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THE NEW CHALLENGES

"IMPORTANT TO SAFETY" AND THE "GRADED APPROACH"

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ABSTRACT

The systematic method used by engineers to classify nuclear plant systems including materials, parts, components and activities will drastically change in the 1980's. Today, the classifications of Safety Related and Safety Grade are used to determine the applicability or regulatory and quality assurance program requirements for the design, procurement, installation and operations phase of nuclear plant life. These classifications are not adequate in today's nuclear environment. A new classification and concept called "Important to Safety" is destined to appear in future nuclear regulations. This classification will present significant changes and challenges to Quality Assurance organizations throughout the industry.

CONCEPT HISTORY AND DEFINITIONS

The following excerpts are from the "Technical Staff Analysis Report on Quality Assurance" by William M. Bland and Dwight Reilly which was presented October, 1979, to the President's Commission on the Accident at Three Mile Island:

> "According to W. M. Morrison, Assistant Director for General Engineering Standards at NRC and one of the authors of 10CFR50 Appendix B, the statement in the introduction to Appendix B concerning application was intended to paraphrase statements contained in 10CFR50 Appendix A which speaks of quality standards commensurate with the importance of the safety functions to be performed. Morrison explains that Appendix B was intended to impose QA on all portions of the plant that could affect safety, but allow a graded approach in which the degree of control was commensurate with the item's importance to safety.
>
> "In application however, both NRC and the industry have interpreted 10CFR50 Appendix B as applying only to structures, systems, and components identified as safety-related. A significant flaw in the NRC guidance regarding the determination of what is safety-related is the limitation of safety-related to the function of equipment installed primarily for safety.
>
> "As a consequence, function of equipment associated with normal operations, such as pilot-operated relief valve (PORV), the condensate polishers, or the

thermocouples in the reactor core are not considered to be safety related, although the role of such equipment in the TMI-2 accident has proven to be significant. Also, by restricting safety related to protective devices, equipment like the radiation monitoring equipment does not qualify as safety-related."[1]

One of the report's major findings was that "QA requirements apply only to a narrow portion of the plant defined as Safety-Related or Safety Grade. Many items vital to the safe and reliable operation of the plant are not covered by the QA program because of this definition".[1] These statements and other similar statements published in the numerous investigations and reviews that have been conducted as a result of the TMI-2 accident prompted GPU Nuclear to reassess the safety classification methods commonly being used throughout the industry.

In November, 1979, GPU Nuclear QA was deeply involved in establishing the requirements for a new Quality Assurance Plan that would address the numerous lessons learned from the TMI-2 accident. Standard definitions of Safety-Related and Safety-Grade did not appear to adequately address the more generic terminology of 10CFR50 Appendix A.[7] GPU Nuclear elected not to expand the 10CFR50 Appendix B safety-related definition to encompass the larger scope of items and activities covered in 10CFR50 Appendix A. Instead, we elected to define a broader classification of items and activities designated as Important to Safety which would also contain the safety-related items of 10CFR50 Appendix B as a sub-set or inner-grouping. This is illustrated in Figure One.

This sub-set approach appeared more rational because it would allow flexibility in limiting applicability of some of the more stringent safety-related regulations (such as reportability, 10CFR21, etc.). The concept applies QA Program requirements to all items or activities classified as Important to Safety on a graded approach consistent with the item's or activity's importance to safety. Since no formal regulatory or utility definition existed for this new classification, GPU Nuclear developed the following one which the NRC approved in early 1980:

"Important to Safety - those items or activities having direct or indirect effect on the physical, functional or human ability to operate the facility, to protect the integrity of the core, and to do so without undue risk of the health and safety of the public."[2][3]

In 1982, this definition is currently under review for change as indicated below:

A special classification or category of those structures, systems, components and activities that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. It encompasses the broad class of plant features covered (not necessarily explicitly) in the General Design Criteria (10CFR50 Appendix A) that contributes in important ways to the safe operation and protection of the public in all phases and aspects of facility operation (i.e., normal operation and transient control as well as accident mitigation). It includes safety related as a sub-set.

During the 1980 TMI-1 Restart Hearings, testimony brought to light the fact that there was not complete consistency among all elements of the NRC's staff in the application of safety classification terms. These terms are used frequently in the conduct of their safety review and licensing activities. It appeared that Important to Safety, Safety Grade and Safety-Related had been used interchangeably and in ways not consistent. In late 1980, Harold Denton, Director of the Office of Nuclear Reactor Regulations, issued a memorandum to all NRR personnel which discussed this inconsistency and defined the new classification of Important to Safety as:

"Those structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public."(4)

In addition, the memorandum included the following guidance which appears consistent to the GPU Nuclear concept:

"Important to Safety includes or encompasses the broad class of plant features, covered (not necessarily explicitly) in the General Design Criteria, that contribute in an important way to safe operation and protection of the public in <u>all</u> phases and aspects of facility operation (i.e., normal operation and transient control as well as accident mitigation). Important to Safety also includes safety grade (or safety-related) as a sub-set."(4)

The Denton memorandum additionally described that the above definitions may be re-examined and changed as part of the NRC's long term efforts to develop a graded QA approach in reactor licensing, but for the time being, the definitions should be considered 'standard' and should be applied consistently by all NRR personnel in <u>all</u> aspects of their safety review and licensing activities. The definitions should be appropriately reflected in their regulatory guidance documents. It was very apparent from this letter that the Important to Safety classification and concept was becoming a matter of regulatory significance!

IMPORTANT TO SAFETY CLASSIFICATION METHODOLOGY

GPU Nuclear Engineering was tasked with developing the systematic method to evaluate and classify our nuclear plant systems under the Important to Safety classification. In addition, they were to provide a Quality Classification List for plant use. Figure Two displays the basic concept and approach that was used in regard to classification groups and QA program applicability. The Important to Safety classification includes:

A. Nuclear Safety Related or Safety Grade Items.
B. Items Required to Achieve Cold Shutdown. (Previous classification system basis was to achieve hot standby)
C. Items of Which One or More of the Following Regulatory Documents are Applicable:
   1. USNRC Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants.

2. 10CFR71 Appendix E, Quality Assurance Criteria for Shipping Packages for Radioactive Material.
3. USNRC Branch Technical Position APCSB 9.5-1, Fire Protection.
4. USNRC Regulatory Guide 1.29, Seismic Design Classification.
5. 10CFR73.55, Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage.

Safety Sequency Diagrams, Safe Shutdown Logic Diagrams and Safety Auxiliary Diagrams were used in evaluating and determining the classification of the various plant systems. (See Figure Three.) Key parameters associated with the Important to Safety classification were radioactive material releases, fuel limits, primary/secondary/containment stress, fire protection and plant environmental conditions. These environmental conditions include the effects of pressure/temperature, toxic gases, flooding and radiological releases. Acceptance limits for the key parameters may change with the frequency at which postulated events will occur. Therefore, it was necessary for the engineers to establish event categories based upon frequency of occurrence to use in the classification process.(6)

The Benefits Reactor Shutdown classification indicated in Figure Two is new. It consists of those structures, systems and components normally used to achieve cold shutdown, but not from a nuclear safety standpoint. These systems were not designed for the specific purpose of preventing or mitigating the consequences of a nuclear accident. For example, the Atmospheric Dump System is classified Important to Safety. However, the Turbine Bypass System normally performs the heat rejection function and is therefore classified as Benefits Reactor Shutdown. For those items, the usefulness of applying QA Program requirements to all or a portion of the activities is evaluated on a case-by-case basis by engineering.(5)

The overall classification scheme was placed into GPU Nuclear Engineering Standards. The Quality Classification List was required to be submitted to the NRC for review and approval and the NRC has approved it.

In the Important to Safety classification concept, even though a plant system may be classified as Important to Safety, it may contain components or parts which are sub-classified as Nuclear Safety Related, Benefits Reactor Safety or Not Important to Safety. The engineer performs this sub-classification by evaluating the functionality of the part or component, and its importance to safety application. This evaluation identifies the specific application upon which the part or component performs its function. It also provides the basis for determining the Quality Assurance Program requirements to be applied.

IMPORTANT TO SAFETY ACTIVITIES

One of the most controversial subjects within our industry for the last decade has been the selection of activities not normally associated with Safety-Related materials, parts or components for application of QA verification activities.

Generic activities, such as fire protection, radwaste shipping, security, environmental control and radiation protection, have long been the subject of debate in regards to whether QA Program verification activities should be applied. No longer can QA be content to schedule their compliance verifications based only on whether the activity involves a Safety Related or even an Important to Safety material, part, or component. Today, more subtle activities, such as control room access, operation and maintenance personnel manhour loading, valve lineup verification and conduct of operations, are identified as major concerns to assure safe operation of nuclear stations.

Generically enhanced within the Important to Safety concept is the reality that some balance of plant systems may be important to safety, not necessarily from a material, part or component basis, but from a functional or operational basis. It was apparent to GPU Nuclear management that a Quality Assurance monitoring program to verify compliance of routine plant activities was necessary. This program would provide management assurance that activities are functioning appropriately. The extent of monitoring to be performed would be based on the day-to-day activity's importance to safety. Typical activities to be monitored included critical valve lineups, technical specification surveillances, corrective and preventive maintenance, radiological control practices, fire protection and security. Though the Quality Assurance Audit Program covers many of the same activities on a programmatic basis, the monitoring coverage is necessary for more timely problem identification and effective problem prevention. Quality Assurance Auditing spending too much time in day-to-day activity verification versus assuring Quality Assurance Program implementation is a real concern and can be a significant quality problem. It can result in too large a gap in QA coverage between the auditor and the Quality Control inspector. The auditor must verify program effectiveness and implementation. The QC inspector is primarily concerned with verification of materials, parts, components and activities associated with those items. The GPU Nuclear QA Program emphasis is on work function activity coverage by committed monitoring programs. This allows the audit function to concentrate on verifying the effectiveness and status of implementation of the QA Program. Both verification programs more effectively assure program compliance. Figure Four shows the major GPU Nuclear QA verification activities.

Procedure inadequacy, procedure noncompliance, operator error, or lack of proper training can have as great a safety impact as poor design or construction at a nuclear unit. Therefore, it is critical that plant day-to-day activities be reassessed as to their importance to safety and the need for QA to provide management assurance that plant safety is maintained.

IMPACT ON QA AS AN ORGANIZATION AND THE PLANT

The total impact on Quality Assurance Departments and plant organizations in implementing an Important to Safety classification concept is of prime concern. GPU Nuclear, with almost two years of implementation experience, is still assessing the significance and magnitude of the program. The potential exists that it may take several years to totally assess and fully implement the concept in its most effective form.

Many factors must be considered in evaluating potential impact of the Important to Safety concept. Methods selected for implementation, extent of affect on present programs, plant organizational structure and plant environment are all key factors. An essential factor is management's acceptance of Quality Assurance as its tool for verification of compliance.

The following items are a listing of categories of potential impacts for Quality Assurance and Plant Organizations.

Potential QA Impact Items

- Need to increase technical capability within QA to adequately assess compliance of programs involving activities not directly related to materials, parts, components or systems (i.e., plant operations, radiological controls, security, fire protection, Emergency Planning, chemistry, etc.).

- Need to develop programs orientated to verify activities not directly related to materials, parts, components or systems on a more timely and frequent basis than normal auditing requirements. These programs should achieve quicker problem identification and resolution.

- Need to develop additional verification programs. These should be orientated towards operability and/or functionability rather than material, part or component design (i.e., Feedwater system may not be designed, installed and procured under QA Program cognizance but may be classified as Important to Safety based on the system's functional ability to remove heat from the core).

- Increase in QA day-to-day interface with plant management and supervision. This is to insure QA is aware of those activities being planned and scheduled which would not appear in normal work authorizing documents (i.e., radiation surveys, operational surveillance activities, chemistry sampling, valve lineup checks, radwaste operations, etc.).

- Need to develop better methods for identification of root cause of activity related deficiencies. QA must evaluate activity related audit findings and monitoring deficiencies in more detail and depth to assure the root cause is identified versus only the symptom (i.e., many identified procedure noncompliances may in fact be the result of procedure inadequacies instead of inadequate training, etc.).

- Need to perform more detailed receipt inspection versus documentation checks due to increase of commercial grade items which fall under Important to Safety scope.

- Need to develop graded approach to handle increase in number of materials, parts, components and systems that fall under Quality Assurance scope.

Potential Plant Impact Items

- Engineering and Plant Programs must be adapted to handle the concept that a material, part, component or system may be Important to Safety even though not designed, built or procured under the QA Program requirements (i.e., Feedwater, Turbine Generator, PORV, etc.).
- Activities that have not routinely been considered Important to Safety should be re-assessed as to their impact on safety (i.e., conduct of operations, control room access, manhour loading, etc.).
- Classical "Q" List or Quality Classification List used by many plants requires upgrading to include those additional materials, parts, components or systems which may be classified Important to Safety and which are not designated Safety-Related. In addition, programs for identifying activities that are Important to Safety but not directly related to an Important to Safety or Safety-Related material, part, component or system may have to be developed (i.e., plant procedures may be designated or identified as Important to Safety or Important to Safety activity matrixes developed, etc.).
- Training or indoctrination programs must be revised to emphasize the Important to Safety concept.
- Plant interfaces need to be better defined and structured as a larger number of activities and systems become classified within QA Program scope. As a result, they receive increased management and regulatory emphasis in regards to their relative importance to safety.
- Need to develop Graded Approach to handle increase in number of materials, parts, components and systems which require increased plant emphasis and attention.

THE GRADED APPROACH PHILOSOPHY AND ITS MISCONCEPTIONS

QA and plant organizations spend a significant portion of available manpower in administrative programs. The number of records generated, activity reports written, verifications performed, document reviews conducted, etc., is tremendous. They are directly proportional to the number of materials, parts, components, systems and activities identified as Safety-Related and, if implemented, Important to Safety. It would appear by increasing this scope with the Important to Safety classification scheme, significant staff and administrative personnel increases would be required. However, this need not be the case.

An effective and viable way to reduce the impact of this increased scope is to apply a Graded Approach in the application and verification of QA Program requirements. This approach and philosophy may not rule out the need for increased staff levels in all areas. It does provide management one method to manage the actual impact and assure that manpower is being used in the most effective and efficient manner. The GPU Nuclear QA Plans contain the following statements (also shown in Figure Six) regarding the Graded Approach:

"The degree to which the requirements of this Plan and its implementing procedures are applied will be based upon the following:

a. The importance of a malfunction or failure of the item to safety;
b. The design and fabrication complexity or uniqueness of the item;
c. The need for special controls and surveillance or monitoring of processes, equipment and operational activities;
d. The degree to which functional compliance can be demonstrated by inspection or test;
e. The quality history and degree of standardization of the item or activity; and
f. The intended life during which the item performs an Important to Safety function."(2)(3)

These words are generic by design and provide Quality Assurance and Engineering the maximum flexibility to develop the systematic method to implement and verify Quality Assurance Program requirements.

The following is an example of how an Operations QA group can use the Graded Approach in selecting activities to be monitored or inspected:

Through attendance at daily Plan of the Day meetings and review of plant monitoring and weekly activity schedules, Operations QA monitors and Quality Control inspectors select activities to be monitored or inspected that day based on the following typical criteria:

Of the activities scheduled:

a. Are there new activities which have never been performed or implemented before?
b. Has there been a trend or history of previous quality problems?
c. Which ones are the most critical to safety and/or have the most potential for safety impact?
d. Have there been rewrites of the procedures which have not as yet been implemented?
e. Which ones have not been monitored in the recent past and/or are not frequently occurring activities, i.e., monthly, weekly, daily?
f. Are new personnel, contractors or technicians performing the tasks?

By using the above criteria, the manager or supervisor can effectively grade out those activities occurring which are of less safety significance and potential impact. This allows the manager or supervisor to more effectively use his available resources and select his coverage priorities. This approach is typical of how QA can use a Graded Approach philosophy to monitor or inspect day-to-day plant activities.

The following is an example of how engineering may apply the Graded Approach in determining the application of QA Program requirements to security systems:

For security systems, Quality Assurance Program requirements can be applied with most benefit in the engineering, test, preventive maintenance and operational areas. All changes and modifications to security systems will be performed by Engineering Change Modification Packages which require QA review. Purchase requisitions for components are normally classified commercial grade and commercial standards are specified. Construction activities do not require QA/QC coverage but installation of materials shall be by documented vendor instructions and plant procedures. Corrective maintenance shall be performed by Work Request or other approved work authorization programs to assure documentation per 10CFR73.70. QA/QC coverage is not required. All startup functional tests require QA/QC surveillance or monitoring. Preventive maintenance procedures and work shall be covered by QA/QC.

This approach is typical of how engineering can use a Graded Approach concept to effectively identify QA Program requirements and achieve the desired level of quality needed based on the item's importance to safety.

There are many misconceptions regarding the use of a Graded Approach philosophy. (See Figure Five.) A frequently occurring one is that a Graded Approach is nothing more than developing sample plans. Do not confuse the Graded Approach with sampling!

Sampling plans and techniques are developed based on statistical studies of variability and probability. This provides a scientific basis for acceptance or rejection of a population of items based on a predetermined set of criteria which have been identified to be critical. The Graded Approach uses criteria based on an item's or activity's importance to safety. It defines the population and the Quality Assurance Program controls and requirements which apply. Sampling plans and techniques are best applied in those cases where there are attributes or variables within the graded population which need to be examined and are susceptible to the laws of variability and probability.

Another basic misconception is that the Graded Approach philosophy can only be applied to Important to Safety items or activities but not to Nuclear Safety-Related items or activities. This is not true! Engineering may have a tendency to not grade QA Program requirements on Safety Related items. The hesitancy to grade is based on the perception of increased safety significance when it may not actually exist. A typical example of this is the use of a commercial grade item in a safety-related application. Engineering, based on the specific importance to safety of the commercial grade item, may determine on a graded approach, that QC receipt verification to assure commercial part identity is the <u>only</u> QA Program requirement to be applied. This is in direct contrast to applying a full scope of Quality Assurance Program verification activities on the item.

THE CHALLENGE OF IMPLEMENTATION

GPU Nuclear has made significant changes, not only in its QA Programs, but also in its philosophy and concept of Quality Assurance. Just as the Safety Related concept was tested at TMI Unit II in March, 1979, the Important to Safety concept and the challenge it presents may be ultimately tested. Hopefully, the results will be drastically different. Figure Seven summarizes the basis for the major changes that have been made within the GPU Nuclear QA Program and the QA organization.

Implementation of these changes have resulted in improved effectiveness and stronger basis for assuring plant safety is adequately maintained. The TMI Quality Assurance Plans contain the following statement, "The effectiveness of any Quality Assurance Program is dependent upon the individuals who implement the program."(2)(3) This challenge, in regards to the implementation, holds especially true in the Important to Safety concept and the Graded Approach.

BIBLOGRAPHY

(1) "Technical Staff Analysis Report on Quality Assurance to President's Commission on the Accident at Three Mile Island," William M. Bland, Jr. and Dwight Reilly dated October, 1979.

(2) GPU Nuclear Operational Quality Assurance Plan for Three Mile Island Nuclear Station Unit 1, Revision 9, dated May 28, 1981.

(3) GPU Nuclear Recovery Quality Assurance Plan for Three Mile Island Nuclear Station Unit 2, Revision 0, dated July 14, 1980.

(4) Nuclear Regulatory Commission Memorandum, "Safety Classification Terminology-Proposed Standard Definitions," Harold R. Denton, Director, Office of Nuclear Reactor Regulation to Thomas E. Murley, Director Division of Safety Technology, NRR, dated October 13, 1981.

(5) GPU Nuclear Procedure No. EP-011, "Quality Classification List," Revision 0, dated June 1, 1981.

(6) GPU Nuclear Engineering Standard No. ES-011, "Methodology and Content of TMI Quality Classification List," Revision 4, dated March 15, 1982.

(7) Title 10-Energy, Code of Federal Regulations, Part 50-Domestic Licensing of Production and Utilization Facilities, Appensix A, "General Design Criteria for Nuclear Power Plants" (10CFR50 Appendix A), January 1, 1982, pages 404-412.

(8) Title 10-Energy, Code of Federal Regulations, Part 50-Domestic Licensing of Production and Utilization Facilities, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," (10CFR50 Appendix B), January 1, 1982, pages 412-416.

SCOPE OF QA PROGRAM

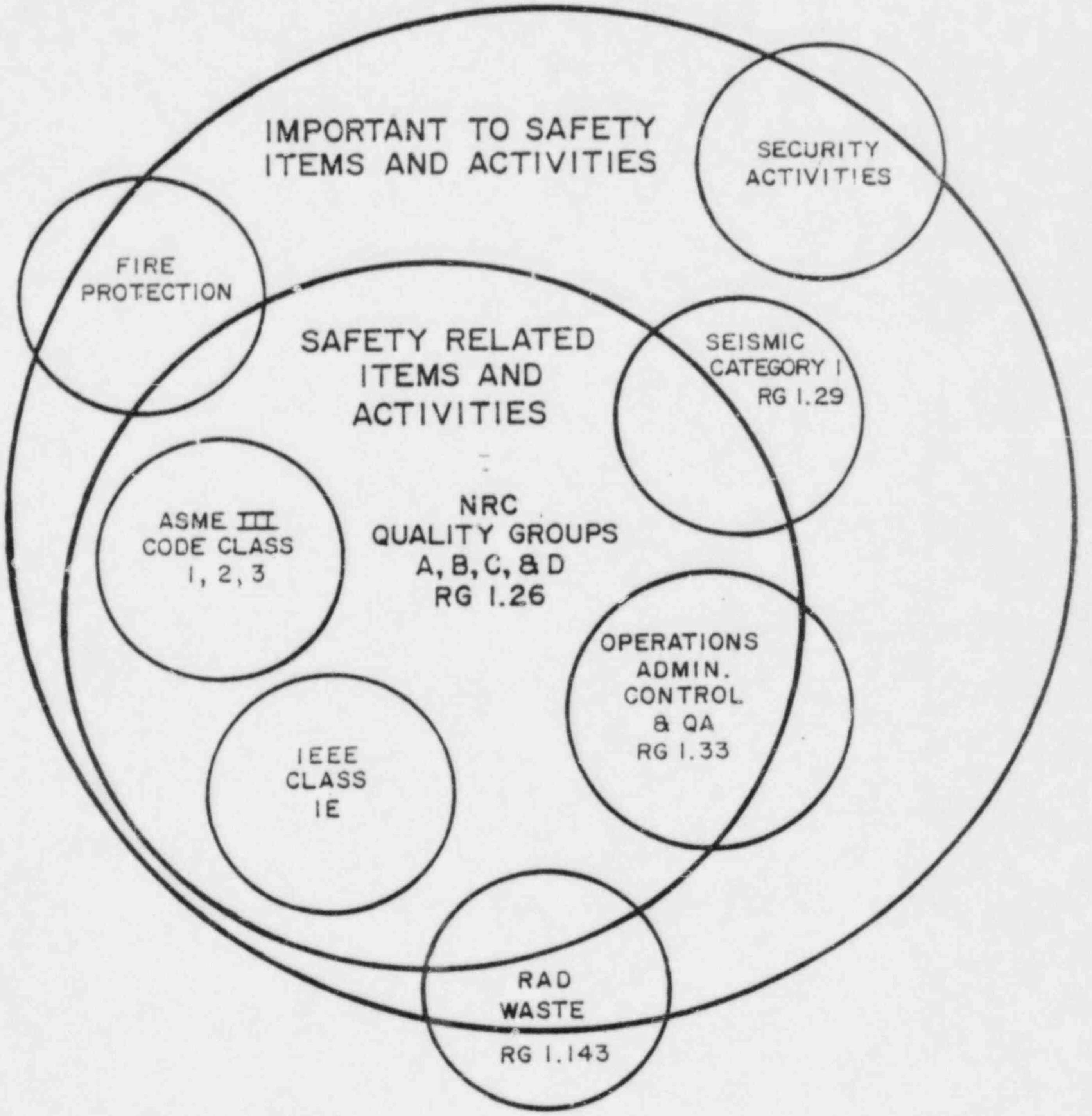

FIGURE ONE

GPUN
QUALITY CLASSIFICATION SYSTEM

PRE-TMI ACCIDENT

PREVIOUS SYSTEM NUCLEAR SAFETY RELATED (PER ES-011/GP-1008)	NON-NUCLEAR SAFETY RELATED
OQA PLAN COVERAGE	NO QA

POST-TMI ACCIDENT

IMPORTANT TO SAFETY			(NOTE 1)	NOT ITS
PRESENT SYSTEM NUCLEAR SAFETY RELATED	ADD. ITEMS TO ACHIEVE COLD SHUTDOWN	ADD. NRC REQMTS. (NOTE 2)	BENEFITS REACTOR SHUTDOWN	NO SAFETY SIGNIFICANCE
OQA PLAN COVERAGE			(NOTE 1)	NO QA

<u>NOTES</u>:

1.) COVERAGE UNDER THE OQA PLAN IS SUBJECT TO ENGINEERING DETERMINATION ON A CASE-BY-CASE BASIS FOR THE SPECIFIC ACTIVITY BEING PERFORMED. ACTIVITIES TO BE COVERED BY THE OQA PLAN ARE THEN CLASSIFIED "IMPORTANT TO SAFETY".

2.) ADDITIONAL REQUIREMENTS ARE BASED UPON:
REG. GUIDE 1.143; 10 CFR 71, APPENDIX E; BTP ASB 9.5-1; REG. GUIDE 1.29, AND 10 CFR 73.55.

<u>FIGURE TWO</u>

PREPARATION OF QUALITY CLASSIFICATION LIST

- **SAFETY SEQUENCE DIAGRAM (SSD):**

  A BLOCK DIAGRAM IDENTIFYING THE SAFETY SYSTEMS WHOSE RESPONSES ARE ESSENTIAL TO PROVIDING THE SAFETY ACTIONS REQUIRED TO MITIGATE THE CONSEQUENCES OF A POSTULATED EVENT.

- **SAFE SHUTDOWN LOGIC DIAGRAM (SSLD):**

  A BLOCK DIAGRAM IDENTIFYING THE SYSTEMS WHOSE RESPONSES ARE ESSENTIAL TO TAKING THE PLANT FROM OPERATING CONDITIONS TO COLD SHUTDOWN.

- **SAFETY AUXILIARY DIAGRAM (SAD):**

  A BLOCK DIAGRAM IDENTIFYING THE AUXILIARY PROTECTIVE SYSTEMS THAT ARE ESSENTIAL TO THE OPERATION OF A PRIME PROTECTIVE SYSTEM.

NOTE: THE SSD'S AND THE SSLD'S IDENTIFY BOTH THE SAFETY RELATED SYSTEMS AND THE NONSAFETY RELATED SYSTEMS WHICH CAN FULFILL A GIVEN FUNCTION.

FIGURE THREE

MAJOR GPUN QA VERIFICATION ACTIVITIES

- **QUALITY CONTROL**
  - RECEIPT INSPECTION
  - INPROCESS WITNESS/HOLD POINT INSPECTION OF CONSTRUCTION, MODIFICATION, & MAINTENANCE ACTIVITIES
  - FINAL WALKDOWN/TURNOVER INSPECTIONS OF NEW OR MODIFIED SYSTEMS
- **OPERATIONS QA**
  - DAILY MONITORING OF PLANT ACTIVITIES TO VERIFY COMPLIANCE TO PLANT PROCEDURES AND PLANT ADMINISTRATIVE CONTROLS
  - REVIEW OF PLANT ADMINISTRATIVE PROCEDURES FOR COMPLIANCE TO QA PROGRAM
- **QA ENGINEERING**
  - REVIEW OF DESIGN, MODIFICATION, PURCHASE REQUISITION, INSTALLATION AND MAINTENANCE DOCUMENTS FOR COMPLIANCE TO QA PROGRAM & TECHNICAL REFERENCES
  - VENDOR SURVEILLANCE AND QUALIFIED SUPPLIER LIST MAINTENANCE
  - CONSTRUCTION/MODIFICATION RECORD REVIEWS FOR DESIGN CONFORMANCE
- **QA AUDITS**
  - VERIFY QA PROGRAM COMPLIANCE
  - VERIFY STATUS OF IMPLEMENTATION AND EFFECTIVENESS OF QA PROGRAM

FIGURE FOUR

QA GRADED APPROACH MISCONCEPTIONS

- THE GRADED APPROACH IS NOTHING MORE THAN A SAMPLE PROGRAM
  - NOT TRUE
  - THE GRADED APPROACH IS BASICALLY A METHODOLOGY OF APPLYING A SET OF CRITERIA BASED ON AN ITEM(S) OR ACTIVITY(S) IMPORTANCE TO SAFETY SUCH THAT A GIVEN POPULATION IS DEFINED IN REGARDS TO THE TYPE AND DEGREE OF QA PROGRAM REQUIREMENTS NEEDED TO BE APPLIED.
  - SAMPLE PLANS AND TECHNIQUES ARE BEST APPLIED IN THOSE CASES WHERE WITHIN THE GRADED POPULATION, THERE ARE ATTRIBUTES OR VARIABLES TO BE EXAMINED THAT ARE SUSCEPTABLE TO THE LAWS OF VARIABILITY AND PROBABILITY.
  - IN GENERAL TERMS, APPLYING A GRADED APPROACH ASSISTS THE USER IN DEFINING A POPULATION OF ITEMS OR ACTIVITIES AND SAMPLING MAY BE ONE TECHNIQUE IN WHICH TO EXAMINE THE POPULATION DEFINED.
- THE GRADED APPROACH ONLY APPLIES TO ITEMS OR ACTIVITIES IMPORTANT TO SAFETY BUT NOT SAFETY RELATED
  - NOT TRUE
  - THE GRADED APPROACH, IF TECHNICALLY JUSTIFIED, HAS APPLICABILITY WITHIN THE SAFETY RELATED DOMAIN AND TO SOME EXTENT HAS BEEN USED HISTORICALLY IN THE PAST. EXAMPLE: COMMERCIAL GRADE ITEMS USED IN SAFETY RELATED APPLICATION.

FIGURE FIVE

GPUN
QA PLAN

THE DEGREE TO WHICH THE REQUIREMENTS OF THE PLAN AND ITS IMPLEMENTING PROCEDURES ARE APPLIED IS BASED UPON THE FOLLOWING:

- THE IMPORTANCE OF A MALFUNCTION OR FAILURE OF THE ITEM TO SAFETY.
- THE DESIGN AND FABRICATION COMPLEXITY OR UNIQUENESS OF THE ITEM.
- THE NEED FOR SPECIAL CONTROLS AND SURVEILLANCE OR MONITORING OF PROCESSES, EQUIPMENT, AND OPERATIONAL ACTIVITIES.
- THE DEGREE TO WHICH FUNCTIONAL COMPLIANCE CAN BE DEMONSTRATED BY INSPECTION OR TEST.
- THE QUALITY HISTORY AND DEGREE OF STANDARDIZATION OF THE ITEM OR ACTIVITY.
- THE INTENDED LIFE DURING WHICH THE ITEM PERFORMS AN IMPORTANT TO SAFETY FUNCTION.

FIGURE SIX

GPUN CHANGES

MAJOR PRE-TMI ACCIDENT CONDITIONS		MAJOR POST-TMI ACCIDENT CHANGES
QA SCOPE	· SAFETY RELATED MATERIALS, PARTS, COMPONENTS, & SYSTEMS · ACTIVITIES DIRECTLY ASSOCIATED WITH SAFETY RELATED MATERIALS, PARTS, COMPONENTS, & SYSTEMS	· IMPORTANT TO SAFETY MATERIALS, PARTS, COMPONENTS, & SYSTEMS · ACTIVITIES DIRECTLY ASSOCIATED WITH IMPORTANT TO SAFETY MATERIALS, PARTS, COMPONENTS, AND SYSTEMS. · ACTIVITIES NOT DIRECTLY ASSOCIATED WITH IMPORTANT TO SAFETY MATERIALS, PARTS, COMPONENTS, AND SYSTEMS BUT WHICH HAVE BEEN DESIGNATED AS CONTRIBUTING IN IMPORTANT WAYS TO THE SAFE OPERATION & PROTECTION OF THE PUBLIC IN ALL PHASES & ASPECTS OF FACILITY OPERATION.
QA VERIFICATION ACTIVITIES	· QUALITY CONTROL INSPECTION · QUALITY ASSURANCE ENGINEERING · QA AUDITS	· QUALITY CONTROL INSPECTION · QUALITY ASSURANCE MONITORING · QA ENGINEERING · QA AUDITS
PLANT ACCEPTANCE OF QA	· TRAFFIC COP SYNDROME · BUFFER FOR REGULATORY PURPOSES · AFTER THE FACT REVIEWER & PAPER ORIENTATED · PROBLEM IDENTIFICATION AFTER THE FACT · NOT PART OF PLANT TEAM	· EMPHASIS ON REPORTING GOOD AS WELL AS BAD · EMPHASIS ON SAFETY & QUALITY VS. JUST MEETING REGULATION · INCREASED BEFORE THE FACT REVIEWS & IN PLANT ORIENTATION VS. AFTER THE FACT PAPER REVIEW · PROBLEM PREVENTION EMPHASIS · FUNCTIONAL PLANT TEAM MEMBER & MANAGEMENT TOOL
QA STAFF	· LIMITED TECHNICAL ADEQUACY IN HOUSE · CONSTR. ORIENTED · LIMITED MANPOWER RESOURCES · INADEQUATE INTERFACE & COMMUNICATION WITH · LIMITED MGMT./SUPV. CAPABILITY ON SITE	· INCREASED TECHNICAL CAPABILITY (ENGR'S, SRO CAPABILITY, ETC.) · OPERATIONS & CONSTRUCTION MIX · MANAGED MANPOWER RESOURCES · IMPROVED INTERFACES & COMMUNICATION TECHNIQUES · SENIOR MGMT. LOCATED ON SITE

FIGURE SEVEN