WATTS BAR NUCLEAR PLANT

REPLACEMENT ITEMS PROGRAM (RIP)

CORRECTIVE ACTION PROGRAM PLAN

REVISION 5

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REVISION LOG

Rev.	Date	Affected Pages	Description of Revision
0	12/01/88		Original issue.
1	12/12/88	Cover	Revised for management concurrence.
2	08/02/89	3, 4, 9	Revised method for evaluation of inventory and maintenance installed items (Sections 4.1.2 and 4.1.3). This included: (1) the addition of seismic sensitive devices, ASME parts, inventory Release Tracking Log, testing review, and commodity justification and sampling, (2) the deletion of Conditional Release Log review and installed item sample, and (3) the temporary suspension of the Quality Release Program. These changes also reflected in Exhibit A and Attachments 2 and 3. TVA organizational changes reflected. Added clarification note to Exhibit B flow chart.
3	07/30/90	3, 9	Revised method for evaluation of inventory and maintenance installed items (Section 4.1.2). This revision identified a change from the inventory release program back to a quality release program for 50.49 and seismic sensitive electrically active (SSEA) devices. Exhibit A (glossary of terms) was also revised to show this change. Organizational name changes were also made to reflect Materials Application Group (MAG) replaced Contract Engineering Group (CEG).
4	02/03/92	All	Updated considerably from previous revisions to indicate an increased scope of work based on a better understanding of the number of piece parts involved and the results of work activities already accomplished.

REVISION LOG

Rev.	Date	Affected Pages	Description of Revision
5	3/1/94	All	General revision to document program implementation and add clarifications as needed. Added explanatory footnote to last sentence of Section 1.1 (footnote 2). Revised last paragraph of Section 3.0 to clarify the manner in which the QA Assessment was conducted (footnote 3). Added footnote to second paragraph of Section 4.1.2 to clarify how material can be released from warehouse inventory (footnote 4). Added footnote to Section 4.1.3.1 to clarify the role played by the MHDB in the 10 CFR 50.49 review task (footnote 5). Also revised Section 4.1.3.1 to delete references to SSP-10.D (footnote 6). Revised Section 4.1.3.3 to clarify a statement in the second paragraph (footnote 7). Revised Section 4.1.3.4 to correct a mistake in the first paragraph (footnote 8) and to explain the relationship between QA Level III items and the 10 CFR 50.49 review (footnote 9). Revised Section 4.1.4 to reflect actual implementation (footnotes 10, 11, 12, and 13). Revised Section 4.2.2 to bring it in line with revised Section 4.1.4 (footnote 14). Revised Section 4.2.3 to reflect deletion of MHDB QA Level III review (footnote 15). Revised Section 4.2.5 to acknowledge that "lessons learned" were incorporated into process procedures (footnote 16). Revised the fifth bullet of Section 7.0 to reflect that the use of SSP-10.C was not restricted to PPSP format. Revised Section 9.0 to add references. Revised Attachment 1 to add examples of CAP bases. Revised Attachment 2 as denoted in footnotes 20, 21, 22 and 23. Added a table of contents, a process flow chart, and a RIP history time line. Added footnotes throughout to enhance user friendliness.

REPLACEMENT ITEMS PROGRAM (RIP)

CORRECTIVE ACTION PROGRAM PLAN

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REPLACEMENT ITEMS PROGRAM
CORRECTIVE ACTION PROGRAM PLAN

1.0 INTRODUCTION

1.1 Introduction [1]

The Replacement Items Program (RIP) Corrective Action Program (CAP) Plan describes the program for resolving deficiencies with the procurement of safety-related replacement items. TVA's previous procurement activities for Watts Bar were not sufficient to prevent the installation of unreviewed and potentially unacceptable spare or replacement parts in previously qualified equipment. Some replacement components and parts were purchased as commercial grade without sufficiently assuring that the items were equivalent to the original parts and/or acceptable for use in safety-related applications.

The root cause of the deficiency in replacement item procurements is that previous policies, procedures, and practices did not adequately prescribe/control engineering involvement in the procurement process used to purchase replacement items. Documents that illustrate specific or general cases of deficiencies that stem from this root cause and form a basis for this CAP are listed in Attachment 1.

The WBN RIP was originally modeled after Sequoyah Nuclear Plant's RIP. However, adjustments have been made for the differing conditions at WBN, i.e., the construction items to be included at WBN. Also, the lessons learned from the Sequoyah program have been considered, especially the generic dedication concerns expressed by the NRC (letter: Peter S. Tam to Oliver D. Kingsley, February 11, 1991). The WBN program reduces the number of items being accepted by generic processes and incorporates the latest inputs from the Electrical Power Research Institute (EPRI), the Nuclear Utility Management and Resources Committee (NUMARC), and Nuclear Regulatory (NRC) Generic Letters 89-02 and 91-05 into the logic developed for the acceptance.[2]

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[1] Attachment 2 provides a glossary of terms used in this CAP plan.

[2] Revision 4 of the CAP suggested that it fully incorporated GL 91-05 guidance. To the extent that the generic letter did not deviate from guidance set forth in EPRI NP-5652 (which TVA endorsed under the NUMARC 90-13 initiative), this position was correct. This was clarified in a letter from TVA to the NRC on July 1, 1992.

1.2 Background

The procurement policies, procedures, and practices of TVA were shown to be suspect in the area of commercial grade items (CGI) purchased for installation in safety-related applications. These deficiencies were initially identified by TVA's Nuclear Safety Review Staff (NSRS) in reports R-84-17-NPS, I-83-13-NPS, and R-85-07-NPS. The NRC cited similar deficiencies at Sequoyah Nuclear Plant (SQN) and classified them as a potential enforcement finding (50-327, 328/86-61-01) because of TVA's failure to take corrective action. The NRC also identified similar concerns with control of qualified replacement parts at Watts Bar Nuclear Plant (WBN) and tracked them as an unresolved item (URI) 50-391/86-21-04. TVA could not confirm that sufficient review and evaluation had been performed to provide proper verification of CGIs suitability for use in safety-related applications. In many instances, items were purchased as CGIs under a procurement classification that implied an intended safety-related end use without documented acceptability for dedication to the end use. In other instances, procurement documents indicated an implied safety-related use, but no such end use was intended - which made the parts available for use in safety-related applications.

These and other concerns, at WBN and within TVA, precipitated the development of RIP. The initial CAP was generated in June, 1988. Subsequent revisions were submitted as shown in the CAP revision log. The CAP listed the corrective actions TVA intended to take to resolve the deficiencies identified. As stated in revision 1, there were four areas that would be addressed: (1) current and future procurements, (2) current warehouse inventory, (3) plant-installed items via previous maintenance activities, and (4) plant-installed items via previous construction activities. This breakdown into major areas allowed the unique problems of each to be addressed and solved in an effective manner. Each area is addressed below:

<u>Current and Future Procurements</u>

The current and future procurements area was resolved by establishing a dedicated group to review and evaluate each procurement made for safety-related applications. Formed in 1987, the group was originally called the Contract Engineering Group (CEG). The group's name was changed to Materials Application Group (MAG) in 1990. In mid-1991 this group of engineers was merged with another group of engineering personnel who were reviewing and evaluating the procurements for engineering change notices (ECNs) and design change notices (DCNs), and became known as the Procurement Engineering Group (PEG). The group reports directly to Nuclear Engineering and is matrixed to Materials and Procurement. The PEG is physically located at the warehouse where they can efficiently and

effectively interface with Material and Procurement personnel and with the QA group. PEG has its own series of site procedures, SSP-10.1 through SSP-10.5. The following major activities are performed by PEG:

- Performs technical evaluations.
- Provides technical and quality requirements for inclusion in the procurement documents.
- Identifies required testing and inspections.
- Performs the acceptance of CGIs intended for safety-related applications.
- Performs the technical review of bids received
- Provides the technical disposition of items received which are identified as non-conforming.

Current Warehouse Inventory

The current warehouse inventory addressed in the CAP is intended to mean the inventory of items currently available to support plant maintenance and construction activities. This inventory of items has been the source of spare and replacement items used by maintenance personnel, or modifications personnel doing maintenance work, since system turnovers in the 1983-1984 time period and the subsequent return of systems to the Modifications Group. This inventory material is managed and controlled by the Material Management System (MAMS) and items in this inventory are identified by a TVA item identification code (TIIC).

Evaluating what was known as the "current" inventory has been complicated by the dynamic nature of the inventory. A project was initiated to evaluate the "current" inventory in early 1989 when TVA contracted with Stone and Webster Engineering Corporation (SWEC) to perform "current inventory" evaluations for 10 CFR 50.49 items, and American Society of Mechanical Engineering (ASME) items; and with Impell Corporation to perform "current inventory" evaluations on the seismically sensitive electrically active (SSEA) devices. The SWEC and Impell evaluations were performed in accordance with the TVA procedures in force at the time.

In September, 1991, TVA Quality Assurance completed an assessment (Section 9.0, reference 5) of the SWEC and Impell evaluations in the area of commercial grade item evaluations for acceptance. The assessment report indicates that the auditors felt that based on the latest information from industry standards, the dedication packages were weak in key areas.

In May, 1991, prior to the September assessment, TVA recognized the potential problems inherent in dealing with a dynamic inventory by trying to use evaluations made in 1989. In response to this recognition, TVA decided to strengthen the Quality Release Program by initiating the Material Improvement Project (MIP). This program was fully implemented June 5, 1991. After June 5, 1991, replacement items must have a Material Improvement Project (MIP) sanitization package prepared and approved before they can be issued to the plant.

To address the current inventory of material, the Material Improvement Project was chartered to "sanitize" all safety-related material, including spare and replacement parts, in the current inventory, before they could be issued to the plant. The sanitization process involves item verification, technical adequacy, QA receipt inspection, proper storage, etc., rather than administrative reviews. This is now an on-going recurrence control activity.

The Material Improvement Project sanitization process operates to site procedures SSP-10.5 and SSP-10.B.

Plant Installed Items via Previous Maintenance Activities

This task was established to review and evaluate spare or replacement parts issued from the Power Stores inventory to personnel performing maintenance work controlled by a maintenance request, work request, or work package. The material installed is identified with a TIIC number and is controlled out of the Power Stores warehouse by a TVA form 575N (TVA Nuclear Power Storeroom Requisition). The 575N forms are noted on the work documents and the work document numbers are noted on the 575Ns, which provides an efficient cross check.

Replacement Items Installed by Previous Construction Activities

This task was established to review and evaluate spare or replacement items installed from the construction warehouse inventory by personnel from the construction group. The scope of this review was limited to activities before the previously conducted system turnovers, while Construction had control of the system, when construction people were maintaining plant equipment and components, or repairing components due to damage caused by construction activities.

The Power Stores unit commenced operation in February, 1977 as the construction group turned systems over to plant operations, and has operated continuously since. Between the beginning of construction and February, 1977 spare and replacement items were procured by construction personnel and provided through the construction warehouse inventory. As systems were turned over, they came under the control of operations and (operations)

maintenance groups. After system turnover, spare and replacement items were procured by maintenance personnel and issued through the Power Stores warehouse inventory. The period between February, 1977 and the last system turnover in 1984, therefore, would have both construction and maintenance personnel obtaining materials. It has not been clearly established where construction-installed replacement were drawn from since construction could, and often did, go to the Power Stores warehouse for parts. Procedural controls in effect prevented maintenance personnel from obtaining spare or replacement parts from the construction warehouse inventory without a documented and traceable transfer into Power Stores, typically a 575N.

RIP Activities That Are Complete

As of December, 1991 several activities presented in previous CAP revisions, and some that are new, had been completed as follows:

- Creation of the Procurement Engineering Group (PEG) as the long-term recurrence control.
- The compilation of the Maintenance History Data Base (MHDB) which records the work documents, issue documents, procurement documents, and related test documents for maintenance work performed on system components and equipment since original system turnover.
- The implementation of the Materials Improvement Project (MIP) in 1991 to perform the evaluation of the current inventory necessary for construction to resume and continue.
- Review of the QA Level I and QA Level III packages for installed 10 CFR 50.49 replacement items.

The work left to be done is described in Section 3.0.

2.0 OBJECTIVE

The primary objective of the WBN RIP is to ensure that replacement piece parts, especially commercial grade items installed into safety-related basic components, are consistent with previously validated environmental or seismic qualifications, and the safety-related basic component's capability to perform its intended safety functions. The WBN RIP is charged with implementing and completing a thorough and accurate evaluation of the piece parts to the above criteria and as described in this document.

In order to achieve this objective, RIP will review the information and recommendations in NRC communications issued with regard to this

subject, as well as review the results of NRC audits of other sites at other utilities.

3.0 SCOPE

The scope of the RIP has been redefined due to a better knowledge of the number and type of piece parts involved and the activities that have been completed. The scope has been refined for more effective coverage and to enhance the level of confidence derived from the RIP activities.

Recurrence Control

Two major areas of recurrence control in the CAP have been fully implemented:

- Current and future procurements are reviewed for technical and quality requirements by PEG engineers in the procurement process.
- Current available warehouse inventory has been reviewed and evaluated by MIP engineers who prepared acceptance packages for material prior to its being made available for issue to the plant.

The procedures governing the work in these areas were found to be acceptable in the September, 1991 QA assessment.[3] Together these activities are sufficient to ensure future piece part replacements will meet all TVA and regulatory requirements.

Evaluation of Installed Items

Within the original major areas there were two remaining to be addressed:

- Replacement items (piece parts) installed in the plant by previous maintenance activities.
- Replacement items (piece parts) installed in the plant by previous construction activities.

Within these major areas, emphasis will be placed on the review and evaluation of commercial grade items (CGIs) installed in safety-related applications, and replacement items (QA level I, II, and III) installed in 10 CFR 50.49 components.

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[3] Revision 4 read: "These areas were found to be acceptable...." The wording has been changed here to clarify that the assessment in this area was procedural in nature.

Also within the scope of RIP is a task to perform a review and evaluation, on a generic basis, of the bulk commodity items found during the Maintenance Installed 10 CFR 50.49 Review task performed by a TVA contractor (Digital Engineering) in 1991. Those bulk commodities meet the definition of "commodity items" in EPRI NP-5652, *Guidelines for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications*, (Reference 7) and represent the greases, thread lubricants, packing material, gasket material, miscellaneous nuts, bolts, and washers, etc., that are used on a commodity basis in 10 CFR 50.49 maintenance activities. The evaluation of these items for acceptance and dedication for safety-related applications on a bulk basis will be conducted in accordance with guidance found in EPRI NP-5652. Generic testing may be required for some of these dedications of bulk commodity items.

4.0 DESCRIPTION OF PROGRAM

4.1 Program Activities

As discussed in section 1.2, Background, previous revisions of the RIP CAP have identified four distinct work activities as comprising the CAP, as follows:

4.1.1 Current and Future Procurements

Current and future procurements are being addressed by PEG as an independent program which will be actively involved during the balance of construction and start-up phases, and for the life of plant operation. This activity was established for recurrence control. As indicated in Section 3.0, above, this activity is in place.

4.1.2 Current Warehouse Inventory

Recurrence controls are in place in the Materials Department to ensure only qualified materials are issued as replacement parts.

Materials received prior to June 5, 1991 must have a sanitization package prepared prior to their release. Materials received after June 5, 1991 may be released to the plant before completion of receipt processes only upon completion of the conditional release controls of SSP-10.02, *Material Receipt and Inspection*.[4]

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[4] Revision 4 had stated that release could occur "...before completion of receipt procedural processes upon authorization and approval by the Site Vice President or his designee." The text has been amended here to clarify that the release has to be procedurally controlled.

4.1.3 Replacement Items Installed by Previous Maintenance Activities

4.1.3.1 Maintenance Installed 10 CFR 50.49 Items

To address the major area of "Replacement items installed by previous maintenance activities," WBN developed the Maintenance History Data Base (MHDB).[5] This data base was developed by reviewing some 91,000 work control documents, surveillance instructions, and operating instructions. The work control documents were generated for:

- Corrective maintenance.
- Preventive maintenance.
- Maintenance performed during surveillance testing.
- Maintenance performed during plant modifications.

These work control documents were issued in the time period between original system(s) turnover and January, 1989, the date when the Quality Release Program was implemented. The review of the work control documents was performed to determine:

1. Did the maintenance activity install parts?
2. Was the host equipment safety-related?
3. Was the host equipment subject to 10 CFR 50.49 requirements?

A "yes" answer to questions number 1 and 2 meant the work document would be added to the data base along with other information that made several cross references possible, for example:

- MR number.

[5] The MHDB is no longer in use. At the time, however, it was useful to the 10 CFR 50.49 review task because of the extensive amount of data it contained which related to MRs and WRs, as well as the cross references between contract numbers, 575Ns, etc. It is now held in inactive status by the Information Systems Group.

- Contract number.
- TIIC number.
- 575N number.
- Quality classification.

A "yes" answer to question number 3 allowed the grouping of the 10 CFR 50.49 equipment subset for later use.

The advantage of the data base information being available up front to the installed items evaluations is that the process starts with a specific "end use," the unique identification number (UNID) for the host equipment, and works backward via the work document and the issue document (575N) to the procurement documents. Work control or 575Ns referencing unclassified equipment, or equipment designated by a temporary identification number, would precipitate a Pro-TIIC designation in the Maintenance History Data Base (see 4.1.3.3).

This process was used to initiate Maintenance Installed 10 CFR 50.49 Item Evaluations using the Maintenance History Data Base as the resource to identify replacement parts that were installed in host components whose unique identification number indicated that they were under the requirements of 10 CFR 50.49. This evaluation process was nearly complete when the September, 1991 QA Assessment was conducted. That assessment determined that the commercial grade item dedication packages prepared needed to be reworked to meet industry standards. In the area of installed replacement parts, one of the major recommendations that resulted from the September, 1991 QA Assessment was that the WBN procedures used for commercial grade item dedications in the past by SWEC, Impell, Digital Engineering (DE), and TVA personnel, did not fully meet current industry standards. RIP management responded to this assessment recommendation by generating a totally rewritten procedure that provides the guidance necessary to prepare commercial grade item acceptance and dedications that conform to the current industry standards. This procedure is WBN SSP-10.C, *Evaluation of Installed Safety-related Replacement Items*. It was written to agree as much as possible with the site procedure SSP-10.5

used by PEG for current procurements, but with the differences necessary to perform the look-back type evaluation RIP has been chartered to perform. The procedure was reviewed and commented on by two of the co-authors of EPRI NP-5652 (Reference 7), and their comments incorporated. The procedure has been issued and is currently in use. A comprehensive training program that presents the current EPRI commercial grade item dedication philosophy and how it interfaces with WBN SSP-10.C, using SSP-10.C forms, was also developed by the co-authors of EPRI NP-5652. Engineers who will perform RIP evaluations are required to complete this two day training program prior to doing RIP-related work.[6]

4.1.3.2 Release Tracking Log Items

The evaluation of a second population of "maintenance installed" replacement parts was added by revision 4 of the RIP CAP. In 1989 WBN instituted a Quality Release Program that required all material to have a CEG evaluation package prepared before the material could be issued to the plant. Previously, in late 1988, WBN had contracted with SWEC to evaluate the "current inventory" at WBN. In order to deal with a developing backlog of quality release packages, a decision was made that since SWEC was evaluating the material, it would be acceptable to track the issuance of the material to the plant in a Release Tracking Log, and issue the material without a package. The possibility of rework was understood if SWEC should subsequently find the material unacceptable. The tracking log provided a means to locate the material so it could be removed and replaced in the plant. Eventually, however, SWEC's scope of work was reduced to evaluating only the 10 CFR 50.49 and ASME items in the inventory, and most of the 5516 line items in the Release Tracking Log (RTL) still require evaluation. This population was identified in the September, 1991 QA Assessment Report. WBN management recognized that this population must be evaluated and added it to the scope of RIP. RIP will be evaluating

[6] Revision 4 contained a paragraph, which followed this one, discussing the issue of a second procedure (SSP-10.D, *Reevaluation of QA Level II PPSP Packages*) which was to be used to evaluate maintenance installed 10 CFR 50.49 items. When the task was started, however, it turned out to be easier to redo everything onto SSP-10.C forms, etc. Thus SSP-10.D was not needed.

these 5516 line items in accordance with site procedure SSP-10.C.

4.1.3.3 TIIC Inconsistencies

A third population of maintenance installed items that will be reviewed are approximately 1000 incomplete TIIC items listed in the Maintenance History Data Base and called Pro-TIICs. These items identify inconsistencies with the correlation of TIIC number on the Maintenance Request number and/or 575N number. These items resulted from in-process reviews of data by the clerks reviewing the documents for inclusion in the data base. They were inconsistencies that required some investigative work by an engineer knowledgeable in the process to resolve exactly what the TIIC number is, or what the material really is. Many involved the simple transposition of the alpha-numeric elements of the TIIC number so that what shows up on the MR, 575N, or contract is an invalid TIIC number, or a TIIC number associated with material obviously incompatible with the description and other data on the MR. Other examples of difficulties were that the TIIC number was not legible, not complete, or missing.

The actual TIIC number for these Pro-TIICs must first be identified before any further review for inclusion is possible. Those that are actually 10 CFR 50.49 or commercial grade items installed in safety-related components will be added to the scope of RIP.[7] They will be evaluated in accordance with site procedure WBN SSP-10.C.

4.1.3.4 Quality Level Determinations

In the population of maintenance installed replacement items issued through the Power Stores inventory (TIIC items) a major part of the evaluation is to determine the correct safety classification.[8] During the 1984-1988 time period there are instances where material was procured as QA level II (see definition) if it was considered that there were any "safety-related" use possibilities. In other cases, material was procured as QA level II for economic reasons. The

[7] This was done as part of another task.

[8] Revision 4 mistakenly contained the term "quality level."

result of these actions was that nearly 60 percent of the procurements in that time frame were made as QA level II and dedication processes for the QA level II items were not acceptable.

As the engineering evaluations are performed, there are expected to be a significant number of upgrades (QA level II [CGI] to QA level I) and downgrades (QA level II [CGI] to QA level III).

The first determination of an evaluation is normally the "safety classification" of the host component and then the impact of the replacement item in a failure mode analysis. For replacement items that are not 10 CFR 50.49, if the evaluation determines the replacement part will not impede or degrade the host component's ability to perform its intended safety function, then the replacement item will be declared QA level III and will be acceptable based on part number and receipt inspection. The Material Management System data base, and all other documentation related to the item will be downgraded to reflect the new QA level III classification. [9]

Some safety-related items procured as QA level II were supplied with sufficient documentation to be qualified as QA level I. The QA programs of vendors on TVA's approved supplier's list (ASL) were normally audited by TVA's Procurement Quality Assurance group (PQA). If the vendor supplied material with a certificate of conformance (COC) and/or certified material test report (CMTR), or other appropriate documentation which included indication that the vendor understood and accepted the responsibilities of 10 CFR 21, then the material supplied is considered acceptable as QA level I. The TIIC number will be upgraded to QA level I in the Materials Management System, and parts installed in the plant will be treated as QA level I.

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[9] The last half of this paragraph (appearing in Revision 4) has been deleted by Revision 5. The only QA Level III items that required review by the RIP program were those QA Level III items installed in 10 CFR 50.49 host components. Revision 2 of the RIP CAP committed to a 100% review of all 10 CFR 50.49 items, of all QA levels. Thus, RIP performed a review and evaluation of all QA Level III items that had been installed by previous maintenance activities to see if these items would degrade the environmental qualification of the host component. This evaluation included a Failure Mode and Effects Analysis in accordance with SSP-10.C, to provide assurance that the QA Level III designation was accurate.

The experience of TVA at Sequoyah Nuclear Plant (SQN) was that 50 percent of the QA Level II items evaluated were downgraded to QA Level III; and 15 percent were upgraded to QA Level I. To date WBN evaluations have resulted in very nearly the same proportions when the SWEC and Digital Engineering evaluations are reviewed together.

4.1.4 Replacement Items Installed by Previous Construction Activities[10]

To address replacement items installed by previous construction activities, WBN RIP reviewed construction group procurements of spare or replacement items to see if they had either received an engineering review or had been procured under the requirements of a General Construction Specification.[11] The scope of this review was limited to activities before system turnovers, while Construction had control of the systems and was maintaining plant equipment and components, or repairing components due to damage caused during construction activities.[12]

4.1.4.1 Unit 1 Construction Warehouse Inventory

During 1990 WBN Materials and Procurement group, in conjunction with Nuclear Engineering, did a study that compared material by manufacturer and part number and items remaining in the Unit 1 construction warehouse inventory to the entries in the MAMS data base. The result was that those items left in the Unit 1 warehouse inventory that were the same part as a TIIC item in the Power Stores inventory (and had documented traceability) were tagged and transferred to the Power Stores warehouse inventory. Items in the Unit 1 warehouse inventory that could not be correlated

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[10] At the time Revision 4 of the CAP was issued, the inventories, while segregated, were not located in three physically separate warehouses.

[11] General Construction Specifications contain requirements specified by engineering through the review and approval process.

[12] Between the beginning of construction and February, 1977 (when the Power Stores unit commenced operation) spare and replacement items were procured by construction personnel and provided from the construction warehouse inventory. After system turnover they were procured by maintenance personnel and issued from the Power Stores warehouse inventory. The period between February, 1977 and the last system turnover in 1984, therefore, had both construction and maintenance personnel obtaining materials.

to a TIIC item in Power Stores were transferred to the Unit 2 construction warehouse inventory.

4.1.4.2 Unit 2 Construction Warehouse Inventory

Procurement for this warehouse was accomplished by contract or by field purchase order. For all major plant equipment and nuclear unique components there were engineering-prepared contracts with specifications and drawings. A set of general construction specifications was used to procure bulk items to federal and/or industry standards.

Field purchase orders could only be issued by certain levels of management, were limited in dollar amount, and were only usable at certain pre-arranged vendor companies at which TVA had established accounts.

In the majority of cases, material purchased on a field purchase order was recorded on a warehouse "ledger card," either from the receipt inspection or from a copy of the field purchase order. RIP has the inactive ledger cards from the Unit 2 construction warehouse inventory. The active cards for material still in the warehouse are maintained by the construction warehouse group, but are still available for review at any time.[13]

4.2 Remaining Work Summary

4.2.1 Evaluate Maintenance Installed Items Prior to June 5, 1991

- (Quality Release) Release Tracking Log (5516 line items) per SSP-10.C.
- Maintenance History Data Base Pro-TIICs (approximately 1026) per SSP-10.C.

4.2.2 Evaluate Construction Installed Items[14]

- Review field purchase orders for possible safety-related

[13] The sections which followed this one in Revision 4 have been deleted by Revision 5. RIP review of the ledger cards (performed per Attachment 2 to SSP-10.C) determined that there were no problems in the ledger cards and, therefore, no need to subdivide or conduct further sampling.

[14] The last three bullets in this section of Revision 4 have been deleted from Revision 5. These steps were unnecessary. For additional details, see footnote number 13.

applications.

- o Sort ledger cards from construction warehouse tracking systems (active and inactive) for possible safety-related applications.

4.2.3 Quality Level III Investigation

- o Review QA Level III items in Material Management System (January 23, 1989 to June 5, 1991) for possible safety-related applications.[15]

4.2.4 Bulk Commodity Item Review

Prepare generic evaluations and/or CGI dedications for the bulk commodity items used during maintenance work on safety-related components.

4.2.5 RIP CAP Closure Activities[16]

- o Close CAQRs, CATDs, SCARs, and other action items related to RIP.

4.3 Recurrence Control

Recurrence control is performed by PEG (formerly CEG and MAG). PEG is a permanent group of engineering procurement personnel assigned to the WBN site at the warehouse, in close proximity to the procurement group, materials group, and QA group. Formation of PEG and procedural control of their work provides recurrence control for the identified root causes of RIP. Quality indicators, audits, and assessments are used to measure the effectiveness of PEG.

The completion of the Materials Improvement Project sanitization process and ongoing controls ensure that only qualified materials are issued for piece part use from the current inventory.

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[15] The bullet which followed this one in Revision 4 has been deleted. The QA Level III data in the MHDB, once extracted, did not prove adequate for performing a reliable review because the data had never been validated. Since the QA Level III review from MAMS indicated that there was not a problem with QA Level III items, the MHDB review was abandoned.

[16] The second bullet in this section of Revision 4 has been deleted from Revision 5. Lessons learned from the conduct of RIP have been incorporated into process improvements by means of procedure revisions.

4.4 Licensing Assessment

This CAP ensures that replacement part procurements are consistent with previously qualified equipment.

5.0 PROGRAM INTERFACES

RIP maintains interfaces with the following WBN groups or programs:

- Procurement Engineering Group - as discussed above in Section 3.0.
- Material Improvement Project - as discussed above in Section 3.0.
- Bulk Item Procurement Review - as discussed above in section 4.2.4.
- Design Baseline and Verification Program (DBVP) Corrective Action Programs - the design basis document (DBD) of the DBVP provides design commitments and licensing and Code requirements for use as input by RIP in determining a component's function and design basis requirements.
- Q-List Corrective Action Program - the existing Q-List provides item identification and functional (safety) classification to RIP. Any deviations in the equipment identifiers or classifications that result from the up-dated Q-List will be corrected on the RIP evaluation records.
- Environmental Qualification (EQ) Special Project - RIP will evaluate installed replacement parts of components covered by the EQ program.

6.0 PROGRAM IMPLEMENTATION

In the past revisions of this CAP, there were five distinct groups identified as implementing the RIP. Revision 4 revised the previous list and identified the following groups as responsible for assuring the adequacy of past or current procurements:

RIP - Provided engineering review and evaluation of previously procured and installed, commercial grade, replacement piece parts intended for safety-related equipment.

Material Improvement Project - Provided services to "sanitize" current inventory and provided engineering support to assure acceptable material and equipment is available for issue to the plant.

PEG - Provides recurrence control for current and future procurements and provides engineering support for the Quality Release of equipment from inventory.

The site RIP project manager provides coordination and specific program direction for RIP-related activities of these groups. The site RIP project manager also provides review and approval of completed RIP activities.

TVA's QA organization provides oversight of RIP activities by performing technical audits and review of procedures. The QA organization also reviews the program's output packages to verify that the appropriate quality assurance requirements are specified.

7.0 PROGRAM DOCUMENTATION

The work of the RIP implementing groups will be performed in accordance with approved site procedures and maintained as QA records.

- The technical and quality requirements provided by PEG will be documented by PEG output packages and dedication packages for commercial grade items prepared in accordance with SSPs-10.01, *Procurement of Materials and Services*; 10.02, *Material Receipt and Inspection*; 10.03, *Handling, Storing, and Shipping*; 10.04, *Material Issue, Control, and Return*; and 10.05, *Technical Evaluation for Procurement of Materials and Services*.

- The compilation of previous maintenance activities will be documented in a computer data base. RIP MS data base is currently on disk and active.

- The technical and quality requirements used by the Material Improvement Project (MIP) will be documented in Material Improvement Project output documents called "sanitization packages" per SSP-10.5 and SSP-10.B. All safety-related material is subject to the Quality Release Program before issuance to the plant. Material Improvement Project sanitization packages document evaluations to satisfy the material release programs.

- The technical and quality evaluations performed on installed safety-related items by the RIP team activities will be documented in Previous Procurement Substantiation Process packages in accordance with SSP-10.C.

- The technical and quality evaluations performed by the Bulk Item Procurement Review task will be documented in output packages prepared using the procedural guidance in SSP-10.C and other appropriate site procedures.

- Other reviews will be documented in task summary reports.

- A CAP final report will serve as the program closure document for the RIP CAP as directed by site procedure SAI-10.02, *Preparation, Review, and Approval of Corrective Action Programs*.

- The Records Plan developed by the QA Records CAP provides a road map of RIP CAP records.

8.0 CONCLUSIONS

The WBN RIP will evaluate installed replacement piece parts to provide a high level of assurance that the parts are consistent with the host component's seismic or environmental qualifications and the host component's capability to perform its intended safety function(s).

9.0 REFERENCES[17]

1. Stone and Webster Engineering Corporation (SWEC) letter to TVA, WBSW-89-0366, dated July 12, 1989.

2. Impell Corporation's Final Report, RIMS B26 891016 310.

3. Advanced Technology's Final Report, RIMS T28 930527 943.

4. TVA Design Criteria WB-DC-40-31.2, Seismic Qualification of Category I Fluid System Components and Electrical or Mechanical Equipment.

5. TVA Design Criteria WB-DC-40-54, Environmental Qualification to 10 CFR 50.49.

6. TVA General Construction Specification G-62, Material Documentation and Acceptability Requirements for ASME Section III Applications.

7. Assessment Report WBA91110, "Nuclear Quality Audit and Evaluation: Assessment of the Replacement Items Program (RIP)," November 12, 1991 (RIMS L17 911113 800); as amended by J. A. Crittenden's letter to J. H. Garrity on November 27, 1991 (RIMS T34 911127 875).

8. EPRI NP-5652, Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications (NCIG-07), June, 1988.

[17] Added: References 2, 3, and 9.

9. EPRI NP-6406, Guidelines for the Technical Evaluation of Replacement Items in Nuclear Power Plants (NCIG-11), December, 1989.

10. EPRI NP-7218, Guidelines for the Utilization of Sampling Plans for Commercial Grade Items Acceptance (NCIG-19), July, 1991.

BASIS FOR THE RIP CAP

The major concerns that precipitated RIP were deficiencies involving the procurement of safety-related replacement items as identified in NSRS reports R-84-17-NPS, I-83-13-NPS, and R-85-07-NPS.

The following documents illustrate additional deficiencies that also stem from the root cause:[18]

CAQR WBP871098SCA	-	Safety related temperature switches were purchased commercial grade and installed without proper verification/documentation.
CAQR WBP871258	-	WBN lacked a program for engineering evaluation of purchases and dedications of commercial-grade items for use as basic components.
CAQR WBP870981SCA	-	Procurement of replacement parts by NC does not comply with requirements.
CAQR WBF870069	-	Some NC procurements were bought by part number only and lack technical and quality assurance requirements.
CAQR CHS870105	-	Upper tier procedures allow possible alteration of environmental and seismic qualification without design organization review.
CAQR WBE880302801	-	WBEP has not implemented a process to identify and verify critical characteristics for commercial grade items for use as basic components.
CAQR WBP880668PER	-	MR A-525511 installed front and back bearings for motor 1-MTR-030-039B. The bearings part numbers do not match those identified for use in EQ binders.
CAQR WBP890132	-	A worn gear shaft bearing for a CSSC Limitorque operator was procured and issued as QA Level III but was used as a basic component without an evaluation of technical requirements.

[18] Added by Revision 5: WBP871098SCA, WBP880668PER, WBP890132, WBP890634SCA, and WBSCA910275.

CAQR WBP890634SCA	-	Electrical devices were released from Power Stores inventory for safety-related applications and were not procured to the requirements of IEEE-344 nor were they subsequently determined to satisfy those requirements.
URI 391/86-21-04	-	NRC inspector unresolved item concerning control of qualified replacement parts.
CAQ WBSCA910275	-	This SCAR was generated to contain all known specific and programmatic issues associated with past procurement, warehousing, and issuing processes.

GLOSSARY OF TERMS

575N[19] - The TVA Nuclear Stores requisition form which is the principal document for controlling/tracking items or materials released from Power Stores.

Basic Component - As defined in 10 CFR 21: "'Basic component,' when applied to nuclear power reactors means a plant structure, system, component or part thereof necessary to assure (a) the integrity of the reactor coolant pressure boundary, (b) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (c) the capability to prevent or mitigate the consequences of accidents which could result in potential off site exposures comparable to those referred to in 100.11 of this chapter." In the RIP CAP and other documents the term basic component is interchangeable with safety-related equipment or material.

Commercial Grade Item - As defined in 10 CFR 21: "'Commercial grade item,' means an item that is (a) not subject to design or specification requirements that are unique to facilities or activities licensed pursuant to Parts 30, 40, 50, 60, 61, 70, 71, or 72 of this chapter and (b) used in applications other than facilities or activities licensed pursuant to Parts 30, 40, 50, 60, 61, 70, 71, or 72 of this chapter and (c) to be ordered from the manufacturer/supplier on the basis of specifications set forth in the manufacturer's published product description (for example a catalog)."

Dedication - As defined in 10 CFR 21: "Dedication' of commercial grade items occurs after receipt when that item is designated for use as a basic component." As used in the CAP, dedication includes acceptance.

QA Level I - Those materials, components, and spare parts that are supplied to TVA as qualified (by associated documentation) for use in basic components.

QA Level II - A category defined to be those materials, components, and spare parts that are basic components and are also commercial grade.

[19] Definition added by Revision 5.

GLOSSARY OF TERMS

QA Level III[20] - Those materials, components, spare parts, and piece parts which are: 1) installed in safety-related host components, but a Failure Modes and Effects Analysis shows will not affect the safety function(s) of the host component, 2) procured as commercial grade for nonsafety-related applications, or 3) designated as Limited QA and/or Quality Related with attributes that are specifically required to meet engineering or regulatory requirements while still not a basic component.

Quality Release Program and Inventory Release Tracking Log - The Quality Release Program is a program to assure proper qualification prior to issue from inventory of parts for 10 CFR 50.49 component application and parts procured as commercial grade for basic components.[21] However, the program will allow procedurally controlled release of items with follow up evaluation for special cases when individually authorized by senior plant management. The Quality Release Program was in effect from January 23, 1989 until June 8, 1989. On June 8, 1989, the Inventory Release Tracking Log was initiated. This log identified unreviewed parts and materials released for installation in safety-related applications to allow for their subsequent replacement should the inventory evaluation indicate unacceptability.

The purpose of the Quality Release Program is to provide confidence in the acceptable qualification of parts before their release for installation in safety-related components. Prior to review of the Nuclear Stores inventory the Quality Release Program included parts for 10 CFR 50.49 component applications and parts procured as commercial grade for basic components. This is the same scope as that of the inventory review activity of the RIP. Based on the results of the inventory review, the Quality Release Program was reinstituted and adjusted to reflect those results.

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[20] Definition modified in Revision 5 to emphasize that the QA III category encompasses a wide range of material types.

[21] Revision 5 deletes a previous reference to SSP-10.4 as the controlling procedure for conditional releases. SSP-10.02 now controls this activity.

GLOSSARY OF TERMS

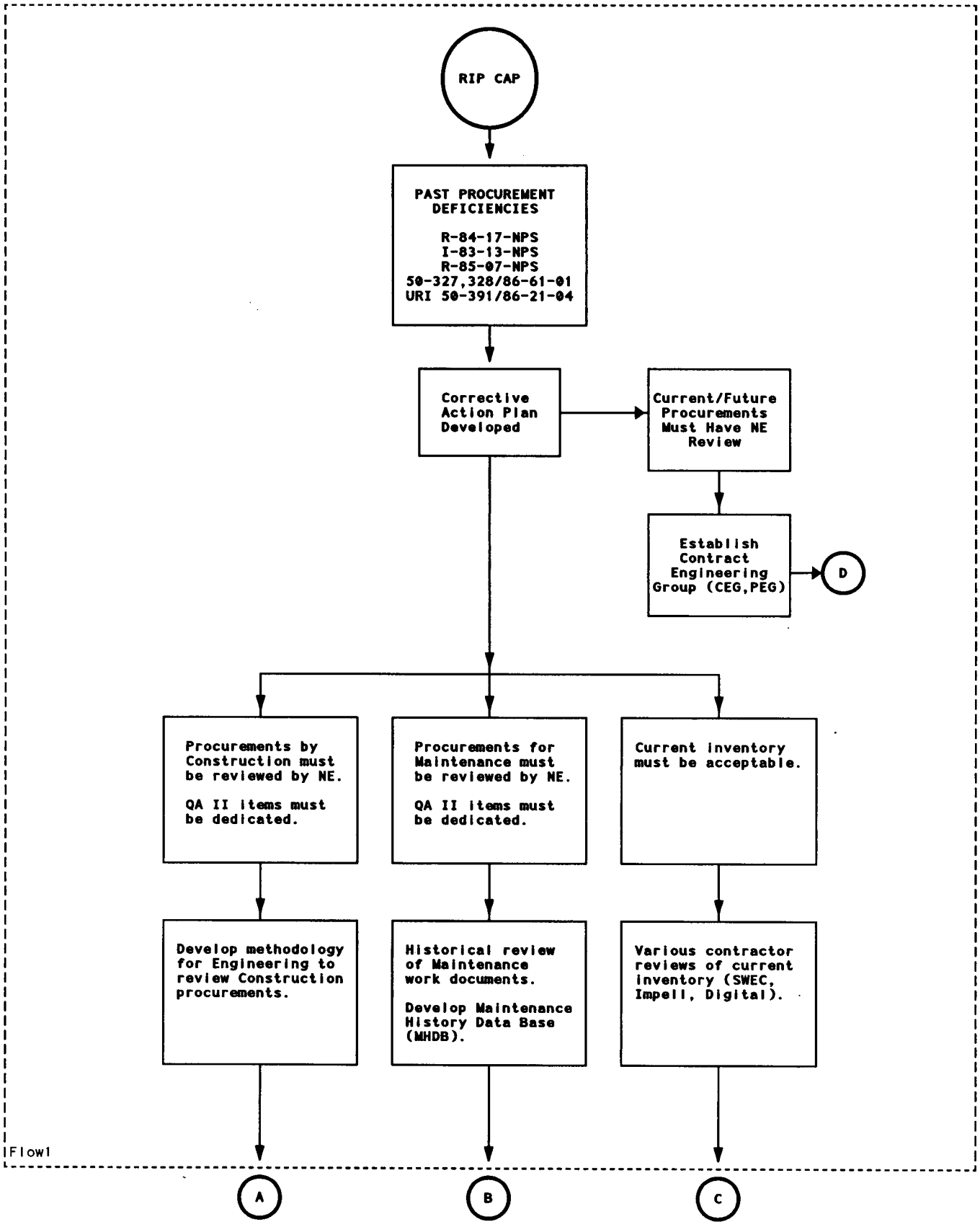
Replacement Item (Piece Part) - An item which replaces an original or installed item (either identical or alternate) for which an equivalency evaluation is performed to assure interfaces, interchangeability, safety, fit, and function are not adversely affected or contrary to regulatory requirements. Generally the item is the smallest subcomponent that can be replaced to repair or maintain the host component. There are instances where a replacement item is an assembly of subcomponents, but it is more economical, or safer, to replace the entire component, such as a Barton transmitter. A replacement item is that configuration of entity that is most often replaced in a standard maintenance or repair operation.

Sanitization Process - The Materials Improvement Project has been chartered to ascertain that the inventory of material and components currently available for issue to the plant are fully acceptable and adequately documented. The "sanitization" process involves documentation reviews and evaluations.

TVA Item Identification Code (TIIC)[22] - Warehouse stock line item identification number.

[22] Definition added by Revision 5.

PROCESS FLOW CHART



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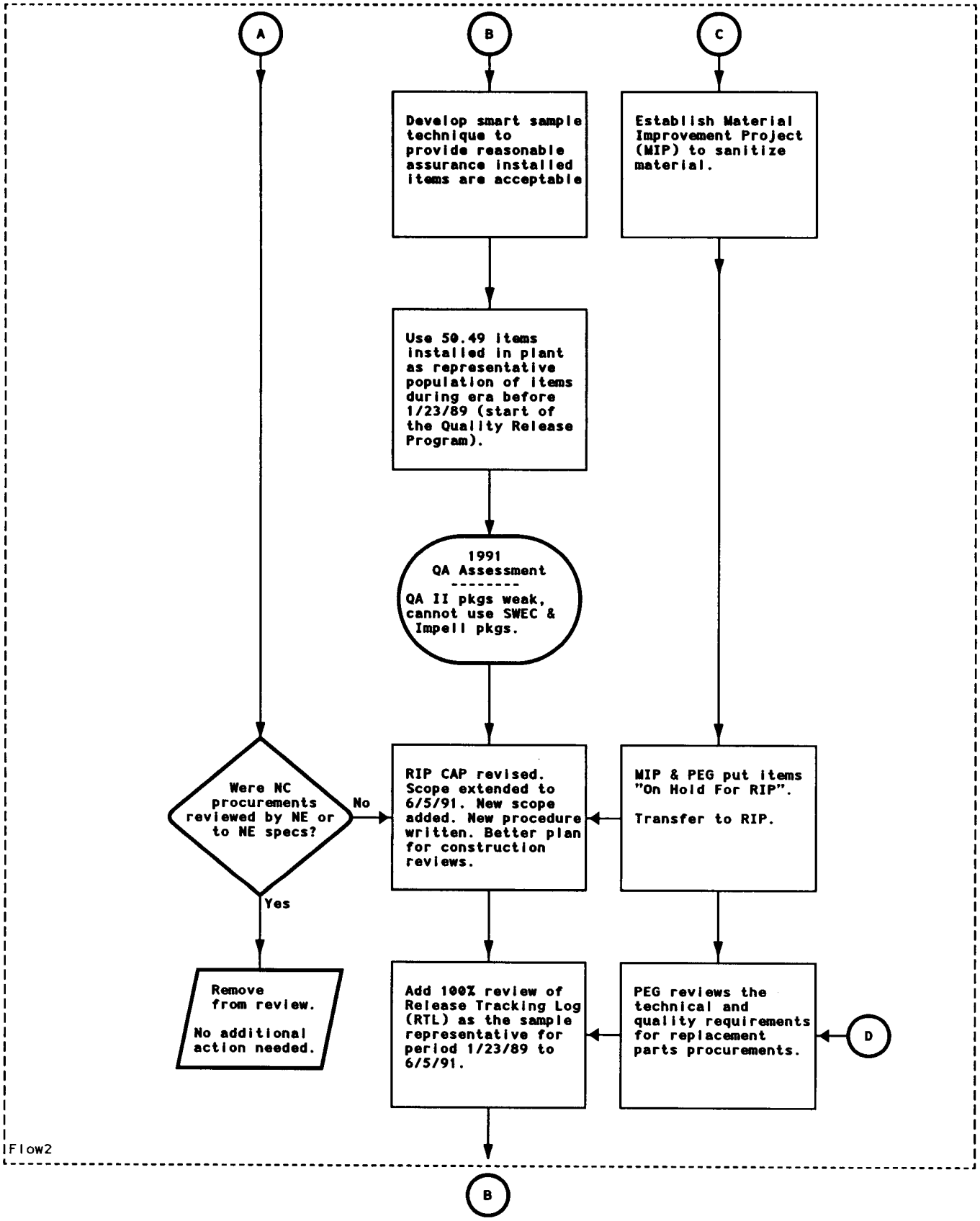

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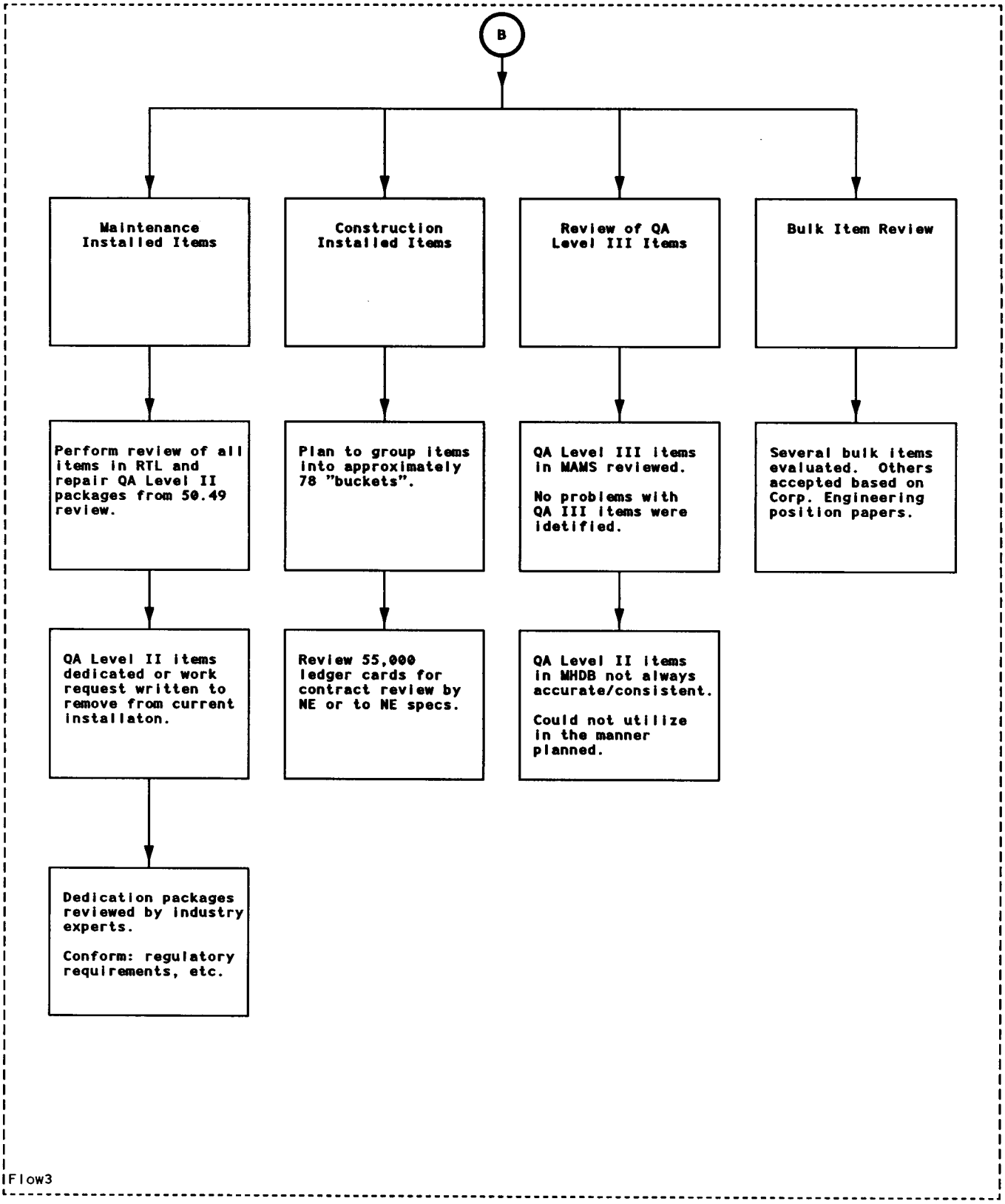
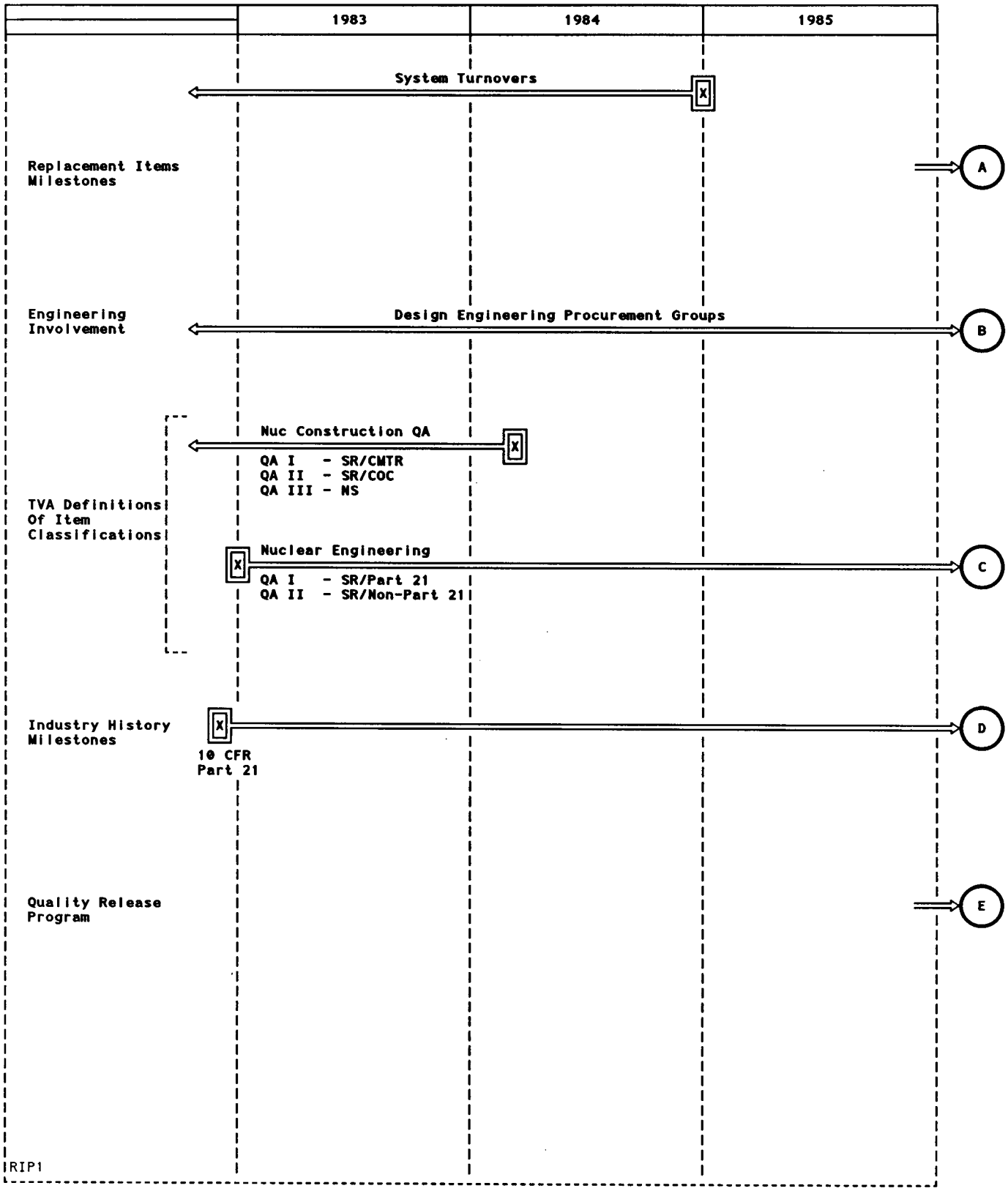


RIP History Time Line



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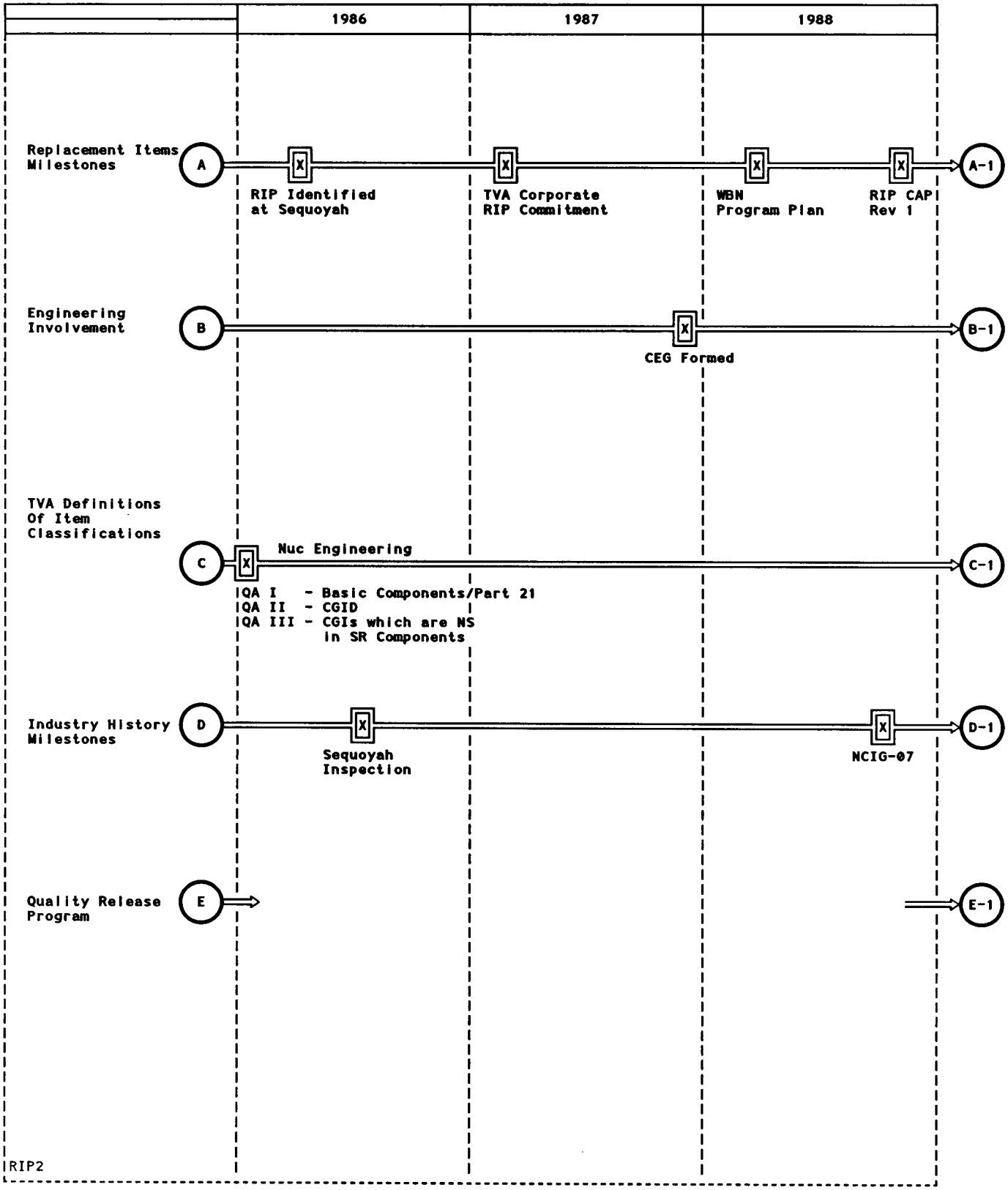

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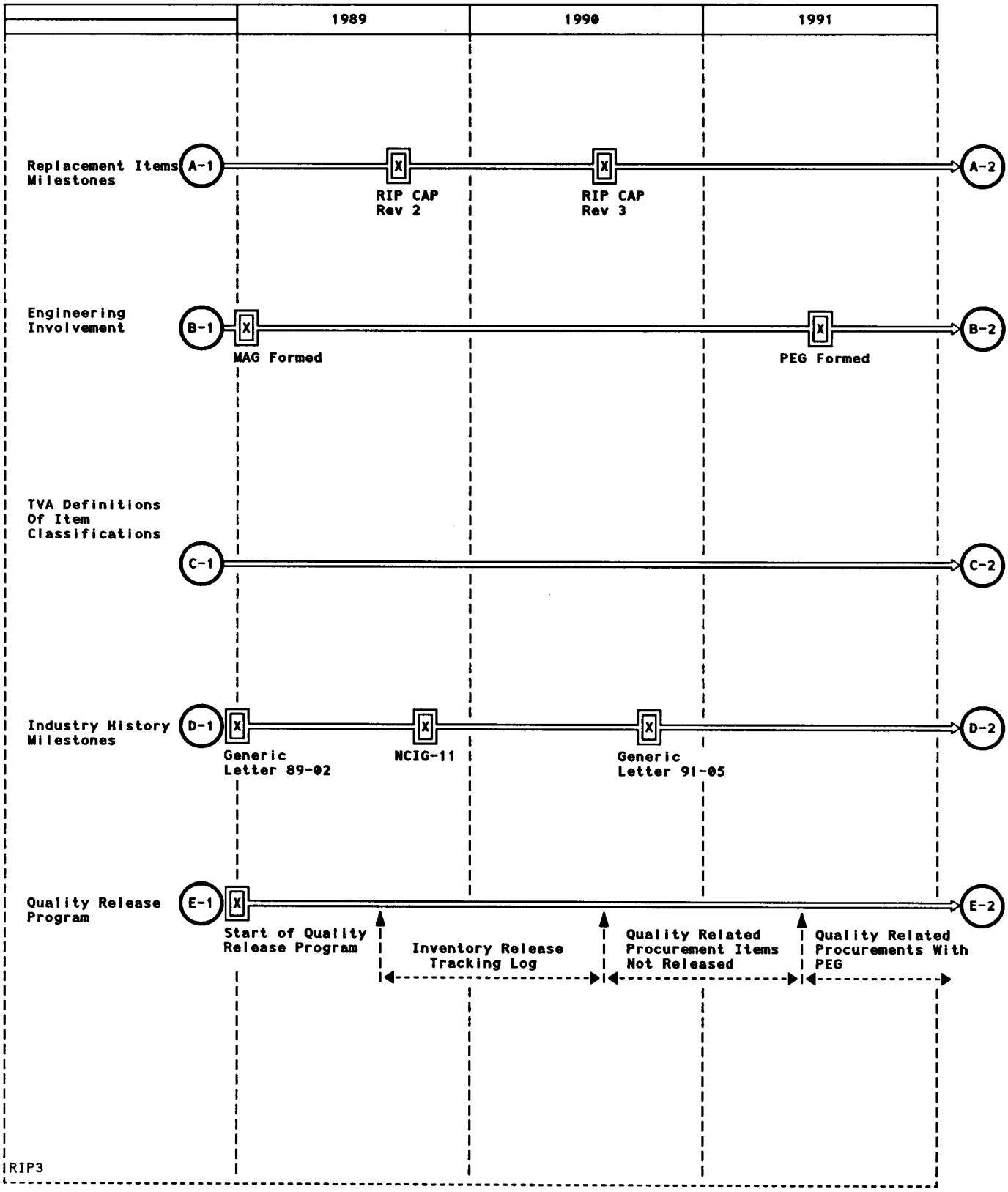

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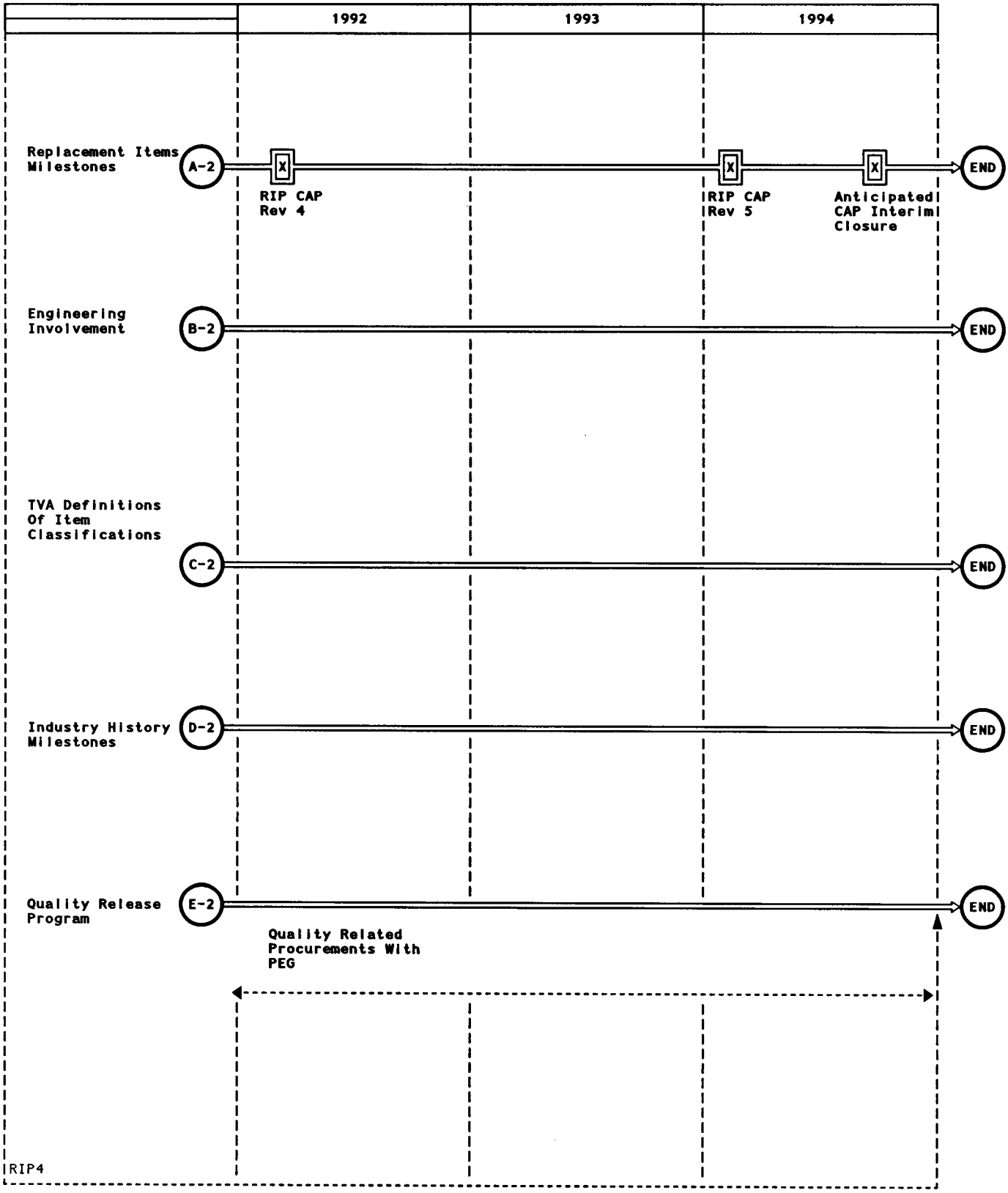

ENCLOSURE 2

SUMMARY OF CAP CHANGES

Section 1.1 Introduction (Page 1)
A footnote was added to incorporate TVA's letter to the NRC dated July 1, 1992. This letter was written to clarify a statement made in Revision 4 of the CAP which could have been interpreted to imply that TVA had fully incorporated GL 91-05 guidance into the Replacement Items Program methodology. TVA explained that this was only true if the generic letter did not deviate from guidance set forth in EPRI NP-5652 which TVA has endorsed under the NUMARC 90-13 initiative.

Section 3.0 Scope (Page 6)
The last paragraph in this section (page 7) was revised to clarify the intent of the QA assessment performed in September 1991. This assessment primarily reviewed material process procedures. However, it did not review program implementation as Revision 4 indicated.

Section 4.1.2 Current Warehouse Inventory (Page 7)
The second paragraph was revised to clarify that the release of materials from the warehouse is procedurally controlled. The previous wording was ambiguous because it suggested that the Site Vice President or his designee approved each material release.

Section 4.1.3 Replacement Items Installed by Previous Maintenance Activities (Page 8 & 9)
This section has been revised to explain the role of the Maintenance History Data Base (MHDB) in the 10 CFR 50.49 review task. It was useful because of the extensive amount of information it contained related to maintenance records and material requisitions with contract numbers for replacement parts. The data was reliable and was used to identify the 10 CFR 50.49 replacement parts. This database was not used to identify replacement parts discussed in other sections of the CAP.

Use of Site Standard Practice (SSP)-10.D, Reevaluation of QA Level II PPSP Packages was replaced by SSP-10.C, Evaluation of Installed Safety-Related Items. SSP-10.C was considered a more advantageous approach because it was planned as a long term procedure. Also, SSP-10.C was reviewed by NRC under Inspection Report No. 390, 391/92-17 with positive results.

Section 4.1.3.3 TIIC Inconsistencies (Page 11)
A footnote was added to clarify that a portion of the TIIC review dealing with 10 CFR 50.49 items was accomplished during the 10 CFR 50.49 review effort.

(QA Level III) -- In previous CAP revisions, TVA committed to evaluate QA Level III items in the MHDB database. This task has been deleted. After review of all of the QA Level III items installed in 10 CFR 50.49 applications, a Failure Mode and Effects Analysis was performed in accordance with SSP-10.C which indicated that QA Level III designations were accurate and additional reviews unnecessary. Also, a Materials Management System (MAMS) QA Level III review helped substantiate that there were no QA III problems.

Section 4.1.3.4 Quality Level Determinations (Page 11)
Clarification was added to indicate that the Quality Level (QA I, II, and III) designation is made after the safety classification is established.

(Also see changes to QA III Level III in Section 4.1.3.3.)

Section 4.1.4 Replacement Items Installed by Previous Construction Activities (Page 13)
Additional clarification was provided in this section because Revision 4 could be interpreted to infer that there were previously three physically separate warehouses in existence at one time. This is incorrect. Only the inventories were separate entities.

Also, ledger card reviews performed to date revealed no notable problems. Therefore, the need to subdivide or conduct further sampling was not warranted and has been deleted from this section.

Section 4.2 Remaining Work Summary (Page 14)
This section was updated to reflect changes discussed above as appropriate.

Section 7 Program Documentation (Page 17)
This section was updated to clarify the role of SSP-10.C in documenting the technical and quality evaluations performed by the Bulk Item Procurement Review task. Revision 4 had been worded in such a way as to imply that all output packages would be in the Previous Procurement Substantiation Process (PPSP) format. Revision 5 changed this to show that while SSP-10.C remained the guidance used for this process, output was not always strictly limited to this format.

Section 9 References (Page 18)
Additional references have been added for information.

Attachment 1
Additional CAP basis documents were added as appropriate.

Attachment 2
New definitions were added for information.

Attachment 3
A Process Flow Chart was added for information.

Attachment 4
A History Time Line was added for information.

General
Other less significant changes were made throughout the CAP, but were considered editorial in nature.