

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

REPORT NO. R-84-17-NPS  
REVIEW OF PROCUREMENT PRACTICES  
AND PROCEDURES FOR OPERATING NUCLEAR POWER PLANTS

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SUBJECT: REVIEW OF PROCUREMENT PRACTICES AND PROCEDURES  
FOR OPERATING NUCLEAR POWER PLANTS

DATES OF  
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## TABLE OF CONTENTS

	<u>Page</u>
I. BACKGROUND . . . . .	1
II. SCOPE . . . . .	1
III. MANAGEMENT SUMMARY . . . . .	1
A. General Unfamiliarity with Procurement Cycle . . . . .	1
B. Excessive and/or Ineffective Review of Purchase Requests and Requisitions . . . . .	2
C. Ineffective Use of Available Procurement System . . . . .	3
D. Apparent Lack of Planning . . . . .	4
E. Quality Assurance . . . . .	4
IV. CONCLUSIONS AND RECOMMENDATIONS . . . . .	6
V. DETAILS. . . . .	11
A. Upper-Tier Documents . . . . .	12
B. Plants. . . . .	12
1. Preparation and Review Cycle for Procurements. . . . .	12
a. Originator . . . . .	12
b. Specifications Engineer . . . . .	13
c. Field Quality Engineering . . . . .	15
d. Plant Superintendent. . . . .	16
e. Power Stores. . . . .	16
2. Functioning of Plant Procurement System. . . . .	17
3. Planning . . . . .	18
4. Special Methods of Obtaining Material and Services . . . . .	19
a. Service Contracts . . . . .	19
b. Indefinite Quantity Term (IQT) Contracts. . . . .	20
c. Transfers . . . . .	21
d. TVA Fabricated Equipment. . . . .	23
5. Receipt Inspection Program . . . . .	23
6. Storage and Reorder of Shelf Life Items. . . . .	27
C. Power Stores. . . . .	29
1. <u>BFN</u> and <u>SQN</u> Power Stores . . . . .	29
2. Power Stores Distribution Center . . . . .	31
D. Central Office. . . . .	32
E. Office of Engineering . . . . .	33
F. Purchasing. . . . .	35
G. Quality Assurance . . . . .	37
H. NUC PR Procurement Problem Task Force . . . . .	43
VI. PERSONNEL CONTACTED. . . . .	45
VII. DOCUMENTS REVIEWED . . . . .	47
Attachment 1, Suggested Solution to Procurement Problems	

## I. BACKGROUND

Problems associated with the timely receipts of procured materials have been the subject of the Division of Nuclear Power (NUC PR) discussions on numerous occasions, and as a result of the Regulatory Performance Improvement Program (RPIP) at Browns Ferry Nuclear Plant (BFN), NSRS support was solicited in the form of a review. The review was conducted to examine and evaluate the procurement process for nuclear plants and determine the reasons for time delays and problems.

## II. SCOPE

The procurement activities associated with TVA's nuclear power program were divided into two phases, operating plants and plants under construction. This review covered only the operating plants and centered on quality level I and II items and services. Those services or items manufactured by TVA were reviewed for only BFN.

As a part of the NUC PR reorganization effort to move personnel from the Nuclear Power Central Office (NCO) and to solve procurement problems identified by a joint Division of Purchasing (PURCH), NUC PR and Power Stores task force, NCO procurement activities were transferred to the sites. Interorganizational communications and working relationships were stated to have been developed to attack problems and streamline operations. NSRS did not include the evaluation of the reorganization within this review, but did evaluate the task force findings based upon the findings of this review.

## III. MANAGEMENT SUMMARY

During the past several months NSRS has been reviewing the procurement process of materials and services for TVA's operating nuclear plants. The review began on June 11, 1984, and continued until the final closeout in Chattanooga on December 5, 1984. As a part of the review, closeouts were held at the completion of the onsite review at BFN, SQN, NCO, and PURCH. Throughout this review, people within NUC PR, Power Stores, PURCH, and the Office of Engineering (OE) were very helpful, cooperative, and in many cases candid. Virtually everyone interviewed considered procurement to be a major problem, and to a large extent the problem was the "other guy." Interviews were conducted with a number of dedicated people trying hard to do their job as they saw it, but frustrated because the system, regulations, QA, etc., were perceived to be working against them. Each group within the procurement chain had real problems and had several examples they were willing to share.

The problems experienced by NUC PR in procuring materials in a timely manner were for the most part problems created by NUC PR. In broad terms, there were five categories within which identified deficiencies could be placed.

### A. General Unfamiliarity With Procurement Cycle

Personnel associated with each step of the procurement cycle were aware of what they were supposed to do or what they perceived to

be their responsibility; however, they were not aware of the role, function, or problems of others within the procurement cycle. No one was found, of the more than 90 people interviewed, that knew the entire system. Unrealistic expectations were placed upon the procurement system by originators of procurements. Ordered material was requested to be onsite generally within 90 days when, based upon this review of procurements, 6 months to 1 year would be more realistic. No one knew how long it would take to purchase materials but it was generally accepted that they would not be there when needed.

That lack of knowledge of the procurement system and associated problems produced frustration along the procurement chain. At the sites the procurement cycle and regulations were viewed at all organizational levels as a burden and designed to make the procurement process more difficult. The system and regulations were viewed as roadblocks telling the sites why they could not purchase something versus how to purchase something, and were also designed to purchase something (low bid) the site did not want over what it did want. As a result, the sites were putting more effort into using the system shortcuts through the overuse of emergency purchases and field purchases rather than learning the system for normal procurements and how to work within it.

There was no procurement training identified at the sites for personnel within the procurement cycle. For the most part personnel were introduced to the rigors of procurement by being handed a copy of the site procurement procedure (e.g., SQA 45), which was over 300 pages long, and told to read it. The procurement of items appeared to be viewed by site personnel as a required undesirable job as if it were part of an initiation.

B. Excessive and/or Ineffective Review of Purchase Requests and Requisitions

Typically 17 approval signatures and initials, some by the same people required to sign both the purchase request and purchase requisition, were required for a site-originated procurement. The value added to those documents beyond what the originator, quality assurance, and authorizing official contributed was, for the most part, minimal. In a very small number of procurements that were considered more complicated, the NCO provided valuable input. Considering the timeframe to prepare, approve, and transmit a procurement requisition from the sites to vendors for bids, the sites typically took one to four days, PURCH about three days, and the NCO weeks to months. The value added by the NCO, which was primarily editorial in nature, could not support the continued time delay by the NCO in the procurement cycle; consequently, the removal of the NCO from the review cycle and transfer of the affected NCO personnel to the sites was viewed by NSRS as a positive action provided the NCO problems and delays were not transferred with them.

It appeared to NSRS that the entire procurement system, with all its reviews, was predicated upon the concept of safety in numbers, i.e., the more people involved in reviewing, the better the product. In actuality what NSRS found was procurement documents being changed for no apparent good reason other than a perceived need to demonstrate a degree of usefulness by each successive reviewer.

All procurements generated by the sites, both QA and non-QA, were reviewed by the site Field Quality Engineering Group (FQE). For the most part there was one individual performing that review at each site. Those procurements included direct charges, IQTs, field purchases, transfers, and Material Management System (MAMS) reorders. For example, at BFN during May and June 1984 there were 1051 procurement actions or about 26 procurements per day that required FQE review and approval. The effectiveness of the review on that number of procurements by one individual is questionable, and the effectiveness of the review of QA procurements could be enhanced if the review of non-QA procurements by FQE were performed only on a sampling basis.

C. Ineffective Use of Available Procurement Systems

IQT contracts are supposed to be time savers in that once the IQT has been reviewed and approved, Requests for Delivery (RDs) against the IQT can be issued directly to the vendor without the review and approval process required for new procurements. NUC PR's procurement procedures negated any time savings afforded by an IQT because they required the review and approval of each RD as if it were a new procurement. There was no mechanism to identify large use items, such as steel, as potential candidates for IQT contracts.

MAMS is a computerized system to maintain an established supply of inventoried stock items throughout Power, and has the potential of being a very powerful tool. The maximum inventory level and minimum reorder point for some materials were inadequate, and the sites established the practice of hoarding items such as mops and plastic bottles to compensate. The sites viewed the established maximum/minimum levels as arbitrary and an effort to reduce stock inventories. In actuality the established maximum/minimum levels were neither, and the site problems can be attributed to poor communication between the site and the Materials Management Services Staff (MMSS), who administered MAMS.

Although MAMS had the capability of reordering QA items automatically, when initiated by Power Stores, this capability could not be utilized due to the reorder program not being approved as a QA system. As such, unauthorized changes to MAMS information on specifications, etc., could occur. Therefore, efforts were underway to write a QA program for MAMS. In addition, MAMS had the capability of combining like orders from different sites for non-QA material, but according to MMSS personnel was constrained by Office of the General Counsel (OGC) requirements such that it

could not be used. MAMS was also disadvantaged by not having a complete usage history of inventory items. Inventory items could be supplemented by field purchases and direct charge purchases which never became a part of a usage history.

D. Apparent Lack of Planning

NSRS did not specifically look at work planning and its associated impact upon the procurement process during the review. It was covered in an NSRS review of outage controls (see NSRS Report R-84-27-SQN/BFN). It was evident, however, from the conspicuous absence of the discussion of a planning or scheduling phase during interviews that whatever work planning was occurring, it had little positive effect upon procurement. That observation was supported by the identified fact that engineers at the plants were scheduling modifications without having the needed material onsite, with unrealistic expectations on delivery dates, and were using a large number of emergency purchases. Engineers were relying upon their ability to find the needed material somewhere within the TVA system when ordered material had not arrived onsite. The review did not attempt to determine how many jobs required cancellation or rescheduling due to material shortages. Contributing to the problem of planning work was the fact that no one interviewed really knew how long it took to procure an item. It is understood by NSRS that there is no one timeframe applicable to all items procured. Examples were found by and identified to NSRS of procurements that ranged from a few days to over three years and still waiting. A reasonable estimate should be established for routine procurements based upon past procurements, be it six months or one year, for use in planning and scheduling.

E. Quality Assurance

The quality requirements for items procured was a portion of this review. The Operational Quality Assurance Manual (OQAM) was reviewed with regard to procurement and found to be rather cumbersome and conflicting in some cases. The main problems identified were the intermingling of 10CFR Part 21 requirements with quality assurance requirements and the use of commercial grade items as basic components.

The quality level I and II designation is used for basic components and 10CFR21 applicability was determined for all procurements with those QA level designations. In the determination of Part 21 applicability, Part 21 could be determined not applicable because the item being procured was a commercial grade item. If it were a commercial grade item then the quality requirements could be significantly reduced to allow the procurement from an unapproved vendor and receipt inspection by an inspector not qualified to ANSI N45.2.6. The OQAM, Part III, Section 2.1, Appendix F, form for determining Part 21 applicability was deficient and was being misused in that if an item was identified as commercial grade no determination was required of its effect upon

the safety function of a CSSC component or system. Many QA level I and II, Part 21 N/A, procurements of commercial grade items were seen. All procurements, however, in the QA level I category required TVA-approved vendors and quality documentation. For those with a QA level II designation, which is almost equally important from a safety standpoint as a QA level I item, most required no QA documentation. Procurement with a QA level designation and no QA documentation or manufacturing requirements results in an implied level of quality that just may not be there; also, it results in purchased equipment whose quality characteristics are not known.

The use of commercial grade items as basic components is allowed by the NRC. In using such an item as a basic component TVA assumes the sole responsibility of assuring that that item will perform as required when required, including an accident situation. Currently TVA has no receipt inspection program for commercial grade items that includes testing or some other mechanism, such as vendor audit, that can make that assurance.

Considering the five basic categories of problems enumerated above and other findings identified elsewhere within this report, a comparison was made with the findings of the NUC PR Procurement Problems Task Force Report. With regard to the work of the task force and their findings, NSRS believes it represents a good work effort. Based upon the findings of this review, NSRS can support many of their recommendations that are directed toward changing the system, such as:

- Establish a planning group
- Improve PURCH/site communications
- Eliminate unnecessary procurement cycle steps
- Better utilize automated systems

NSRS understood that many of these recommendations were being implemented, but did not review the extent of the implementation. Other task force recommendations, however, appeared to be directed toward correcting the system as is or developing the ability to place blame within the present system with which NSRS does not agree.

In the details of this report additional problems are identified in the areas of approving vendor services, documentation inadequacies with internal TVA transfers, TVA-fabricated equipment, receipt inspection program, and materials with a limited shelf life. As negative as the findings may be, NSRS wants to emphasize that the findings are not for the most part people problems but are system problems. People did not have the procedures or training to perform the task more efficiently.

An NSRS suggested solution to the problems found during this review is contained in Attachment 1.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

##### A. R-84-17-NPS-01, The Procurement System is Too Cumbersome and Not Well Known by the Users

###### Conclusion

The biggest problem found with the procurement system used by NUC PR was its wasteful and cumbersome nature. Procurements were overloaded with redundant reviews producing little value added in most cases and causing unnecessary time delays up to months. Virtually anyone could initiate a procurement action with little or no training. No one was found in the procurement process that knew the process much beyond their sphere of involvement. That resulted in unrealistic expectations being placed upon the system by the originator with regard to delivery time, and in perpetuation by others in the process who did not correct the problems or expectations. One of the more cumbersome and redundant review processes occurred within the NCO, and the removal of that review process on October 1, 1984, with the transfer of people to the sites, will help streamline the process provided the Central Office problems were not also transferred to the sites. To correct the problems with the system, drastic introspective management analysis and action are required (see sections V.B.1, .2, .3, .4b; V.D; and V.H).

###### Recommendations

###### R-84-17-NPS-01A

The Procurement Problem Task Force recommendation to eliminate all unnecessary steps in the procurement cycle with the goal of placing very few, if any, steps between the requisitioner and the purchasing agent should be given the highest priority.

###### R-84-17-NPS-01B

A formalized, documented training program covering the entire procurement process should be developed and required for all personnel within the procurement cycle from the originator (requisitioner) through the purchasing agent.

###### R-84-17-NPS-01C

A realistic timeframe(s) should be established for routine non-special order procurements, based upon past experience, to cover the time required from procurement origination through receipt of the material onsite. A mechanism should be included in the procurement system to periodically evaluate and adjust that timeframe as necessary, as well as communicate the timeframe to involved personnel (planners, procurers, etc.).

###### R-84-17-NPS-01D

Material availability and procurement timeframes should be included in all maintenance and modification planning activities. (NOTE: This recommendation is predicated upon information that NUC PR is developing a maintenance and modification planning and

scheduling function at each site. Also see NSRS Report R-84-27-SQN/BFN on outage control.)

B. R-84-17-NPS-02, Lack of Approval of Onsite Vendor Services at SQN

Conclusion

The OQAM, Part III, Section 2.1, paragraph 10 requires and identifies three acceptable methods for evaluating and accepting the work performed onsite by vendors. Contrary to that requirement SQN received services on three separate occasions and could not provide, after repeated requests, objective evidence that the service had been evaluated and accepted in accordance with the OQAM requirement. It is therefore concluded that OQAM, Part III, Section 2.1, paragraph 10 is not being implemented at SQN. (See section V.B.4.a.)

Recommendation

SQN should develop and implement a program that satisfies the requirement and intent of OQAM, Part III, Section 2.1, paragraph 10.

C. R-84-17-NPS-03, Excessive Review of Requests for Deliveries (RDs) on IQT Contracts

Conclusion

NUC PR was reviewing and approving RDs with the same rigor as the IQT contract, against which the RDs were written. That constituted a redundant effort costing 20 days or more delay in receipt of the commodity or service. (See section V.B.4.b.)

Recommendation

NUC PR should streamline its procedure for the review and approval of RDs, with no change of contract involved, to be in line with the requirements of the TVA Procurement Manual.

D. R-84-17-NPS-04, Insufficient Documentation for Transferred Material

Conclusion

ID-QAP 4.3 requires the original contract to be reviewed by the site receiving the transferred material for technical and QA requirements. No objective evidence could be found substantiating compliance. Sites requesting material to be transferred to them by another TVA organization or location did not specifically identify documentation requirements or require a copy of the original contract the material was purchased under. Therefore, the receiving site had a limited basis for accepting material during the receipt inspection process. The site assumed that all

applicable documentation had been sent by the transferring organization without knowing exactly what the original specifications (technical/QA) were. (See sections V.B.4.c and V.B.5.)

Recommendation

NUC PR should implement the requirements specified in ID-QAP 4.3 regarding transferred material. A copy of the original contract should be in the possession of and used by the receiving site during receipt inspection, and QC documentation required with the transfer should be specifically identified.

- E. R-84-17-NPS-05, Cable Assemblies at BFN with Assigned QA Level I Designations Fabricated by TVA from QA Level II Parts with No Mechanism to Upgrade QA Classification

Conclusion

Cable assemblies manufactured by TVA were improperly classified QA level I items. The assemblies were manufactured from parts with a lesser QA level II designation and no mechanism was found that was capable of upgrading the QA level designation. (See section V.B.4.d.)

Recommendation

BFN should take whatever steps are necessary to assure that the cable assemblies, identified in section V.B.4.d, in stock, in use, and fabricated in the future satisfy the technical and QA specifications required.

- F. R-84-17-NPS-06, BFN Power Stores Receipt Inspected Material Not Trained to Inspect

Conclusion

Power Stores receipt inspectors are not trained to receive material with Certificates of Compliance or Certificates of Conformance (COC), Certified Mill Test Reports (CMTR), or other similar QC documentation. On at least two separate occasions BFN Power Stores personnel receipt inspected and accepted material with CMTRs. One CMTR was for different material than specified in the contract and was not nonconformed. The other CMTR was for similar material substituted by the vendor but no TVA approval of the substitution was found. While the OQAM, Part III, Section 2.2 does not prohibit Power Stores personnel from receipt inspecting material with QC documentation, they should not be allowed to receipt inspect shipments with QC documentation they have not been trained to interpret. (See section V.B.5.)

Recommendation

NUC PR should revise the OQAM to prohibit receipt inspection of material with QC documentation by Power Stores and that BFN evaluate and take corrective action as necessary for the items identified in section V.B.5.

G. R-84-17-NPS-07, Material With Limited Shelf Life Not Reordered In a Timely Manner

Conclusion

The OQAM and DPM system of procedures required the periodic inspection of material with limited shelf life at one half the shelf life. Through DPM revisions that OQAM requirement was deleted. Prior to deletion of the requirement, periodic inspection was being performed (before the shelf life expired) at BFN but not at SQN. BFN required (BF 16.4) reordering shelf life material with a three-month lead time, but SQN had no requirement. Neither BFN nor SQN were reordering material with sufficient lead time to have new material in place before the existing material shelf life expired. Considering the latest industry philosophy regarding shelf life material, as contained in ANSI/ASME NQA-1-1979, the deletion of inspection requirements and reordering of items with insufficient lead times to assure an adequate supply of fresh material is considered inappropriate. (See sections V.B.6 and V.B.2.)

Recommendation

NUC PR should revise the OQAM to establish programs to inspect and reorder shelf life material to assure an adequate supply of fresh material. Also, the current three-month reorder lead time specified in DPM N77A2 should be reevaluated and adjusted as necessary.

H. R-84-17-NPS-08, Materials Management System (MAMS) Under Utilized

Conclusion

The MAMS system was being under utilized in that its capability to track inventory items usage and to reorder inventory items automatically was not being used. Considerable manpower was being expended to perform those functions manually and the MAMS system was not receiving all sources of inventory item usage. One deterrent to a more complete utilization of MAMS was the fact that its program did not have any quality assurance control to prevent unauthorized changes to specifications or other QC information. Efforts were reported to be underway to prepare a quality control feature for MAMS which NSRS highly endorses. (See section V.C.1.)

Recommendation

NUC PR, Power Stores, and the Materials Management Services Section should jointly increase efforts to utilize the MAMS in the most effective and efficient manner possible.

I. R-84-17-NPS-09, 10CFR21 Requirements Incorrectly Linked to NUC PR QA Requirements

Conclusion

Reporting of defects and liability requirements imposed upon vendors by 10CFR21 were incorrectly linked in the OQAM to NUC PR quality levels in that if 10CFR21 was determined not applicable then manufacturing quality and receipt inspection requirements were automatically reduced. In addition, the OQAM, Part III, Section 2.1, Appendix F, attachment 1, form for determining Part 21 applicability was incorrect in that if an item was determined to be commercial grade then its affect upon or use within a Critical System Structure or Component (CSSC) could incorrectly be ignored. NUC PR agreed with NSRS that the form should be corrected. (See section V.G.)

Recommendation

The OQAM and NUC PR procedures should be revised to remove influences of 10CFR21 applicability upon the determination of required quality levels for items and services, and training in the requirements and limitations of 10CFR21 should be provided to all personnel in the procurement cycle. It is further recommended that the OQAM, Part III, Section 2.1, Appendix F, attachment 1, be corrected as soon as possible and separated from the general OQAM revision so that all questions on the form are answered whether or not 10CFR21 is applicable to the item or service.

J. R-84-17-NPS-10, Commercial Grade Items with QA Level I and II Designations

Conclusion

Commercial grade items were being purchased with little or no QA requirements or from vendors or manufacturers without TVA-approved QA programs and classified as QA level I or II. That practice was contradictory to the purpose of having QA level I and II items with considerable QC documentation attesting to its suitability for fulfilling an intended function. (See section V.G.)

Recommendation

Items purchased with no QA requirement or requirements for material certifications (COC, CMTR, etc.) and/or from vendors or manufacturers without TVA-approved QA programs should not be purchased with a QA level I or II designation.

K. R-84-17-NPS-11, Quality Verification for Commercial Grade Items

Conclusion

The use of commercial grade items as basic components places the responsibility for assuring that the item will function as intended under all conditions solely upon TVA. The QA program within TVA, at the time of this review, was not capable of providing that assurance because it did not include a receipt inspection program which included testing of the item or comparable mechanisms such as an audit of the vendor's QA program for commercial grade items. (See sections V.E and V.G.)

Recommendation

NUC PR should establish a receipt inspection program which includes testing or comparable mechanisms, such as audit of vendor's QA program, verification of certificate of conformance, etc., for replacement commercial grade items that will be dedicated as basic components or parts thereof, that would provide documented assurance that the item will function as intended when necessary including accident conditions.

L. R-84-17-NPS-12, Receipt Inspection of QA Level I and II Items by FQE

Conclusion

Considering the changes recommended by NSRS in this report with regard to the procurement of quality level I and II material and commercial grade items to be dedicated as basic components, the division of receipt inspections between FQE and Power Stores, in effect during this review, will be inadequate. (See sections V.B.5 and V.G.)

Recommendation

All items procured as QA level I and II and commercial grade items to be dedicated as basic components should be receipt inspected by FQE or others qualified to ANSI N45.2.6.

V. DETAILS

The procurement process was evaluated by review of pertinent NRC regulations, consensus standards TVA was committed to, TVA policy documents, and various levels of procedures. As part of this evaluation the procedural flow of selected procurements was followed from the originator through PURCH. NSRS attempted to identify all points of origination for procurements for operating nuclear plants and included the site, OE, NCO, vendor-supplied items with services, and internal TVA transfers between sites and organizations. More than 100 procurement requisitions selected at random from BFN, SQN, OE, and the NCO were reviewed. Of those reviewed, 45 were selected for further study as being representative of basic types of procurements in the

electrical, mechanical, and structural areas. Those procurements included items, services, and internal transfers procured as either direct charge, Indefinite Quality Term (IQT), or Material Management System (MAMS) stock reorders. Of those 45 representative procurements, 21 were followed through the entire review and approval cycle to PURCH. Of the 21 procurement actions, 12 were classified as emergencies with the remaining 9 being normal procurements.

During the course of selecting and following the procurement actions over 90 people at all organizational levels were interviewed with regard to their function in the procurement process and problems associated with their function. At PURCH, in addition to their function within the TVA procurement system, discussions were held on U.S. Government procurement regulations and their impact upon TVA.

A. Upper-Tier Documents

Throughout this review an evaluation was made which compared the regulatory requirements contained within the Code of Federal Regulations and Regulatory Guides committed to in the TVA Topical Report against TVA implementing procedures which included the Operational Quality Assurance Manual (OQAM), Division of Nuclear Power Area Program Manuals (DPMs), TVA Procurement Manual, Office of Engineering Engineering Procedures (EPs), and applicable plant procedures. A detailed listing of the procedures reviewed is contained in section VII, "Documents Reviewed." Except as noted elsewhere in this report TVA's procurement programs in the areas reviewed were in compliance with regulatory requirements and were implemented in accordance with program procedures.

B. Plants

Activities at the plants associated with the procurement and ultimate receipt and storage of items and services were reviewed. Unless otherwise specified the findings are applicable to both SQN and BFN.

1. Preparation and Review Cycle for Procurements

At the sites procurement activities were confined primarily to five groups or functional areas of responsibility. Each is discussed as follows:

a. Originator

Once it was determined that an item or service was required for operation of the nuclear plants, some individual had to initiate the procurement action and that individual was identified as the originator. As identified in the OQAM and found in practice, the originator could be any "cognizant engineer, supervisor, or responsible designee." The originator was responsible for preparing the purchase request and specifying thereon all technical and quality require-

ments associated with the procurement. Specifically, as assigned in the OQAM, the originator should:

- be familiar with the functions of the system the procurement is associated with,
- be familiar with the system's importance to safety, and
- be familiar with the compliance, technical, and quality requirements of the system.

With regard to the above requirements, and in procurements evaluated during this review, all originators occupied positions where the qualifications to fill those positions satisfy the requirements to procure items and services specified above. In addition, the originator was required by the OQAM to specify completely and accurately on the purchase request as applicable the following:

- technical description of the procurement
- component or system of use
- applicable regulatory code
- QA level
- design basis
- other manufacturing requirements
- identify required tests, inspections, and examinations
- list documentation requirements
- specify special handling, packaging, or storage requirements
- determine the original EN DES procurement QA requirements
- evaluate 10CFR21 applicability
- identify special receipt inspection requirements
- specify the date the procurement is wanted

If the originator prepared the purchase request completely and accurately as required, no additional review of the document would be necessary. In practice, contrary to established procedures, the originator was not expected to complete the purchase request

accurately and completely for all items above. For example, the manufacturer was expected to provide information on special handling, packaging and storage requirements. The final QA requirements and Part 21 applicability were specified by the plant FQE staff and NCO QA Group, and the final technical requirements were specified by the plant specifications engineer and NCO QE Group.

NSRS expected to find a training program for originators in place and functioning. None was found nor required. What NSRS found instead was a description by plant supervision of self training. Originators were given a copy of the plant procurement procedure(s) and expected to learn on their own. As a result NSRS found that most routine purchase requests prepared by the originator were changed at the site by FQE and Materials personnel. Those changes ranged from significant (wrong QA level or technical specification identified) to editorial.

While the originator was required by the OQAM and plant procedures to specify everything required in all procurements, they were not given the training necessary to accomplish this.

b. Specifications Engineer

Once the originator completed the purchase request, it was sent to the specifications engineer for review of the technical specifications and coordination with FQE, other maintenance and engineering staffs, administrative staff, Power Stores, and Plant Manager for their input and/or approval. Basically, the specifications engineer was to assure the purchase request was complete and accurate. Both BFN and SQN handled this function somewhat differently.

At BFN there were positions of specifications engineer for both Operations and Field Services that were staffed with engineers. For the Field Services Group, the specifications engineer assumed the function of the originator and filled out the purchase request. For the Operations Group the specifications engineer reviewed the purchase request as completed by the originator.

At SQN the specifications engineer's function was fulfilled by a materials officer from the Materials Unit, who did not have an engineering background. An attempt to review technical specifications was described, but the function primarily fulfilled by the materials officer was one of expediting procurements.

Materials Units at both SQN and BFN were the principal points of contact for technical and quality assurance changes made in the NCO. The NCO Quality Engineering Branch (QE) prepared a form letter to the file with the name of the originator and FQE persons concurring by telephone with the NCO changes. It reportedly was the materials officer's responsibility to assure that input by the originator or FQE was obtained before the changes were approved. On procurements reviewed by NSRS, a variety of names were listed for the originator concurrence on the QE form letters and most of the time the individual was other than the originator of the purchase request. Some approvals were by technical personnel and others were by the materials officer. In all cases the plant FQE engineer approving the purchase requisition concurred in the NCO changes. The materials officers are not technically qualified to approve either technical or QA changes on their own. Contrary to obtaining the originator's approval for changes, a materials officer concurred in the NCO proposed changes for the originator on four specific instances (PRs 942988, 951133, 951028, 951134). With regard to PR 951134, correspondence was found in the procurement file which showed the originator was aware and agreed with the change before the materials officer approval was given; however, in the other three cases no similar correspondence was found. With regard to PR 951028, the NCO added a technical requirement in which the materials officer concurred and to which the vendor took exception. The plant wanted zinc-coated sheet-metal, not oiled. The NCO added not chemically treated. The vendor quoted chemically treated no oil, and the site materials officer approved the exception. The site materials officer should not be concurring in technical changes.

c. Field Quality Engineering

The FQE was also required to review quality level I and II purchase requests for completeness and accuracy and approve them. At both SQN and BFN one individual in each FQE group was assigned that responsibility. NSRS found that in addition to the procurements of quality level I and II materials and services, which this review centered on, that engineer also reviewed all QA level III and IV procurements as well as non-QA procurements. Virtually everything procured by the sites was approved and/or reviewed to assure the proper quality level and requirements had been placed upon the item being procured. To put perspective on the magnitude of that effort, BFN Power Stores provided a compilation of procurements for May and June 1984 showing 1051 procurements, but did not show how many were quality level I or II. That number of procurements

would result in an average of about 26 per day requiring FQE approval and/or review.

The FQE review of purchase requests was described in the OQAM as including both technical and QA requirements. Depending upon the item or service being procured, FQE described their review as including a comparison of the technical and QA requirements with plant drawings and previous procurements of the same item. Although NSRS did not physically observe this type of FQE review in process, the mechanics involved in performing it could be time consuming. Considering the number of purchase requests reviewed, the completeness of each review is of concern. FQE described the number of procurements found with QA levels lower than required as very few. The routine review of non-QA procurements by FQE is, therefore, considered too time consuming by NSRS for the benefit received, and the time expended could be more effectively utilized on QA procurements. A periodic review of a sampling of non-QA purchases should be sufficient to detect program deficiencies.

d. Plant Superintendent

Upon completion of the review and approval cycle of the purchase request, the purchase request was sent to the plant superintendent for authorization.

e. Power Stores

The purchase request with all approvals and authorization was sent to Power Stores for determination of the appropriate method of obtaining the requested item(s) and preparation of the associated documentation. Methods available to Power Stores included direct charge procurement using a purchase requisition, request for delivery under an existing IQT contract, field purchase order to purchase items of less than \$300 from local suppliers, or a transfer requisition (TR) used to transfer items from one TVA site to another. Once the method was selected, Power Stores would transcribe the approved purchase request writeup verbatim on the appropriate form and add on all the purchase request attachments which could include QA and technical specification requirements. Procurement forms prepared by Power Stores were defined as QA documents in OQAM, Part III, Section 4.1, whereas purchase requests were viewed as worksheets and not QA documents. The official QA document requires the signature of FQE and the plant superintendent. Consequently both FQE and the plant superintendent were signing the same procurement action twice.

The purchase request as described to NSRS was not considered a QA document because it was not always prepared in indelible ink and could fade with time. The OQAM, Part III, Section 4.1, required QA records to be prepared in ink or typed. In conflict with that philosophy, NSRS observed attachments to purchase requests (e.g., 10CFR21 applicability form) that were prepared partially in pencil that were classified as QA documents.

In addition to signing the procurement form for record purposes, FQE was required to review for accuracy the documents prepared and attachments included by Power Stores. As FQE was the last to see the purchase request prior to transcription by Power Stores, their review of the finished product was editorial in nature. FQE, therefore, was required by the OQAM to duplicate its own work in reviewing and approving all QA level I and II purchases twice.

Like FQE, the Plant Manager was required to duplicate his work in authorizing both the purchase request and purchase requisition.

With all required signatures obtained, Power Stores then transmitted the procurement package to Chattanooga for additional review and approval prior to going to Purchasing.

## 2. Functioning of Plant Procurement System

Overall, the procurement system used at the plants contained redundancy and was predicated on the concept that additional review will promote a better product. As a general rule, a procurement from the identification of need through transmittal of the completed procurement package to Chattanooga contained 10 signatures or initials signifying review and approval of the procurement. Generally that preparation process was not considered excessive--taking 4 days for normal and emergency direct charges and 1 day for an emergency RD under an IQT contract. More complicated procurements were seen that required 1 to 1-1/2 months to prepare. Of the 10 signatures or initials in the approval process, only 2--the originator and FQE--were identified as having any substantive technical or quality contribution regarding the specifications or requirements of the procurement.

Personnel interviewed were generally aware of their function in the TVA procurement process but generally unaware of the function and responsibility of other sections in that process. With the possible exception of Power Stores, knowledge of Federal procurement regulations was lacking among those in the procurement process. For example, no one at

the plants or elsewhere within TVA knew how long it normally took to procure something. They knew it took too long and seldom arrived when needed. The originators would allow 90 days, in establishing a date wanted, from the time a purchase request was initiated for routine nonemergency purchases of common items (nuts, bolts, steel, etc.), until those items were expected onsite. That date was virtually ignored throughout the procurement process. As a result, the purchase requisition rarely arrived at Purchasing with sufficient time remaining, until the date wanted was passed, to advertise for quotations, let alone time to review the quotations, award the contract, manufacture, and deliver the item. Of the requisitions reviewed by NSRS, it typically took 6 months to 1 year to receive material onsite and the sites were only allowing 90 days. With sufficient training in and knowledge of the procurement process, personnel within the procurement cycle could establish more realistic timeframes in order to receive needed materials.

Probably the most frequent complaint about the procurement process expressed by the sites was the material was not there when needed. That complaint results in large part from the unrealistic expectation placed by the sites upon the procurement system. The site routinely wants rapid results, 90 days or less, and the system can't handle it.

### 3. Planning

Planning of work for maintenance and outage modifications was not a formal part of the review; however, the obtaining of needed materials to perform work was reviewed. As identified in section V.B.2 above, ordered material often arrived at the site after it was needed. There was no one factor producing that condition but several factors beginning with the originator and including all steps through receipt inspection of the material onsite. This review found, however, no evidence onsite that material availability was factored into the work planning process. For further information on planning see NSRS Report R-84-27-SQN/BFN (GNS 841220 052).

For example, in ECN modification work, site personnel explained that a complete ECN package was not received from EN DES. Portions of the ECN package would arrive in stages over some time period. When the sites had what they believed to be a sufficient amount of the ECN package, work would be scheduled and materials ordered. Engineers at the site in charge of the modification work and ordering material openly stated that the material ordered would probably not arrive before the ECN work started. Considering that only 90 days was allowed for procurements that sometimes took 6 months to 1 year to get, that expressed concern was well founded. No effort was found, however, to include a more realistic timeframe in the site planning process.

What resulted, when the material did not arrive, was an exercise in resourcefulness by the site engineers, which they appeared to be very good at. The engineers had to find the material they needed through borrowing it from another engineer onsite, finding it at another site and having it transferred, or initiating an emergency purchase. Effective as the engineers may be, that effort in resourcefulness is time consuming and wasteful. With more effective planning a significant portion of the time wasted on obtaining materials could be eliminated.

4. Special Methods of Obtaining Material and Services

Much of the emphasis within this report is generic in nature and applicable to all types of procurements. The sites have numerous methods available for obtaining material and services with direct charge contract being the most common. This review examined not only direct charge contracts but other methods as well, and this section will focus on the less common methods and their associated strengths and weaknesses.

a. Service Contracts

Often the services of consultants or workers with specialized expertise is required. Like materials being received at a site requires a receipt inspection, the receipt of a service at the site also requires an evaluation and acceptance. Acceptance of a service is identified in the OQAM, and three acceptance methods are listed in Part III, Section 2.1, paragraph 10.0.

On two separate occasions, SQN obtained the service of Furmanite, Inc., to stop leaks which could cause a shutdown of the plant. Those services were requested by purchase requisitions 959104 and 955163 which specified the vendor shall comply with the technical requirements of IQT contract 82P38-925403. On one occasion a Gulf and Western Service representative was requested, under purchase requisition 940060, to perform work at SQN. In all three requisitions it was specified that work was to be performed and documented under TVA procedures and QA program. On four separate occasions SQN mechanical maintenance and compliance personnel were asked for the documentation contained in the work packages or elsewhere, for those three contracts, which satisfied the acceptance of service requirement of the OQAM specified above. NSRS did not receive any such documentation or an explanation of how the OQAM was satisfied and must therefore conclude that it does not exist.

b. Indefinite Quantity Term (IQT) Contracts

An IQT contract can be a powerful tool when procuring the same item or service on a routine, repetitive basis. When such an item or service is identified, an IQT contract can be prepared following the same preparation, review, and approval procedures as if it were a direct charge contract. IQTs are advertised, sent out for bids, bids reviewed, and contract awarded no differently than a direct charge. The difference is, or is supposed to be, that when items or services are required under the IQT, a request for delivery (RD) is prepared and sent to the vendor bypassing the review and approval process. That procedure was described as being followed by EN DES, but not by NUC PR. In each of the NUC PR RDs reviewed by NSRS, the RDs went through the same review process as the original IQT, therefore eliminating any savings of manpower or time gained by having the IQT. Arguments were presented that the IQT was not an actual contract, the RD was, and therefore, had to go through the review and approval process to satisfy QA documentation requirements. It was also argued that some times not everything purchased on an RD was covered by the original IQT.

With regard to the first argument, the IQT contract was retained as a QA record as were the RDs. The RDs specified what was wanted and that the terms and conditions of the specified IQT were applicable. Each RD was reviewed onsite by FQE and an authorizing official. In NSRS's opinion that should be sufficient to satisfy QA requirements and the RD should be sent directly to the manufacturer.

With regard to the second argument, NSRS views that as a completely separate issue. If an item or service is to be procured that was not initially contracted for and a change of contract was required, then it should go through the review and approval process as a new procurement.

The additional review of all RDs by the central office only resulted in additional verbiage added to the RD which was already contained in the IQT. This was considered redundant, unnecessary, and resulting in needless time delays of 20 days or more. The elimination of the central office review by NUC PR should eliminate the problem provided that in transferring the central office positions to the sites the problem was not transferred as well. That transfer was not evaluated as a part of this review.

In the process of evaluating procurement at the sites, a number of direct charge procurements for steel were

observed at each site. It would appear that an IQT contract would be beneficial for those.

A problem with IQTs developed and was apparently solved during this review. It was determined by OGC that RDs for greater than \$10,000 would require advertising in the Commerce Business Daily as if it were a new purchase. OGC later determined according to NUC PR personnel that a periodic generic advertisement would be sufficient to satisfy Federal procurement regulations.

c. Transfers

Although the transfer of material within TVA is not a procurement in a true sense of the word, transfers do provide another commonly used mechanism of introducing new materials to a site. As such, transfers were reviewed as if they were procurements from outside vendors.

Many items have become available for transfer due to the cancelled units and are shipped to all nuclear sites from HTN. Other transfers occur when one operating plant or construction site has unused material which can meet an emergency need at another site.

NOTE: Transfer of electrical cable was not pursued by the review team at this time. Both BFN and SQN personnel identified documentation problems occurring with cable which resulted in a large number of nonconformances being written. Basic problems as told to NSRS stemmed from lack of coordination between the Office of Engineering (Electrical Engineering Branch) and the site and erroneous documentation accompanying cable transferred from HTN. Most participants were already aware of the problem and appeared to be working on a solution. The implementation of the solution will be subject to review in Phase II of the NSRS procurement review.

Form TVA 4139, "Request for Shipment of Material," is used as the means to transfer items between divisions (NUC PR and CONST). The form includes descriptive information of the item, Part 21 applicability, FQE signoff, and other miscellaneous signatures. ID-QAP 4.3, "Transfer of Items," states that the following steps are to occur in an interdivisional transfer:

- (1) Requesting organization establishes a source of available items.
- (2) Requesting organization prepares request for transfer.

- (3) Requesting organization reviews original contract for technical and QA requirements.
- (4) Copies of all appropriate records are transferred on the requested item.
- (5) Source organization transfers materials to requesting organization.

No objective evidence of a technical review occurring utilizing the original contract could be identified. In actuality, the original contract (or copy) was not even requested of the source organization. Site procedures and transfer requisitions were not specific enough in stating what documentation was to be sent. The statement generally found on all transfer requisitions was, "all applicable documentation" to be included. The employee performing the receipt inspection cannot discern if all appropriate documentation has been received if it is not known what the contract required. The decision as to what was applicable documentation was the responsibility of Power Stores personnel transferring and receiving the material. Quality level material with COCs and CMTRs were among the items Power Stores was allowed but not trained to receipt inspect.

Another concern identified by NSRS involved the significant number of nonconformances written against material shipped from cancelled units, usually due to the absence of the original receipt inspection report or a disagreement between the material shipped and the original receipt inspection report. In some cases materials have been transferred that are similar to items requested but technically not the same and useless to the requesting organizations. Site employees expressed concern in utilizing HTN as a source of material. Basically, they had no assurance that the material received on a transfer would be what was originally requested. Although the HTN shipping process wasn't reviewed, NSRS identified enough nonconformed material to substantiate the concern. Controlling of the HTN warehouse will be transferred from Construction to Power Stores in the future and Power Stores will establish it as a distribution center, similar to the present Power Stores distribution center located in Chattanooga. The documentation problem on transferred materials was not limited to HTN. Inadequate documentation similar to that found from HTN occurred from other plant sites transferring materials.

d. TVA Fabricated Equipment

Another mechanism to introduce quality equipment into the plants was for TVA to manufacture the part from stock material. This review had planned to include work performed by the Power Service Shop for the nuclear plants as if the shop were another vendor. This was eliminated from the scope of the review after the BFN review segment because of time constraints.

Before the TVA-fabricated equipment was removed from the review, operator console cables and control festoons for the BFN refueling platform and jib crane were identified to NSRS as being fabricated by BFN electrical maintenance personnel. Completed control cables and festoons were classified as QA level I items and stocked within the Power Stores warehouse. Documentation was obtained on the manufacturing process and materials used to fabricate those items. It was determined that each cable and festoon was manufactured from QA level II parts and nothing could be found that showed how the assembling of QA Level II parts produced a QA level I finished product. When identified to BFN management, they assured NSRS the matter would be corrected.

5. Receipt Inspection Program

The NSRS review of the receipt inspection program was limited to a review of receipt inspection reports and associated documentation. Actual receipt inspections being performed were not observed. The review effort consisted of selecting requisitions at random from the Power Stores files and verifying that all documents requested in the contract had been received. The proper group performing receipt inspection as required by the QA level assigned to the item was noted, i.e., Power Stores personnel only or Power Stores assisted by FQE inspectors. Selected personnel from Power Stores and FQE were interviewed to verify their understanding of receipt inspection procedures. Those interviewed appeared knowledgeable of the NUC PR requirements and site procedures.

The receipt inspection program at the nuclear plant sites was directly linked to the quality level assigned to the material being received. As such, material with higher quality levels was inspected by FQE inspectors and material with lower or no quality level was inspected by Power Stores clerks. The types of inspection performed in those groups had varying degrees of difficulty associated with them, and therefore, the inspector training was significantly different between FQE and Power Stores personnel.

FQE inspectors according to the OQAM perform receipt inspection of all QA level I, level II substituted items (items substituted by the vendor as being equivalent to those asked for), level II and ECN items to which 10CFR21 applies and which are shipped from the vendor directly to NUC PR. The FQE inspectors receive formal training and certification through the Power Training Center that meets requirements established in Regulatory Guide (RG) 1.58 (which endorses ANSI 45.2.6).

Certified Power Stores clerks according to the OQAM perform inspections of QA level II non-10CFR21 items, QA level III, QA level IV, and ECN material transferred to NUC PR from CONST regardless of the QA level. The Power Stores receiving clerks must be certified by the plant QA supervisors. To become certified, 550 hours of on-the-job training must be completed and an examination passed with a score of 70 percent or better. Recertification was required at intervals not to exceed 18 months. Power Stores personnel were also delegated (by the Topical Report) the responsibility of inspecting commercial grade items.

The separation of FQE versus Power Stores performing receipt inspection occurred at QA Level II and was determined by the applicability of 10CFR21, "Reporting of Defects and Non-compliances," to the item procured.

The documentation associated with the QA level II items can vary from certificate of conformance (COC) and certified material test reports (CMTR) to packing slips. During the course of the review, no consistency could be established for documentation required of QA level II items. For example, QA level II items with Part 21 applicability could require certificates of conformance provided by the manufacturer and/or certified materials test reports. Contracts for QA level II, Part 21 not applicable, could also have the previous same requirements and/or a packing slip.

If a packing slip is the only documentation requested on a requisition, the inspection is essentially a number check and the "on-the-job" Power Stores training is acceptable to perform the inspection. However, the appropriateness of Power Stores personnel performing document reviews (such as COCs and CMTRs) that they have not been trained to perform against material received is questionable and of concern to NSRS. Examples of Power Stores receipt inspecting CMTRs on QA level II (Part 21 N/A) material were identified at BFN. Material requested was to be either ASTM A336 or A479, type 316 stainless steel. The CMTR received with the material specified results for ASTM A276, type 316 stainless steel. The items weren't nonconformed. The difference in material was being evaluated by BFN QA Staff at the conclusion of the review.

Two examples of materials being received without having all associated documentation were identified at SQN. Those items had been received on a transfer from HTN. They did not have the original CONST receiving reports and had not been nonconformed by SQN (reference V.B.4.c). The CONST reports were later obtained by Power Stores personnel.

A basis for 10CFR21 nonapplicability, in the NUC PR structure, was the determination of an item to be "commercial grade." A commercial grade item is considered to be an industry manufactured standard product with sufficient use history in non-nuclear applications to justify its use in a nuclear application. When Part 21 was determined not applicable, Power Stores receipt inspected the item.

ANSI 45.2.6, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants," defines inspection as:

A phase of quality control which by means of examination, observation, or measurement determines the conformance of materials, supplies, parts, components, appurtenances, systems, processes or structures to predetermined quality requirements.

The personnel who perform those inspections are required to also meet the established standards of inspectors as specified in ANSI 45.2.6.

If an item has no predetermined quality, then an inspection as defined above wouldn't apply, and the Power Stores clerks performing receipt inspection wouldn't have to be trained to ANSI 45.2.6 requirements.

The inspection and treatment of a commercial grade item takes on new meaning and becomes quite important if the item is subsequently used as a basic component. The Code of Federal Regulations in Part 21, "Reporting of Defects and Noncompliance," states that a commercial grade item can be designated for use as a basic component through "dedication." The dedication process is basically TVA accepting responsibility for the quality and performance of the dedicated commercial item. When TVA accepts that responsibility, there should be some documented assurance of the quality of the item.

That assurance could be established through means such as the following:

- (1) audit of the supplier
- (2) testing of the item
- (3) verification of certificate of conformance
- (4) maintaining records documenting supplier history

The previously identified concern of Power Stores personnel performing receipt inspection on materials and related documentation with minimal training becomes more important when realizing that commercial grade materials can be dedicated as basic components.

In many cases, the Power Stores clerk is the only one who has evaluated the quality of an item before use. The importance of the inspection has gone beyond the basic inventory of items received versus items ordered and should be performed by FQE inspectors who have been trained in the review of documentation related to procured items.

However, it also should be emphasized that the FQE inspector receiving the certificate of conformance is basically looking for a signature. The review team did not pursue the validity of COCs but did observe the following:

- (1) No testing is routinely performed on material to verify material properties as stated by the manufacturers. (FQE formal training doesn't include testing methods.)
- (2) Not all vendors who provide COCs with commercial grade material have been audited by TVA. Therefore, the value of the COC would be in question.
- (3) Supplier and product history has not been maintained on materials received and used onsite. Therefore, no documented bases exist to substantiate the acceptability of an item on that basis.

As a result, for true commercial grade items supplied by a vendor without an approved QA program and with no supporting QA documentation, the only assuring activity remaining for TVA is testing of the item. No program was identified that tested items upon receipt. As identified in section V.G there are no TVA controls over the manufacturing process or materials for true commercial grade items that could assure that the materials of construction and operability of an item is acceptable for its intended purpose or its environment of operation.

NUC PR personnel stated a functional test of equipment was required when repaired or replaced. That test should provide suitable evidence that the item functions properly under normal operating conditions. That test will not, however, provide any assurance or demonstrate an ability of that item's functionability with respect to time or environmental conditions present during an accident. As such that functional test is unsuitable for assuring a commercial grade item used as a basic component will function as required during accident conditions.

## 6. Storage and Reorder of Shelf Life Items

The complete storage program for all procured materials was not reviewed at this time due to the amount of work already performed in this area by other TVA organizations. Some inadequacies and noncompliance to DPM requirements have already been identified through audits performed by OQAB of the storage program (reference audit report BF-8400-03). BFN and SQN are currently planning and building larger storage facilities which will reduce some inadequate storage conditions. Follow-up activity related to the OQAB audit should include a review of the entire storage function on all procured materials to verify compliance to DPM N82A17, "Equipment and Materials Storage Requirements for Nuclear Power Stores."

The NSRS review team limited the storage portion of the review to an area not emphasized in previous audits, but one that presented problems in the accessibility of materials. A basic problem identified by site employees was the unavailability of routine inventory items, with limited shelf life, when needed for maintenance. Examples told to the review team at both SQN and BFN involved rubber products such as O-rings and gaskets and chemicals reaching their expiration date with no suitable replacements available in stock. A limited review in the storage area was performed to address the specific problem of shelf life items. The storage requirements reviewed include the OQAM Part III, Sections 2.1 and 2.2, DPM N82A17, DPM N77A2, BF16.4 and SQA45. Discussions were held with Power Stores representatives who have the responsibility of performing the inspection on shelf life items and the subsequent reordering of materials. Records were also reviewed for completeness and accuracy of previous inspections performed.

The N-OQAM addresses the inspection of shelf life items in both Part III, Section 2.1, "Procurement of Materials, Components, Spare Parts, and Services," and in Part III, Section 2.2, "Receipt and Inspection, Handling, and Storage of Materials, Components, and Spare Parts."

Part III, Section 2.1, paragraph 3.2.3.4, "Limited (or Shelf) Life Material," states that "For additional guidance in NUC PR's policies with regard to limited shelf life or natural aging life refer to DPM No. N77A2, 'Storage and Shelf Life Considerations for Materials with Natural Aging Life.' This document covers requirements for procurement, receipt inspection, periodic inspection, and disposition."

While DPM N77A2 previously contained shelf life requirements its revision log under the entry of March 21, 1983, stated that the "Revision removes requirements for periodic inspection of materials with limited shelf life." It did, however, contain a requirement to reorder shelf life material

at least three months prior to their expiration date. As stated in section V.B.2, three months may be an inadequate lead time.

Part III, Section 2.2, paragraph 4.3, "Inspections," stated that "Inspections shall be performed and documented on a periodic basis to ensure the integrity of the item and its container is being maintained . . . specific inspection requirements for equipment and material are delineated in DPM N82A17." That DPM, which did not cover all items with a shelf life, was revised on September 7, 1984 removing the inspection criteria.

Consequently, whatever inspection process was intended by the OQAM reference to lower tier document requirements was lost with the revision of both DPMs.

The Power Stores personnel at SQN and BFN had different procedures for inspecting and reordering material with a shelf life. Materials were being inspected at SQN near the expiration date and then reordered. BFN was performing an inspection when material reached about one-half its specified shelf life but assigned a low priority to the reordering of those materials.

SQN Power Stores personnel did state that a shelf life item inspection program would be initiated in the near future, but no specified date was identified. The program described would provide an inspection at six months prior to the expiration date.

The BFN site procedure BF16.4, "Materials, Components, and Spare Parts Receipt, Handling, Storage, Issuing, Return to Store Room, and Transfer," was reviewed. BF16.4 referenced incorrectly DPM N77A2 for the storage and inspection requirements of shelf life items. BF16.4, section 4.8, was consistent with DPM N77A2 and required the reorder of shelf life material at least three months before the expiration date.

In order to verify compliance with the BF16.4 inspection requirement, three months of computer printouts (May 1984 through July 1984) were reviewed that listed all shelf life stock items due to expire during the month. A checkmark (✓) had been placed by each item by Power Stores personnel verifying that an inspection had been performed. That type of documentation did not meet the requirement of OQAM Part III, Section 2.2, paragraph 4.3, which stated that a form similar to attachment 4 of that OQAM section should be used for inspections.

At BFN five items were selected from the June 1984 computer listing to evaluate the shelf life inspection process. Of those, two items were judged by BFN to be in acceptable

condition and their shelf life did not expire for another year. Therefore, no reorder was required. In contrast, three of the items were due to expire within three months and had not been ordered, i.e., a purchase request had not been written.

It was emphasized by Power Stores that those small quantity items were not being reordered until a larger quantity order could be made. Certain constraints regarding the minimum dollar value of orders were imposed by PURCH and manufacturers. While the size of an order may be relevant, materials should also be ordered in a timely manner. The consolidation of orders to make "quantity orders" was the responsibility of MMSS. (See V.C.1 for details.)

When material exceeded its specified shelf life, which appeared to be a common occurrence, specific approval by PORC was required at each site to use the outdated item. More recent industry philosophy regarding materials with shelf life is contained within ANSI/ASME NQA-1-1979, Supplement 8S-1. That standard requires that shelf life items be identified and controlled to preclude the use of items exceeding their shelf life. As such it appears inappropriate for TVA to remove requirements regarding shelf life inspections, and to continue the practice of reordering material as the shelf life expires or without sufficient lead time to assure a supply of fresh material.

### C. Power Stores

#### 1. BFN and SQN Power Stores

The initial review time in Power Stores was spent gaining an understanding of the basic mechanics of site procurements (forms used, terminology, coordination required, time delays, etc.) and reviewing procurement files. Power Stores maintains a file on each procurement, which includes all available information relating to the specific procurement (request, requisition, receipt inspection report, etc.). Those files became a main source of information for the review team and, with a few minor exceptions, were essentially complete records. Various personnel were interviewed to ascertain their understanding of the total procurement system and to identify their specific responsibilities and problems within the procurement system. Those interviewed appeared conscientious in the performance of their understood responsibilities and demonstrated a willingness to assist the review team in locating documents relating to specific procurements. Areas reviewed included the automated reordering of stock items, the utilization of the MAMS database, the shelf life item inspection program, the Power Stores receipt inspection program, associated training, and handling of records. (The receipt inspection program and storage of shelf life items were previously discussed in sections V.B.5 and V.B.6 respectively.)

Power Stores personnel were responsible for typing requisitions and coordinating all the required signatures. They also helped locate needed materials within TVA by utilizing available information on the MAMS system and assisted in coordinating transfers of materials between divisions and other storerooms. Reorders of stock items were also initiated by Power Stores.

The utilization of the MAMS database onsite was controlled by Power Stores. Basic information on stock items was available through that system which functioned on a Reorder Point/Reorder Quantity (ROP/ROQ) concept. In principle a maximum (MAX) inventory level was established for each item to support plant needs without excessive inventory. A minimum level or ROP was also established which allowed sufficient time to order and receive replacements without exhausting the inventory. When the stock level reached the ROP (MIN) amount, an order could be placed for the ROQ to bring the inventory back to the MAX level. The MAMS system also contained data as to the date and amount of an item withdrawn at that time, i.e., a usage history.

The development, maintenance, and changes to the MAMS system with inputs from Power Stores and NUC PR are the responsibility of the Materials Management Services Staff (MMSS). The MAX-MIN levels have been evaluated by the MMSS in an attempt to better utilize stock inventories, either increasing or decreasing as necessary. A basic problem faced by site personnel was caused when MMSS reduced stock levels based on incomplete information. Procurements through emergency and field purchases on a specific item were not included in the MAMS usage history and therefore were not included in the evaluation. Both users of MAMS and MMSS personnel offered explanations of why and how stock shortages of certain items occurred. NSRS decided that ascertaining the validity of the explanations would not be fruitful, as Power Stores and MMSS were well aware of the problem and appeared to be cooperating in establishing meaningful usage histories to base stock reductions and increases on. Unfortunately, the originators at SQN and BFN felt they were being hampered in their work by not having basic materials available when needed. They considered MMSS the problem because MAX levels weren't high enough. A problem, resulting from the shortage of materials in stock and the MAX level being too low, was identified at both BFN and SQN and involved the hoarding of materials.

In an attempt to ensure adequate supplies when needed, user organizations would "buy out" certain items as they arrived in the stockroom, thus forcing the reorder of that item. Power Stores personnel stated that on some specific items, no matter what the MAX level was, they could never keep material in stock. Those items varied from mops and cleaning supplies to plastic bottles and electrical equipment.

Power Stores is responsible for issuing material when requested and not for questioning the usage of material.

The hoarding of materials demonstrated the frustration level experienced by maintenance and modification personnel and their lack of confidence in the procurement system. The hoarding problem was discussed with Power Stores personnel at the central office. Plans were described for better utilization of the Power Stores Distribution Center in Chattanooga as a source of heavy use stock items. Plans also included the establishment of the HTN warehouse as a Power Stores Distribution Center.

Contained within the MAMS system was the capability of MMSS in Chattanooga to monitor stock levels at all Power Stores locations and to automatically reorder material as the reorder point was reached. MAMS also had the capability of combining orders of like material, but MMSS personnel stated they were prohibited from using that feature by OGC. The reasoning behind that prohibition was not pursued.

While the MAMS system has an automatic reorder feature, it was not being utilized because the plant FQE was required by the OQAM to review and approve all procurements (both QA and non-QA). Consequently, all inventory reorders were prepared by hand and the combination of like orders by MMSS was performed by hand. Rationale for not using the automatic reorder system was that the MAMS system was not a QA system and changes to the information within MAMS (material specifications, QA level, etc.) could be made without QA knowledge or approval. Information was provided NSRS which explained efforts underway to develop a procedure acceptable to QA which would protect the MAMS system from unauthorized QA changes. NSRS highly endorses that effort. Upon completion of that feature the MAMS system should be usable to a larger extent, thus eliminating the considerable manpower requirements currently required to manually reorder inventoried material.

## 2. Power Stores Distribution Center

The review of the distribution center in Chattanooga and the Investment Recovery Program (IRP) warehouse at HTN was limited to discussions with Power Stores personnel.

Power Stores currently has a distribution center warehouse in Chattanooga. At the time of this review over 100 items were being stocked there. The basic concept of that center was to provide a warehouse of inventoried items that the plants stockrooms could draw from. Described plans included maintaining a 6-month supply of items, thereby allowing the plants to reduce their inventory and associated storage requirements. In concept that idea appears functionally sound but will require the cooperation of all concerned to

work within the system. During this review, Power Stores was having difficulty maintaining a stock of mops, for whenever a delivery was made to BFN to replenish their inventory, plant personnel would "buy out" the mops and hoard them. That process created a real shortage within the Power Stores system based upon a perceived shortage by the users.

The distribution center did not have a QA program, but Power Stores personnel stated that one was being developed. At the time of this review the only QA material stored at the center consisted of welding rod and dye penetrant. As Power Stores personnel were not ANSI N45.2.6 trained receipt inspectors, any quality material received at the center required an FQE inspector to go from SQN to the center to perform the receipt inspection.

The IRP associated with TVA's canceled nuclear plants provided a vast supply of materials to the remaining nuclear plants. Power Stores was in the process of taking control of the HTN IRP warehouse operation. It was described as containing material with an acquisition cost of approximately 100 million dollars including approximately 33,000 valves. Approximately 40 percent of that material had QA documentation sufficient to support use in a QA system and the remaining 60 percent was suitable for non-QA systems or fossil plants. Like the Chattanooga distribution center, Power Stores described plans to keep the HTN facility as a distribution center for large items. The HTN facility was also having QA and preventive maintenance procedures prepared.

D. Central Office

The central office portion of the procurement review primarily involved the following groups: Nuclear Central Office Quality Assurance Branch (NCO QEB), NCO Materials Management Section (MMS), Central Power Stores, and the Materials Management Services Staff of Operations Support.

The OQAM (Part III, Section 2.1) was the reference used to define the responsibilities that each of the above groups had in the procurement cycle. Flowcharts which correspond to the OQAM-defined responsibilities were found in DPM N72A14. Requisitions for QA level I and II (Part 21 applicable) materials and services were reviewed by various groups in the NCO. Power Stores and MMSS basically reviewed requisitions for inventory items. Implementation of these documents was evaluated with only a few exceptions to compliance identified.

It should be noted that many of the NCO procurement responsibilities and associated personnel had been transferred to the plant sites on October 1, 1984, and the organization reviewed by NSRS was the one in place prior to October 1, 1984. As the functions

and responsibilities no longer exist at the NCO, an individual breakdown of each organization and associated problems will not be presented but an overall summary is provided.

Procurements of QA level I and II 10CFR Part 21 applicable materials and services were circulated for review and approval throughout the NCO groups identified above. The only group with any visible impact upon a procurement package was the NCO QEB. Other groups provided signatures of approval or acknowledgement or were within the distribution cycle due to the mandates of organizational communications. The value added to the procurement documents by QEB on the 21 procurements followed from the sites through the NCO was minimal. For the most part QEB changes were editorial rather than substantive (e.g., changing the verbiage specifying 10CFR Part 21 was applicable). Technical review of procurements were also being performed by QEB. Both the OQAM and DPM N72A14 specified it was to be performed by the NCO technical branches when required. NSRS found that the technical branches who were previously performing most of the technical reviews were no longer doing so and it was being performed by an SC-2 mechanical engineer in QEB.

The responsibilities of the MMS were essentially clerical. They were to "coordinate central office NUC PR procurement communications among the nuclear plants, Power Stores, and the NCO." (OQAM Part III, Section 2.1, 2.2.1) They also performed a review of requisitions for "administrative correctness and completeness." (OQAM, PART III, Section 2.1, paragraph 3.1.2.10) The review was similar to others performed by the site and not considered necessary by NSRS. The MMS served as a paper coordinator that moved QA levels I and II requisitions between Power Stores, NCO QEB, and the technical branches. Files had also been maintained on specific requisitions, but these files were not evaluated for completeness because they were being transferred to the plant sites. The MMS also interfaced with other procurement groups on IQT contracts. The IQT tracking of available funds and administration of IQT contracts were functions still performed by the MMS after the October 1984 reorganization.

Findings regarding length of time to prepare, review, and approve procurements within NUC PR can be summarized as follows:

1. Normal direct charge procurements took 4 days to prepare and approve at the sites and 2 months to review and approve in the NCO.
2. Emergency direct charge procurements took 4 days to prepare and approve at the sites and 7 days to 1 month (15 days average) for the NCO to review and approve.
3. Emergency Requests for Delivery took 1 day to prepare and approve onsite and 8 to 14 days for the NCO to review and approve.

4. More complicated nonroutine procurement took 1.5 months for the site to prepare and approve and 7 months for the NCO to review and approve.

Even though NSRS found that the NCO provided little assistance on most procurements, one procurement of services to decontaminate and repair a Westinghouse CCP motor for SQN was reviewed where considerable NCO help and input was provided; however, considering all the procurement documents reviewed, the value added by the NCO could not support the continuation of several weeks or months delay between preparation at the site and transmitting the procurement package to vendors for bids. The NCO was not providing a service the plants could not provide for themselves with proper training. NSRS supports the NUC PR decision to eliminate the NCO from the procurement review cycle provided the function was not just transferred unchanged to the site.

E. Office of Engineering

The Office of Engineering (OE, formerly Engineering Design) was reviewed from the standpoint of their involvement in the procurement process for operating plants. Their involvement primarily consisted of design work on modifications. As a general rule if a modification involved the procurement of engineered items (valves, pumps, etc.) OE would procure those items. NUC PR would procure any remaining stock type items (steel, pipe, conduit, etc.). A part of the modification package consisted of a Bill of Materials which listed all the materials needed for the modification and identified by procurement contract number those purchased by OE. A problem expressed by NUC PR, but not pursued as a part of this review, was that the Bill of Materials did not necessarily arrive onsite in time for NUC PR to know what materials to buy. As a result, modifications were sometimes started not knowing if all the required materials were available.

Inconsistencies between OE and NUC PR terminologies and procedures were identified which could present problems. One such inconsistency involved the QA level assigned procured material. Within OE material was either QA material or not and if it were QA material 10CFR Part 21 was applicable to the vendor. NUC PR, on the other hand, had four different levels of quality within the QA materials it purchased and non-QA material. Within the four QA levels two had optional 10CFR Part 21 applicability. Consequently what was designed and constructed as either a QA system or a non-QA system was being maintained and modified using six different QA classifications and no QA. This is not to imply either is more or less correct, but to point out an inconsistency within TVA of doing work that really should not be there.

Another problem was identified in that the nomenclature used to define the various design classifications for piping systems were different for each plant and no official definition for the classifications could be found. An engineer within OE provided a list he developed for his own use. Engineers at the plants have

a problem knowing what a piping classification means on a modification drawing because the plant engineers don't classify their systems the same way as OE. That problem results in the plant engineer having to communicate with OE for an interpretation before material is bought so the appropriate material specification can be placed upon the item procured.

Regarding OE procurements, one good practice was identified in that Requests for Delivery on an IQT contract could be issued directly from OE without going through the laborious review and approval process employed by NUC PR. Another practice, which will be discussed further in section V.G, of questionable validity was identified. Where a large component was assembled from commercial grade parts (parts not requiring an ANSI N45.2 QA program over manufacturing) and qualified to an 1E environment, OE continues to procure replacement parts as commercial grade and assumes the component maintained its 1E classification.

No areas for improvement specific to OE were identified in the limited areas reviewed.

F. Purchasing

The review time spent in PURCH involved gaining an understanding of the laws pertaining to Federal procurements, identifying the purchasing agents' (PA) responsibilities and their specific problems within the procurement cycle, and tracking specific requisitions through the bid process and award of contract. Specific internal PURCH procedures were not reviewed or evaluated due to time constraints. The PAs appeared conscientious and professional in the performance of their responsibilities and demonstrated a willingness to help in improving the procurement system. They consistently expressed concern over the excessive use of emergency purchases and unrealistic "want" dates and how these affect TVA credibility with vendors. The PAs also stressed the need to be technically accurate on all specifications found in requisitions. In the PA's opinion, too many specification problems were being identified by vendors and not within the TVA review cycle.

One review area involved obtaining a general understanding of the legal constraints placed on Federal procurements. Many were identified including low bid and EEO and small business requirements. Many of these requirements, including their impact upon the procurement process such as time delays, were unknown to site technical and NCO personnel. A relatively new constraint, Public Law 98-72 and the associated requirement that procurements of \$10,000 and over be advertised in the Commerce Business Daily prior to the bid process were known by site personnel and presented more consternation than any of the others discussed during this review. That law allows all interested vendors the equal opportunity to bid on an item and delays bid opening up to 45 days. Unfortunately, due to the great number of items required to be advertised in the Commerce Business Daily by all Federal

agencies, a 3- to 30-day waiting period resulted at the Department of Commerce before the ad was placed. That presented an additional significant time delay in an already lengthy process. Although many people informed the review team of the 45-day advertising requirement, there was no awareness of the waiting period delay by the site originators. Had they been aware of the additional delay there was no reason to expect that that time delay would be factored into the ordering lead times because no other time delay had been factored in either by the originator or anyone else in the procurement process.

A consistent problem identified by the PAs was the amount of time taken in the resolution of problems identified on a requisition and exceptions taken by vendors when submitting bids. The PA did not communicate directly with the originator. In fact, the PA typically did not know who the originator was. The signature of the originator was not on the requisition. Therefore, the PA had to rely on someone else (possibly from Power Stores or the Materials Unit onsite or NCO) to coordinate resolution of problems identified with the requisition after the bids were received. The agents varied as to the method used in the coordination process although all were aware of the resultant time delay.

Another problem identified by the PAs was the time delay involved in getting bids approved by the NCO QA Staff. The "review" performed by NCO QA (when no exceptions to the contract are taken) consisted of stating which of the low bidders were on a list of vendors with a TVA-approved QA program. The process of PURCH sending the bids for review was extremely cumbersome and time consuming. PURCH sent the bid to Management Services, who sent it to Materials Management, who sent it to QA. After approval the process was reversed. If an exception was involved, QA would send the exception to the site and coordinate approval between FQE, Materials Unit, and originator as necessary.

The time delay resulting from the memorandums and paperwork generated in stating which of the lowest bidders had a TVA-approved program was considered excessive and unnecessary by NSRS. In many cases the PA had worked consistently with a particular commodity and was knowledgeable of the approved vendors. To eliminate time delays and excess written communication, it would appear prudent to establish guidelines to allow PAs the task of selecting the lowest bidder from the approved vendors list. That responsibility would be applicable for cases only in which no exception was taken by the vendor.

The PURCH portion of the review occurred a few days prior to the October 1, 1984 transfer of NCO procurement responsibility to the sites. The PAs had limited or no information concerning the changes which would affect the procurement cycle. Although some time is required in a transition stage to incorporate changes, the review team considered this symptomatic of what appeared to be limited communication occurring between NUC PR and PURCH.

G. Quality Assurance

The NRC regulations and TVA procedure recognize that basic components can have varying degrees of quality placed upon them depending upon their importance to safety. The OQAM establishes four QA levels (level I, II, III, and IV) to which items or services for CSSC may be assigned. Guidelines in assigning levels are listed in paragraph 3.2.5.2 and are identical to those listed in ANSI N45.2-1971. These are interpreted by NSRS to range from items requiring considerable QA activities to those requiring little or no QA, i.e., commercial grade items of standard design which have proven successful for many years. In reviewing the QA levels in OQAM, Part III, Section 2.1, paragraph 3.2.5.2, it is found that each apply to CSSC with QA level I basically applying to, among other things, ASME Code material and items procured to a standard unique to the nuclear industry and decreasing in safety importance to QA level IV with no safety-related function.

Reviewing the definitions contained within 10CFR21, 10CFR50, and associated appendices, regulatory guides, and the OQAM, it was clear that TVA has equated the following terms:

1. Basic component.
2. Critical systems, structures and components (CSSC).
3. Structures, systems and components important to safety.
4. Safety-related structures, systems and components.

Those definitions being equivalent are used throughout the OQAM in a variety of contexts and introduce conflict and confusion.

A contradiction is introduced in the description of QA levels III and IV. In the OQAM both levels III and IV are described as being for CSSC items, but elsewhere the OQAM specifies that levels III and IV are not for basic components.

The use of commercial grade items in association with QA levels presented confusion and contradiction. Commercial grade items were allowed to be purchased by the OQAM, Part III, Section 2.1, paragraph 3.2.5.2 with QA levels I through IV. However, OQAM, Part III, Section 2.1, paragraphs 4.3.1.7 and 4.5, excluded level II as an option for purchasing commercial grade items. In addition the OQAM, Part III, Section 2.1, Appendix F, paragraph 2.2, stated commercial grade items were not basic components.

Items procured with quality level I and II designations require considerable documented quality control unless procured as commercial grade. A commercial grade quality level I or II procurement could be from vendors with an unapproved QA program, require no documented quality assurance, and receipt inspected by Power Stores personnel. Although allowed by the OQAM most but not all procurements of QA level I and II commercial grade items seen by NSRS were required to be from vendors with N45.2 approved programs.

As the QA requirements are all essentially the same for commercial grade items, NSRS believes there is a fallacy in trying to pigeonhole purchased commercial grade items into a variety of QA levels. The origin of this fallacy appeared to stem from the application of 10CFR21 to items procured to either QA level I or II. TVA, in the OQAM, stated that the determination of Part 21 applicability applied only to QA level I and II procurements. Determination of Part 21 applicability was contained within OQAM, Part III, Section 2.1, Appendix F. In order for Part 21 to be determined not applicable, the item being purchased must have been a commercial grade item, must not have been a complete basic component, or several other criteria. Appendix F, Attachment 1, was a form, "Determination of Part 21 Applicability," which when completed became a QA document. The first question asked was "is the item 'commercial grade' (yes or no) . . ." If the answer was yes, Part 21 was not applicable and any remaining questions remained unanswered, such as, could its failure cause a basic component not to perform its required safety function. NUC PR QA personnel agreed this was a problem.

Considering whether or not a commercial grade item could affect the ability of a basic component to perform its safety function was addressed by the NRC when Part 21 was developed. In its first publication of Part 21 as a proposed rule on March 3, 1975, the wording was such that Part 21 could be considered applicable to off-the-shelf or catalog items. In response to inquiries and public meetings, NRC amended Part 21 on October 19, 1978, and recognized that commercial grade items could be purchased without the Part 21 requirement to report defects and the associated liabilities for not reporting them. This recognized that commercial grade items could be purchased for use as a basic component and Part 21 would become applicable after "dedication" of the part as a basic component. Based on discussions with TVA Office of the General Counsel (OGC), this dedication means to put into use and at that time Part 21 reporting requirements becomes the responsibility of TVA. Consequently, the NRC has allowed the use of items with a variety of QA levels including commercial grade as basic components. However, the use of commercial grade items with Part 21 not applicable does not eliminate the need for some level of quality, rather it shifts the burden of assuring quality and the continued ability of that item to perform its safety function from a joint manufacturer/TVA responsibility to TVA's sole responsibility. That is, if TVA procures a commercial grade item for use as a basic component, it must either assure quality during the manufacturing or through receipt inspection, testing, or other means. For a true commercial grade item that is purchased off the shelf by part number with no documented quality, the only avenue available to TVA to assure quality is through receipt inspection and testing.

In OQAM, Part III, Section 2.1, Appendix F (2.3.1) the statement is made, "Specific components, systems, and structures listed on the CSSC list are basic components by definition unless procured as commercial grade." Therein lies the fallacy. A basic com-

ponent remains a basic component whether or not it is replaced with a pedigreed item or commercial grade item.

Part 21 specifies [21.3(a)(4)] that "a commercial grade item is not a part of a basic component until after dedication." It does not state that a basic component ceases to be a basic component if supplied as a commercial grade item. A commercial grade item can be used as a basic component once dedicated, and it can be used where its failure could cause a basic component not to perform its required safety function. All the Part 21 applicability means for a commercial grade item is if TVA finds it defective at some point in time, TVA must report the defect to NRC just as the vendor or TVA would have to do if a defect were found on an item where TVA imposed Part 21 upon a manufacturer.

In determining Part 21 applicability one criterion for judging Part 21 not applicable is by identifying the item as a commercial grade item. Most Part 21 not applicable determinations seen during this review were because the item was identified as being commercial grade. That determination has resulted in what NSRS concludes as a misapplication of the definition of commercial grade. One example is offered in support of that conclusion:

- o Requisition number 951134 from SQN was written to procure sheetmetal for ECN 2768. The metal was to be manufactured to ASTM specifications and required the manufacturer, through Appendix E Attachment 8, to have a quality assurance program that met the requirements of ANSI N45.2-1971. The items being procured were classified as commercial grade and assigned a QA level I Part 21 not applicable.

Purchasing that material to an ASTM Standard and requiring an N45.2 QA program is certainly more restrictive and prescriptive than purchasing an item to a catalog number. It therefore should not be classified as commercial grade. Part 21 may still not be applicable, but for different reasons such as it would not adversely affect the performance of a safety function.

It appears that a situation occurred where material was being procured not for a basic component but for an application that still required QA level I attention. As the Appendix F, Part 21, applicability form first questioned whether or not it is commercial grade, it appeared that personnel completing the form were taking the easy way of determining Part 21 not applicable by calling it commercial grade thereby avoiding the evaluation of other significant qualifying factors.

It could be argued that it makes no difference if Part 21 is declared not applicable by either calling the item commercial grade or by deciding it is not a basic component. The argument breaks down, however, when, as stated previously, it is recognized that the manufacturing of commercial grade items requires no approved QA program or FQE receipt inspection while other

will in fact be exactly the same as the one qualified, and therefore maintain that qualification. If a true commercial grade item is purchased by part number from a manufacturer or supplier, the manufacturer or supplier is not required to have an approved QA program, and TVA only receipt inspects the item to assure that the part number is correct. There was no testing or inspection by TVA identified that would assure that the item would perform as required or that detrimental changes to the item occurred or did not occur. NUC PR does perform a functional test of newly installed equipment which should provide some assurance that it will perform during routine operations. That test, however, will not provide any assurance that the item will perform as required under accident conditions. The manufacturers of commercial grade items are under no obligation or authority to identify changes. NSRS was informed that changes generally are accompanied by a part number change by the manufacturer. That, however, is by convention rather than by requirement. Additionally, what would constitute a change would probably differ from manufacturer to manufacturer, and a change as subtle as using a different lubricant (which could have a very detrimental effect under accident conditions) would probably not be considered a change by any manufacturer.

OE personnel interviewed stated that some manufacturers will not sell commercial grade items to a nuclear plant. OE personnel stated that if certain manufacturers received an order for a commercial grade part and knew it was to go, e.g., to SQN, they would automatically provide the QA documentation on the item, delay shipment about six months while assembling the documentation, and would charge ten times the amount they would charge for the same item if it were commercial grade. OE stated no value was added to the part, it was not manufactured any differently than the commercial grade item, and TVA already had the item so if a defect were found TVA would receive its 10CFR Part 21 notification on the previous or original orders. To avoid what OE considered exorbitant pricing, an ordering procedure was devised when ordering parts from certain manufacturers where the Power Stores Distribution Center was the recipient of the commercial grade item. Specific instructions were provided to PURCH on the Purchase Requisition not to mention 10CFR Part 21, 1E qualification, or nuclear plant. At the time the Purchase Requisition was prepared, a Transfer Requisition was prepared for the use of the Power Stores Distribution Center when the item was received. That Transfer Requisition changed the classification of the commercial grade item to a QA item and directed shipment to the appropriate nuclear plant.

That procedure had been reviewed and approved by both OGC and OQA. Discussions with Division of Quality Assurance, Procurement Evaluation Branch, personnel revealed that the manufacturer in question did, according to OQA audits, have different production runs and QA requirements for items going to nuclear plants; therefore, it appears that some value was added to the commercial grade item for the increased fee.

This entire question was not pursued any further as a part of this review. NSRS has serious reservations regarding this practice and reserves final judgement until it can be evaluated further. Until that time it would be considered prudent on the parts of OE and NUC PR PEB to evaluate this practice on their own.

With the conflicts, confusion, and fallacy described above, the situation has developed where the QA level system is being further divided within the levels I and II, through the use of Part 21 applicability, to accommodate commercial grade items. In doing so an artificial QA level is implied for a commercial grade item (i.e., commercial grade item purchased with no QA and assigned a QA level of I or II), or items appropriately purchased with a QA level and requirements are called commercial grade. It is considered more appropriate and less subject to errors if the commercial grade items are recognized for what they are, either QA level IV or non-QA, and procurement of QA level I and II commercial grade items should be prohibited. In addition, all QA level I and II items regardless of the Part 21 applicability should be receipt inspected by FQE. Further, the quality requirements associated with an item adequately performing or affecting a safety function need to be separated from the Part 21 commercial grade determination which has nothing to do with quality. Whether the quality assuring activities for an item's ability to perform a function is jointly shared by the manufacturer and TVA or solely by TVA, is irrelevant to the required quality activities.

There is a basic philosophical problem with the QA program for items purchased as basic components versus items purchased as commercial grade but dedicated as a basic component. TVA's procurement QA program for basic components is based upon adding additional TVA quality assurance activities where there is quality assurance to begin with in the manufacturing process and have no quality where there is no verifiable quality in the manufacturing process.

To fulfill its responsibility when using commercial grade items as basic components, TVA will have to develop some mechanism to qualify replacement commercial grade items such as a receipt inspection and testing program that is more stringent than what is currently in place for QA items requiring FQE receipt inspection. (For additional suggestions and information on receipt inspection see section V.B.5.)

With regard to the QA program associated with procurement, the OQAM was found cumbersome and sometimes contradictory, 10CFR21 applicability was being used incorrectly as a determinant in establishing quality levels, and the Appendix F, Attachment 1 form, for 10CFR21 applicability was inappropriate and being misused. In addition, commercial grade items were being given implied quality by assigning a quality level to them, and TVA had no mechanism to assure a commercial grade item used as a basic component would function when needed during accident condition.

H. NUC PR Procurement Problem Task Force

The review team interviewed two of the three-member NUC PR Procurement Problem Task Force to gain an understanding of the perceived problems within the procurement system. The task force report and recommendations were issued subsequently on August 10, 1984 in a report from Eric Kvaven to Jim Darling (LOO 840810 294). That report was reviewed by NSRS considering all material assimilated during the procurement review. The major recommendations identified in the Management Summary of the task force report were to:

- (1) Establish an adequate planning group at the plant.
- (2) Implement status tracking systems.
- (3) Set goals for turnaround time for each review/approval cycle step.
- (4) Improve and add adequate resources for expediting efforts.
- (5) Improve communication between PURCH and the site.
- (6) Eliminate all unnecessary steps in the procurement cycle with the goal of placing very few, if any, steps between the requisitioner and the purchasing agent.
- (7) Improve the inventory stock out problem.
- (8) Better utilize the automated systems.
- (9) Develop improved QA procedures and training.
- (10) Redefine QA responsibilities for procurement.

The following observations were made concerning the proposed recommendations:

- (a) Items 1 through 5 above have a basic emphasis of incorporating more people into the procurement cycle by adding various expeditors, trackers, and designated contacts for PURCH and OE interface. The basic premise is to eliminate the delays. It should be emphasized though that time delays at the site could not be substantiated by the review team. The only consistent time delays involved procurements which traveled through the Central Office. Those time delays stemmed from the amount of handling a requisition received traveling between the Materials Management Unit, NCO QA, Power Stores, MMSS, and PURCH. The Central Office QA review was eliminated in October with all reviews now performed at each site. Adding more resources to the cycle to perform the recommended functions will not eliminate a basic inherent problem of too many people already in the procurement cycle.

- (b) Although item 6 recommends the elimination of all unnecessary steps in the procurement cycle, the steps are not readily identified in the report. It appears that the extensive tracking proposed would be established to follow a cycle similar to what presently exists. The tracking would apparently start with the procurement request and be maintained until the item is received, set aside, and finally used. Some tracking may be appropriate and effective, but the emphasis appears to be to find the people who are not performing their job properly. Instead of developing a method to track all the reviews, more emphasis is needed in simplifying the present system, i.e., identifying the reviews not needed and better utilization or elimination of resource people presently available within the system.
- (c) Necessary action on item 7 was observed during the review. To alleviate the stock out problem, more emphasis was being placed on having accurate usage history available. MMS and Power Stores were coordinating that effort. An additional Task Force report recommendation to alleviate the stock out problem was the increased usage of IQT contracts. NSRS observed, under the current NUC PR system, no benefit in using IQTs to reduce time delays due to the RD on an IQT being treated as a new contract, i.e., going through the same review cycle every time an RD is to be used. A definite benefit can be realized if NUC PR uses the IQTs as intended and prescribed in the Procurement Manual. Another improvement can be made if site Power Stores order parts as inventories become low and not save them up for a big order.
- (d) Item 8 is highly supported, and establishing a uniform database with QA control could enable the use of the automated system for reordering of all inventory items both QA and non-QA. This would be an effective method to eliminate the unnecessary site review performed on an item each time it is reordered. Current emphasis by MMS, Power Stores, and NUC PR should remain on QA program development.
- (e) Although items 9 and 10 appear to be directed toward QA, the report substantiates the need to train all personnel in the procurement chain and to revise and standardize all procedures. NSRS fully agrees with this recommendation.

The Task Force report identifies some real problem areas in the procurement cycle and makes many valid recommendations. Immediate emphasis should be placed on the more simplified solutions like eliminating unnecessary steps that could provide significant improvements in the present system. An NSRS suggested solution to the problems with procurement is presented in Attachment 1.

VI. PERSONNEL CONTACTED

A. Browns Ferry Nuclear Plant

R. E. Burns	Group Head, Instrument Maintenance
J. A. Coffey	Site Director
R. Cole	OQAB
T. D. Cosby	Head, Electrical Maintenance Group
J. A. Dement	Supervisor, Materials Unit
H. L. Johnson	Quality Assurance Engineer
G. T. Jones	Plant Manager
H. C. Le	Chemical Engineer
R. E. Mabry	Materials Officer, Power Stores
D. C. Mims	Head, Engineering Group
J. R. Nebrig	Supervisor, Modifications Section
J. C. Owen	Materials Officer, Power Stores
W. J. Percle	Supervisor, Electrical Section
J. R. Pittman	Assistant Plant Manager, Maintenance
R. D. Putman	Assistant Supervisor, Power Stores
S. W. Solley	Electrical Engineer, Electrical Maintenance
W. C. Thomison	Supervisor, Engineering
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B. Sequoyah Nuclear Plant

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J. M. Smith	Purchasing Agent, Open Market Electrical Section
R. H. Sunderland	Chief, Procurement Support Staff

C. Browns Ferry Nuclear Plant Procedures

BF 16.2, "Procurement," June 5, 1984

BF 16.3, "Quality Control of Material Components, Spare Parts, and Services," July 20, 1982

BF 16.4, "Material Components and Spare Parts Receipt, Handling, Storage, Issuing, Return to Storeroom, and Transfer," June 5, 1984

BF 16.9, "Procurement, Shipment and Receipt of Services and Material Involving Power Service Shop," July 5, 1983

BF 6.10, "TVA Fabricated Parts Used in CSSC," June 29, 1982

BF EMI 41, "Electrical Maintenance Instruction 41, Refueling Platform and Jib Crane Checkout," Revision in effect on June 12, 1979

D. Sequoyah Nuclear Plant Procedures

SQA45, "Quality Control of Material and Parts and Services," May 30, 1984

AI-11, "Receipt Inspection, Nonconforming Items, QA Level/Description Changes and Substitutions," May 21, 1984

E. Office of Engineering Procedures

G-28, "Construction of Piping Systems for Boiling Water Reactor Nuclear Power Plants," December 30, 1982

SS-E18.11.04, "Quality Assurance Requirement for Electrical or Mechanical Equipment Requiring Seismic Category 1 (L) Qualification," June 19, 1984

SS-E18.10.01, "Environmental Qualification Requirements for Safety-Related Electrical Equipment," August 29, 1984

SS-E18.11.02, "Quality Assurance Requirements for Safety-Related Electrical and Mechanical (Non-ASME Section III) Equipment," June 19, 1984

SS-E18.11.01, "Quality Assurance Requirements for ASME Code, Section III Control Valves," May 26, 1983

SS-E18.11.03, "Quality Assurance Requirements (Certificate of Conformance)," June 19, 1984

IDP-N 51.05, "Preparation and Processing of Preliminary Design Change Requests (P-DCR)," May 9, 1983

IDP-N 51.03, "Modification Implementation and Control Modification Tracking Program," January 11, 1984

## ATTACHMENT 1

### SUGGESTED SOLUTION TO PROCUREMENT PROBLEM

NSRS offers an approach to solving NUC PR procurement problems starting with the basic procurement function. An attitude change should occur whereby the procurement of items is considered for what it is--a very important function. Procurement within TVA is not simple and requires a level of expertise and knowledge not inherent in any position currently at the plants. The knowledge and experience must be taught and learned. Presently, the time delays and inadequacies are associated to a large extent with individuals learning on their own how to procure things. NSRS contends that procurement of items should be elevated in stature and importance to a professional level.

To make the concept work, NUC PR should change its practice that everyone can and should be able to procure materials to one where a dedicated and trained staff provides all procurement services. People need to know how to procure things before they are faced with the task. With proper training, a significant number of learning errors could be eliminated and the quality of the procurement process, both from a materials standpoint as well as a time delay standpoint, could be improved. A training program on the entire procurement process to include TVA's procedures, quality requirements, purchasing requirements, and Federal procurement requirements should be developed and provided to personnel performing a procurement function. Satisfactory completion of that training should be a requirement before an individual is allowed to procure anything.

An extension to the training requirement could be the establishment of a group whose responsibility is the procurement of materials. In that concept, engineers requiring items or services would go to the procurement group and specify what was needed. That group staffed with the necessary expertise would, in turn, prepare the necessary procurement documents, define the material specifications, quality requirements, and provide a completed procurement package ready for the approving official, be it the Plant Manager or the Board of Directors. That staff would be responsible for assuring that the procurements were correct and require no further review or approval with the exception of the authorizing official(s) and interface directly with PURCH. Power Stores personnel and their ordering of stock items would not be included in this staff but would work closely with them on procurements of stocked quality level materials.