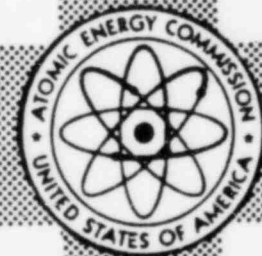


~~FORN TO INFORMATION CENTRAL FILES~~
~~...~~
~~...~~

SAFETY EVALUATION OF THE SEABROOK NUCLEAR POWER STATION UNITS NOS. 1 & 2

**DOCKET NOS. 50-443
50-444**



**U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF LICENSING
WASHINGTON, D. C.**

**Issue Date: AUGUST 14, 1974
Suppl. 1: AUGUST 20, 1974**

8212100112 821118
PDR FOIA
KINDER82-024 PDR

17.0 QUALITY ASSURANCE

The description of the Quality Assurance (QA) Program for Seabrook Station, Units 1 and 2 is contained in Chapter 17 of the PSAR, as amended. Our evaluation of the QA Program is based on a review of this information, and related discussions with the applicants. The evaluation was made to determine the measures to be implemented by Public Service of New Hampshire Company (PSNH) and its principal contractors Yankee Atomic Electric Company (YAEC), United Engineers and Constructors (UE&C) and Westinghouse Electric Corporation (Westinghouse), to comply with the requirements of Appendix B to 10 CFR Part 50 and Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)". Our review of the applicant's QA Program included discussions with Regulatory Operations, Region I relating to their inspection reports and acceptance of the PSNH QA Manual.

In the course of our evaluation, we reviewed the PSNH Quality Assurance Program to ascertain:

1. That a QA organization for the Seabrook design, procurement, and construction activities is established to develop and execute a QA Program in compliance with 10 CFR Part 50 Appendix B; and that this organization is structured such that those responsible for QA can effectively manage and control the quality assurance and quality control (QC) functions.

2. That personnel assigned QA responsibilities or performing QA functions within the applicant's and contractor's organizations have sufficient authority and organizational freedom to perform their functions effectively without undue influence from cost and schedule, and without reservation.
3. That the QA Program embodies sufficient policies and procedures to fully implement 10 CFR Part 50 Appendix B for safety-related structures, systems, and components.

17.1 Public Service Company of New Hampshire

Public Service Company of New Hampshire (PSNH) will act as agent for, and on behalf of, the applicants and will be responsible for the design, construction and operation of the Seabrook Station. The PSNH President has overall responsibility for the Seabrook Station QA Program. Reporting directly to him is the PSNH Executive Vice-President. The PSNH project manager and his technical support staff are responsible to the Executive Vice-President for maintaining cognizance of the overall project effort and to advise the PSNH management accordingly. The PSNH project manager's direct responsibilities are separate from those of YAEC and entail state and local permits, environmental licenses, biological studies, public relations and plant external electrical design.

PSNH has contracted with Yankee Atomic Electric Company (YAEC) to establish and execute the QA Program. In accordance with Criterion 1, "Organization," of Appendix B to 10 CFR Part 50, such delegation of authority is acceptable (see Section 17.2).

The PSNH project manager does not have assigned QA responsibilities and, as shown on Figure 17-1, there is no organizational element within the PSNH organization to review, monitor and maintain cognizance of the quality assurance activities during the design and construction of the facility. The President and Executive Vice-President directly retain the responsibility for QA aspects by reviewing YAEC quarterly QA summaries, YAEC monthly summaries, results of YAEC audits of subcontractors and attending YAEC meetings. We are (1) evaluating the additional information submitted by the applicants in Amendment 21 and (2) considering the corporate interrelationships between PSNH and YAEC. The results of our review will be documented in a supplement to this report.

17.2 Yankee Atomic Electric Company

The organization of YAEC is shown in Figure 17-1. The Vice President is responsible for the direction and management of the Seabrook Project Quality Assurance Program. He establishes the policies for the QA staff, approves the QA Manual, continuously evaluates the effectiveness of the QA Program, and reports to PSNH management to keep them advised on the program status. Reporting to the Vice President is the Quality Control and Audit Manager (QCAM), who is responsible for direction and supervision of work performed by the Quality Control and Audit Department (QCAD), both at the corporate offices and the plant site.

The QCAM is responsible for the preparation, maintenance and distribution of the Seabrook Station Quality Assurance Manual. In response to a Staff concern, the applicants have provided "stop work" authority to the QCAM and his staff in the engineering, design, and construction phases. The QCAD performs monitoring and surveillance of quality assurance activities conducted by PSNH prime contractors (the Architect-Engineer, NSSS Supplier, Constructor) subcontractors, and vendors. The QCAD also establishes means to assure that individuals assigned responsibilities for verifying correct performance are independent of the group responsible for performance of the safety related activities.

The
operation
and sched
responsib
quality c
responsib
subcontra
(UE&C).

Base
of the YA
to effect
principal

The
detail in
ment by w
The QA Man
procuremen
Appendix B
of Appendi
of these p
applicable
"Gray Book

The QCAM and his staff are independent of engineering, construction, operations, and the project managers are sufficiently independent of costs and schedules. The Field Quality Control and Audit Manager (FQCAM) is responsible to the QCAM, for the direction and supervision of the YAEC quality control and audit personnel at the site. The FQCAM also has the responsibility to conduct surveillance of the quality activities of the subcontractors and construction manager, United Engineers & Constructors (UE&C).

Based on our review, we find that the structure and responsibility of the YAEC organizations provide the necessary independence and authority to effectively implement the QA Program and control the QA functions of the principal contractors.

The Quality Assurance Program for Seabrook Station is described in detail in the Quality Assurance Manual. This manual is the primary document by which YAEC assures effective control of all Seabrook activities. The QA Manual is comprised of the procedures which detail how the design, procurement, and construction of Seabrook will comply with 10 CFR Part 50, Appendix B. We reviewed the QA Manual and conclude that the QA Program of Appendix B has been acceptably addressed by the implementing provisions of these procedures. In addition, YAEC will comply with all currently applicable Regulatory Guides as well as guidance contained in the AEC "Gray Book".

YAEC has established a three level program to obtain quality assurance and quality control:

- Level 1 - Quality control by vendors and constructors on the activities they perform including site receiving inspections, inspections, and tests.
- Level 2 - Surveillance of design, fabrication, and construction activities by United Engineers and Constructors and surveillance by YAEC FQCAM at the site.
- Level 3 - Home office audits by YAEC QCA Department of activities performed by Level 1 and 2 organizations. The YAEC audit program utilizes the provisions of ANSI N45.2.12 "Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants".

In the course of our review we have evaluated the qualifications of QA Managers, stop work authority, identification and independence of inspection personnel, qualifications of personnel, provisions for inclusion of quality characteristics in the inspection procedures, calibration program, control of inspection and test status marking, and the disposition of "use as is" or "repair" nonconformances. Based on our review of the QA Program description for Seabrook 1 and 2 contained in the PSAR and on its implementation in accordance with the QA Manual, we find that, with the exception noted in 17.1, the program provides sufficient detailed procedures, requirements, and elements of control to assure that all safety related structures, systems, and components will be designed, constructed, installed, inspected, and tested in accordance with the requirements of 10 CFR 50

Appendix B.

17.5 United

UP
procure
issues
struct
and org
in the
T
Engine
Seabro
struct
assura
activi
Admini
is ind
Reliab
T
discip
the QA
T
the su
they w
by the

17.3 United Engineers and Constructors, Inc.

UE&C, as the Architect-Engineer, will provide engineering design procurement and QA surveillance services. UE&C, as the Construction Manager, issues contracts to individual construction contractors defining the construction requirements and requiring contractor's Quality Assurance Programs and organizations to be in accordance with the UE&C QA Program description in the PSAR.

The UE&C project manager reports directly to the Vice President, Power Engineering and he has the assigned responsibility within UE&C for the Seabrook project. The project engineering manager and the project construction manager report to the project manager. The reliability and quality assurance manager is responsible to the project manager for all UE&C QA activities. The latter, however, reports directly to the Vice President Administration, thus providing a direct channel to higher management which is independent of cost and schedules. The organization for the Manager Reliability and Quality Assurance is shown in Figures 17-3 and 17-4.

The Home Office QA Engineers (HOQAE) includes engineers of various disciplines. One of these Engineers is assigned the responsibility for the QA activities of UE&C at the site.

The Vendor Surveillance Superintendent directs the personnel assigned the surveillance at vendors shops and on fabricated items. In addition they witness tests and perform inspections to vendor check plans prepared by the HOQAE.

The quality assurance and control responsibility at the site is assigned to the Field Superintendent Quality Assurance. He has a staff of Assistant Superintendents, Supervisors, and Quality Control Engineers. The organization is independent of construction.

The Supervising Engineer (Site QA & QC Philadelphia) reports to the R&QA Manager and is responsible to audit design and engineering activities for conformance with applicable codes and regulations and for auditing other activities. The nondestructive examination (NDE) Engineering Superintendent is responsible for the NDE activities of UE&C and other contractors. The Chief Materials Engineering is responsible for the control of materials and manufacturing processes.

A concern of the staff was the apparent lack of authority of QA personnel to stop work and control further processing or delivery of non-conforming material. In response to our request, this authority has been provided to QA personnel at vendor plants and at the construction site.

The Quality Assurance Program for UE&C activities has been described in the PSAR. A matrix has been included to show the principal procedures which implement the criteria of Appendix B of 10 CFR 50. Included in this matrix is a description of the purpose of the procedures. Our review of this program information shows that each criterion of Appendix B, 10 CFR 50 has been covered by these procedures.

Based on our review of the description of the QA Program of UE&C, and of the organization executing the program, we conclude that there are sufficiently detailed procedures, requirements, and controls provided to

dem
for
als
hav
for

17.4 Wes

Wes
is
Pr

me

pr

co

as

qu

pr

s

t

T

f

F

F

F

demonstrate compliance with the criteria of 10 CFR Part 50 Appendix B for those engineering and procurement functions assigned to UE&C. We also conclude that the UE&C personnel assigned to carry out QA functions have sufficient authority and organizational freedom to effectively perform these responsibilities.

17.4 Westinghouse

PSNH has purchased the Nuclear Steam Supply System (NSSS) from Westinghouse. The Westinghouse Organization and Quality Assurance Program is described in Westinghouse topical report WCAP-8370, "Quality Assurance Program". Our review is based on this topical report.

Westinghouse is responsible for developing quality control requirements and procedures for the NSSS and assuring that these requirements and procedures are followed. Westinghouse Nuclear Energy Systems (NES) is comprised of a number of operating Divisions (Figure 17-5). The quality assurance aspects of NES are monitored by the NES QA Committee made up of quality assurance reliability managers of the NES Divisions. The pressurized water reactors systems division (PWR-SD) is responsible for supplying the nuclear plant. Overall contract responsibility for supplying the NSSS is assigned to a Project Manager within PWR-SD (Figure 17-6).

Quality Management within each NES Division has stop work authority. The Quality Control Inspectors are located in each NES Division. The functional organization for quality assurance for PWR-SD is shown in Figure 17-7. Responsibility for QA activities is assigned to the Product Assurance Department. The Manager of the Product Assurance Department

reports directly to the Division General Manager and is in parallel to other major departments within the Division. The Product Assurance Department is divided in two groups: the Product Assurance Systems Group and the Quality Assurance Group. The Product Assurance Systems Group is responsible for the following activities: (1) records management, (2) files operation, (3) systems compliance, and (4) quality and reliability engineering.

Westinghouse uses three levels of organization control to evaluate the QA Program. At the first level, process audits are conducted by the Nuclear Energy Division and by other Divisions to assure functional areas are adequately covered. At second level is the NES QA Committee, and at the third level is the Headquarter's Quality Control Staff reporting organizationally independent from the Westinghouse Power Systems Company. surveillance of suppliers during fabrication, inspection, test, and shipping of components is planned and conducted in accordance with Quality Control Plans. The QC Plans provide the field representative with instructions on auditing, surveillance of key operations, and inspection verification. Westinghouse holds the supplier responsible for inspecting and testing. The field representative assures that it is done in accordance with previously approved procedures.

The organization structure and functional responsibility assignments are such that attainment of quality objectives is accomplished by individuals assigned responsibility for specifying quality or for performing work to specifications. We find that verification of conformance to established quality requirements is accomplished by those who do not have direct

17.5 Qua

resp
Base
the
assu
app
requ
org
lev
clu
ind
QA
Ass
Pro
one
con
imp
has
to
to
the
eff
(se

responsibility for specifying or for performing work to specifications. Based on our review of the QA Program of Westinghouse, we conclude that the program contains those quality system elements necessary to provide assurance that systems and components important to safety will meet applicable codes, standards, regulatory requirements and the quality requirements of PSNH and YAEC.

Since the Product Assurance Department is independent of manufacturing organizations and since its manager is on the same organizational reporting level as those managers directly responsible for cost and schedules, we conclude that Westinghouse QA organizational departments have sufficient independence and authority to properly carry out their QA responsibilities.

Quality Assurance Program Implementation

Inspection by the Directorate of Regulatory Operations (RO) of the QA Program activities conducted by PSNH/YAEC and of the Seabrook Quality Assurance Manual for construction has shown compliance with the QA Program described in the PSAR without substantive deficiencies with one exception, YAEC has not yet completed review and approval of contractor QA procedures and manuals.

On the basis of our review of the QA Program and inspection of its implementation, we conclude that the QA Program for the Seabrook Station has been developed and is being conducted in accordance with Appendix B to 10 CFR Part 50, with the exception of the item noted above. Prior to issuance of a construction permit, RO will verify the resolution of the deficiency noted above and, will verify the implementation of effective control of the responsibilities of the QA Program by PSNH (see Section 17.1).

17.6 Conclusion

Based on our detailed review and evaluation we conclude:

1. That the QA organizations of YAEC, UE&G, and Westinghouse, have adequate independence from line organizations who have assigned responsibility and authority for cost and schedules and for performing QA related activities both "onsite" and "offsite".
2. That YAEC, UE&C, and Westinghouse have delegated adequate authority to their respective QA Managers to permit effective implementation of their respective QA Program responsibilities.
3. That YAEC, UE&C, and Westinghouse have described adequate QA Programs, with sufficient requirements, procedures and controls to demonstrate coverage of the requirements of Appendix B to 10 CFR Part 50 during design and construction of Seabrook Units 1 and 2.
4. That YAEC, UE&C, and Westinghouse have described adequate audit and management information systems which can assess and report on the implementation and effectiveness of the QA Programs to respective managements.

Resolution of the item noted in 17.1, and our conclusions in this matter will be documented in a supplement to this report.

YAEC

PAGE NH

g-
ons

e

which
tiveness

n

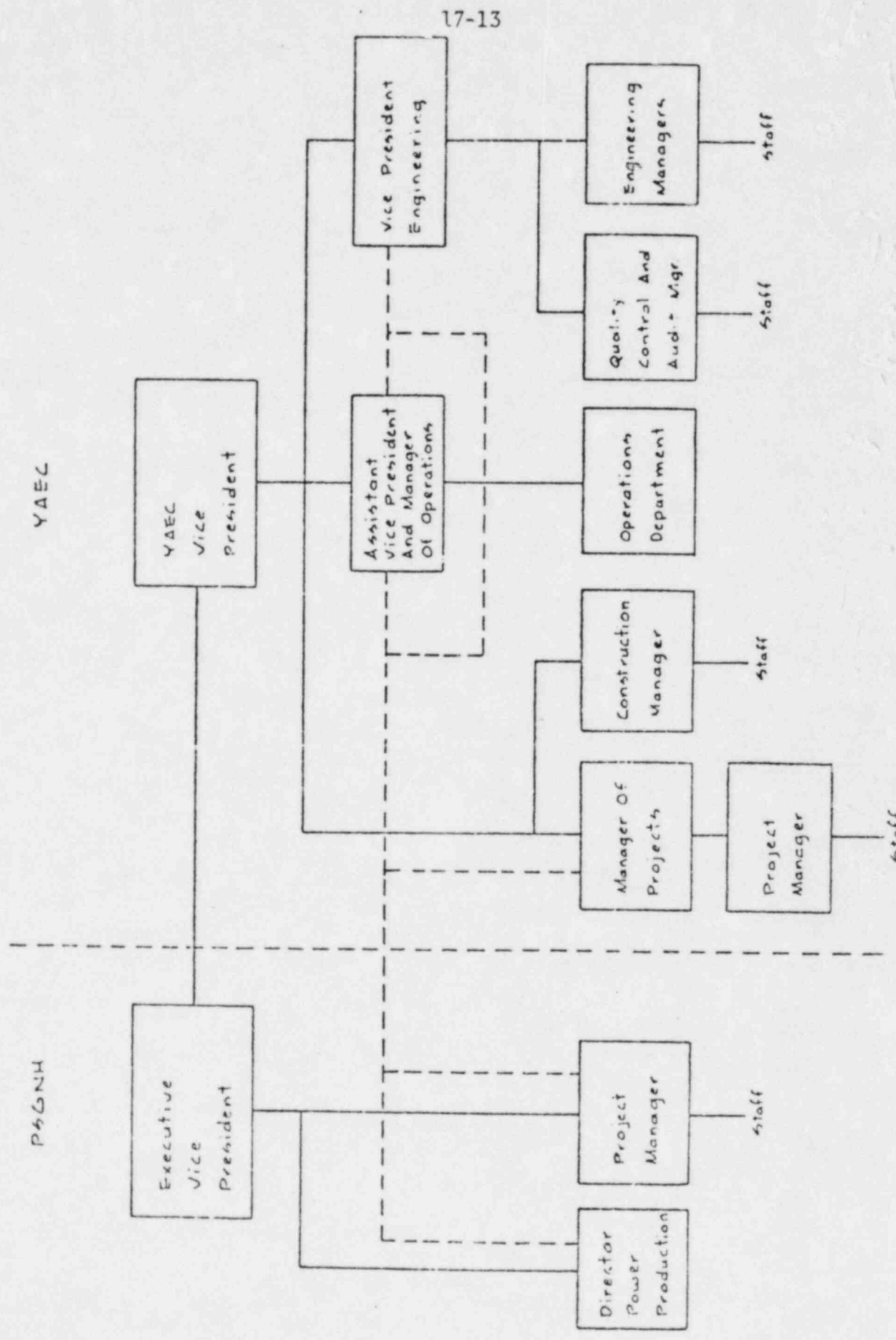


FIGURE 17-1
PSM1 - YAEC ORGANIZATION INTERFACE

FIGURE 17-2
YAEC QUALITY ASSURANCE ORGANIZATION

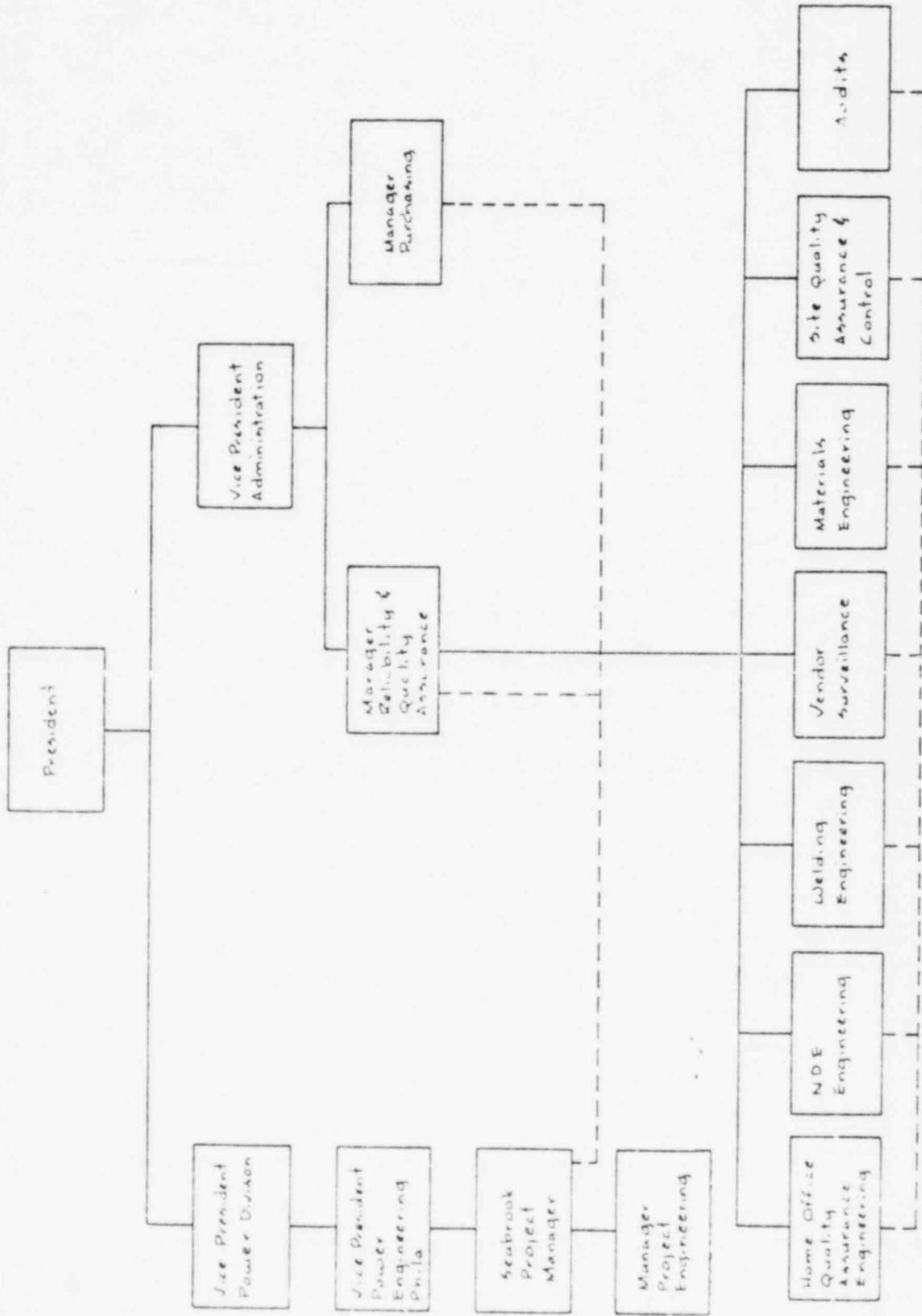


FIGURE 17-3
UEEC QUALITY ASSURANCE ORGANIZATION

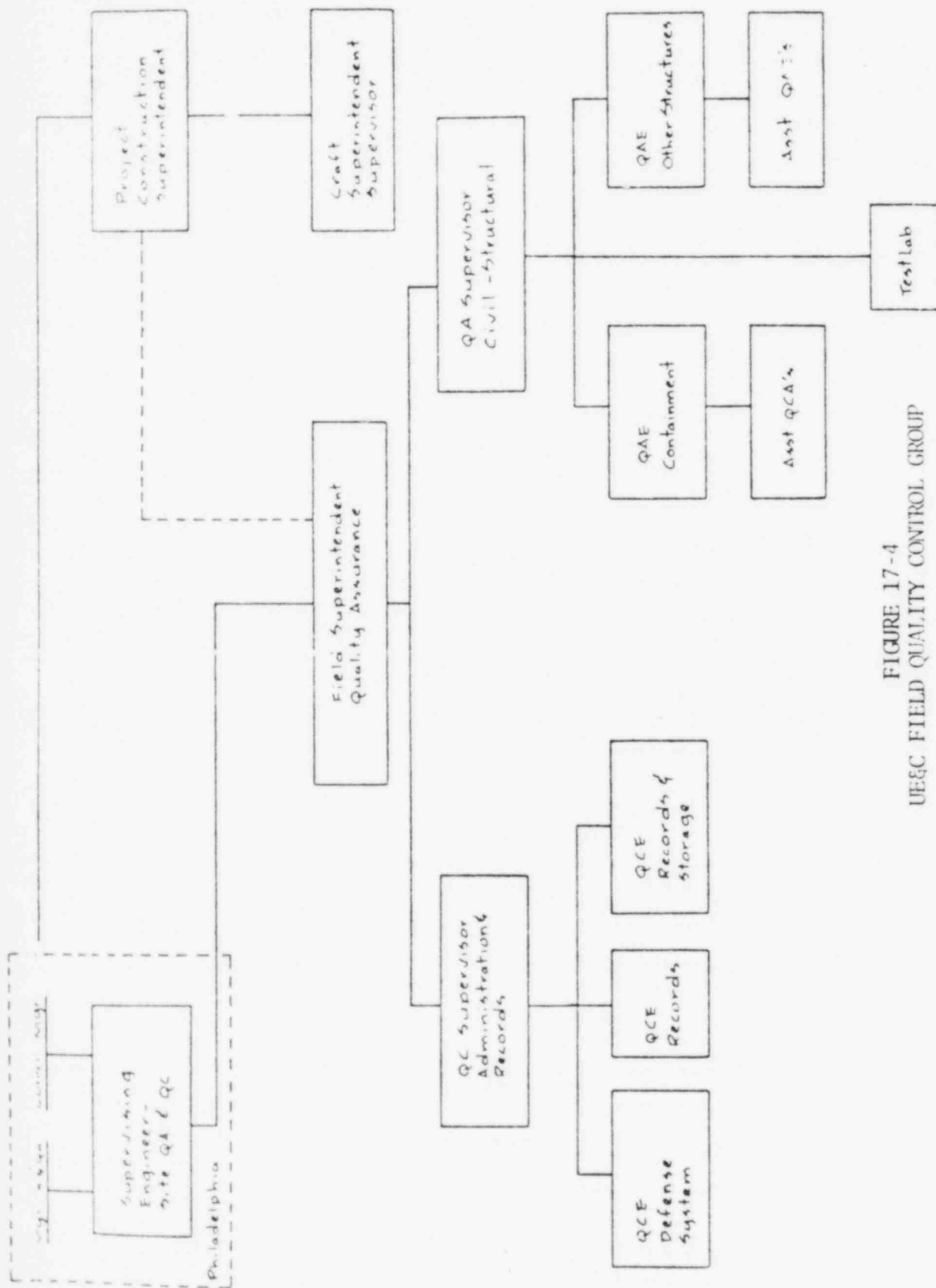


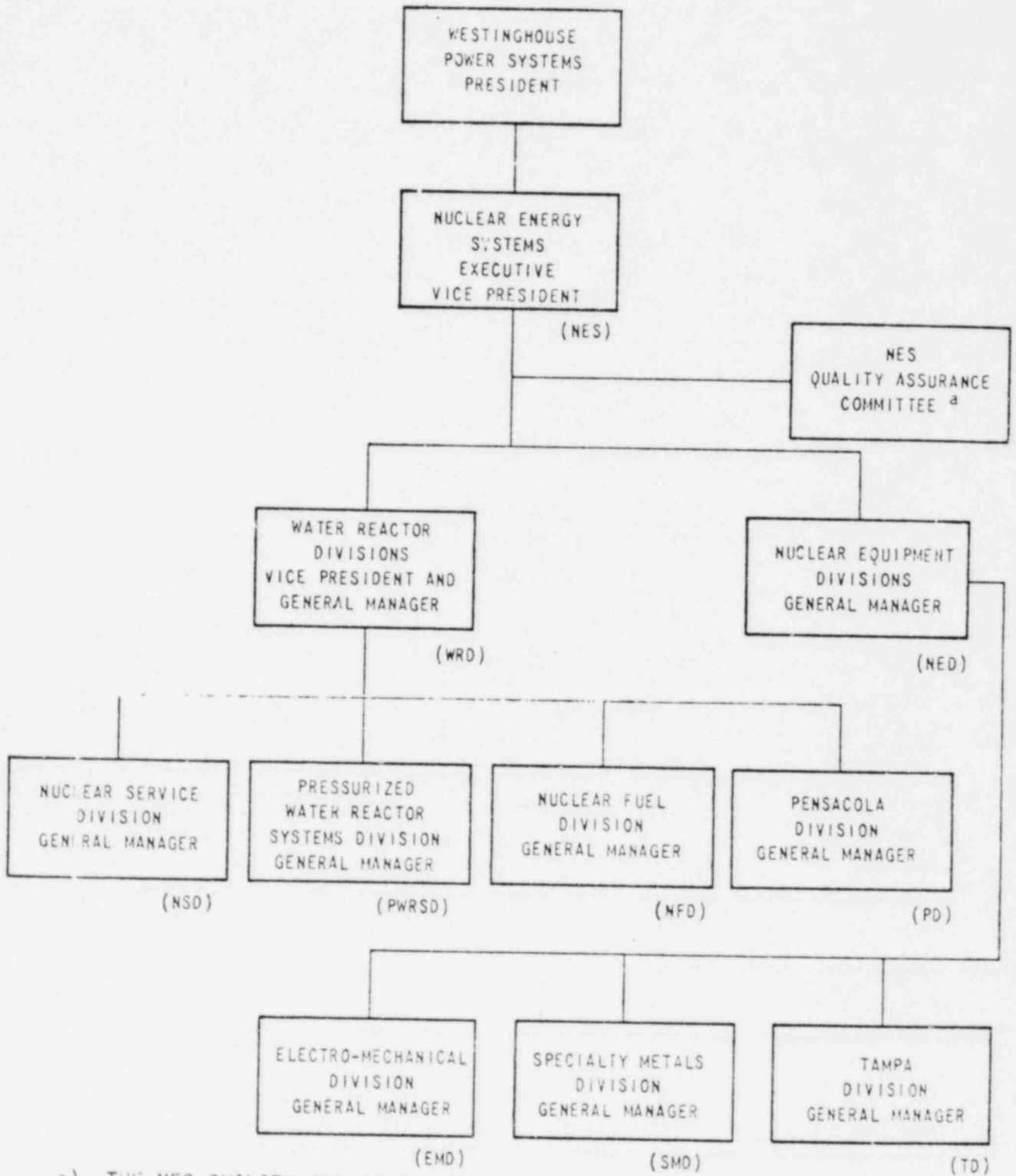
FIGURE 17-4
UE&C FIELD QUALITY CONTROL GROUP

NUCLEAR
DIVISION
GENERAL

1251 Lab

UE&C FIELD QUALITY CONTROL GROUP

17-17



a) THE NES QUALITY ASSURANCE COMMITTEE IS COMPOSED OF THE QUALITY ASSURANCE AND RELIABILITY MANAGER FROM EACH OF THE NES DIVISIONS. THE COMMITTEE'S CHAIRMAN IS THE PWR-SU PRODUCT ASSURANCE MANAGER.

FIGURE 17-5
WESTINGHOUSE NUCLEAR ENERGY SYSTEMS

17-18

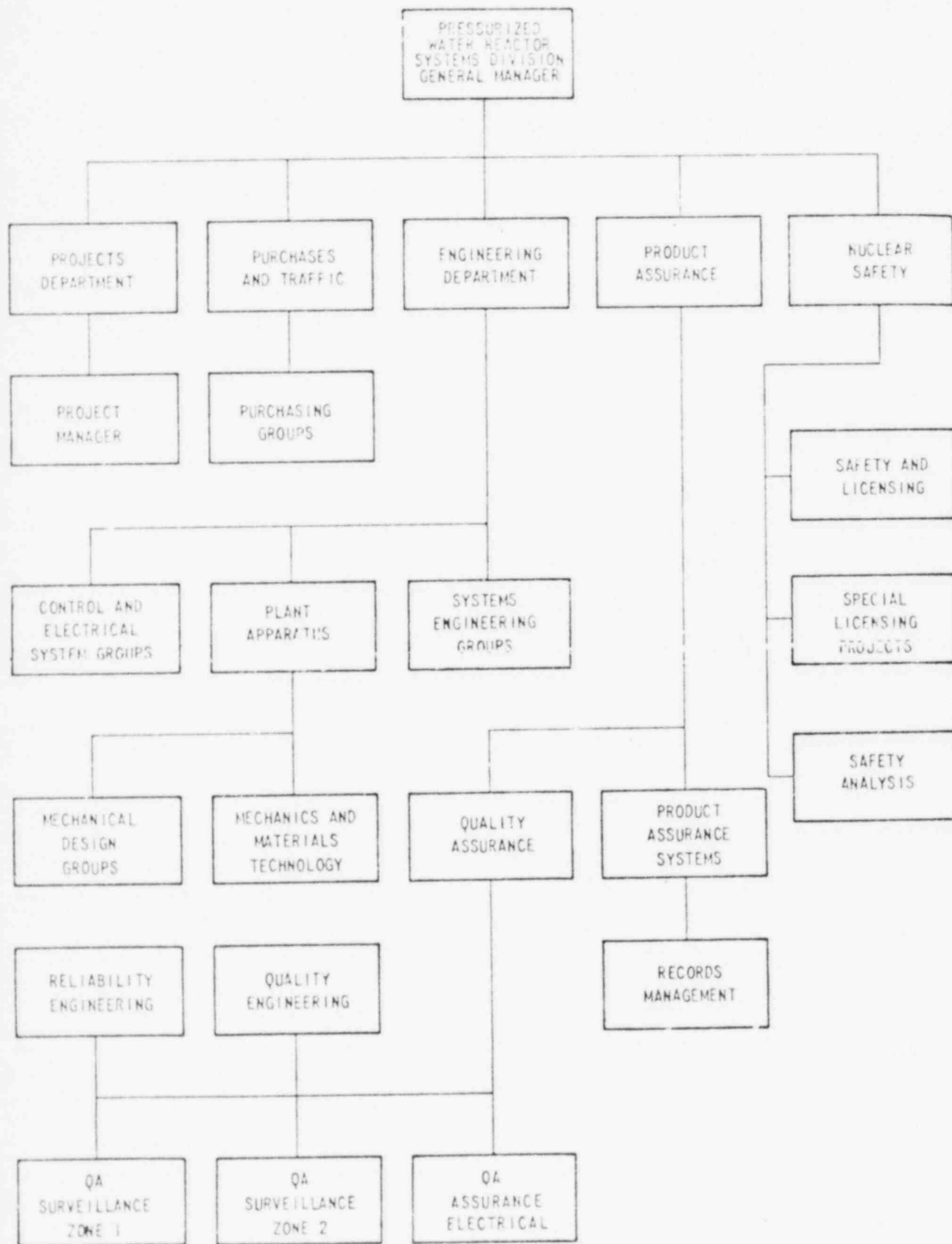


FIGURE 17-6
WESTINGHOUSE PWR SYSTEMS DIVISION

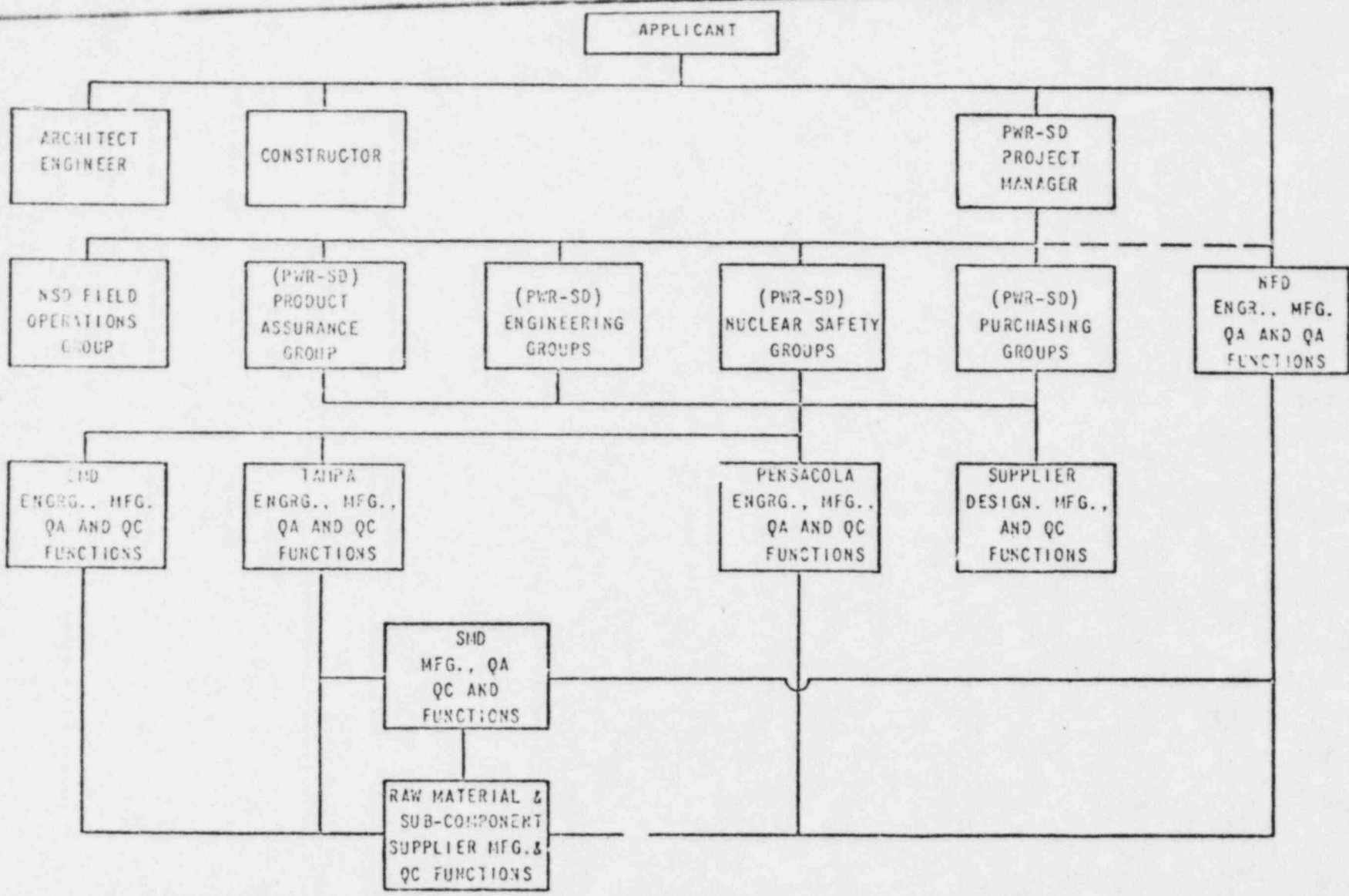


FIGURE 17-7
NSSS FUNCTIONAL RELATIONSHIP CHART