NRC report numbers 50-438/85-12 and 50-439/85-12 was reviewed. BLN-OC commitments to comply with findings were reviewed.

NCRs 4333, 4554, and 4829 concerning violations to BNP-CTP-6.1 were reviewed.

Reviewed QMO independent review of concern BNP-QCP-10.35-8-36.

Reviewed memorandum from J. T. Barnes, Supervisor, QAU, BNP-OC to G. W. French, ACE, STCU/FEU, BNP OC concerning unacceptable review results for BNP-CTP-6.1.

Reviewed FEU findings for concern BNP-QCP-10.35-8-36.

Reviewed QMO meeting minutes dated May 10, 1985, concerning instrumentation and mechanical flush packages.

Reviewed BNP-QCP-10.36 Sequence Control Chart Log in MEU for examples of post-flush entry into clean systems.

3.2.9 Instrumentation Tubing/Instruments

3.2.9.1 WBN

NSRS report I-85-212-WBN and the DNC response were reviewed.

WBN QCI-1.36, Revision 13, and WBN QCP-1.36, Revision 10, "Storage and Housekeeping," were reviewed.

Walkdown of plant areas observing caution signs about damage to permanent equipment was performed.

DNC 1985-86 Safety Bulletins and Newsletters were reviewed.

Construction Category Deterioration report number 10500 was reviewed.

Standard Operating Procedure-46, Revision 0, "Employee Involvement Program," was reviewed.

Discussions were held with DNC Safety Engineer, ONP Maintenance Supervisor, DNC Employee Involvement Unit Supervisor, ONP Modifications Supervisor, Project Manager, Special Project on Instrumentation Tubing, ONP Training personnel, and DNC Instrumentation Engineering Aide.

AI-9.2, revision 17, "Maintenance Requests and Equipment Maintenance History," was reviewed.

AB, elevation 713, inside unit 1 security was walked down to check for uncoupled radiation monitor lines.

A visual inspection of unit 2 elevation 692 AB system 31 instruments was performed.

November 26, 1985, memorandum from G. W. Curtis (Project Manager, WBN Instrumentation Project) to G. Wadewitz (Project Manager, WBN DNC) and E. R. Ennis (Site Director, WBN) and the DNC response were reviewed.

Computer listing of MRs for 1984 and 1985 on unit 1 radiation monitors was reviewed.

Computer listing of system 90 workplans on radiation monitors was reviewed.

3.2.9.2 SQN

Reviewed WBN ECTG Element Report Instrumentation Tubing/Instruments (C015109) for applicability to SQN.

Interviewed cognizant SQN Instrumentation Maintenance Unit personnel about damage to tubing and about programs established to prevent this damage.

A walkdown of AB elevations 669, 690, and 734 instrument lines was performed to assess the condition of the lines.

Reviewed Standard Practice SQMZ, "Maintenance Management System," Revision 18, to identify pertinent procedural requirements.

3.2.9.3 BFN

Reviewed WBN ECTG Element Report Instrumentation Tubing/Instruments (C015109) for applicability to BFN.

Interviewed knowledgeable BFN Instrumentation Maintenance Unit personnel about damage to tubing and/or about programs to prevent this damage.

A walkdown of portions of TB and RB instrument lines was performed to assess the condition of the lines.

Reviewed Standard Practice BF-7.6, "Maintenance Request and Tracking," Revision 1, to identify pertinent procedural requirements.

Interviewed knowledgeable training personnel about training related to prevention of instrumentation tubing/instruments damage.

3.2.9.4 BLN

BNP-QCP-4.3, Revision-13, and BNP-QCP-6.20, Revisi[illegible], on "Instrument Tubing Installation" and "Flexible Metal Hose Assemblies," were reviewed.

BLN Awareness Bulletins were reviewed.

OWIL Master Status Report for BLN unit 1 was reviewed.

BNP-QCP-10.50, "QA Training Program for Engineering Personnel," records were reviewed.

Instrument Craft Training Module dated October 24, 1985, "General Tubing Installation With Emphasis On Compression Fitting Make-up and Routing Lines To Prevent Damage," was reviewed.

Discussions were held with DNC Instrumentation QC Group Leader, DNC Instrumentation Engineering Group Leader, DNC Instrumentation Engineer Aides, DNC Completion Unit System Engineer and DNC Mechanical Engineer.

BLN unit 1 RB, AB, and CB were walked down to discern any visible evidence of tubing or flex hose damage.

NCR log for period of September 25, 1984 through September 5, 1986 was reviewed.

3.2.10 Valves

3.2.10.1 WBN

NSRS report number I-85-598-WBN on concern IN-86-205-001 was reviewed.

MRs A-525382 and A-525384 concerning valve damage repair were reviewed.

The following memorandums on valve damage were reviewed: Whitt to Ennis September 23, 1985; Ennis to Whitt September 16, 1985; Harrison to Culver August 16, 1985; Schum to Harrison August 12, 1985; Whitt to Schum August 5, 1985; Cottle to Whitt July 18, 1985; Ennis to Gibbs July 18, 1985; Ennis to Wadewitz July 18, 1985; Whitt to Cottle July 8, 1985.

ERT Report IN-85-221-001 on, "Valve Damage," was reviewed.

NSRS Report Number I-85-166-WBN on, "Essential Raw Cooling Water System Mortar Lining," was reviewed.

NSRS report number I-85-723-WBN was reviewed.

Special Maintenance Instruction 67.1, draft for, "Inspection of Mortar Lining," was reviewed.

Memorandums Whitt to Brown October 10, 1985 and Standifer to Wilson February 26, 1985 were reviewed.

4.0 FINDINGS

4.1 Findings on Floor Drains

4.1.1 Generic

Discussion

All documented blocked floor drains at WBN had been corrected before the ECTG evaluated the concern. A side issue stemming from the concern evaluations was that one sump had water backed up into the floor drain system because the sump level alarm and transmitter failed to signal the water level. Since similar sumps and level transmitters exist at SQN, this side issue was evaluated at SQN. Blocked floor drains were considered generic for WBN and SQN only.

Conclusion

Blocked floor drains were not found to be factual at the time of evaluation. Blocked floor drains had been corrected before this evaluation took place.

4.1.2 Site Specific

4.1.2.1 WBN

Discussion

NSRS report I-85-509-WBN related to concern IN-86-158-005 was reviewed. The findings concluded that no floor drains were blocked at the time the NSRS Report was written. Water backing up into the floor drains in the RB raceway was caused by failure of the level transmitters for the Reactor Building auxiliary floor and equipment drain sump which had been damaged by personnel working in the area. ONP identified and isolated the source of a leak which was causing the sump to fill up and be pumped down often. The level transmitters are to be replaced with ultrasonic transmitters. Modifications will complete the installation with workplans E6005-1 and E6005-2. They are to be labeled as delicate instrumentation at the sump. The report did verify the concern and specified corrective action which consisted of identifying the source of leakage and repairing or replacing the damaged transmitters.

With regard to concern IN-86-140-001, the TB AUO log for August 20, 1985, was reviewed to determine if and why a flood had occurred. The flood was verified, but no reason was given for its existence. The cognizant AUO was interviewed to ascertain the reason for the flood. He related that the flood was caused by a misalignment of a valve in the line-up for the station sump to the Low Level Storage Pond. During the conversation, the AUO stated the valve was presumed to be open when it was closed. This allowed the level in the sump to rise high enough to cause water to back up into the lower level floor drains. The problem was identified and the valve was opened. The level in the sump subsequently dropped and the water drained back through the floor drains. Therefore, the concern was verified, but no further corrective action was necessary.

Concerns IN-85-814-001 and IN-86-158-004 were evaluated simultaneously because both dealt with stopped up drains. The PMO response to IN-86-158-004 was reviewed. Additional information was deemed necessary because the report did not include any details concerning the subject. The cognizant WBN Startup and Coordination Engineer was interviewed to gain information about the flush packages for floor drains. Preoperational test TVA-44A, revision 0, was reviewed for requirements for testing system 77 drains. Unit 1 RB, AEB, and AB drains were to handle 60 gallons in 4 minutes to meet TVA 44A acceptance criteria. Problems were encountered with clogged drains, but all were corrected and passed the required flow rate. Metal covers were installed over the drain openings as a Temporary Alteration Control according to Administrative Instruction 2.15 after they had been tested. There was no preoperational test designated for the system 40 drains. In conversation with the cognizant WBN Preoperational Engineers, the walkdown of the drains (both systems 77 and 40) consisted of observation of each drain for trash. A printout of MRs on systems 40 and 77 from January 1, 1982 to May 14, 1986 was reviewed. MRs for clogged drains in the unit 1 RB, AEB, TB, or AB were not discovered. It was determined that

any clogged up drains in the unit 1 RB, AEB, and AB were discovered during the TVA-44A test and subsequently corrected. Unit 2 drains in the RB and AEB will be covered by the TVA-44A (unit 2), test. Debris in drain lines was verified by reviewing the test log for TVA-44A. However, all drains tested were cleared and maintained acceptable flow rates. It was determined from a conversation with the cognizant Mechanical Maintenance Engineer that there is a Preventive Maintenance Program covering all RB and AB drains to verify they are clear and there is no standing water present during inspection tours. There is no program governing system 40 drains, but as stated before, there had been no MRs for clogged drains from 1982 to May 14, 1986.

DNC conducted housekeeping walkthroughs as part of QCI-1.36 requirements. There is no specific mention made of floor drains, but they are covered under examples of damage to permanent plant equipment. This would apply to dirty floor drains and standing water around floor drains. The critical radwaste drains are covered and will be tested before plant operation.

Conclusion

WBN

A. Concern IN-86-158-005 was verified by NSRS report I-85-509-WBN. The source of water causing the Reactor Building auxiliary floor and equipment drain sump to overflow was isolated and new level transmitters were ordered (CATD 15100-WBN-03). The concern was factual and identified a problem, but corrective action for the problem was initiated before the evaluation of the concern was undertaken.

B. Concern IN-86-140-001 was deemed factual because a flood did occur on August 20, 1985. However, the flood was not caused by clogged floor drains, but by misalignment of a valve. A problem was identified but corrective action was initiated before the evaluation of the concern was undertaken.

C. IN-85-814-001 was considered factual because of the amount of dirt that was flushed out of the drain lines during implementation of test TVA-44A. This corrective action was initiated before the evaluation of the concern was undertaken. No evidence of clogged drains was discovered during a review of the system 40 and 77 MR log. IN-86-158-004 was not factual for unit 1 RB because the floor drains were successfully tested. Clogged floor drains is an ongoing problem during the plant's construction phase. Preoperational testing and housekeeping tours will identify and correct any floor drain problems.

4.1.2.2 SQN

Discussion

The review of WBN Element Report, "Floor Drains" (C015101), revealed the problem stated in the concern resulted from the failure of the level transmitters in the Reactor Building auxiliary floor and equipment drain sump to alarm. Subsequent investigation revealed the transmitters were damaged by personnel working in the area. The report showed the level transmitters were scheduled to be replaced by a different type which is less susceptible to damage.

The review of NSRS report I-85-509-WBN concern IN-86-158-005 revealed that the problem stated by the concern centered around the damage to the Reactor Building auxiliary floor and equipment drain sump level transmitters. This report also stated that new ultrasonic level transmitters were being ordered to replace the damaged units at WBN.

The interviews with SQN Instrumentation Maintenance personnel revealed numerous malfunctions of the present level transmitters occurred at SQN, although none of these were related to damage. Replacements for the existing transmitters are not readily available, and spare parts are no longer available from the manufacturer. A Design Change Request (DCR) was initiated on December 12, 1985, to replace existing level transmitters which are LT-77-125, 126, 410, and 411 with Delta Controls

Corporation type 851 ultrasonic level transmitters which are considered to be more reliable. These same transmitters have also been ordered as the WBN replacements.

Conclusion

Damage to level transmitters at SQN caused by personnel was not a problem, but other problems with these transmitters has warranted their replacement. The type of transmitters being installed are identical to those being used at WBN and will decrease the potential for any future damage caused by personnel working in the area. The side issue was factual and required corrective action which had been initiated before the evaluation of the issue was undertaken.

4.2 Findings on Electrical Penetrations

4.2.1 Generic

Discussion

Damage to electrical penetration covers in WBN unit 2 RB was found to be factual. The damage was corrected through existing programs. No additional corrective action is required. This issue was considered generic to SQN since SQN has a similar RB. The electrical penetration covers at SQN were produced by using a heavier gauge material by a different manufacturer and had not been damaged.

Conclusion

Damage to electrical penetration covers was found to be factual at WBN but not at SQN. Damage was to be corrected through existing programs and no additional corrective action is required. The problem at WBN was identified before the evaluation of the issue was initiated.

4.2.2 Site Specific

4.2.2.1 WBN

Discussion

Approximately 80 percent of the sheet metal electrical penetration covers evaluated were found to be damaged.

The damage appeared to be caused by traffic over and around the covers. Several caution signs were posted to alert employees about damage to permanent equipment within the plant.

The damaged electrical penetration covers were added to a punch list of items requiring correction during a November 1985, Construction walkdown for transfer of the equipment from DNC to ONP control. Unit 1 electrical penetration covers have been closed with 3-sided covers bolted in place. Replacing the covers with stronger units was concluded to be not as practical as repairing existing covers for the following reasons:

1. The covers were vendor supplied, and new covers would require seismic analysis qualification.

2. Replacement would be difficult because the cables would have to be pulled back to remove the covers.

3. The covers can be straightened and once bolted closed, the covers will not be as vulnerable and damage will not be a problem.

Building protection over some of the covers in the annulus would be difficult because of the orientation, elevation, and the limited attachment points available.

Conclusion

Damage to electrical penetration covers in unit 2 RB was factual; however, protection of the electrical penetrations was not compromised. The damage had been documented and was to be corrected before transfer to ONP control. This action was specified before the evaluation of the issue was undertaken. Replacement with stronger covers was not as practical as repairing the existing covers. Caution signs imploring employees to avoid damaging permanent equipment have been placed in the areas of the damaged penetration covers. (CATD 15100-WBN-02)

4.2.2.2 SQN

Discussion

Review of the SQN GCTF report revealed the SQN compliance section had performed a review of potential reportable occurrences from 1984 to early 1986. Their review showed no cases of electrical

penetration damage. The GCTF report revealed that the SQN penetrations were purchased from Westinghouse Electrical Corporation on contract 72C61-75146 while the WBN electrical penetrations were purchased from Conax Corporation on contract 76K61-87064. Interviews with responsible personnel indicated that the Westinghouse supplied electrical penetration junction boxes at SQN were of a stronger design than those used at WBN.

Conclusion

The damage to electrical penetration covers was not a problem at SQN. The issue was not factual.

4.3 Findings of Electrical Cabinets

4.3.1 Generic

Nonapplicable

4.3.2 Site Specific

4.3.2.1 WBN

Discussion

WBN QCT-4.36 revision 6, dated March 12, 1985, (reference paragraphs 6.2.2.5 and 6.2.2.6) did adequately address the checking for leakage and protection of electrical equipment during flushes. The procedure states "Cover electrical equipment in the area as required to protect it from damage."

A walkdown was performed in the WBN pipe chase in the AB on elevation 713. This walkdown revealed no electrical cabinets in the pipe chase only junction boxes. These junction boxes were all sealed and would not be harmed by water being spilled on them.

Interviews with three cognizant Start-up and Coordination Unit personnel revealed that water is not intentionally dumped on electrical equipment or on the floor. However, leaks cannot be anticipated, and whenever they do occur, the leak or the flush is stopped, whichever is appropriate. The test package

will normally identify electrical equipment in the area of the flush, and this equipment will be covered, or necessary precautions will be taken to protect it. During flushing, people are continually walking the system down, employing two-way radios for communication, looking for leaks and controlling the flushing activity as necessary.

Interviews with cognizant Electrical Engineering personnel noted that the flushing personnel are directed to notify the Electrical Engineering Unit if electrical equipment gets saturated during flushing. When and if the electrical engineers are notified, they will inspect the equipment for damage. If water has gotten inside the equipment, the electrical engineers will get the equipment dried out and functionally test the equipment and/or wiring.

Conclusion

This evaluation revealed that there are provisions for protecting electrical equipment during flushing activities. There was no indication that electrical equipment in WBN's unit 2 pipe chase on elevation 713 had ever been saturated. No corrective action was necessary at WBN for this issue. The issue was not factual.

4.4 Findings on Conduit

4.4.1 Generic

Nonapplicable

4.4.2 Site Specific

4.4.2.1 WBN

Discussion

A. Water entering conduit at floor level was found to be not factual at WBN. No corrective action was necessary at WBN. This issue was not evaluated at other nuclear plant sites.

Interviews with Electrical Maintenance personnel revealed that water had been found in conduit. In the noted situations, the water had entered the conduit through open junction boxes or conduit openings. No evidence of water entering control panels or conduits at floor level was discovered. Review of General Construction Specification G-40, "Conduit Installation," indicated conduit joints shall be sealed and conduits shall be sloped for drainage. A Mechanical Maintenance employee familiar with penetrations indicated floor conduit penetrations are sealed with RTV foam and all penetration seals within the fire barrier floors are governed by surveillance instructions. A walkdown of AB unit 1 and 2, floor elevations 757, 737, 713, and 692 was made in search of open conduit at any floor level. No open conduit was found at any floor level. Some junction boxes were open and some conduit covers were missing in unit 2 construction areas. No open junction boxes or missing conduit covers were found within the unit 1 security boundary. No information was found in the UO's Daily Journal concerning water in conduits. Interviews with maintenance personnel indicated corrective action was taken as necessary if water is discovered in conduit. Steps to be taken include elimination of the source of water getting into the conduit, blowing air through the conduit to remove the water, and checking insulation resistance of the cables involved.

B. Two discolored spots on conduit were found at WBN that could possibly have been made by heat from welding operations made near the conduit. Cable megger testing has been completed for one of [illegible] cations, and so far, no cable [illegible] damage has been revealed. The issue was not evaluated at the other sites.

NSRS report I-85-679-WBN was issued January 10, 1986, on concern IN-86-158-007 (cuts close to conduit). The concern was considered factual since two discolored conduits were found during an intensive inspection effort. A

recommendation was made in the NSRS report I-85-679-WBN that two locations have conductor to conductor, and conductor to ground megger testing or other appropriate testing, to establish if there was any electrical insulation degradation. Two cables in conduit O-4PLR-292-1383 had been transferred to ONP control and had been meggered by ONP Maintenance. Results of the meggering test showed that cable insulation integrity was maintained. Conduit 2-2PM-292-6474-D contained 26 cables. These are to be tested by the WBN Modifications Section. NSRS report I-85-679-WBN, DNC's and ONP's response were considered to be thorough and no further action was required other than the completion of the cable inspections in conduits 2-2PM-292-6474-D and O-4PLR-292-1383. (CATD 15100-WBN-01)

C. Heat damaged flexible conduit was found to be factual for the specific case noted in the WBN concern. This was an isolated incident at WBN and was not evaluated at the other sites.

NSRS report I-85-474-WBN was issued November 29, 1985, on concern IN-86-169-001 which noted heat damage to four flexible conduits. The damaged flexible conduits were located and the extensive damage appeared to be caused by the flex hoses and supporting bracket being used as part of a welding ground path. The cables inside the flex conduit were energized when evaluated by NSRS and were reported to ONP Industrial Safety. MR A-477393 was initiated to correct the damaged flex conduit. NSRS report I-85-474-WBN made two recommendations. The first recommendation was to correct the damage and eliminate the cause of the damage. The second recommendation was to re-emphasize to construction personnel that potentially hazardous conditions should be immediately reported.

The flex conduits and damaged cables were replaced according to instructions included in MR-A-477393. The cause for the damage was considered to be grounding of welding leads using the support bracket which contacted the flex conduit. Welding lead grounding methods were covered in the agenda for the March 31, 1986, construction safety meetings. An Employee Involvement Program established by WBN-SOP-46 has been initiated for all site annual and craft employees. One anticipated advantage to be gained from this program is better communications of field problems including the reporting of hazardous conditions. NSRS report I-85-474-WBN and DNC's responses were considered to be thorough and complete.

D. NSRS report I-85-581-WBN concerning sharp objects found in a broken PVC conduit concluded that no cable damage was visible in accessible areas. No occurrence other than the 1979 incident was discovered. NSRS report I-85-581-WBN was considered thorough and complete. The concern was considered to be factual, but not a problem.

Conclusion

A. Water entering conduit at floor level was found to be not factual. No instances of water being in conduit were found for the unit 1 area at WBN after the conduit openings were closed. There have been instances where water was found in open conduit above floor level and corrective action was taken as required to eliminate the source and evaluate the involved equipment.

B. An intensive inspection tour was undertaken to identify heat discolored conduit. Two conduits were identified to be discolored by heat. Cables in one conduit received megger testing. Cables in the second conduit have not been tested to date (CATD 15100-WBN-01). The issue was factual and a problem for which corrective action had been, or was being, taken as a result of an evaluation.

C. Heat damaged flexible conduit was found to be factual. The damage was corrected and measures were taken to eliminate the cause. The problem had been corrected as the result of an evaluation.

D. An instance where concrete had to be removed from PVC conduit was found to be factual. The incident did not create an unacceptable final condition (i.e., not a condition requiring corrective action). The cables were inspected for damage and were accepted.

4.5 Findings on Flex Hose Connections

4.5.1 Generic

Discussion

Damage to flex hose connections was found to be factual at WBN. Damage to flex hose connections was considered to be a generic concern at all nuclear plant sites and was evaluated at each of the sites. No flex hose connection damage existed at BLN, BFN or SQN. The issue of torquing flexible conduit couplings is covered in Construction Subcategory 19200 "Conduit and Cable Tray."

Conclusion

Flex hose connection damage was a problem at WBN. The problem of flex hose connection damage does not exist at the completed plants of SQN and BFN. BLN's controlling procedures, craft training modules, and flex hose protective devices have proven effective in preventing damage.

4.5.2 Site Specific

4.5.2.1 WBN

Discussion

Review of DNC response to IN-85-449-001 indicated that flex hose damage had been a problem and the DNC had taken several corrective actions. The specific example given in the concern had been corrected. QCI-1.36, Revision 13, "Storage and Housekeeping," included revisions requiring the Construction

Superintendent's office to perform monthly surveillance of flex hose installations. Caution signs were placed at various locations to inform employees of potential flex hose damage. Added protection had been placed around some vulnerable installations. Employees had also been informed of potential flex hose damage through Safety Bulletins.

Two DNC Safety Bulletins (November 4, 1985 and February 24, 1986) were found to have a section cautioning employees about damage to permanent plant equipment. Also, the March 3, 1986, WBN Construction Newsletter had a paragraph concerning damage to permanent plant equipment.

Review of Surveillance Report C03S840223-X01 and Audit Number WB-E-82-04 reinforced the conclusion that damage to flex hoses existed.

Review of WBN-QCI-1.36, Revision 13, and WBN-QCP 1.36, Revision 10, on "Storage and Housekeeping," confirmed that revisions were included for flex hose damage surveillance.

Review of June 1985, Institute of Nuclear Power Operations (INPO) findings and TVA responses to the findings reinforced the conclusion that a problem with damaged flex hoses had existed. The INPO findings were issued before the TVA corrective action was fully implemented. The TVA response to the findings was that procedure changes had been made but had not been in place during the INPO review.

Several caution signs warning about damage to permanent equipment (especially flex hose and instrument lines) were evident on the unit 2 side of the security barrier during a plant walkdown. No similar signs were found inside the security area for unit 1.

Discussions were held with cognizant individuals concerning damage to flex hoses and the prevention of damage. Damage to flex hoses has been considered a problem by ONP and DNC. DNC has placed signs, added a surveillance program, added protection for vulnerable flex hoses, informed employees through safety bulletins and newsletters, and initiated an

Employee Involvement program. These items were viewed as adequate DNC responses for the problem of flex hoses being damaged. The ONP does not have a program in place to address the issue.

Conclusion

DNC has adequately addressed damage to flex hoses, and no further corrective actions are required. The issue was factual and identified a problem, but the corrective action for the problem was initiated before the evaluation of the issue was undertaken.

4.5.2.2 SQN

Discussion

The interviews with SQN Instrumentation Maintenance Unit personnel revealed no problem with damaged flex hoses. The interviews also revealed that there is no formal training program in place addressing the prevention of damage to flex hoses.

During the walkdown of the AB, approximately 150 flex hoses were observed--none of which was found to be damaged or in need of repair.

The review of Standard Practice SQMZ, "Maintenance Management System," Revision 18, revealed that any plant personnel may report the need for plant corrective maintenance or repair work. Anyone noticing any damage or other degradation may fill out an MR.

Conclusion

During plant tours, damage to flex hose was not observed and discussions with maintenance personnel did not reveal damage to flex hose to be a problem. SQN did not have a formal program to address flex hose damage prevention. The issue was not factual.

4.5.2.3 BFN

Discussion

The interviews with BFN Instrumentation Maintenance Unit personnel revealed no problem with damaged flex hoses. The interviews also revealed that there was

no formal training program in place concerning the prevention of damage to flex hoses.

During the walkdown of the TB and RB, flex hoses were observed, none of which were found to be damaged or in need of repair.

The review of Standard Practice BF-7.6, "Maintenance Request and Tracking," Revision 1, paragraph 5, revealed that any plant personnel may report the need for plant corrective maintenance or repair work. Anyone noticing any damage or other degradation may fill out an MR.

Conclusion

Discussions with maintenance personnel and plant tours revealed no damaged flex hoses. BFN did not have a formal training program to address flex hose damage prevention. The issue was not factual.

4.5.2.4 BLN

The procedures controlling tubing and flex hose installation are comprehensive and to the point. They have specific routing parameters designed to prevent tubing from being installed in unprotected environments. The flex hose installation procedure specifies protective devices where necessary.

Interviews with Instrumentation Engineers (IE) directly involved with tubing and flex hose installation supported the concern over tubing damage and revealed several instances where repetitive damage was a problem. A more active role was taken by the Instrument Engineering Unit groups in attempting to preclude any damage to tubing and flex hoses. Emphasizing the cost of replacing components in the BNP Awareness Bulletin and creating a comprehensive training module to use in engineering and craft training classes, the IE had taken steps to alleviate the problem.

Conclusion

Construction at BLN has emphasized flex hose protection to employees through awareness bulletins and a comprehensive training module.

Instrumentation tubing damage has been decreased measurably and flex hose damage has been eliminated through use of the controlling procedures and training and installation programs in effect. No additional action is necessary. The issue was factual and identified a problem, but corrective action for the problem was initiated before the evaluation of the issue was undertaken.

4.6 Findings on Insulation

4.6.1 Generic

Nonapplicable

4.6.2 Site Specific

4.6.2.1 WBN

Discussion

The concern addressing damage to pipe insulation was voiced in the form of a suggestion. The suggestion was that the use of a different insulation material would help prevent insulation damage. This evaluation concurred with the DNC response to the concern. DNC stated that the type of insulation used on each system was specified by DNE. In some situations (such as for heat traced systems) the soft insulation was a requirement.

In conversation with the cognizant mechanical engineer, the corrective action for the two examples given in the concern were discussed. The insulation in the 692 pipe gallery was for heat traced pipe. In the DNC response to the concern, it was specified that soft insulation was required for heat traced systems by the heat trace manufacturer. The suggested replacement is a heavier material. Hanger load capacity would had to have been considered if the heavier type of insulation was used. The insulation at the sewage treatment plant had been replaced before the DNC evaluation. To preclude further damage to the insulation, signs had been placed at several locations reminding individuals not to walk on the insulation. QCI-1.36 Revision 13 and AI-1.8 revision 9 both have provisions for walkdown inspections of plant areas for damage to permanent plant equipment.

Conclusion

The concern was not considered to be factual in the DNC response. The required type of insulation was specified by DNE. There were certain piping systems named which required the soft insulation because of heat tracing systems and systems where the hanger load capacity was designed for lightweight insulation (calcium silicate was a heavier material). No corrective action was required. The issue was not evaluated at the other sites.

4.7 Findings on Electrical Cables and Cable Trays

4.7.1 Generic

Discussion

Statements concerning electrical cables and cable trays being left uncovered, being used as walkways, and being subjected to damage caused by welding operations were found to be factual at WBN and BLN. Poor cable tray housekeeping had been noted by NRC and was being addressed before it became an issue to be addressed by ECTG. This issue applies only to nuclear plants during construction and was not evaluated at SQN and BFN. No damaged cables were found during evaluation at WBN & BLN.

Conclusion

The poor housekeeping of cable trays was found to be factual. No damaged cables have been documented.

4.7.2 Site Specific

4.7.2.1 WBN

Discussion

A. NSRS report I-85-535-WBN documented the findings concerning cable trays being left uncovered, being used as walkways, and being subjected to damage from welding operations.

The NSRS findings revealed that cable trays have, in the past, been used as walkways while the trays were uncovered. However, no cable damage has been discovered. The report revealed the cable tray side rails were used more often for climbing and movement to a work location, rather than as walkways. The NSRS findings revealed that retraining of employees to WBN-QCI 1.36 and training for the proper protection of cable trays during construction has been initiated. The training included the statement, "if work is required over or near a cable tray, they will be covered extensively and a fire permit is required." The NSRS report stated that the DNC training module addresses the concerns adequately and will increase the level of awareness needed to ensure cables are always protected.

Evaluation of concern IN-85-935-001 was shared with ECTG 10900. Only the portion of concern IN-85-935-001 on cable not being protected from damage during construction was addressed in this report.

B. According to TVA drawing 48N406 and FSAR table 6.2.4-1, penetration X-54 is listed as the thimble penetration and would be flanged closed during plant operation. All cables running through the penetration were considered to be temporary construction cables. No condition adverse to quality or safety related issue could be assigned to the cable cutting incident. No factual verification of the incident could be substantiated.

Conclusion

A. Poor housekeeping for cable trays was found to be factual. Corrective action had been taken at WBN to increase the level of awareness to ensure cables are always protected. No further corrective actions are required. The corrective action for the problem was initiated before the evaluation of the issue was undertaken.

B. All cables through WBN RB penetration X-54 are temporary. No condition adverse to quality or safety related issue was determined to be caused by the cutting of the temporary cable. The issue was factually accurate, but what it described was not a problem (i.e., not a condition requiring corrective action).

4.7.2.2 BLN

Discussion

Review of NRC reports 50-438/85-06, 50-439/85-06, 50-438/85-15, and 50-439/85-15 clearly indicated that a problem of poor cable tray housekeeping had existed at BLN. TVA's response to these NRC violations was reviewed. Cable trays were cleaned and inspected. The cause of the inadequate performance was stated as a general lack of knowledge of the required policies and practices. The corrective actions taken were to inform employees through a memorandum to all employees, post highly visible signs at strategic project and building entrances, cautioning employees to keep debris, tools and everything else but cable out of cable trays, and emphasize the requirements in issues of the weekly safety bulletin. The BLN response was adequate and no further corrective action is required.

Conclusion

Poor housekeeping of cable trays was found to be factual. Corrective action had been taken to inform the employees on the policies and practices of cable tray housekeeping. The corrective action for the problem was initiated before the evaluation of the issue was undertaken.

4.8 Findings on Piping and Pipe Flushing

4.8.1 Generic

Nonapplicable

4.8.2 Site Specific

4.8.2.1 WBN

Discussion

Section 6.2.5.1 of WBN-QCI-1.36 specifically states that electrical cords are not to contact stainless steel pipe and the memorandums referenced in section 3.2.8.1 of the evaluation methodology emphasize this requirement to all employees. To ensure that this requirement is being adhered to, housekeeping tours are conducted monthly and any deficiencies noted are documented and corrected.

Extensive walkdown tours were undertaken in an attempt to identify any instances where welding leads were wrapped around piping. Although the concern indicated an example of the problem existed in the Auxiliary Building, no evidence could be found to prove the concern to be factual. Tours were also taken through both of the Reactor Buildings in attempts to substantiate the concern.

These walkdowns did reveal that trapeze assemblies are located throughout the plant, specifically designated for hanging air hoses, welding leads, and drop cords.

Based on the above findings and management's emphasis placed on obviating conditions stemming from welding leads being wrapped around pipe, this problem has been adequately addressed and no further corrective action is required.

Conclusion

The procedures and field conditions existing at the time of this evaluation indicated no problem existed with welding leads being wrapped around pipe. The issue was not factual.

4.8.2.2 BLN

Discussion

Review of current flushing procedures and drafts of flushing procedure revisions presently in final review cycle established criteria for answering concerns voiced not only by the concerned individual, but by site QA, DNC-QA, Procedures and Training Unit personnel and NRC auditors.

NCR 2991 dated May 14, 1984, proved that the controls needed for system cleanliness maintenance after flushing were not being utilized. The final report dated July 16, 1984, from DNC to NRC stated procedure BNP-CTP-6.1 would be revised to include controls for flushing, boundary valve tagging, and tracking. The deviation report cited specific areas of noncompliance to the requirements of section 6.6 of BNP-CTP-6.1 and documented unacceptable review results for the draft of CTP-6.1 revision 7.

Memorandum review revealed that there was a sustained, concerted effort by DNC to address the specific issues noted in the deviation report for the period between March 1984 and December 1985.

The procedure revision request specifically addressed sections of CTP-6.1 that would bring DNC into compliance with NRC, site QA and QMO-DNC recommendations.

Site QA's report reiterated a list of noncompliance items established in Deviation Report BL-S-85-093-D01 and disputed DNC's contention that DNC was addressing the deviation in a timely manner.

Three NCRs were generated based on test procedure results review findings that violated CTP 6.1 requirements. The flushes were performed before DNC compliance with CTP 6.1 revision 6.

The independent review by QMO of concern BNP-QCP-10.35-8-36 assessed the Flush Engineering Unit program as "Having a good handle on the process", though several problems were noted that required immediate attention.

Review of the memorandum dated August 6, 1985, revealed that although DNC committed to revise CTP-6.1 revision 5 to address all concerns compiled from previous deviations, NRC reports, memorandums, etc., revision 6 did not address seven specific areas.

The Flush Engineering Unit evaluation of concern BNP-QCP-10.35-8-36 dated September 20, 1985, states "Due to the attention given to this problem, it is extremely unlikely that any widespread chronic contamination problems have occurred or will occur." This evaluation takes exception to this statement since 23 flush packages were reviewed and all had deviations to the flushing procedure. The deviations were addressed by NCRs 4333, 4829, and 4554.

Conclusion

Throughout the evaluation of the concern, it was apparent that DNC was not complying with procedural requirements. NCRs, QA deviation reports, NRC reports, inter office memos, and corrective action verification reports all document the shortcomings of the procedures DNC was utilizing for work control.

After initial identification of the problem, a six month period of time elapsed where a concerted effort by the Flushing Engineering Unit, Procedures and Training, QMO, MEU, IEU and DNE to establish a manageable control procedure emphasizing post-flush entry and contamination of safety-related systems is documented. Each procedure deviation was addressed and documented collectively and individually at some point during this time period.

When BNP-CTP-6.1, revision 5 was issued with the blessing of OC, QMO, OE and ONP, FEU resumed their flushing program. Within two months, site QA raised a concern citing seven specific areas where they

felt the procedure was still not in compliance with OC's documented commitments. At this point in time, revision 6 of CTP-6.1 was in the final review cycle. Revision 6 was issued without addressing the listed concerns, but with dependence on OC management's ability to control ongoing work with revision 6.

Finally OC, QMO, ONP, Site QA and Procedures and Training agreed to a revision 7 of 6.1 which would address the noted concerns. Revision 7 was in the final review cycle at the time this evaluation was made.

BNP-CTP-4.4 revision 3 also addresses the listed concerns. It was also in the review cycle.

Review of BNP-CTP-6.1 revision 7 draft (in procedure review) and BNP-CTP-4.4 revision 3 draft (in procedure review) showed each concern raised and documented throughout the history of the problem was being addressed and work will be controlled. (CATD 15100-BLN-01)

The proof will be documented as soon as the first flushing package completed under revision 7 of CTP-6.1 is reviewed and stored in the Document Control Unit. The issue was factual and identified a problem but corrective action for the problem was initiated before the evaluation of the issue was undertaken.

4.9 Findings on Instrumentation Tubing and Instruments

4.9.1 Generic

Discussion

Damage to instrument lines was found to be a problem at WBN and was evaluated at each of the other nuclear plants. Uncoupled radiation monitoring lines was found not factual at WBN and therefore was not evaluated at other nuclear plants. Damage to the specific instruments within the concerns at WBN was found not factual. Since these were for specific instruments at WBN, no evaluation was conducted at the other nuclear plants. Reference Construction Category Deterioration report number 10500 for further evaluation for system 31 instruments at WBN.

Conclusion

Damage to instrument lines was found to be factual and generic to all four TVA nuclear plants. Uncoupled radiation monitoring lines and damaged instruments at WBN were issues that were found to be not factual.

4.9.2 Site Specific

4.9.2.1 WBN

Discussion

A. Review of NSRS report I-85-212-WBN and the DNC response indicated that a damaged tubing subassembly was found in unit 2 accumulator room number 4. The damage was to be repaired (CATD 15100-WBN-04) and caution signs were posted in the area. The system transfer process was emphasized as the means of inspecting and correcting damage before the equipment is transferred to ONP.

Review of WBN QCI-1.36, revision 13, and WBN QCP-1.36, Revision 10, on "Storage and Housekeeping," confirmed that provisions were included for instrument line damage surveillance.

Several caution signs warning about damage to permanent equipment (especially flex hose and instrument lines) were found on the unit 2 side of the security barrier during a plant walkdown. No similar signs were found inside security for unit 1.

Two DNC Safety Bulletins (November 4, 1985 and February 24, 1986) were found to contain sections emphasizing precautions to be taken to avoid damage to permanent plant equipment. March 3, 1986, WBN Construction Newsletter had a section addressing damage to permanent plant equipment.

Discussions were held with IEU personnel concerning damage to instrument lines. Damage to instrument lines has been considered a problem by ONP and DNC. DNC has posted signs, added a surveillance program, added protection for vulnerable lines, informed employees through Safety Bulletins and Newsletters, and initiated the Employee Involvement Program. These items were viewed as an adequate DNC response for the problem of instrument line damage. ONP does not have a program in place for this. Communication with employees concerning damage to instrument lines and flex hoses being a costly problem could help limit the amount of damage. This communication could be through ONP section meetings and by placing caution signs within the traffic areas of the unit 1 security area.

B. No uncoupled radiation monitoring lines were found inside unit 1 security on floor elevation 713 of AB.

No information was found on radiation monitor lines having been uncoupled in the maintenance request review.

No information was found on radiation monitor lines having been uncoupled in the workplan review.

Tubing subassembly installations missing couplings was shown to be factual. It is a standard installation practice to field route the tubing, install the supports, obtain preliminary location, slope & configuration inspections (from system engineers) and then finally weld the couplings in place after all other installation operations have been performed. This practice eliminates reworking welds and tubing rework. All couplings and welds will be completed before final flushing and hydrotest. Missing or unwelded couplings do not pose problems.

C. All instruments on the unit 2 side of elevation 692 AB were covered. The covers were removed and a visual inspection was performed on all instruments at the entrance to pipe chase. No damage was documented for the system 31 instruments in the concern, but other instruments in all buildings have been damaged. Reference Construction Category Report Number 10500 for further evaluation on the system 31 instruments.

D. The specific instrument damage addressed by concern IN-85-163-003 could not be positively verified, but collective information was available to address the generic problem of instrument damage.

The Instrument Engineering Unit (IEU) maintains a Missing Instrument List (MIL) which documents not only missing instruments, but damaged instruments also. Any instrumentation discovered to be damaged is repurchased and placed in storage. The instruments will be reinstalled just before system transfer.

Conclusion

A. Damage to instrument lines has been a costly problem for ONP and DNC. DNC has initiated programs to preclude instrument line damage. A specific example of tube damage was identified. The issue was factual and presented a problem for which corrective action had been, or was being, taken as the result of an evalution.

B. No radiation monitoring lines within unit 1 security boundary on elevation 713 of AB were found uncoupled. No information was gained from the evaluation process to conclude any functional radiation monitoring line had been uncoupled.

Tubing installed without couplings being installed is factual but presents no problem. It is a standard installation practice designed to minimize weld and tubing rework. The issue was not factual.

C. No damage to system 31 instruments was found. Surveillance of damage to equipment is covered by QCI-1.36 and QCP-1.36 on "Storage and Housekeeping." The issue was not factual.

D. Because of the limited information supplied in concern IN-85-163-003, the specific case of a damaged temperature device in the WBN TB could not be evaluated. The issue was not factual.

Damage to instruments in all buildings has been documented. Damaged instruments are repurchased, but not reinstalled, until just before system transfer to ONP to minimize the chance for damage.

4.9.2.2 SQN

Discussion

The review of WBN ECTG Element Report, Instrumentation Tubing/Instruments (C015109), revealed that DNC had initiated programs designed to decrease the frequency of instrument line damage, but the ONP at WBN does not have a program that addresses this issue. The need for a program to communicate to employees the need to limit the amount of instrument line damage was what made these concerns generic to SQN.

The interviews with SQN Instrumentation Maintenance Unit personnel revealed that instrument line damage was not a problem. These discussions also revealed that there was no specific training program in place to address instrument line damage prevention.

Walkdown tours were made on elevations 669, 690, and 734 of the AB observing approximately 800 instrument tubes. None of the instrument tubes observed were damaged.

The review of Standard Practice SQMZ, "Maintenance Management System," Revision 18, revealed that any plant personnel may report the need for plant corrective maintenance or repair work. This may be done by filling out an MR form.

Conclusion

The observations of instrument lines at SQN revealed no problem with instrument line damage nor did the

interviews reveal a problem. There was no specific training program in place at SQN addressing the prevention of damage to instrument lines and a need for such a program was deemed not necessary. The issue was not factual.

4.9.2.3 BFN

Discussion

The review of WBN ECTG Element Report, Instrumentation Tubing/Instruments (CO15109), revealed that DNC had documented instrument line damage and the ONP at WBN did not have a program that addressed this issue. The need for a program to communicate to employees the need for instrument line damage prevention was what made these concerns generic to BFN.

The interviews with knowledgeable BFN Instrumentation Maintenance Unit personnel revealed that instrument line damage was not a problem. These discussions also revealed that there was no specific training program in place to address instrument line damage prevention.

Walkdown tours were made in the TB and RB observing approximately 150 instrument tubing assemblies. None of the tubing assemblies were damaged.

Interviews with training personnel revealed there was a training program titled "Rod Gallery Familiarization." The purpose of this training was to ensure that a majority of Trades and Labor and engineering personnel who enter the rod gallery, for any reason, have received the appropriate training concerning delicate instrument tubing, electrical cables and connectors. This will help prevent unnecessary damage to undervessel instrumentation while other maintenance work is underway. This course also informed the people of what course of action should be taken in the event of damage to any equipment.

Conclusion

Tubing damage was found to not be a problem at BFN. There was no specific training program in place at BFN to prevent damage to instrument lines and a need for such a program was deemed not necessary. The issue was not factual.

4.9.2.4 BLN

Discussion

Review of BNP-QCP-4.3, revision 13 revealed specific routing parameters designed to prevent any tubing from being installed in unprotected environments if possible. Review of BNP-QCP-6.20 revealed that protection of flex hoses would be required where obvious vulnerability to damage would be present and that protective barriers should be fabricated in accordance with DNE approved drawings.

Review of BLN Employee Awareness Bulletins dated January 1985 through August 1986, provided one instance where instrument tubing damage prevention was emphasized, citing cost of replacement of tubing and/or flex hoses.

Complete review of BLN unit 1 Outstanding Work Items List Master Status Report provided two instances of damaged instrument tubing requiring replacement. No flex hose assembly damage appeared in the status report.

Mechanical Engineering Unit, Instrument Engineering Unit, Electrical Engineering Unit, and Flush Engineering Unit training coordinators were contacted and provided interviewer with a current record reflecting the training status for BNP-QCP-6.20. All engineering personnel involved in flex hose installation were trained to the current procedure revision.

Review of the instrument craft training module provided numerous examples of detailed installation sketches showing "preferred" practices for tube routing and support configurations emphasizing tubing and flex hose protection to minimize accidental damage.

Discussions were held with individuals knowledgable in the field of tubing and flex hose installation. The consensus opinion among all interviewees is that tubing damage does exist, that it is an ongoing problem, but installation methods and awareness programs are in place to preclude, but not obviate accidental damage. Areas where repetitive damage occurred have been surveyed by the Instrument Engineering Unit and tubing has been rerouted out of or around high-traffic areas. Where rerouting would not be feasible, temporary and/or permanent protective devices were installed and periodically monitored to ensure damage did not exist. Flex hose damage is, from all available information, not a problem. Section 6.2.6 of BNP-QCP-6.20, revision 5, directs Instrument Engineering Unit to provide protection devices for hose assemblies susceptible to damage. No hose assemblies have required replacement. BNP-QCP-6.20, revision 5 provides inspection criteria that requires all flex hoses to be inspected twice, once at installation and once again immediately before system tentative transfer.

Walkdowns covering RB 1, AB and CB, high-traffic areas and AB pipe chase areas A24, A25 and A26 were performed. One area in AB where instrument tubing was vulnerable to damage was observed to have obvious damage to one line out of ten lines on the same routing path. The damage appeared to be caused by someone crawling over the tubing bank to reach an otherwise inaccessible area. Conversations with responsible Instrument Engineer concluded that he was aware of the situation and protective devices were now being fabricated to alleviate potential damage to all of the tubing in that path. Overall, protective devices, caution signs, periodic preventive maintenance walkdowns, training sessions and awareness programs have proven to be effective in minimizing accidental damage to tubing and flex hose assemblies.

Review of the NCR Logs revealed four instances where instrument tubing was damaged and had to be replaced over a two-year period.

Conclusion

The concensus opinion among all interviewees was that instrument tubing damage is an ongoing problem, but minimal, considering the quantities of tubing assemblies installed throughout the plant.

Procedural training for engineers, inspectors, flushing unit personnel and craft was documented. Detailed training modules are available to craft personnel showing "preferred" methods of tubing and flex hose installation. Safety precautions consisting of barriers, caution signs and protective devices such as tube tracks and panel covers and awareness programs are all emphasized and are highly visible throughout the power house.

To date, damage to tubing has been kept to a minimum because of the emphasis on installation methods and the extra care taken to prevent damage after each component is installed. The issue was factual and identified a problem, but corrective action for the problem was initiated before the evaluation of the issue was undertaken.

4.10 Findings on Valves

4.10.1 Generic

Nonapplicable

4.10.2 Site Specific

4.10.2.1 WBN

Discussion

From a review of and concurrence with the referenced NSRS reports, the following conclusions were reached.

A. For the perceived problem of valve damage caused by the use of a pry bar to manually operate the valve, the facts were concluded to be that two valves sustained damage as a result of using a pry bar to forcefully operate them.

After the employee concern was voiced, the valve damage was identified and repaired by means of MRs. These repairs were viewed as routine maintenance, and the results of the inspection

gave no indication of a nonconforming condition. The concern was deemed factual, but no further corrective action is required.

B. For the perceived problem of valve damage caused by ERCW mortar flakes, an extensive investigation was performed by NSRS of the entire ERCW system because of this and other related concerns. This investigation included reviews of maintenance requests, drawings, test packages, and interviews with a number of individuals responsible for ERCW installation, maintenance, and repair. This investigation did not identify any valves that had been damaged from mortar flakes from the pipe lining. However, enhanced inspection requirements for the ERCW lines are being implemented by means of Special Maintenance Instruction 67.1 to ensure detection of any lining deterioration occurring in the future. No condition adverse to quality was identified.

Conclusion

A. Two valves were damaged by the use of a pry bar. The repairs were considered routine maintenance and no condition adverse to quality was identified. The issue was factual and presented a problem for which corrective action had been, or was being taken, as a result of an evaluation.

B. No damage to ERCW piping or valves from pipe lining mortar was found. The issue was not factual.

5.0 COLLECTIVE SIGNIFICANCE

5.1 Significance of Each Issue

5.1.1 No significant problem was found associated with floor drain drainage.

5.1.2 Damage to RB electrical penetration covers was found to have occurred only at WBN. However, the damage was being addressed through the existing program for transferring equipment to ONP control. The issue was nonsignificant.

5.1.3 No evidence was found to indicate electrical equipment had been water soaked. No significance was assigned to this concern.

5.1.4 Water entering conduit at floor level was found to be not factual at this time. No significance was assigned.

Conduit damaged by welding operations in its general area was a factual occurrence which had not been completely evaluated at this time. However, the problem noted was an isolated instance of personnel not implementing the precautionary methods stated in the controlling documents and no significance was assigned.

Heat damaged flexible conduit caused by improper grounding of welding leads was an isolated incident and no significance was assigned.

Removal of concrete from PVC conduit was an isolated incident which posed no significant problem.

5.1.5 Damage to flex hose connections was found to be a problem at WBN. This problem has been addressed by additional employee training and employee awareness bulletins addressing the problem. The issue was significant in that damage was identified. It was indicative of poor work practices utilized by employees and inattension of management personnel to these work practices. However, corrective action had been implemented before the evaluation of the issue.

5.1.6 The use of a different type pipe insulation for two specific areas was not considered to be an acceptable design change. No collective significance was determined for this issue.

5.1.7 No indications were found to conclude damage occurred to cables from poor cable tray housekeeping practices but the poor housekeeping practices were found to be factual. WBN and BLN have increased employee awareness of this issue through training, bulletins, and signs. The issue was significant in that poor housekeeping in cable trays was identified. It was indicative of poor work practices utilized by employees and inattention of management personnel to these work practices. However, corrective action was implemented before the evaluation of the issue.

No significance was assigned to the cutting of the temporary cable through penetration X-54 at WBN unit 2.

5.1.8 Damaged pipe caused by wrapping welding leads or electrical cords around the pipe was found to be not factual. No significance was assigned.

Piping system flushing status control at BLN was a significant problem at one time. BLN-OC Management has been effective in revising the controlling procedures and methods to bring the Flushing Unit into compliance with QA and NRC mandated requirements.

5.1.9 Instrument line damage is an ongoing problem at WBN and BLN. Employees have been made aware of this problem through training, awareness bulletins and caution signs posted at the work sites. The issue was significant in that damage was identified. It was indicative of poor work practices by employees and inattention of management personnel to these work practices. However, corrective action had been implemented before the evaluation of the issue.

No radiation monitoring lines were found uncoupled at WBN and no significance was established for this issue.

Missing and damaged instrumentation is an ongoing problem. WBN-OC Management has been effective in minimizing future damage by not installing replacement instruments until just before system transfer. The issue was significant in that damage was identified. It was indicative of poor work practices by employees and inattention of management personnel to these work practices. However, corrective action had been implemented before the evaluation of the issue.

The specific TB temperature device addressed by concern IN-85-163-003 could not be positively identified. No significance was established for this issue.

5.1.10 Two specific valves at WBN were found to have sustained damage from a pry bar used to operate them. The valves were repaired and inspected. This repair was considered to be a maintenance requirement and not as a CAQ. No significance was assigned.

Pipe elbow and valve damage caused by ERCW pipe mortar lining flakes was not found to be factual. No collective significance was determined for this issue.

5.2 Collective Significance of the Subcategory

5.2.1 Generic

The concern areas addressed by this subcategory cover a wide variety of work procedures, policies, craft disciplines, engineering and inspection units and reflect significant problems which required concerted efforts by management and employees to control or at least minimize. Damage to conduit, cable, instrumentation, tubing, flex hoses and pipe

insulation are ongoing construction problems. These problems, for the most part, were due to poor work practices by employees. Safe operation of the plant could conceivably have been compromised if these practices were allowed to continue. However, management has been increasingly effective in initiating programs and revising procedures to preclude Quality Assurance violations and damage to permanent plant equipment. The Employee Involvement Program has provided employees an opportunity to relate problem areas identified during their day-to-day work activities and a way for management to address them in a timely manner. From the evaluations at WBN and the other sites, the problems with damage decrease substantially with the turnover of equipment to ONP with the resultant lessening of construction activity in the area.

5.2.2 Site Specific

5.2.2.1 WBN

Twenty-nine concerns addressed by this subcategory were evaluated at WBN. Of the 29, nineteen were deemed to be factual. Significant problems identified were instrument and tubing damage, conduit and potential cable damage, and insulation damage. Most of the concerns had already been addressed and corrected. Some, as shown in section 4.0, are ongoing construction problems requiring constant surveillance and corrective actions yet to be taken. Training, revisions to procedures, and safety bulletins are being utilized to better inform employees of the necessity of minimizing damage to plant equipment.

5.2.2.2 SQN

No problems were found for the concerns addressed at SQN. No collective significance was assigned.

5.2.2.3 BFN

No problems were found for the concerns addressed at BFN. No collective significance was assigned.

5.2.2.4 BLN

System Flush Status, instrument line damage, and poor cable tray housekeeping were found to have been problems at BLN. Management, the IEU, the FEU, and

the QMO have collectively responded to problem areas and vastly improved procedures and revised installation and test methods have resulted from their actions.

6.0 CAUSE

6.1 Floor Drains

6.1.1 WBN

Equipment failure was concluded to be the cause of the flooded Reactor Building auxiliary floor and equipment drain sump. The Turbine Building flood was caused by a misaligned valve which was immediately corrected. Other floor drain blockages were caused by debris in the drainage system which were corrected as they were identified.

6.1.2 SQN

No floor drain problems were identified at SQN.

6.2 Electrical Penetrations

6.2.1 WBN

Penetration cover damage occurred from ongoing construction activities.

6.2.2 SQN

No problem existed at SQN.

6.3 Electrical Cabinets

6.3.1 WBN

Concern IN-85-328-001 indicating the existence of water soaked electrical equipment was not found to be factual; therefore, a cause has not been assigned.

6.4 Conduit

6.4.1 WBN

A. No problem with water entering conduit at floor level was identified.

B. Unconscientious work practices caused the damage to conduit when welding operations were performed without protecting surrounding equipment.

C. Improper grounding of welding leads was the cause of heat damage to the four flexible conduits.

D. Concrete removal from the PVC conduit did not cause a problem.

6.5 Flex Hose Connections

6.5.1 WBN

Procedures and programs to limit the amount of damage to flex hose were inadequate at the time the concern was expressed.

6.5.2 SQN

There was no problem with flex hose damage at SQN.

6.5.3 BFN

There was no problem with flex hose damage at BFN.

6.5.4 BLN

Protective devices, extensive training, and improved installation methods eliminated potential problems for flex hose connections.

6.6 Insulation

6.6.1 WBN

The suggested insulation type substitution was found to be unacceptable. Since the concern was not factual, no cause was assigned.

6.7 Electrical Cables and Cable Trays

6.7.1 WBN

A. Lack of employee awareness of the need for good cable tray housekeeping was determined to be the cause for this problem.

B. Cutting temporary cables routed through WBN RB penetration X-54 was not a problem, therefore no cause was assigned.

6.7.2 BLN

The cause of poor cable tray housekeeping was determined to be a general lack of employee awareness of the need for good cable tray housekeeping.

6.8 Piping and Pipe Flushing

6.8.1 WBN

Pipe damage from wrapped welding leads or electrical cords was not substantiated, therefore no cause was assigned.

6.8.2 BLN

Inadequate controlling procedures caused the problem of poor system cleanliness status documentation.

6.9 Instrumentation Tubing/Instruments

6.9.1 WBN

A. Procedures and programs to limit the amount of damage to instrument lines were inadequate at the time the concerns were expressed.

B. Since no radiation monitoring lines were found uncoupled, no cause for this concern was determined.

C. No damage to the system 31 instruments was found, therefore no cause was assigned.

D. Damage to a specific temperature device in the TB could not be verified. Damage to instruments in all buildings has been identified. Causes include, but are not limited to, accidental damage during construction and vandalism.

6.9.2 SQN

No problem with instrument line damage at SQN was found, therefore no cause was assigned.

6.9.3 BFN

No problem with instrument line damage at BFN was found, therefore no cause was assigned.

6.9.4 BLN

Accidental damage to instrument tubing was a minimal ongoing problem. Flex hose assembly damage was non-existent.

6.10 Valves

6.10.1 WBN

A. No cause was determined for the damage to valves resulting from the use of a pry bar.

B. No damage to ERCW piping or valves from the mortar lining was found and no cause was assigned.

7.0 CORRECTIVE ACTION

7.1 Floor Drains

7.1.1 WBN

A. The corrective action for concern IN-86-158-005 was as specified by NSRS report I-85-509-WBN. The source of water leakage was identified and the level transmitters are scheduled to be replaced. (CATD 15100-WBN-03)

The line management response was:

The problem will be corrected on ECN 6005 with workplans E6005-1 and 6005-2 before fuel load. Work will begin upon receipt of the mechanical drawings currently scheduled for release on March 15, 1987 and June 1, 1987.

B. There was no futher corrective action required for IN-86-140-001 because, though the flood was verified, the corrective action was carried out immediately by the AUO when he opened the valve.

C. No corrective action was specified for the drains mentioned in concerns IN-85-814-001 and IN-86-158-004 because, short of welding caps on the drains, there is no way to keep debris from getting inside them. This would not be feasible because these drains are required to be operable (for example, in case of floods). At WBN, there was no past history of clogged drains mentioned in the MR log. |R2

7.1.2 SQN

Line management provided the following corrective action.

A design change request (DCR) was initiated on December 12, 1985, to replace existing level transmitters LT-77-125, 126, 410, and 411 with Delta Controls Corporation

type 851 ultrasonic level transmitters. New type transmitters were chosen because of a lack of availability of replacement parts for the other transmitters and for increased reliability. (CATD 15101-SQN-01)

7.2 Electrical Penetrations

7.2.1 WBN

Damage to RB electrical penetrations was to be corrected by DNC through the process of transferring the equipment to ONP control. (CATD 15100-WBN-02)

The line management response was:

Conax Corporation penetration covers will be corrected and inspected prior to transfer of RB2 penetrations (commonly referred to as ZPET) to ONP. This work will transfer to ONP in July 1988. After transfer to ONP occurs, traffic will be reduced and recurrence will be minimized. ONP will then assume maintenance.

7.2.2 SQN

No damage to electrical penetrations existed at SQN, therefore no corrective action was necessary.

7.3 Electrical Cabinets

7.3.1 WBN

No evidence was found to indicate that electrical equipment had been water soaked, therefore no corrective action was necessary.

7.4 Conduit

7.4.1 WBN

A. Water entering conduit at floor level was found to be not factual, therefore no corrective action was necessary.

B. Heat damage to cable insulation from welding or cutting operations occurring close to conduit has been found and cables within one conduit with a discolored spot had not been inspected for damage. Conduit 2-2PM-292-6474-D is one of two locations recommended for cable inspection in NSRS report I-85-679-WBN. The inspection is now the responsibility of WBN Modifications Section. (CATD 15100-WBN-01)

The line management response was:

All cables contained in conduits O-4PLR-292-1383 and 2-2PM-292-6474-D will be pulled out and inspected by DNQA personnel for any damage to the cables. If any damage is found, an NCR will be written to document the damage and to initiate corrective action. The cable pull out and inspection activities for cables in conduit O-4PLR-292-1383 will be handled on MR A596114 by DNC Modifications. The cable pull out and inspection activities for cables in conduit 2-2PM-292-6474-D will be handled on workplan FB001MB by DNC electrical engineering unit.

C. Damage to four flexible conduits from improper grounding of a welding lead was repaired by Maintenance Request A-477393. The proper method of grounding welding leads was covered in the March 31, 1986 Construction Safety meetings. No further corrective actions are required.

D. The incident of concrete removal from PVC conduit did not create an unacceptable final condition, therefore no corrective action was necessary.

7.5 Flex Hose Connections

7.5.1 WBN

DNC had taken corrective action on flex hose damage due in part to June 1985 INPO findings. The specific example in concern IN-85-449-001 had been corrected. QCI-1.36, Revision 13, Storage and Housekeeping included revisions requiring the Construction Superintendent's Office to perform monthly surveillance of flex hose installations. Caution signs were posted to inform employees of potential flex hose damage. Added protection had been placed around some vulnerable installations. Employees have been informed of potential flex hose damage through Safety Bulletins. No further corrective actions are deemed necessary.

7.5.2 SQN

Damage to flex hoses was not a problem at SQN, therefore, no corrective action was necessary.

7.5.3 BFN

Damage to flex hose was not a problem at BFN, therefore, no corrective action was necessary.

7.5.4 BLN

Construction at BLN has emphasized flex hose protection to employees through Awareness Bulletins and comprehensive employee training.

7.6 Insulation

7.6.1 WBN

The suggested change of pipe insulation type was found to be unacceptable, therefore, no corrective action was necessary.

7.7 Electrical Cables and Cable Trays

7.7.1 WBN

A. To correct poor housekeeping of cables and cable trays, DNC employees were retrained on WBN-QCI-1.36 and on proper protection of cable trays during construction. No further corrective actions are required.

B. Cutting of temporary cable run through RB penetration X-54 was not a problem, therefore no corrective action was required.

7.7.2 BLN

Poor housekeeping of cable trays was corrected by implementing a program for cleaning and inspecting cable trays, and informing employees about proper cable tray housekeeping. Employees were informed by signs posted at strategic project and building entrances, a memorandum to all employees, and an article within the weekly Safety Bulletin. No further actions are required.

7.8 Piping and Pipe Flushing

7.8.1 WBN

Pipe damage from wrapped welding leads or electrical cords was not a problem. Therefore, no corrective action was required.

7.8.2 BLN

The cause of poor status control on BLN flushed pipe systems was inadequate procedures. The corrective action taken was to revise BNP-CTP-4.4 and 6.1. No further corrective actions are required. (CATD 15100-BLN-01)

The line management response was:

BNP-CTP-4.4 R3 and BNP-CTP-6.1 R7 have been approved. No further action required.

7.9 Instrumentation Tubing/Instruments

7.9.1 WBN

A. DNC has initiated programs to minimize the amount of instrument line damage. DNC has placed signs, added a surveillance program, added protection for vulnerable lines, informed employees through Safety Bulletins and a Newsletter, and initiated the Employee Involvement program. These items were viewed as an adequate response for addressing the problem of instrument line damage. (CATD 15100-WBN-04)

The line management response was:

The damaged tube (subassembly 2-043-L232B-0004) in unit 2, accumulator 4 room will be reworked to meet DNE requirements on workplan GA043LB. Workplan GA043LB will be completed for system transfer boundary Z043 (00).

B. No radiation monitoring lines were found uncoupled, therefore no corrective action was necessary.

C. The specific instruments were inspected and no damage was documented. No corrective actions are required.

D. Protective devices, employee awareness training and installation schedule revisions have been implemented in an attempt to minimize instrument damage. No further corrective actions are deemed necessary at this time.

7.9.2 SQN

No problem of instrument line damage was found at SQN, therefore no corrective action was necessary.

7.9.3 BFN

No problem of instrument line damage was found at BFN, therefore no corrective action was necessary.

7.9.4 BLN

The ongoing minimal problem of instrument line damage has required collective attention to further reduce the amount of damage. DNC has informed employees through Awareness Bulletins, caution signs, and training sessions. Protective devices were being used and periodic preventive maintenance walkdowns were being performed. No further corrective action is considered necessary.

7.10 Valves

7.10.1 WBN

A. Two valves damaged by the use of a pry bar were repaired through MRs. No further corrective action was considered necessary.

B. No damage to ERCW piping or valves from pipe mortar lining was found, therefore no corrective action was required.

8.0 ATTACHMENTS

8.1 Attachment A, Subcategory Summary Table

8.2 Attachment B, List of Evaluators

8.3 Attachment C, List of Concerns by Issue

ATTACHMENT A

REFERENCE - ECPS131J-ECPS131C
FREQUENCY - REQUEST
OWP - ISSS - RWM

TENNESSEE VALLEY AUTHORITY
OFFICE OF NUCLEAR POWER
EMPLOYEE CONCERN PROGRAM SYSTEM (ECPS)
LIST OF EMPLOYEE CONCERN INFORMATION

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
EX-85-088-001 T50192	CO	151	WBN	N	N	N	Y	REPORT	NO	SOFT INSULATIONS THAT ARE FREQUENTLY WALKED ON SHOULD BE REPLACED WITH CALCIUM SILICATE INSULATION. LOCATION EXAMPLE: ELEV. 692 IN THE PIPE GALLERY, AND THE SEWAGE TREATMENT PLANT. CONSTRUCTION DEPT. CONCERN. CI HAS NO ADDITIONAL INFORMATION.	1.2.6, 2.1.6, 2.3.6, 3.2.6, 4.6.1, 4.6.2, 5.1.6, 6.6, 7.6
HI-85-069-N05	CO	151	WBN	N	N	N	Y	REPORT	SR	NRC IDENTIFIED THE FOLLOWING CONCERN FROM REVIEW OF QTC FILE. "TUBING HUNG BUT COUPLINGS NOT INSTALLED."	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9
IN-85-119-002 T50065	CO	151	WBN	Y	Y	Y	Y	REPORT	SR	INSTRUMENTATION LINES DAMAGED, BENT, FLATTENED AND TOUCHING. THEY ARE LOCATED IN ELECTRICAL RACEWAY IN THE REACTOR BUILDING AT EL. 702, UNIT 1. C/I STATED "JUST WALK THROUGH THE POWER BLOCK AND YOU CAN SEE ALL TYPES OF DAMAGED INST. TUBING."	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9
IN-85-119-003 T50019	CO	151	WBN	N	N	N	Y	REPORT	SR	WBNP UNIT 1, RADIATION MONITORING LINES UNCOUPLED ON CEILING AT ABOUT 730' ELEVATION	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

2446T

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-138-005 T50235	CO	151	WBN	N	N	N	Y	REPORT	NO	CABLE COMING OUT OF UNIT 2, PENETRATION 54, WAS INTENTIONALLY CUT BY UNKNOWN PERSONS AND USED TO TIE UP WELDING LEADS AND DROP CORDS FOR LIGHTS. IT WAS NECESSARY TO REWORK THE CABLE. INCIDENT OCCURRED IN FEB. OR MARCH 1985. CONSTRUCTION DEPARTMENT CONCERN. CI HAS NO FURTHER INFORMATION. NO FOLLOW UP REQUIRED.	1.2.7, 2.1.7, 2.3.7, 3.2.7, 4.7.1, 4.7.2, 5.1.7, 6.7, 7.7
IN-85-163-003 T50088	CO MP	151 715	WBN	N	N	N	Y	REPORT	NO	TEMPERATURE DEVICE IN THE TURBINE BUILDING REPEATEDLY BROKEN BY HEAVY TRAFFIC; WAS REPORTED TO FOREMAN (NAME GIVEN); AFTER THREE WEEKS, NO CORRECTIVE ACTION TAKEN TO FIX TEMP. DEVICE. CI DOES NOT HAVE ANY ADDITIONAL INFORMATION.	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-198-001 T50156	CO	151	WBN	N	Y	N	Y	I-85-535-WBN REPORT	SR	CABLE TRAYS ARE LEFT UNCOVERED, USED AS WALKWAYS BY CRAFT PERSONNEL AND SUBJECTED TO DAMAGE FROM WELDING OPERATIONS DUE TO BEING LEFT UNCOVERED. CI WOULD NOT PROVIDE ANY ADDITIONAL DETAILS/SPECIFICS, CONSTRUCTION DEPT. CONCERN. NO FOLLOW UP REQUIRED.	1.2.7, 2.1.7, 2.3.7, 3.2.7, 4.7.1, 4.7.2, 5.1.7, 6.7, 7.7
IN-85-221-001 T50008	CO	151	WBN	N	N	N	Y	IN-85-221-001 REPORT	SR	IMPROPER VALVE OPERATION, 2 INCH STAINLESS STEEL VALVE ON THE 692 FOOT ELEVATION NEAR STAIRWAY, A 4 FOOT PRY-BAR (CHEATER) WAS USED TO OPERATE THE 2 INCH S.S. VALVE, VALVE AND/OR PIPE TO VALVE APPEARS TO BE DAMAGED. LOCATION IN UNIT #2.	1.2.10, 2.1.10, 2.3.10, 3.2.10, 4.10.1, 4.10.2, 5.1.10, 6.10, 7.10

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2446T

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-328-001 T50008	CO	151	WBN	N	N	N	Y	REPORT	SR	SYSTEMS ARE BEING FLUSHED AND HOSES ARE NOT USED TO COLLECT WATER CAUSING ENERGIZED ELECTRICAL CABINETS AND OPEN CONDUITS TO BE SOAKED. THIS OCCURRED IN UNIT 2 PIPE CHASE ROOM EL 713.	1.2.3, 2.1.3, 2.3.3, 3.2.3, 4.3.1, 4.3.2, 5.1.3, 6.3, 7.3
IN-85-346-002 T50026	CO	151	WBN	N	N	Y	Y	K-FORM	SR	ELECTRICAL PENETRATIONS GOING INSIDE REACTOR #2 ARE FLIMSY SHEET METAL, AND ARE WALKED ON AND DAMAGED. LOCATION 716' ELEVATION.	1.2.2, 2.1.2, 2.3.2, 3.2.2, 4.2.1, 4.2.2, 5.1.2, 6.2, 7.2
IN-85-396-001 T50017	CO	151	WBN	N	Y	N	Y	REPORT	SR	ELECTRICAL CABLES ARE NOT COVERED PROPERLY TO PROTECT THEM BEFORE WELDING OCCURS OVERHEAD. UNIT #2 REACTOR.	1.2.7, 2.1.7, 2.3.7, 3.2.7, 4.7.1, 4.7.2, 5.1.7, 6.7, 7.7

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-449-001 T50034	CO	151	WBN	Y REPORT	Y	Y	Y		SR	ALL CRAFTS & ENG. PER. SHOULD BE TRAINED ON THE PROTECTION OF FLEX HOSE CONNECTIONS. AFTER INSTRUMENTATION FITTERS INSTALL AND INSPECTION BY-OFF, OTHER PERSONNEL WALK, CLIMB & DISFIGURE THE ASSY. THIS AFFECTS THE ABILITY THE FLEX TO OPERATE AS REQUIRED PER DESIGN. EXAMPLE SYS #63 ELE. 717' 4' E OF ALL 10' S OF W IT IS POSSIBLE THAT REPAIRS HAVE BEEN MADE BUT NOT VERIFIED.	1.2.5, 2.1.5, 2.3.5, 3.2.5, 4.5.1, 4.5.2, 5.1.5, 6.5, 7.5
IN-85-618-004 T50059	CO	151	WBN	Y REPORT	Y	Y	Y	I-85-212-WBN	SR	INSTRUMENT TUBING, UNIT 2, ACCUMULATOR #4 AREA, IS BEING SEVERELY DAMAGED BY CRAFT PERSONNEL AS THE RESULT OF SUBSEQUENT CONSTRUCTION ACTIVITIES. SOME FORM OF TUBING PROTECTION SHOULD BE PROVIDED.	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9

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CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-814-001 T50071	CO	151	WBN	N	N	N	Y	REPORT	SR	UNITS 1 & 2, FLOOR DRAINS IN ALL BUILDINGS (ESPECIALLY IN REACTOR AND TURBINE BUILDINGS) WERE NOT ADEQUATELY PROTECTED (LEFT UNCOVERED) DURING CONSTRUCTION ACTIVITIES. THIS CAUSED FLOOR DRAINS TO BECOME FILLED WITH DEBRIS (NUTS, BOLTS, WELD ROD, LITTER) AND CEMENT FROM VARIOUS POURS/ PLACEMENTS. C/I DID NOT KNOW ANY SPECIFICS OR LOCATIONS. NO FURTHER INFORMATION IN FILE.	1.2.1, 2.1.1, 2.3.1, 3.2.1, 4.1.1, 4.1.2, 5.1.1, 6.1, 7.1
IN-85-935-001 T50096	CO CO	109 151	WBN	N	Y	N	Y	REPORT	SR	CI STATES THAT 70% to 75% OF THE CABLE INSTALLED IS BAD AND IT SHOULD BE REPLACED. WHEN THE CABLE WAS INSTALLED, PRESSURE BY SUPERVISORS CAUSED PRODUCTION NOT QUALITY. CABLE WAS PULLED WITHOUT PROPER EQUIPMENT. BEND RADUS WAS VIOLATED AND PULLING PROCEDURE WAS NOT FOLLOWED. AFTER CABLE WAS IN PLACE, IT WAS NOT PROTECTED AND WAS DAMAGED FURTHER BY CONSTRUCTION (UNIT 2) FOLLOW UP REQUIRED.	1.2.7, 2.1.7, 2.3.7, 3.2.7, 4.7.1, 4.7.2, 5.1.7, 6.7, 7.7

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

2446T

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-85-962-001 T50245	CO	151	WBN	N	N	N	Y	REPORT	SR	15-20 INSTRUMENTS (SOME CHILLERS) ARE DAMAGED OR NEED TO BE REPLACED, 692' ELEV., (NO "25" TEST) SYSTEM 31, UNIT #2, AUX. BLDG. (ENTRANCE TO PIPE CHASE). THESE INSTRUMENTS WERE INSTALLED 1980, BUT NEVER DOCUMENTED AS INSTALLED. CREDIT FOR INSTALLATION IS CURRENTLY BEING GIVEN TO JUSTIFY OVERSTAFFING. CI DECLINED TO PROVIDE FURTHER INFORMATION. CONSTRUCTION DEPARTMENT CONCERN.	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9
IN-86-140-001 T50126	CO	151	WBN	N	N	N	Y	REPORT	NO	ON 8-20-85, UNIT 2 TURBINE BLDG FLOODED, BUT NO ONE COULD DETERMINE WHY: SOURCE OF WATER COULD NOT BE IDENTIFIED, AND CAUSE OF APPARENTLY BLOCKED FLOOR DRAINS. COULD NOT BE DETERMINED. (HAPPENED 4-5 AM). 2" DRAINS PUMPS COULD NOT KEEP UP WITH FLOW, AND ENTIRE 692' ELEV WAS COVERED 2" TO 3". CONSTRUCTION DEPT CONCERN. CI HAS NO ADDITIONAL INFORMATION.	1.2.1, 2.1.1, 2.3.1, 3.2.1, 4.1.1, 4.1.2, 5.1.1, 6.1, 7.1

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CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-158-001 T50180	CO	151	WBN	N K-FORM	N	N	Y		SR	CONDUITS IN BOTH UNITS HAVE WATER RUNNING THROUGH THEM, INCLUDING CONTROL PANELS. WATER THAT IS RELEASED ON THE FLOOR DURING FLUSHING, CLEANING ETC., WILL ENTER CONDUITS THAT ARE EVEN WITH FLOORS SURFACE. MANY CONDUITS ARE NOT PLUGGED. C/I STATES THE WATER WILL FLOW THROUGH THE CONDUITS TO THE CONDUITS TO THE CONTROL PANELS. (CONSTRUCTION DEPT. CONCERN) UNITS #1 AND 2. C/I HAS NO FURTHER INFORMATION.	1.2.4, 2.1.4, 2.3.4, 3.2.4, 4.4.1, 4.4.2, 5.1.4, 6.4, 7.4

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	OTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-158-002 T50180	CO EN	151 233	WBN	N K-FORM	N	N	Y		SR	THE INTAKE LINES FROM THE PUMPING STATION WERE GROUTED BACK IN 1981/ 1982. SOME OF THIS GROUT IS FALLING LOOSE, WHICH COULD DAMAGE OR STOP THE PUMPS. (CONSTRUCTION CONCERN). C/I STATED THAT "HUNKS OF CONCRETE 6" OR 8" IN DIAMETER ARE IN THE INTAKE LINE FROM THE PUMP STATION". CONCRETE DEBRIS HAS BEEN ENTERING AUX BUILDING @ 737' AND DAMAGING THE BUTTERFLY VALVES. CONST. DEPT. CONCERN. C/I HAS NO FURTHER INFORMATION.	1.2.10, 2.1.10, 2.3.10, 3.2.10, 4.10.1, 4.10.2, 5.1.10, 6.10, 7.10
IN-86-158-004 T50129	CO	151	WBN	N REPORT	N	N	Y	IN-86-158-004	SR	FLOOR DRAINS IN THE BOTTOM OF THE REACTOR BUILDING ARE STOPPED UP, AND PAINT HAS BEEN POURED IN THESE DRAINS. CONSTRUCTION CONCERN. CI HAS NO ADDITIONAL INFORMATION.	1.2.1, 2.1.1, 2.3.1, 3.2.1, 4.1.1, 4.1.2, 5.1.1, 6.1, 7.1
IN-86-158-005 T50129	CO	151	WBN	N REPORT	N	Y	Y	I-85-509-WBN	SR	ON THE REACTOR BUILDING FLOOR, THERE ARE CONDUITS THAT ARE NOT PLUGGED, YET THERE IS ALWAYS WATER BACKED UP ON THIS FLOOR. CONSTRUCTION CONCERN. CI HAS NO ADDITIONAL INFORMATION.	1.2.1, 2.1.1, 2.3.1, 3.2.1, 4.1.1, 4.1.2, 5.1.1, 6.1, 7.1

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-158-007 T50179	CO	151	WBN	N	N	N	Y REPORT	I-85-679-WBN	SR	WELDERS HAVE MADE WELDS AND CUTS VERY CLOSE TO CONDUIT. THE CONDUIT CONTAINED CABLE WHICH EXPERIENCED HIGH TEMPERATURES. THE CABLE INSULATION WAS POSSIBLY DAMAGED. LOCATION GIVEN WAS THE AUX. BUILDING. NO FURTHER SPECIFICS COULD BE GIVEN. DISCOLORED AREAS ON THE CONDUIT WOULD IDENTIFY THE PROBLEM SPOT. C/I HAS NO FURTHER INFO. CONST. CONCERN. UNIT 1 AND UNIT 2.	1.2.4, 2.1.4, 2.3.4, 3.2.4, 4.4.1, 4.4.2, 5.1.4, 6.4, 7.4
IN-86-169-001 T50123	CO	151	WBN	N	N	N	Y REPORT	I-85-474-WBN	SS	A PIECE OF FLEXIBLE CONDUIT HAS EXTENSIVE HEAT DAMAGE. LOCATION: AUX BLDG, EL 713', 6' EAST OF A12, 3' SOUTH OF V LINE. CI HAS NO ADDITIONAL INFORMATION. CONST. CONCERN/ELECT. CRAFT. TIME FRAME UNKNOWN.	1.2.4, 2.1.4, 2.3.4, 3.2.4, 4.4.1, 4.4.2, 5.1.4, 6.4, 7.4

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CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-198-002 T50125	CO SF	151 909	WBN	N REPORT	N	N	Y	IN-86-198-002	NO	"NEEDLE BEAMS" (4"-6" HORIZONTAL BEAMS SUPPORTED BY CABLES ATTACHED TO THE OVERHEAD, USED TO SUPPORT SCAFFOLDING) SHOULD BE LEFT INTACT WHEN WRECKING SCAFFOLDING. REMOVING AND REINSTALLING THESE BEAMS IS HAZARDOUS TO CRAFT (KNOWN) AND CAUSES DAMAGE TO INSTRUMENT LINES AND OTHER EQUIPMENT IN THE AREA. CONST. DEPT. CONCERN. CI HAS NO FURTHER INFORMATION. NO FOLLOW UP REQUIRED.	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9
IN-86-200-006 T50130	CO	151	WBN	Y REPORT	Y	Y	Y		SR	COPPER AND STAINLESS INSTRUMENTATION TUBING IS UNPROTECTED. TUBING SPANS BETWEEN HANGERS ARE BENT. OCCURS THROUGHOUT UNITS 1 AND 2. CONST. DEPT. CONCERN. CI HAS NO ADDITIONAL INFORMATION. NO FOLLOW UP REQUIRED.	1.2.9, 2.1.9, 2.3.9, 3.2.9, 4.9.1, 4.9.2, 5.1.9, 6.9, 7.9

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

2446T

CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-205-001	CO	101	WBN	N	N	N	Y	I-85-598-WBN	SR	ERCW (3" INTAKE) PIPELINES ARE UNSUITABLE FOR SERVICE. ALL FOUR LINES WERE SUBJECTED TO STRESS DURING ORIGINAL BACKFILLING WITH IMPROPER METHODS (UNCONTROLLED DUMPING) DURING ORIGINAL INSTALLATION; ABOUT 1976. LATENT STRESS BECAME EVIDENT WHEN PIPE WAS EXCAVATED AND CUT FOR MORTAR LINING IN ABOUT 1982. BECAUSE THE PIPE MOVED UP TO 8" WHEN CUT. PIPE REQUIRED EXCESSIVE FORCE TO RE-INSTALL SECTIONS THAT HAD BEEN REMOVED. PRESENT LATENT PIPE STRESS LEVELS ARE NOT KNOWN. ALTHOUTH PIPE WAS CLEANED THOROUGHLY BEFORE BEING LINED WITH MORTAR, THE MORTAR WAS SEEN TO BE STILL WET AND WAS ALREADY FALKING OFF WHEN THE PIPE WAS BEING RECONNECTED. PIPE WAS HYDROSTATICALLY TESTED IN SHORT SECTIONS, THEN AFTER INSTALLATION MUCH OF THIS PIPE WAS TESTED SEVERAL TIMES AT 600 PSI AND COULD HAVE BEEN DAMAGED.	1.2.10, 2.1.10, 2.3.10, 3.2.10, 4.10.1, 4.10.2, 5.1.10, 6.10, 7.10
T50148	CO	151		REPORT							
	CO	171									

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CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
IN-86-259-003 T50149	CO	151	WBN	N	N	N	Y	I-85-581-WBN REPORT	SR	PVC CONDUITS IN THE DIESEL GEN. BLDG., 741' LEVEL ARE BADLY BROKEN. CONCRETE WAS CUT OUT OF 5" CONDUITS WITH ONLY A 3" HEAD, LEAVING SHARP OBJECTS REMAINING IN THE CONDUIT. CONSTRUCTION DEPT. CONCERN. CI HAD NO ADDITIONAL INFORMATION. NO FOLLOW UP REQUIRED.	1.2.4, 2.1.4, 2.3.4, 3.2.4, 4.4.1., 4.4.2, 5.1.4, 6.4, 7.4
OW-85-007-008 T50224	CO CO	151 192	WBN	N	Y	N	Y	REPORT	SR	WATTS BAR HAS HAD TOO MANY INSTANCES OF UNCRAFTSMAN-LIKE ELECTRICAL WORK, INCLUDING POORLY BENT AND INCOMPLETELY SCREWED TOGETHER CONDUIT (AUXILIARY BLDG), AND CABLES DAMAGED DUE TO SLAG FROM WELDING OPERATIONS OVERHEAD (TURBINE BLDG, ELEV. 729'). NO SPECIFIC LOCATIONS OR UNIT NUMBERS KNOWN. CONSTRUCTION DEPT. CONCERN. CI HAS NO FURTHER INFORMATION. NO FOLLOW UP REQUIRED.	1.2.7, 2.1.7, 2.3.7, 3.2.7, 4.7.1, 4.7.2, 5.1.7, 6.7, 7.7

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CATEGORY: CO CONSTRUCTION-PROCESS SUBCATEGORY: 151 DAMAGE

CONCERN NUMBER	CAT	SUB CAT	PLT LOC	GENERIC APPL B F	B L	S Q	W B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION	REFERENCE SECTION # CATEGORY - CO SUBCATEGORY - 151
OW-85-007-009 TS0225	CO	151	WBN	N	N	N	Y	REPORT	SR	STAINLESS STEEL PIPING HAS BEEN ABASED BY HAVING ENERGIZED ELECTRICAL CORDS AND WELDING LEADS WRAPPED AROUND THEM. AN EXAMPLE IS A STRAIGHT HORIZONTAL RUN OF 6" STAINLESS STEEL PIPE IN AUXILIARY BLDG WHICH WAS WRAPPED WITH ENERGIZED WELDING LEADS SO THAT NO ONE WOULD TAKE THE WELDING LEADS. THE CI HAS NO FURTHER INFORMATION. CONSTRUCTION DEPARTMENT CONCERN. NO FOLLOW UP REQUIRED.	1.2.8, 2.1.8, 2.3.8, 3.2.8, 4.8.1, 4.8.2, 5.1.8, 6.8, 7.8
QCP10.35-8-36	CO	151	BLN	N	Y	N	N	REPORT	SS	BECAUSE OF FEU NOT HAVING A HANDLE ON STATUS OF CLEAN SYSTEMS, THERE COULD BE SYSTEMS WHICH COULD BE CONTAMINATED AND WOULD NOT MEET THEIR INTENDED FUNCTION.	1.2.8, 2.1.8, 2.3.8, 3.2.8, 4.8.1, 4.8.2, 5.1.8, 6.8, 7.8

30 CONCERNS FOR CATEGORY CO SUBCATEGORY 151

CONCERNS ARE GROUPED BY FIRST 3 DIGITS OF SUBCATEGORY NUMBER.

Attachment B

List of Evaluators

Evaluator	Plant Site
Chris A Haerr	WBN, SQN
Guy R. Huff	WBN, SQN, BFN
Charles A. Manning	BLN
Margaret E. Selewski	WBN
Mike B. Shirey	WBN

Attachment C

List of Concerns by Issue

1. Floor Drains

Issue A
IN-86-158-004
IN-86-158-005

Issue B
IN-86-140-001

Issue C
IN-85-814-001

2. Electrical Penetrations

IN-85-346-002

3. Electrical Cabinets

IN-85-328-001

4. Conduit

Issue A
IN-86-158-001

Issue B
IN-86-158-007

Issue C
IN-86-169-001

Issue D
IN-86-259-003

Attachment C

List of Concerns by Issue

5. Flex Hose Connections

IN-85-449-001

6. Insulation

EX-85-088-001

7. Electrical Cables and Cable Trays

Issue A
IN-85-396-001
IN-85-198-001
OW-85-007-008
IN-85-935-001

Issue B
IN-85-138-005

8. Piping

Issue A
OW-85-007-009

Issue B
BNP-QCP-10.35-8-36

9. Instrumentation Tubing/Instruments

Issue A
IN-86-200-006
IN-85-119-002
IN-85-618-004
IN-86-198-002

Issue B
IN-85-119-003
HI-85-069-N05

Attachment C

List of Concerns by Issue

Issue C
IN-85-962-001

Issue D
IN-85-163-003

10. Valves

Issue A
IN-85-221-001

Issue B
IN-86-158-002
IN-86-205-001