



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
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ATLANTA, GEORGIA 30323

Report Nos.: 50-390/93-27 and 50-391/93-27

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Docket Nos.: 50-390 and 50-391

License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: March 29- April 2, 1993 and April 12-16, 1993

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5-6-93  
Date Signed

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### SUMMARY

#### Scope:

This special, announced inspection was performed to examine the licensee's activities and controls implemented for the Corrective Action Program (CAP) Plan for Vendor Information at the 75 percent completion milestone to ensure that CAP elements were completed or properly focused, and to sample installed hardware for proper installation and configuration.

#### Results:

The inspectors determined that, with the exception of the below findings, the Vendor Information Program (VIP) was adequate in identifying and incorporating vendor information into vendor technical manuals (VTM). However, the findings below indicate weaknesses in the program at the 75% completion milestone.

TVA identified the root causes of these problems to be: (1) vendor documents were not considered as documents requiring configuration control; (2) inadequate procedural requirements to govern the receipt, review, distribution, filing, control, maintenance and use of information; and (3) a lack of attention to detail.

The VI CAP was established to resolve and prevent recurrence of problems with vendor information at WBN and to provide reasonable assurance that vendor technical documents for safety-related equipment at WBN are current, complete, and appropriately updated for the life of the plant. The VI CAP was also intended to address NRC concerns identified in GL 83-28 relative to the control of vendor information.

### 3. Vendor Information Program Scope

The inspectors reviewed Revision 4 to the CAP Plan for Vendor Information, dated February 4, 1993, which described the scope of the VI program that included preparing VTMs for Unit 1, common, and Unit 2 equipment necessary for Unit 1 operation. The inspectors also reviewed Revision 3 to the CAP Plan for Vendor Information, dated March 15, 1990.

During review of Revision 4 to the VI CAP, the inspectors noted that TVA clarified the scope of the VIP (for which VTMs will be prepared) to be the Q-List components specifically itemized on the Q-List with the classification "verified safety-related" as of December 1, 1992. The VI CAP revision further limits the scope and excluded RPS equipment and relays from the program, as well as electrical cables, terminal blocks, and piping supports. The inspectors discussed the VIP scope with licensee personnel and expressed concern that VTMs would not be controlled for the RPS and relays. While not controlling VTMs for electrical cables, terminal blocks, and pipe supports appeared to be acceptable, the exclusion of RPS equipment and relays was not. RPS equipment was one of the bases for GL 83-28 and the generic letter specifically identifies the RPS equipment for inclusion in the program scope. Also, vendor information for safety-related relays is used by various plant groups, including NE during development of design change packages and the Customer Group during relay setting and maintenance in safety-related switchgear. Documented industry problems associated with relays combined with the use of uncontrolled vendor information in this area could lead to further problems.

During discussions with the inspectors, licensee personnel clarified the scope of VTM information relative to the RPS to indicate that VTMs for RPS equipment would be developed and controlled after the modifications associated with the redesign of the RPS are completed. Through further discussions with licensee personnel and review of selected controlled VTMs by the inspectors, it was determined that the licensee was controlling VTMs for most relays on the 480V and 6900V safety-related shutdown boards. The relays were covered in the VTMs for the shutdown boards. Also, the inspectors noted instances where vendor information for relays associated with specific equipment was included in the controlled VTM for the equipment (for example, intermediate head safety

injection pump). Licensee personnel indicated that clarification of the VIP scope relative to the control of VTMs for RPS equipment and relays would be documented and submitted to the NRC. The inspectors will review the VIP scope further during the VI CAP 100 percent inspection.

As part of the VI CAP and licensee efforts to provide reasonable assurance that plant equipment was installed in accordance with manufacturer or vendor requirements, the licensee developed an IDR Matrix Project. The purpose of the IDR project was to demonstrate that the licensee had a program in place at the time of initial equipment installation to ensure adequate consideration of vendor installation design requirements. The IDR project was the primary basis for the acceptability of plant installations. During review of the IDR report, the inspectors noted that components procured under the NSSS contract and the EDG contract were excluded from the IDR scope. The inspectors questioned licensee personnel concerning these exclusions. The basis given for the exclusions was that all NSSS and EDG equipment was installed under the guidance and supervision of onsite vendor personnel whose responsibilities included assuring compliance with vendor requirements. The inspectors expressed concern that NSSS equipment was excluded from the IDR scope, since the VI CAP was based in part on a NRC violation involving vendor installation requirements not being followed during installation of a NSSS component (390/89-25-01). The inspectors further questioned whether the licensee's efforts provided reasonable assurance that plant equipment was installed in accordance with vendor requirements, since NSSS equipment was not included in the IDR scope.

The inspectors informed licensee personnel that questions concerning the VIP scope relative to the exclusion of RPS equipment and relays, and the exclusion of NSSS equipment from the IDR scope will be identified and tracked as IFI 50-390/93-27-02, Vendor Information Program Scope. This item will be reviewed further during the VI CAP 100 percent inspection.

#### 4. Vendor Information Management Program

The inspectors reviewed the licensee's vendor information control systems to ensure the appropriate use of correct and current vendor information for plant activities. The following procedures governing vendor document controls were reviewed:

- STD-2.10 Vendor Manual Control, Revision 0, SCN 2
- SSP-2.07 Document Control, Revision 4
- SSP-2.08 Controlling Drawings, Revision 7
- SSP-2.10 Vendor Manual/Information Control, Revision 4
- SSP-10.05 Technical Evaluation for Procurement of Materials and Services, Revision 8

SAI-18.01 Assessment Program, Revision 4

SAI-18.02 Processing and Controlling Vendor Manuals, Revision 2

Procedure SSP-2.10 provides the requirements for the vendor manual program and specifically establishes a standardized process for receipt, review, revision, and utilization of vendor manuals and manual-like information. This procedure includes a general requirement that all site organizations send all vendor information to the VMPM for review. The inspectors reviewed the processes by which the VMPM receives, documents, evaluates, and incorporates vendor information into VTMs. The inspectors reviewed working procedures used by VMPM for conducting vendor control activities, data bases used to track vendor information, vendor manual revision requests, and deviation requests.

The inspectors reviewed vendor manual revision request VR-0395 and controlled VTM W120-0570, Westinghouse Supplied Ingersoll-Rand Residual Heat Removal Pumps, located in the NE document control station to ensure that changes were made to the manual as indicated in the VR. This VR was initiated by the plant technical support group to add instructions for assembly and disassembly of vertical motors which have high thrust bearings in the lower portion of the motor. The inspector found that the vendor manual accurately reflected the information contained in the VR.

The inspectors concluded that the licensee's vendor control processes were effective in identifying and incorporating vendor information into VTMs, with the following exceptions:

- Three undated and unapproved desk instructions developed by PRC Engineering Systems, Inc., a service contractor, detailed the work steps the VMPM (including the TVA staff) utilized to implement SSP-2.10. These procedures described the process for review package development, technical review, and vendor manual revision. These procedures provided specific detail of the vendor manual development process including technical review criteria, documentation (forms), database information input and tracking, instructions for forcing revisions to related VTMs, etc. After questions were raised by the inspectors concerning use of the desktop instructions, licensee personnel added a cover sheet for review and approval of revisions to the desktop instructions by the VMPM. The instructions will continue to be informal. This issue will be identified as IFI 390/93-27-03, Vendor Program Procedure Review, pending further review by the NRC staff.
- Procedure SSP-2.10 did not specify any minimum time for processing information received from a vendor or site personnel that potentially affected VTMs (e.g., performing the engineering evaluation, preparation, and issuance of a VTM revision as appropriate). Vendor information received by the VMPM from the purchasing group or other sources was placed on a list which was reviewed for applicability each time a VTM was issued. If the

information was subsequently incorporated into a VTM it was removed from the list. However, these items had not been reviewed to determine if they affected currently issued VTDs, the date they had been received by the VMPM group was not documented, and a historical record of receipt and disposition was not retained in the tracking database. In addition, the VMPM group tracking of NER supplied vendor information documents was on an informal database (not controlled by procedure) that did not reflect information such as the current status (open or closed) or the date the item was closed. This will be reviewed further as part of IFI 390/93-27-03, Vendor Program Procedure Review. As a result of questions raised by the inspectors, the licensee revised procedure SSP-2.10 to add time requirements for updating VTMs.

#### 5. Control of Vendor Drawings and Documents

The inspectors reviewed the WBN policy for the use of vendor drawings found in VTMs, and for the updating of VTMs, as specified in SSP-2.10, SSP-6.02, Maintenance Management System, and SSP-7.53, Modification Workplans. The inspectors also selected the following vendor documents to verify that they had been properly and promptly evaluated, processed, and incorporated into VTMs:

- The inspectors reviewed all of the WTBs received and documented by the NER group for 1992 (15 issues). The inspectors noted that all applicable items had been sent to the VMPM for information. The inspectors reviewed WTBs 92-06 and 92-09 further for specific implementation of vendor information controls,
- A vendor's facsimile communication related to the lubrication of ERCW pump motors that was attached to a conditional use form in DCRM records,
- A MKW Power Systems communication recommending periodic surveillance related to SB-0027-1 for the addition of an adapter to correct a thread mismatch at the connection of the EDG governor to a conduit, taken from the closure package for CATDs 24104-WBN-01 and 24104-WBN-02.

The inspectors concluded that the program in place adequately addressed the issues reviewed, with the exception of the following concerns:

- Procedure SSP-2.10 and other WBN procedures prohibit the use of vendor drawings contained in VTMs to perform work and identifies these drawings as for "information only." Only drawings that have been reviewed and approved by TVA engineering and placed in the drawing management system may be use to perform work. However, the inspectors observed that some vendor drawings located in VTMs had not been marked as information only, none were marked with colored ink for clear visibility of the drawing status, and many were also marked with old "engineering reviewed and approved" stamps. Because of the lack of clear and consistent marking of

VTM drawings, combined with the two incidents related to improper control and use of vendor information described below, the inspectors were concerned that vendor drawings were not adequately controlled to prevent improper use. As a result of the concerns raised by the inspectors, the licensee stamped the drawings in the controlled VTMs "information only" in red ink.

WTB 92-09, Failure of Pressurizer Spray Valve Linkage, concerned vibration related valve positioner linkage/fastener failures on pressurizer spray valves. The Westinghouse review concluded that the failures might be traceable to a maintenance activity. The vendor recommended that licensees replace pan-head machine screws with longer screws and secure with locknuts or apply Loctite to the nuts during reassembly. The WBN NER group directed this issue to the plant maintenance organization for action and to the technical support organization and vendor manual program for information.

After a technical review of WTB 92-09, technical support personnel initiated a vendor manual revision request to incorporate the WTB information into the pressurizer spray valve VTM. At the same time, the technical support personnel also issued WR C154491 to implement the recommended corrective action on the valves. Subsequently, WO 93-01709-00 was issued to perform the work in accordance with the WTB; however, the WO did not reference the VTM or an approved vendor drawing for the torque values required to complete the work. Instead, the work order directed that the locking nuts be torqued to the values given in the unapproved WTB. Although work had not been completed for the work order, authorizing work to be performed in accordance with vendor documents that are not part of the approved VTM or approved by NE is not in accordance procedural requirements. Paragraph 2.2.2.C of SSP-6.02 specifies that planners for safety-related WOs are to use information from approved vendor manuals and if needed information is not in the manual use NE approved vendor drawings or other approved design documents. Paragraph 2.3.E of SSP-2.10 specifies that if vendor documentation is needed to support safety-related activities before it can be issued in a VTM it shall be processed as a Class 3 manual (conditional use). Failure to follow procedures SSP-6.02 and SSP-2.10 in authorizing work to be performed on pressurizer spray valves in accordance with vendor information not yet approved by NE and without formal "conditional use" controls is identified as VIO 390/93-27-01, Use of Unapproved Vendor Information.

The licensee issued PER WBP930079 to document this finding and initiate corrective actions. As corrective action, the licensee placed the work order in a hold status until the WTB could be approved; retrained the work order writers to SSP-6.02 and initial training to SSP-2.10; and reviewed 10 additional work orders to

ensure that no other unapproved vendor manuals were used during work order generation. No further examples were identified. The PER was closed on April 12, 1993.

- A program requirement for routinely and periodically contacting vendors as required by GL 83-28 is specified in SSP-2.10, but the full program scope and details are not yet fully defined.

## 6. Vendor Manual Issue and Control

The inspectors reviewed the process and documentation for issuing VTMs to document holders (including by DCRM to the CDSs and by CDSs to individuals) and the control of conditional use (Class 3) manuals.

The issuance of vendor manuals appeared to be well controlled and documented. The receipt of new and revised manuals were being acknowledged in a timely manner and manuals checked out of CDSs were being logged, tracked, and returned in a timely manner. However, several weaknesses and discrepancies were identified in the areas of the control of conditional use manuals, the lack of time constraints on the incorporation of new or revised vendor information, and the periodic assessment of the VTM control system by DCRM.

- A "conditional use" program for vendor manuals which documented the use of draft or unapproved VMs and required a follow-up technical evaluation of any work performed to these manual versions has been in place at WBN for many years. For tracking and closure purposes, WBN has separated the conditional use documentation generated under the previous document control program from that generated under the current program (SSP-2.10). The tracking and closure of conditional use documentation was not consistently maintained at WBN and 117 conditional use forms remained open from the "old" program, many dating back to 1988 and 1989. Although WBN is attempting to evaluate and close these issues, there has been significant difficulty in evaluating the impact of conditional use manuals on completed work due to the passage of time and turnover of personnel.

The inspectors reviewed the 22 open "new program" conditional use VTM issue forms in DCRM and noted that, for 12 issuances, memorandums had been sent to the holders notifying them of VTM revisions, or of VTM issuance, and directing the evaluation of previous work as required by SSP-2.10. Although six of these notifications had been issued as far back as May and June 1992, they had not yet been responded to by the manual users. Revision notifications dating back to May 1992 that have not been responded to also exist for several conditional use VTMs (used for Unit 2 work to VTMs approved for Unit 1). Although the previous revision of SSP-2.10 (Revision 3) did not specify any definite response time, Revision 4, issued March 25, 1993, required that within 60 days of notification by DCRM that a vendor manual issued for conditional use has been revised or issued as a VTM, the user of a

conditional use manual is to document an evaluation regarding previously performed activities and provide that evaluation to DCRM.

Considering the difficulties experienced by WBN in reconstructing and dispositioning open conditional use issues from the "old program", it seems prudent for WBN to promptly address the backlog of evaluations for the "new program" issues. In addition, the inspectors noted that on a few conditional use forms there were no signatures by the responsible supervisor and the work document(s) (e.g., WR, WP, PM) were not referenced, making subsequent evaluation of impact difficult at best, especially if the user is no longer on site. This apparent program weakness will be reviewed as part of the 100% program review and will be tracked as IFI 50-390/93-27-05, Review of conditional use manuals process.

- Procedures SSP-2.07 and SAI-18.01 specify that controlled documents are to be assessed annually by DCRM to verify that the latest revision is available for use. However, controlled vendor manuals had not been assessed by DCRM. Further, SAI-18.01 did not identify vendor manuals as a discrete element of controlled documents requiring assessment and did not provide any specific attributes that should be assessed for VTMs, such as a verification that revised sections of manuals have been properly inserted. The failure to perform annual assessments of the control of VTMs as discussed above is not being cited in this report. It will be included as an additional example of a similar generic failure of DCRM to perform annual assessments that is being evaluated for enforcement and will be documented in Inspection Report 50-390, 391/93-29.

- During discussions with plant personnel and review of controlled VTMs at selected locations, the inspectors noted that some plant groups had uncontrolled VTMs in their work areas even though controlled VTMs were available. During the course of the inspection and again at the Exit Interview the inspectors expressed concern over the availability of the uncontrolled VTMs in work areas and the potential for misuse of these VTMs.

## 7. As-Installed Hardware Versus Vendor Manual Information

### a. Field Verification

The inspectors obtained vendor nameplate data from components in the plant and compared the data against EMS and Q-List information. All of the components were correctly listed as QA status "Q" and safety-related on the Q-List. In addition, each component had a vendor manual referenced in the EMS. The following components were selected:

| <u>Component ID</u>  | <u>Name</u>                             |
|----------------------|---|
| 1) 0-CHGR-236-0002-E | 125V VITAL CHGR II                      |
| 2) 0-TCV-031-0112    | SHTDN RM A AHU A-A COOL WATER CONT      |
| 3) 1-CKV-074-0514-A  | RHR PUMP DISC CHECK                     |
| 4) 1-FCV-074-0016    | RHR HT EX A OUTLET FLOW CONTROL VALVE   |
| 5) 1-FCV-074-0028    | RHR HT EX B OUT FLOW CNTL VLV           |
| 6) 1-HTX-074-0020-B  | RHR PUMP 1B-B SEAL WATER HEAT EXCHANGER |
| 7) 1-ISV-074-0525-B  | RHR HX INLET ISOL                       |
| 8) 1-MTR-030-0178-B  | CNTMT SPRAY PMP RM CLR FAN B-B          |
| 9) 2-FCV-067-0066-A  | EMER DSL HTXS A1 & A2 SUP VLV FRM HDR A |
| 10) 2-MTR-082-0221B  | DIESEL AIR START MOTOR                  |

The inspectors reviewed the vendor manuals referenced in the EMS for the above listed components to verify that the correct manual was referenced and to ensure that the information in the manuals was the same as that on the component nameplate. The following vendor manuals were reviewed (The number in parenthesis indicates the applicable component identified above):

| <u>Vendor Manual</u> | <u>Title</u>   |
|----------------------|--|
| (1) P319-0060        | Power Conversion Products, Inc., Three Phase Thyristor Controlled Battery Chargers |
| (2) A391-0040        | W-K-M Control Valves Pneumatic Controllers and Transmitters                        |
| (3) (7) W120-0800    | Westinghouse Electro Mechanical Division Valves                                    |
| (4) (5) W120-2564    | Fisher/Continental Butterfly Valves Supplied by Westinghouse                       |
| (6) W120-0570        | Westinghouse Supplied Ingersoll-Rand Residual Heat Removal Pumps                   |
| (8) R165-0040        | Reliance Motors  |
| (9) P304-0010        | Posi-Seal Butterfly Valves   |
| (10) P318-0110       | The Power Systems Diesel Generator Air Starting System                             |

The inspectors found that all of the components reviewed were referenced on the applicability lists in the vendor manuals identified on the EMS. For associated valve actuators, positioners, and operators, the vendor manuals contained the vendor information, or the applicability lists with references

to vendor manuals that included the components. No deficiencies were identified by review of the vendor nameplate data against the data in the vendor manuals.

In addition, this review of vendor manuals was conducted during the second week of the inspection and the inspectors noted that all of the drawings in the vendor manuals reviewed had been stamped "information only" in red ink.

b. Document Review

WBFIR9300050 documented a condition adverse to quality involving inadequate controls for implementation of vendor as-built information. Based on a recommendation from a vendor technical representative, the SUT organization requested PEG to procure a replacement printed circuit board for the 120VAC vital inverters referencing part numbers that were not reflected on WBN approved vendor drawings or VTMs and without referencing drawings or the VTM. PEG received information from the vendor prior to procurement which identified a different part number for the replacement printed circuit board. PEG procured the requested parts from the vendor without performing an equivalency evaluation as required by SSP-10.05, Technical Evaluation for Procurement of Materials and Services, and without requiring the vendor to provide proper design documentation for the new part. The purchased replacement circuit board fit and functioned as the original, but was of a different design; an internal fuse had been replaced with a resistor. The error was detected when, after the new boards had been installed, SUT was performing a preoperational test step on April 8, 1993, that required removal of the fuse, but could find no fuse. The test was being observed by NRC inspectors at the time the error was detected. The preoperational test is discussed in greater detail in inspection report 50-390, 391/93-25.

The inspectors informed the licensee that failure to perform an equivalency evaluation as required by SSP-10.05 will be identified as another example of the failure to follow procedures violation 50-390/93-27-01, discussed in paragraph 5 of this inspection report.

-8. Training

The inspectors reviewed the established training requirements and training provided to vendor manual users in the modifications, startup and test, and plant maintenance organizations. The review was conducted to verify training on SSP-2.10 or equivalent training on the use of vendor information and manuals. Procedure SSP-2.10 establishes a standardized process for utilization of vendor manuals and manual-like information. The SSP includes detailed requirements for obtaining, using, and revising vendor manual information and drawings.

Administrative procedure indoctrination training for WBN personnel is governed by section 2.2 of SSP-1.03, Training of Personnel. The manager of each section is required to identify the procedure training requirements for their staff and ensure that the training is completed prior to the performance of related work activities. Each manager forwards the requirements for the section to the WBN training department for entry into the NETS which is used to maintain the training status of each individual.

a. Plant Maintenance

The inspectors held discussions with the plant maintenance manager on the use of vendor information in the maintenance organization and the training provided to maintenance personnel who use vendor information. The maintenance planners are tasked with planning and writing work order instructions for work activities to be performed by maintenance craftsmen. This function includes the use of vendor information and manuals where applicable.

The inspectors reviewed the training requirements and records for 26 individuals in the maintenance planning group including managers, planners, and engineers. The inspectors found that all of the individuals had documented training on SSP-6.02, Maintenance Management System. This procedure defines the maintenance program for WBN and is the primary procedure for performing maintenance planning activities. The inspectors found that all but one of the individuals had documented training on SSP-2.10 or the use of vendor information. Maintenance management stated that the use of vendor information is required for personnel in the planning group and the individual who had not had training on vendor information was a case of missed training. No other concerns were identified.

b. Start-up Testing

The inspectors reviewed the training requirements for start-up and test personnel and found that SSP-2.10 was included as a "one time only" procedure for review. The inspectors reviewed the training records for 23 individuals in the SUT organization including managers, NSSS Level 2 and 3 test engineers, and BOP Level 2 test engineers. The inspectors found that each individual had documented training on SSP-2.10; however, the inspectors noted that several of the training records did not include the revision level of the SSP-2.10 which was reviewed to satisfy the training requirement. The inspectors discussed this concern with a SUT manager who stated that the revision level reviewed was not important because the training was for procedure familiarization only. The SUT manager stated that the individuals would have read the procedure revision which was in effect at the time they completed their review. No other concerns were identified.

## c. Modifications

Organizational training requirements for modifications personnel at WBN are governed by MAI-1.8, Managing Training. Supervisors are required to develop a training matrix for employees which lists training requirements and the training method. All training applicable to MAI-1.8 is required to be documented on an appropriate training roster and forwarded to the modifications training manager. The modifications training manager then inputs a completion status into the NETS program for each employee who successfully completes training.

Procedure MAI-1.8, section 6.C states that it is the responsibility of each individual to know the procedure that controls the activity they are performing and to ensure their training (i.e., procedure self-study and/or course presentation) is current prior to performing the activity. In addition, supervisors are required to ensure required training is completed before assigning independent work.

The inspectors reviewed the following modifications training requirements matrices:

C22K224220 MR Planning Group  
 C22K222220 Workplanning Mechanical/Civil/I&C  
 C22K222210 Workplanning Electrical

The inspectors noted that none of the matrices included training on SSP-2.10. In addition, the inspectors could not identify any training requirement which addressed the use of vendor information.

Similar concerns with inadequate training were identified and documented in URI 390, 391/93-20-01, Personnel Training. The URI included findings of the lack of training documentation for modifications personnel completing material request forms (TVA form 575N); lack of training for modifications personnel in the use of the Q-List; general questions with completing required training for modifications personnel; and adequacy of training matrices. In response to these concerns, the licensee initiated PER WBPER930067 to address inadequate training documentation for modifications personnel. The corrective action plan for this PER was not approved by the end of this inspection.

Due to the apparent programmatic problems identified during this and other recent NRC inspections, further review of the specific NRC identified items as well as the site training program in general is required. Based on the reviews conducted during this inspection, the following specific concerns will require further NRC review:

- Adequacy of SUT training records documenting procedure review which do not include the revision of the procedure reviewed.

- Adequacy of modifications work planning training matrices which do not include a requirement for SSP-2.10.
- Adequacy of modifications training for the use of vendor information (detailed training records were received by the inspectors prior to the exit meeting on April 16, 1993).

The training concerns identified by this inspection will be reviewed during the follow-up of URI 390, 391/93-20-01, Personnel Training.

#### 9. Field Verification of Vendor Manual Requirements

The inspectors review selected VTM information to determine if the vendor and design installation requirements had been appropriately incorporated into the equipment as installed in the field, and incorporated into the installation, maintenance, operation or other related procedures as appropriate. Additionally, the inspectors reviewed the results of a field verification performed by a licensee contractor against vendor installation design requirements for selected components. The reviews included examination of the following vendor technical manuals:

WBN-VTM-W-120-0720, Vendor Technical Manual for Westinghouse Supplied Safety Injection Pumps and Motors.

WBN-VTM-P318-0880, Vendor Technical Manual for Power Systems, Parsons-Peebles 4750 KW AC Synchronous Generator.

WBN-VTM-W120-0570, Vendor Technical Manual for the Residual Heat Removal Heat Exchanger

WBN-VTM-G292-0120, Vendor Technical Manual for G.A. Technologies Vent Monitor

WBN-VTD -G292-0130, Vendor Technical Document for the Operation and Maintenance for G.A. Technologies Radiation Monitoring Systems.

##### a. Safety Injection Pump 1A-A:

Requirements selected to be independently verified from the Safety Injection Pump and Motor vendor technical manual included:

- Name Plate data, including: model nos., brake horsepower rating, design speed rating, flow rate, and casing hydrostatic test pressure.
- doweling pins for alignment
- orientation of the suction piping
- torque requirements on base plate hold down bolting

- requirements for SI pump while equipment is expected to be set idle after installation:
- removal of bearing caps
- periodic installation of corrosion inhibitor
- rotation of pump shaft 180 degrees every six months
- installation of motor space heaters
- removal of motor\pump coupling

An examination of the safety injection pump and motor 1-PMP-063-0010-A was conducted. All of the above data was observed to be correctly implemented in association with the SIS pump except as follows:

Dowel alignment pins were not installed as required, hold down bolting on the SI pump were lagged over and could not be verified, hold down bolts on the SI pump motor could not be checked during the immediate inspection, and it did not appear that preventive maintenance requirements were being performed. Subsequently, the licensee provided the inspectors with documentation which demonstrated that many of the maintenance requirements were being addressed as follows:

TVA N3M-935 RO "Plant Layup/Equipment Preservation" provided instructions to remove bearings, couplings, rotate the shaft, and provide other protective measures while the pump is in a layup condition.

Temporary Modification 92-073 provided for the removal of the radial bearings and installation of the corrosion inhibitor "Vapotec" in the pump bearing oil system.

TVA Maintenance Instruction 63.1, Safety Injection Pump Shaft, Bearing and Seal Maintenance, correctly incorporated the requirements of the vendor technical manual addendum A1A85 to JHF Operating and Maintenance Instructions 3101 with a new procedure for a Seal Housing Check.

In response to the SI pump motor not being properly dowelled with alignment pins, the licensee indicated that this discrepancy was noted during a previous TVA walkdown of selected components, and was resolved as follows. The licensee provided the inspectors with correspondence between the licensee and the vendor regarding the requirement for doweling of the SI pump motor (Westinghouse letter WAT-D- 8910 dated July 9, 1992, "Doweling Requirements for Auxiliary Pump Assemblies"). The vendor indicated that doweling contributed to maintaining the seismic qualification of the machine. However, doweling was not required provided that the vendor requirements for torquing the motor hold down bolts were

met as specified. The licensee was unable to provide documentation which demonstrated that the motor hold down bolts were properly torqued to the specified values. Therefore, the inspectors requested the licensee to physically verify the torque values for the bolts in question. The inspectors observed licensee personnel during field verification of proper torquing for the motor hold down bolts. The results indicated that the bolts had been torqued to values within the allowable torque tolerances specified by the vendor. The Licensee also checked the torque of a Unit 1 Charging Pump hold down bolting. The resulting torque values were also within the prescribed tolerances.

Even though the field verification of the SI pump motor hold down bolts verified that the bolts were properly torqued the inspectors questioned the licensee as to the lack of an installation record. The licensee did however produce a record from the 1976 era that indicated that the pump was installed in accordance with requirements. Specific verification of torquing was not addressed in the record provided. The licensee is currently evaluating the quality of original installation records to support plant licensing through their QA Records CAP. This record CAP will generate alternate records in areas where there is a generic concern with the quality of the original records. Other records requested by the inspectors were produced. The inspectors discussed the specific record issue with the licensee's records group who indicated that they would determine if it constituted a generic issue that needed to be addressed by the records CAP. Further review of installation records will be conducted by the NRC through field verification of proper hardware/record coordination during the effectiveness evaluation of the QA records corrective actions.

While reviewing the VTM for the SI pump, the inspectors noted that two different torque values were specified for the SI pump motor hold down bolts. When questioned about the different torque values, the licensee indicated that the vendor provided a letter which stated that either value was acceptable.

During field observations the inspectors noted that the SI pump suction pressure transmitter PT-63-149 was a Rosemont brand transmitter and that Rosemont was not specified in the Vendor Technical Manual for Westinghouse supplied SI Pumps and Motors. Further, the vendor technical manual indicated that the Rosemont transmitter was not the installed equipment but that a Robertshaw transmitter was installed. Subsequently the licensee provided documentation specifying that the Rosemont transmitter was part of a current design change (DCN P-03447) which also indicated that the vendor technical manual WBN-VTM- R369-0010 (vendor technical manual for Rosemont transmitters) and the vendor technical manual for Westinghouse supplied SI pumps and motors required updating.

## b. Residual Heat Removal Heat Exchanger (RHRHX)

Requirements selected to be independently verified from the RHRHX VTM included:

- Name Plate data, including: manufacturer (Engineers and Fabricators Co.), flow rate and casing hydrostatic test pressure (tube and shell side).
- a sampling of dimensions in accordance with WBN-VTM-W120-2760
- orientation and heat exchanger supports
- orientation of the suction and discharge piping
- space requirements on base plate hold down bolting
- material specifications for bolting and thread engagement

An examination of the RHRHX 1A was conducted. All of the above data was observed to be correctly implemented in association with the RHRHX 1A.

## c. Emergency Diesel Generator

Requirements selected to be independently verified from the EDG VTM included:

- Name Plate data for the Parsons-Peebles 4750 kw generator including: model no., design speed rating, and rated generator output
- requirements for EDG while equipment is expected to be set idle after installation:
  - remove or lift and bag generator brushes
  - periodic installation of corrosion inhibitor
  - rotation of shaft 180 degrees every six months
  - installation of motor space heaters
  - removal of coupling
  - installation of environmental filter protection

An examination of the EDG was conducted. Additionally, the inspectors held discussions with maintenance technicians assigned to maintain the EDG. All of the above data was observed to be correctly implemented in association with EDG 1A-A. The diesel appeared to be well maintained in a layup condition. Maintenance technicians were knowledgeable of the preventive maintenance requirements and the maintenance activities being conducted on the EDG. It was noted through discussions with maintenance mechanics that the EDG was being lubricated in accordance with the licensee's approved lubrication program. However, the EDG vendor manual WBN-VTM-P3118-0880 permits substitution of lubricants to be used in the

EDG without engineering approval. The licensee indicated that the statement in the vendor manual would be corrected. Additionally, although not described in the VTM, the air start motors, compressors, filters and dryers also appeared to be well maintained. The 125 VDC battery for EDG 1A-A did not appear as if it were being maintained.

Battery water levels were well below the specified values, corrosive deposits were evident on most terminals, and there also appeared to be evidence of electrolytic corrosion of connecting cables. The battery was not described in the EDG vendor technical manual. The licensee indicated that the EDG battery in question was scheduled for replacement. The inspectors reviewed DCN M-11793-A, Replacement of Defective Batteries and verified that the batteries for all four of the EDGs were scheduled for replacement. The battery for the fifth EDG was determined to be acceptable by the licensee and is not currently scheduled for replacement.

d. Radiation Monitoring System Air Particulate Detector

The inspectors conducted a general review of the technical manuals WBN-VTM-G292-0120, Vendor Technical Manual for G.A. Technologies Vent Monitor and WBN-VTD -G292-0130, Vendor Technical Document for the Operation and Maintenance for G.A. Technologies Radiation Monitoring Systems. Subsequently a system walk down was performed. It was noted that the system had many deviations from the vendor drawings and the TVA issued approved drawings. Discussions with the licensee indicated that they were aware that the current radiation vent air particulate detection system was not installed as required. However, the system was scheduled to be modified extensively and the vendor manuals and drawings would be updated as part of the modification process.

10. Review of Licensee Walkdown Verification of Vendor Requirements on Installed Equipment

The licensee conducted an IDR Project to assess the compliance of equipment with specific installation requirements provided by the manufacturer and/or the vendor. The EDGs and components purchased under contract from the NSSF were not included because they were installed under the supervision of the vendor. Additionally, components not included on the licensee's "Q-list" were also not included. This resulted in the exclusion of electrical relays. TVA engineers recognized that many previously conducted efforts could possibly provide sufficient assurance of compliance with vendor requirements and credited other Watts Bar activities for achieving or verifying compliance with installation requirements. The IDR took credit for formal, approved TVA processes which were in place to ensure completion of many actions where vendor requirements were required to be implemented. The IDR performed an evaluation that determined that WBN site organizations (Engineering, Construction, and Operations) had developed procedures or other documents that required compliance with vendor installation requirements. As described in the licensee's program, if installation

procedures could be matrixed to a vendor requirement, walkdowns would not be necessary. In most cases the physical equipment installation was not verified through walkdowns. In fact, field verification was performed for only about 15 percent of all requirements associated with the IDR project.

As part of this project, TVA hired a contractor to perform field verification against the vendor installation design requirements for 67 selected components. These verifications were to include selected vendor requirements which did not require craft support to perform the reverification, only requirements that could be visually verified, and only vendor installation design requirements that were previously developed for TVA. Any components that were manufactured by TVA were also exempt from inspection.

The inspectors reviewed the field verification walkdown discrepancy reports and resolutions for the components listed below and performed an independent walkdown of several selected components.

Safety Injection Pump 1A-A  
 Safety Injection Pump 1B-B  
 RWST RHR Injection Isolation Valve FCV-63-0001  
 RHR to RCS 1 and 4 flow control valve FCV-63-0094  
 Residual Heat Removal Pump 1-A  
 Residual Heat Removal Pump 1-B  
 RHR Heat Exchanger A  
 Component Cooling Water Pump 1-A  
 Centrifugal Charging Pump 1A-A

The inspectors' review of the field verification report identified the following concerns:

a. Extensiveness of the Verification:

- Vendor requirements selected for a class of components i.e. pumps, valves, or heat exchangers, were generally all the same. For example, the requirements selected for SI Pump 1A-A, SI Pump 2B-B, the Component Cooling Water Pump 1-A and the Charging Pump 1A-A all examined; the mounting/hold down attachments, accessibility for maintenance, layout and arrangement of suction and discharge nozzles. The requirements for valves all examined orientation of the valve and whether or not "T" drains were installed.

Other vendor requirements were either not verified or assumed to be correctly implemented based upon marginal evidence. Administrative controls or maintenance and operations procedures were not verified to ascertain that vendor requirements were in place or would be performed in a controlled or systematic manner. For example;

- The field verification walkdown indicated that WBN-VTD-I075-0430 applicable to RHR pump 1-B required that the hold down casing allow for differential expansion between the casing and the support structure, and be permitted to slide (radially) as increased temperatures cause the casing to expand. The condition noted by the field inspector indicated that the bowl of the pump was covered with insulation making inspection impossible. No further action was taken.
- The field verification walkdown indicated that WBN-VTD-120-0800 applicable to RHR Reactor Supply Isolation Valve 1-WBN-FCV-074-0001 required that the yoke torque arm slot lubrication be performed on a scheduled basis. The condition noted by the field inspector was that a light film of lubricant was on the torque arm and slot. No discrepancy was noted. A schedule for lubrication was not verified.

The inspectors' concern was that the field verification may not be adequately comprehensive or sufficiently rigorous.

b. Adequacy of Field Observations:

Some observations made by the field inspectors judged inadequate vendor requirements to be acceptable and reported the observations as "No Discrepancies Noted". For example, a vendor requirement for the RHR Pump 1-A was that the shaft be rotated every thirty days. The verification report states "the shaft turns; however, can not determine if turning has occurred. No discrepancy noted". Additionally, the vendor manual for this pump also required that a seal vent valve be installed by the customer in order to "Vent the seal cavity by opening the seal vent valve". The verification report stated, "A pipe cap is installed for venting. No discrepancies noted".

The inspectors' concern is that the field inspector's decisions regarding the adequacy of the observed conditions were not adequately reviewed by personnel with technical expertise associated with the finding or that these observations were not further dispositioned by management through a review of the report.

c. Resolution of Observed Discrepancies:

It was noted that the resolutions of some discrepancies were predicated on future actions, and that the dispositioning of the resolutions did not include a tracking system or feedback mechanism to ensure that the corrective actions for the deficiency were carried to completion. For example, a stated vendor requirement for the Component Cooling Water Pump 1-A was that the stuffing box be fitted with an unobstructed drain path. The field inspector's observation noted a valve in the drain path.

Resolution of the discrepancy stated "leave the valve open." No further actions or dispositioning of the item was indicated. There was no mechanism to inform Operations department to leave the valve open, or to inform operations that leaving the valve open is a vendor requirement.

A review of the summary results of the 67 components for which a field verification walkdown was conducted, indicated that of the requirements observed about 40 percent of the findings were discrepancies.

In summary, the independent review of vendor requirements by the inspectors and subsequent walkdown of selected components identified minor inconsistencies and indicated that vendor requirements have been incorporated into installed equipment based on a selected and very narrow sample size. However, the field verification walkdowns performed by the licensee's contractor, which appeared to be limited in scope, narrow in depth, and observed only superficial requirements provided a lesser confidence (40% discrepancies) that vendor requirements were adequately incorporated into field installations. During discussions with the inspectors the licensee indicated that mechanisms were in place to ensure that the discrepancies identified during the field walkdown verifications were being tracked to resolution. The inspectors will followup on this concern during the VI CAP 100 percent inspection. This item will be identified as IFI 50-390/93-27-04, Resolution of Field Verification Walkdown Discrepancies.

#### 11. Review of CAP Basis Issues

The following closed ECSP CATDs documented employee concerns related to the control and use of vendor information and the corrective actions taken. The inspectors reviewed the concerns and corrective action plans in these CATDs to verify that the issues related to vendor information had been adequately addressed. In general, the specified corrective actions involved the development and implementation of a formal vendor manual/information control program at WBN. Additional corrective actions were taken to address specific identified discrepancies. The inspectors concluded that WBN had developed the specified vendor information control program and that, overall, the CATD corrective actions adequately addressed the concerns and related issues. The weaknesses and deficiencies noted in the previous sections of this report are primarily problems related to the implementation of this program. However, discrepancies were identified for three CATDs which indicated that the CATD corrective actions were not fully effective (CATDs 30804-WBN-01 and 30804-WBN-02) or were not carried out (CATD 11200-WBN-06). The inspectors concluded that these three CATDs were improperly reviewed and closed. Further evaluation and action is required by the licensee for these issues. Based on the inspectors' concerns the licensee was reassessing the closure of these CATDs to ensure proper evaluation and documentation for closure. The premature and poorly documented closure of CATDs is discussed further in inspection report 50-390/93-24 (Employee Concern Resolution (CATD)

Inspection). The examples identified in VIP CAP inspection are similar to other examples discussed in the CATD inspection report.

- a. CATD 80511-WBN-01 Lack of Document Control for Vendor Documents

The concern that resulted in this CATD was that the WBN Engineering organization did not have a procedure to govern vendor document control and that Construction organization receipt acknowledgments for vendor documents were not being returned to the Vendor Document Distribution Center. Corrective action was to develop a comprehensive document control procedure.

- b. CATD 20404-WBN-01 Lack of Procedure to Review and Approve Vendor Manuals and Revisions

The CATD corrective action for this issue was to develop site specific procedures at WBN for the review, approval, and control of vendor manuals.

- c. CATD 30804-WBN-02 Use of Vendor Drawings Which are Not Part of the WBN Drawing Management System to Make Repairs

The concerns resulting in this CATD related to the use of uncontrolled schematics in unapproved vendor manuals to perform trouble shooting and the identification of replacement parts.

Two concerns were identified by the inspectors related to this CATD; 1) lack of documented training of plant staff with regard to the use of vendor information which is discussed in more detail in paragraph 8 above, and 2) adequate controls do not appear to be in place to assure that only approved and controlled drawings are used to perform work, as discussed in paragraph 5 above.

In addition, the inspectors identified two instances that indicated the corrective actions specified in this CATD have not been effective as discussed in detail in paragraphs 5 and 7.b. above:

- The issuance of a work order to replace material on the pressurizer spray valves in accordance with a vendor document that had not yet been approved by engineering and without referencing the appropriate vendor drawing.
- The requisition, procurement, and installation of replacement 120V vital Inverter circuit boards that were of a different design and part number than specified in approved VTMs and VTDs.

d. CATD 30804-WBN-01 Vendor Manuals and Drawings Do Not Reflect As-Built Configuration

The concern resulting in this CATD related to vendor manuals in the shop which did not contain the latest drawings and schematics. The WBN investigation of this concern identified several instances where vendor manuals had not been updated to reflect as-built conditions or revised vendor information. The inspectors identified two instances that indicated the corrective actions specified in this CATD have not been effective as discussed in detail in paragraphs 5 and 7.b. of this report related to work documents for modifications to pressurizer spray valves and to the requisition, procurement and installation of circuit boards that were of a different design than specified in approved VTMs and VTDS.

e. CATD 11200-WBN-06 Inspection of Vendor Wired Electrical Panels for Proper Labeling

This CATD resulted from an ECTG concern developed from a review of two NCRs that identified a large number (thousands) of discrepancies between as-built vendor wiring and drawings, mostly related to labeling. The problem description was that it was not clear whether all safety-related vendor wired panels had been inspected or scheduled for inspection to ensure that vendor wiring was properly labeled. The final resolution of this CATD (through a deviation to the corrective action plan approved in June 1992) was essentially that no further action was required due to the following conditions:

- The pre-op testing program proves operability,
- The NCRs were determined to be "non-significant",
- Wiring configuration for modifications are verified,
- Labeling problems will be corrected on a case basis, when identified, through the corrective action program,
- A large number of the safety-related panels had been walked down and discrepancies corrected.

In addition, corrective action plan item number five stated that no action to prevent recurrence was necessary in the procurement program, due to the then current requirement that vendors of QA equipment supply certified as-built drawings with the equipment shipment as delineated in a November 26, 1985 policy memorandum.

The inspectors reviewed SSP-10.05, Technical Evaluation for Procurement of Materials and Services; reviewed several procurement packages; and interviewed PEG management and determined that routinely requiring vendors to supply certified

as-builts was not the current practice at WBN and apparently never has been. Thus, the CATD corrective action step had not been implemented as stated. Based on these observations, the inspectors concluded that CATD 11200-WBN-06 had been improperly closed and the stated justification for no additional recurrence prevention was not accurate. Additional discrepancies were identified with the engineering evaluations and corrective actions related to this CATD which are detailed in inspection report 50-390/93-24.

## 12. Exit Interview

The inspection scope and results were summarized on April 16, 1993, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee. The following findings were discussed:

- Violation 50-390/93-27-01, failure to follow procedures when a work order was initiated to perform work in accordance with an unapproved VTB (paragraph 5); and failure to follow procedures when performing a technical evaluation for procurement of a replacement part that was not a "like for like" replacement (paragraph 7.b.).
- Failure of Document Control's assessment program to audit controlled VTMs periodically is identified as an additional example of a violation that will be documented in NRC inspection report 50-390,391/93-29 (paragraph 6).
- Training for modifications and maintenance work planning groups on the use of VTMs and vendor information is identified as an additional example of unresolved item discussed in inspection report 50-390/93-20-01 (paragraph 8).
- IFI 50-390/93-27-02, vendor information program scope (paragraph 3).
- IFI 50-390/93-27-03, vendor program procedure review (paragraph 4).
- IFI 50-390/93-27-04, resolution of field verification walkdown discrepancies (paragraph 10).
- IFI 50-390/93-27-05, review of conditional use manual program (paragraph 6).

- The inspectors also expressed concern over the availability of uncontrolled vendor drawings and VTMs in work areas and the potential for misuse of these uncontrolled documents.
- The inspectors expressed concern over the lack of adequate documentation which supported the licensee's conclusions for the VI CAP completion status.

### 13. Acronyms and Initialisms

|      |   |
|------|---|
| BOP  | Balance of Plant                        |
| CAQ  | Condition Adverse to Quality            |
| CATD | Corrective Action Tracking Document     |
| CDS  | Control Document Station                |
| DCN  | Design Change Notice                    |
| DCRM | Document Control and Records Management |
| DG   | Diesel Generator                        |
| ECSP | Employee Concerns Special Program       |
| ECTG | Employee Concerns Task Group            |
| EDG  | Emergency Diesel Generator              |
| EMS  | Equipment Management System             |
| ERCW | Essential Raw Cooling Water             |
| FIR  | Finding Identification Report           |
| GL   | Generic Letter                          |
| IDR  | Installation Design Review              |
| IFI  | Inspector Followup Item                 |
| IR   | Inspection Report                       |
| MAI  | Modification and Addition Instruction   |
| MR   | Maintenance Request                     |
| NCR  | Nonconformance Report                   |
| NE   | Nuclear Engineering                     |
| NER  | Nuclear Experience Review               |
| NETS | Nuclear Employee Training System        |
| NSSS | Nuclear Steam Supply System             |
| PEG  | Procurement Engineering Group           |
| PER  | Problem Evaluation Report               |
| PM   | Preventive Maintenance                  |
| QA   | Quality Assurance                       |
| RCS  | Reactor Coolant System                  |
| RHR  | Residual Heat Removal                   |
| RPS  | Reactor Protection System               |
| RWST | Refueling Water Storage Tank            |
| SAI  | Site Support Administrative Instruction |
| SB   | Service Bulletin                        |
| SCN  | Specification Change Notice             |
| SI   | Safety Injection                        |
| SSP  | Site Standard Practice                  |
| STD  | Nuclear Power Standard                  |
| SUT  | Startup and Test                        |
| TVA  | Tennessee Valley Authority              |
| URI  | Unresolved Item                         |

|      |                                 |
|------|---------------------------------|
| VDC  | Volt Direct Current             |
| VIO  | Violation                       |
| VM   | Vendor Manual                   |
| VMPM | Vendor Manual Program Manager   |
| VR   | Vendor Manual Revision          |
| VTB  | Vendor Technical Bulletin       |
| VTD  | Vendor Technical Document       |
| VTM  | Vendor Technical Manual         |
| WBN  | Watts Bar Nuclear Plant         |
| WO   | Work Order                      |
| WP   | Workplan                        |
| WR   | Work Request                    |
| WTB  | Westinghouse Technical Bulletin |