

U. S. ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION V

Report of Inspection

CO Report No. 50-275/70-3

Licensee: Pacific Gas & Electric Company
Construction Permit No. CPPR-39
Category A

Date of Inspection: July 6, 1970

Date of Previous Inspection: June 23-26, 1970

Inspected by:

G. D. Johnson for 7/16/70
A. D. Johnson
Reactor Inspector

Reviewed by:

G. S. Spencer 7/16/70
G. S. Spencer
Senior Reactor Inspector

Proprietary Information: None

SCOPE

Type of Facility:

Pressurized Water Reactor

Power Level:

3250 Mwt

Location:

Diablo Canyon, San Luis Obispo County,
California

Type of Inspection:

Routine - Announced

Accompanying Personnel:

None

Scope of Inspection:

Perform initial review of PG&E's
Operation and Startup organization,
Safety Committee and Training activities
pursuant to PI 3800/1, Attachment N.8.

U. S. ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION V

Report of Inspection

CO Report No. 50-275/70-3

Licensee: Pacific Gas & Electric Company
Construction Permit No. CPFR-39
Category A

Date of Inspection: ~~June 23-26, 1970~~ July 6, 1970 July 6, 1970

Date of Previous Inspection: ~~July 6, 1969~~ JUNE 23-26, 1970

Inspected by: A. D. Johnson 7/16/70
A. D. Johnson
Reactor Inspector

Reviewed by: G. S. Spencer 7/16/70
G. S. Spencer
Senior Reactor Inspector

Proprietary Information: None

SCOPE

Type of Facility: Pressurized Water Reactor

Power Level: 3250 Mwt

Location: Diablo Canyon, San Luis Obispo county, California

Type of Inspection: Routine - Announced

Accompanying Personnel: None

Scope of Inspection: Perform initial review of PG&E's Operation and Startup organization, Safety Committee and Training activities pursuant to PI 3800/1 Attachment N.8.

SUMMARY

The responsible organizations for startup and operation of the Diablo Canyon Unit No. 1 facility have been established. The assigned personnel have already received rather extensive training in preparation for startup of the Unit with additional formal training scheduled to continue through May 1971.

DETAILS

A. Persons Contacted

C. V. Richards	-	Director, Quality Engineering
R. S. Bain	-	Construction Superintendent
W. R. Hershey	-	Project Superintendent
D. A. Brand	-	Resident Startup Engineer
J. Carroll	-	Supervising Steam Generation Engineer
R. Hawes	-	Senior Steam Generation Engineer (Training)
B. Good	-	Quality Assurance Engineer
W. Jones	-	Quality Assurance Engineer

B. Operating Organization Structure, Safety Committee and Training

Pursuant to PI 3800/2, Attachment N.8, the inspector met with the licensee personnel listed above for the purpose of determining the status and plans concerning organization, staffing and training for the startup and operation of the unit. The following information learned during the discussions reflects PG&E's efforts toward fulfilling the PSAR requirement contained in Section 13 of the PSAR.

1. Operations

a. Organization and Staff

The principal personnel responsible for operation of the unit have been formed into a task force currently located at the Company's Humboldt nuclear power station. The organization structure and assigned personnel are shown in Attachment A. The responsibilities and activities of the group include:

- (1) Preparation or revision of training manuals for the planned courses in Nuclear Technology, Radiation Protection, and Chemical and Radiochemical Procedures.
- (2) Preparation of an operating manual and detailed operating procedure.

- (3) Participation in the preparation of the Final Safety Analysis Report and the operational aspects of the proposed Technical Specifications.
- (4) Analysis of the design of all systems for operational considerations as the description and operating procedures are prepared. Considerations are to be given to (a) adequate instrumentation, (b) proper valving arrangements, (c) accessibility of critical components, and (d) provisions for surveillance testing and maintenance for each system and component.
- (5) Review of all preoperational test procedures prepared by the Construction Department Startup Engineers along with the development of the overall startup operations procedures for complete systems. This responsibility includes the initial loading procedure and the power operation test program.

b. Startup Engineers - Construction Department

Subsequent to completion of construction of components and systems, each will be tested to assure performance consistent with the prescribed specifications. The preoperational test procedures are to be formulated by the Resident Startup Engineer. Mr. Brand and his 16 member staff of startup engineers are responsible to the PG&E Construction Department. However, the startup engineers are responsible for the direction of the tests and for preparation of the equipment acceptance reports. Upon a showing of satisfactory performance of equipment and systems, the responsibility for the items will shift from the Construction to the Operating Department. The organization, assigned personnel and detailed duties of the startup engineers are shown in Attachment B of this report. Mr. Brand, Resident Startup Engineer, stated that his staff would move to the construction site shortly after January 1, 1971.

2. Training

Personnel training activities began about a year ago. Five of the startup engineers worked with Westinghouse during the startup of the Ginna plant. Subsequent to initial criticality three other engineers followed operations for approximately three months. In addition several of the engineers participated in the activities of PG&E's recent refueling operation at the Humboldt Bay nuclear

power plant. Also nine individuals completed a 9 week training course sponsored by Westinghouse which was concentrated on theory, core loading and testing. Five of the nine also completed an additional 8 weeks at the Saxton nuclear power plant for observation of nuclear operations as a portion of the Westinghouse training course. Startup Engineers have also attended NDT training courses. Key operations personnel have been involved with the startup activities of both the Ginna and H. B. Robinson plants. In addition operations personnel currently assigned to the Diablo organization have been scheduled for training at several other pressurized water nuclear power plants and the Humboldt Bay power plant. The schedule also showed individuals are to receive training in NDT, Computers and Diesels.

During March of 1971, 12 startup engineer and 12 operating personnel have been scheduled to attend a design review series. During this training effort, Westinghouse will review the design parameters and maintenance requirement of all operating systems associated with the react . According to Carroll the Operation Group is scheduled to move on site during June, 1971.

3. Safety Committee

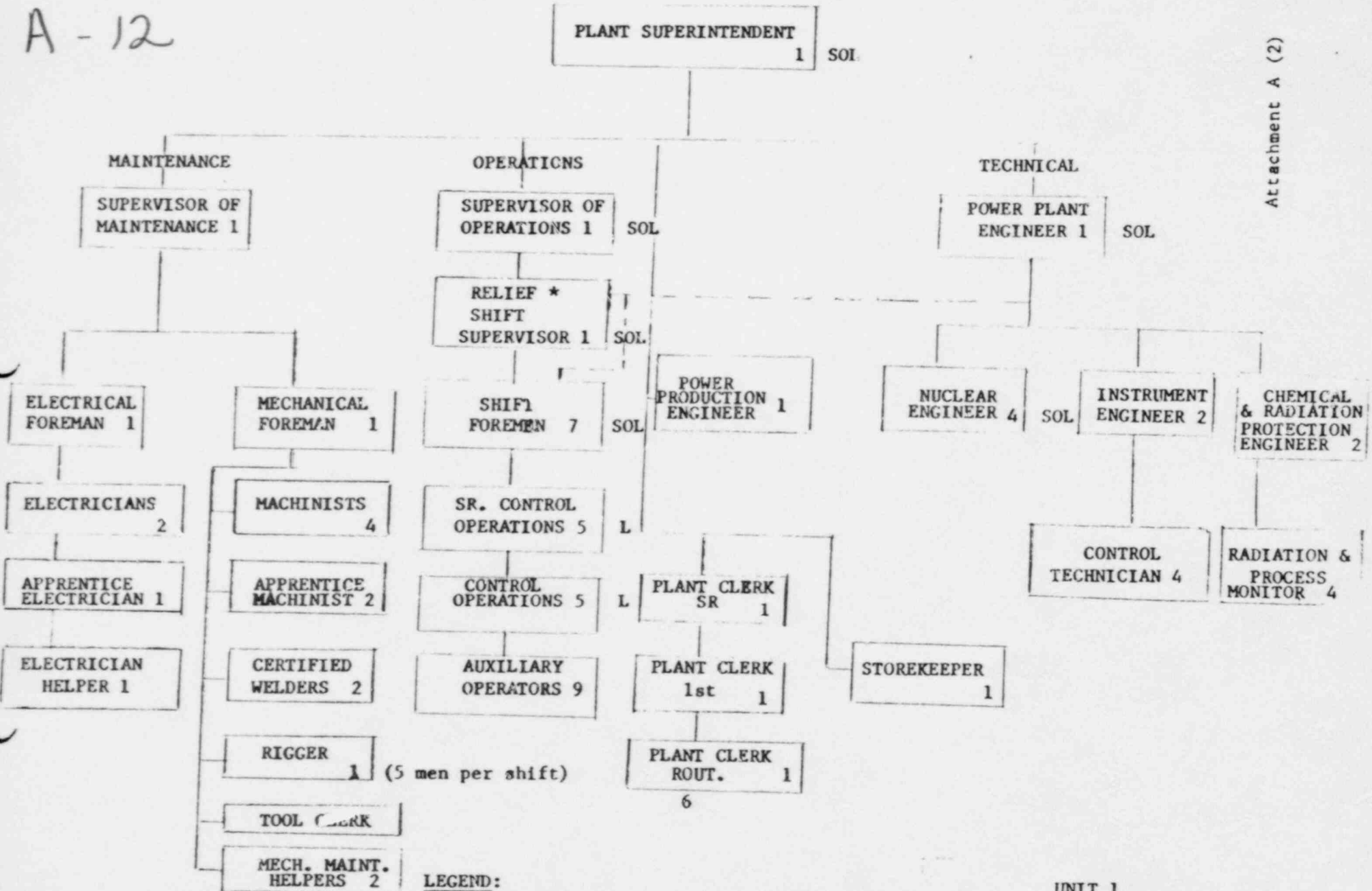
According to Mr. Carroll, the Safety Committee functions will follow the same pattern as that currently established for review of PG&E's Humboldt Bay nuclear power plant. The on-site review committee will be formed from the Operations Group and during the startup phase the Resident Startup Engineer will be an active member of the Committee. The General Office Review Committee will be the same committee now responsible for the Humboldt Bay plant. Mr. Chandler or Mr. Bain will represent the Construction Department on the Committee during the startup phase of the Unit.

DIABLO CANYON PERSONNEL ASSIGNMENTS - 6/24/70

Ramsey	-	Plant Superintendent
Shiffer	-	Power Plant Engineer
Patterson	-	Supervisor of Operations
Backens	-	Supervisor of Maintenance
Allen	-	Power Plant Engineer
Kennedy	-	Instrument Engineer
Doss	-	Instrument Engineer
Boots	-	Chemical & Radiation Protection Engineer
O'Hara	-	Chemical & Radiation Protection Engineer
Gisclon	-	Nuclear Engineer
Heinicke	-	Nuclear Engineer
Johnson	-	Nuclear Engineer
McCracken	-	Nuclear Engineer
Maloney	-	Relief Shift Supervisor
Bashaw	-	Shift Foreman
Cole	-	Shift Foreman
Sundquist	-	Shift Foreman
White	-	Shift Foreman

A-12

Attachment A (2)



LEGEND:
 SOL - AEC Senior Operator License Required
 L - AEC Operator License Required

UNIT 1
 DIABLO CANYON NUCLEAR POWER PLANT

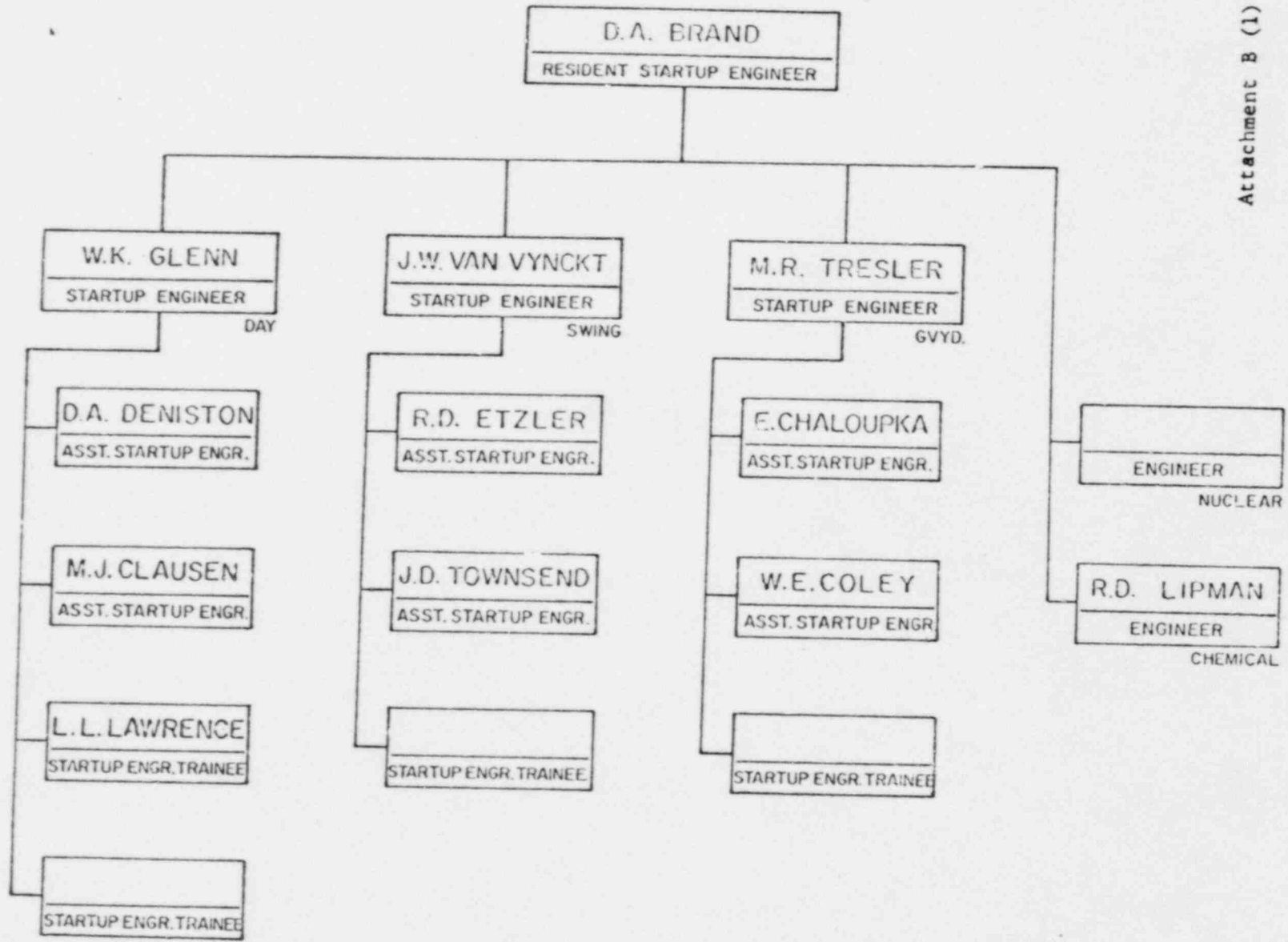
*Start-up Coordinator
 (Std. Prac. 420 -1)

Total Plant Complement - 70

OPERATING ORGANIZATION FOR
 STARTUP AND INITIAL OPERATION

DIABLO CANYON STARTUP ORGANIZATION CHART

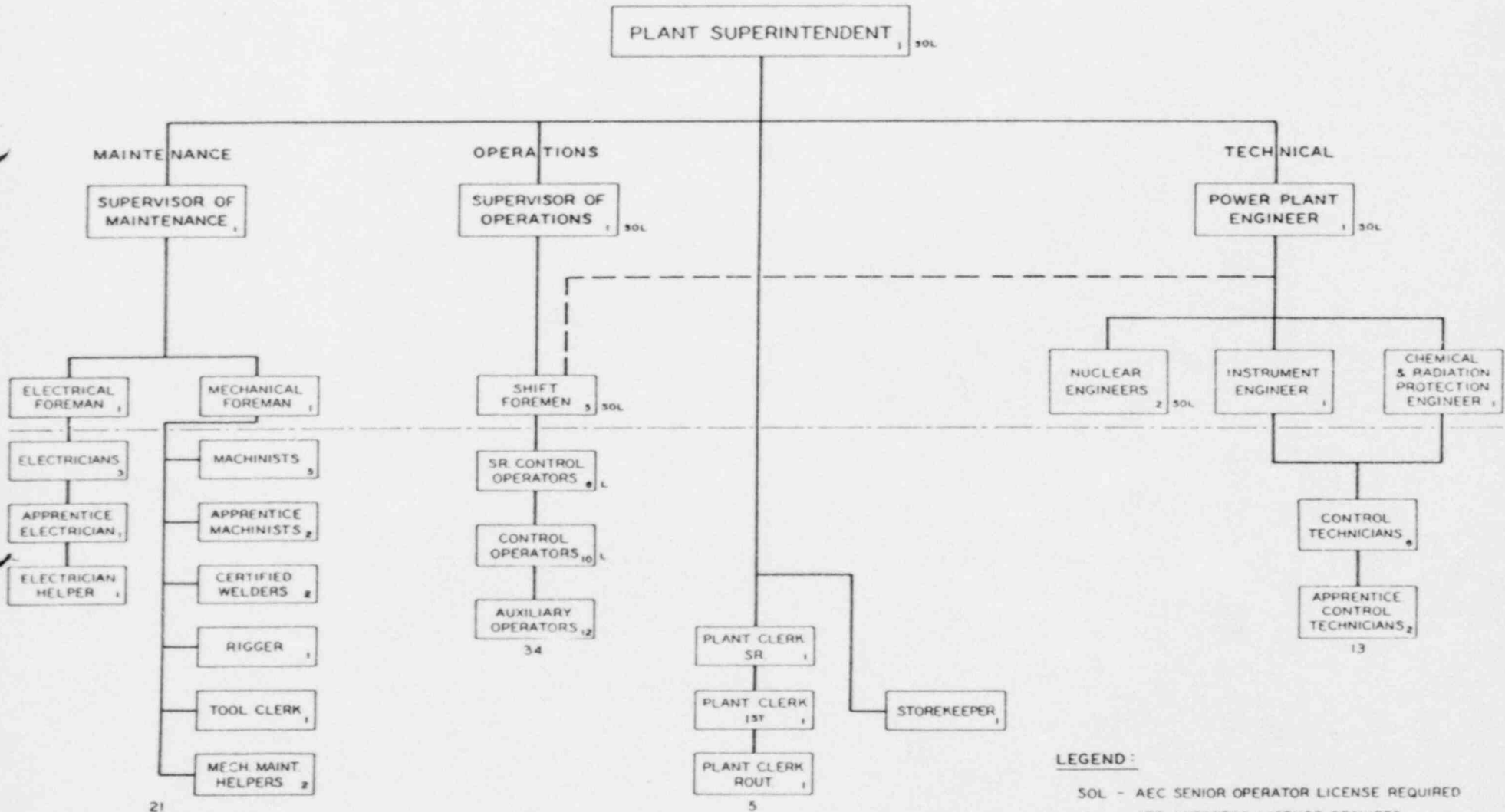
Attachment B (1)



A-11

ULTIMATE OPERATING ORGANIZATION DIABLO CANYON POWER PLANT UNITS NO. 1 & 2

Attachment A (3)



LEGEND :

SOL - AEC SENIOR OPERATOR LICENSE REQUIRED

L - AEC OPERATOR LICENSE REQUIRED

TOTAL PLANT COMPLEMENT = 73

June 30, 1970

Description Of the Position Of
Resident Startup Engineer

- Responsibility: The Resident Startup Engineer is responsible for the overall startup program in accordance with Company policies and procedures.
- Reports To: Project Superintendent (On-Site)
- Supervises: In a line capacity exercises direct supervision of his group of Startup Engineers.
- Duties:
- Function as principal contact between the construction and operating organizations for startup activities.
 - Prepares a startup program which encompasses all tests and performance demonstrations to prove compliance with design of all equipment.
 - Prepares startup schedules that will assure operational status of the new facility in the least expeditious time.
 - Coordinates the plant testing schedule with the plant superintendent.
 - Responsible to obtain from the various Departments of Engineering responsible colleagues all design information necessary to fully understand the plant systems so that he may prepare the plant systems acceptance criteria.
 - Direct and coordinate tests of mechanical and electrical systems to determine that installation is in accordance with acceptance criteria.
 - Monitor the results of flow facility tests and report to the lead test engineer for the system to be started.

Attachment B (2)

A-13,

Requests clearances as required in accordance with standard Company procedures.

Releases independent auxiliary equipment or systems for operation as needed after satisfactory performance has been demonstrated.

Verifies satisfactory performance of each preoperational and startup test.

Approves and distributes to all interested parties results of tests on apparatus or equipment.

Determine when a Startup Engineer trainee's training is sufficient for him to begin assuming responsibilities.

Maintain Quality Assurances applicable to startup.

ROLES OF THE START-UP ENGINEERS

1. Prepare All Start-Up Procedures

Detailed start-up procedures for equipment and systems shall be prepared in advance of initial plant operation. Such procedures will serve these purposes:

- (a) Give an organized direction to individual start-up activities. All persons participating in the start-up will have a procedure to follow and will know what is to happen next.
- (b) Be a guide and reminder of the agreed upon test procedure to the engineer conducting the test. Due to the complexity and number of plant systems, each engineer will prepare several procedures, some far in advance of actual start-up. These we cannot expect the engineer to recall instantly during start-up; thus the need of written material.
- (c) Be a record sheet for important, never-to-be repeated information collected during start-up. The records will be compiled into plant start-up books.
- (d) Fulfill A.E.C. Quality Assurance requirements for documentation of plant start-up procedures.
- (e) Enable others to review our procedures. They may catch any errors and omissions. Their start-up and operating experience may suggest a better approach to a systems start-up. This review should produce the best possible start-up procedure.

The magnitude of this writing assignment will require all start-up engineers to assist. These procedures will be prepared in a professional manner; they may well be reviewed by other Comgray departments as well as the A.E.C.

2. Perform Equipment Start-Up

Each start-up of plant equipment shall follow an organized written procedure. If a plant condition causes a deviation from the written procedure, the procedure must be amended to incorporate the newly planned activity and then reviewed by the plant superintendent's representative before the test is continued. Only check steps will insure the proper documentation of start-up activities. Incomplete records will not be reviewed. Preparation for each start-up will be made in advance, to permit the actual start-up to run smoothly: communications established, system walk-down completed, tools on hand, inventory present and labeled, systems clearances lifted (and locked where safe).

3. Perform Pre-Operation Tests

Plant instrument control systems shall be tested before operation. Plant mechanical and electrical equipment shall have a "initial check-out" before start-up and shall be checked without exception before start-up. (See attached "initial check-out" form.)

check relay actio valve operation, and instrumen calibration settings.

4. Operate Equipment During Flushing Phases Of Construction

All piping systems shall be verified clean before system acceptance. This is generally accomplished by air blowing or flushing with water. To minimize piping rearrangement during flushing and still assure piping cleanliness, engineers must show real ingenuity. While pipe flushing is not the responsibility of start-up, we may be asked to contribute to the program. Certainly we will direct the operation of plant equipment used for flushing. Beyond this, our familiarity with system operation allow us to suggest better methods or routes to achieve system cleanliness.

5. Know System Limitations

To safely direct plant start-up operation, we must know equipment, system, and plant limitations. Important trip settings are generally known, but some systems possess limitations without trip protection. These limitations are the ones to remember.

6. Keep Supervisors Informed

It is imperative that your supervisor be kept informed of all activities happening in the plant; this applies to the project superintendent and other resident engineers as well as usual.

7. Keep San Francisco Office Informed

It is imperative that the San Francisco office be kept informed of all plant conditions. You are urged to call San Francisco daily to report these conditions, as well as special calls whenever necessary, such as plant emergencies, equipment damage, etc.

8. Keep Start-Up Log Book Current

The start-up log book has been the only dependable means of communication between shift personnel. Each start-up engineer beginning his work shift must read this log to become familiar with plant conditions before relieving his counterpart. It reports only those activities that have occurred on past shifts. It is not a forecast of coming events. It must have times noted, conditions described, results explained. The reader must also sign his entry. Start-up testing activities must be described. This description should not be a repetition of the testing procedure. Log should contain process deviations, causes, and conclusions. Personnel writing this log should be aware that information entered must retain clarity years later. It is vital that log entries will be a basis for claims against others.

9. Take Equipment Clearances as Necessary

Plant phases of plant start-up involve several separate activities occurring simultaneously. Some workers will be in operation while others are being repaired, modified or replaced. It is vital that all personnel be aware of the status of the plant and the activities of others.

clearance limits are requested and dictated by the start-up engineer following release on construction. This responsibility requires that the engineer know plant systems intimately; only then can he request a proper and safe clearance. This responsibility is a large one and its safe execution is essential.

10. Coordinate Plant Testing with Plant Personnel

Schedules for plant testing must be publicized in advance to allow other Company departments (Engineering, Steam Generation, etc.) to prepare themselves to witness or participate in testing activities. Such re-planning will produce both better testing procedures and better inter-department relations. Plant testing requires manpower which is available only through advance planning.

11. Assure Start-Up Qualities

Cooperation with Company quality assurance groups is a necessary part of our work. Our procedures and our actions will be scrutinized by others to assure the A.E.C. and ultimately the nation as a whole that we are proficient in our assignments.

12. Keep Familiar With A.E.C. License Application Documents

All will be expected to know the PSAR, the FSAR, and the technical specifications, which together describe individual plant systems and their intended operation. These documents which PG&E has or will submit to the A.E.C. will dictate boundaries of our intended method of start-up and operation. Additionally, Federal laws such as 10 CFR 10, 50, and 100, governing operation of nuclear power plants, must be understood and maintained throughout plant start-up. No shall neither start-up nor direct plant operations in violation of any of these documents.

13. Release Equipment as Necessary

Following pre-operational testing, but before initial operation, control of equipment and systems shall be released from construction forces by the resident, civil, electrical, mechanical engineers to start-up; this is accomplished via a tagging procedure. Such release will allow the Steam Generation Department to operate those systems so designated during start-up until release for operation.

14. Check Plant Drawings and Design

While we will be writing start-up procedures, we simultaneously will be checking engineering drawings and engineering design. There is a likelihood of discrepancies and errors in either. They will be there, for design will not be 100% complete and correct as we prepare our procedures. As design changes, there will need to be incorporated in our procedures. This procedural updating will be continuous; these errors will not be allowed to accumulate.

15. Take Original Equipment Data as Necessary

Original equipment data shall be taken as necessary. This data shall be taken as necessary. This data shall be taken as necessary.

16. Keep Familiar with Instruction Books

An often neglected but still important part of start-up procedure preparation is the consultation of equipment instruction books. Therein lies detailed, specific information describing start-up and operation of equipment. The actual use of plant equipment without first consulting instruction books cannot be permitted.

17. Monitor Plant Operations

Any change in plant conditions should be noted in the start-up log book and other start-up personnel informed whenever the change affects their work.

18. Know Computer and Computer Programs

Two computers will be installed in the plant: one for monitoring plant systems, the other for controlling secondary plant systems. The successful adoption of these computers to this start-up requires our being familiar with the computer software and the Diablo Canyon control programs, nuclear as well as conventional.

19. Act as Tour Guide When Necessary

Periodically during construction start-up engineers will act as tour guides. The reason for your selection as guides should be apparent, for you should know most about plant systems and their operation. You will be expected to recall pertinent details which describe the unit.

20. Keep Familiar With Division Design Change Items

As the plant is constructed, the plant operating staff will note plant design discrepancies and deficiencies. We, along with the project superintendent and other resident engineers, shall be expected to monitor these complaints and to advise Engineering accordingly. All start-up engineers should maintain a familiarity with these complaints.

21. Know Site Evaluation Procedure

Because each of you at one time or another will be in principal charge of plant start-up operation, you must thoroughly know the plant site evacuation plan in case of serious accident. This will be one of your responsibilities as Senior Engineer during that shift.

22. Know Radiation Protection Rules and Procedures

For the safety of yourself and those around you, you shall know the radiation protection procedures and those operating procedures prepared to allow working within a radiation area.

23. Maintain Start-Up Readiness

All start-up engineers shall be expected to be ready to order and keep ready to go any time during the start-up. All work shall be done in accordance with the start-up plan and the start-up procedures. The start-up plan and the start-up procedures shall be available to all start-up engineers at all times.

25. Train New Personnel

A project as long as Diablo will have a turnover of personnel, even in start-up. You shall be expected to pass on to new start-up personnel that information you have learned. This training function should not be minimized. Remember the more well trained personnel there are in start-up, the lighter will be our individual work load and the less will be our overtime hours.

26. Share Your Training

Your start-up training, with Westinghouse or with a utility, is to be shared with others. The Company does not expect to train you simply as a start-up specialist, but also as a teacher, one with an obligation to transmit his training to others not so fortunate.

27. Suggest Construction Schedule Changes

The construction schedule for Diablo Canyon is a complex integration of separate activities. To create effective scheduling, constant updating and revision of field information is required. All start-up engineers shall be expected to report on construction progress and to suggest schedule changes as they appear.

28. Safety

Each engineer has a well-defined responsibility to assure personnel as well as equipment safety on our construction projects. It is because each engineer will be conscious of safety that OSHA is not required by the state of California to have a permanent safety engineer on each project staff. Keep in mind interests in safety produce substantial construction economies as well as reduced frequency of accidents to personnel, such as yourself. Participation in the project safety program is a must.