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T B QUALITY ASSURANCE
OPERATIONS

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APPENDIX 1B

QUALITY ASSURANCE OPERATIONS

1.0 GENERAL

The proposed Rancho Seco Nuclear Power Plant will be designed and constructed under the direction of the engineering staff of the Sacramento Municipal Utility District (SMUD). SMUD has retained Bechtel Corporation (Los Angeles) as architect-engineer and manager of construction. Individual contracts will be let as necessary for the supply of equipment, for plant construction, and for equipment installation. To date, contracts have been signed with Babcock & Wilcox for the supply of the nuclear steam supply system, and with Westinghouse for the supply of the turbine generator. Each of these two contracts includes provision of full time on-site consulting services during equipment installation.

2.0 PROJECT ORGANIZATION FOR QUALITY ASSURANCE

Direct responsibility for the project rests with the SMUD project manager located in Sacramento. Reporting to him are the project engineering group (PEG) and the project construction management group (PCM). The actual supply of equipment and construction work is performed by contractors engaged by SMUD under competitive bidding procedures.

The PCM group is responsible for the orderly progress of construction work on site. Under the direction of the project construction manager, the PCM group comprises field engineers in the disciplines of mechanical, electrical, civil, structural, welding, safety related to construction practices, costs and scheduling, together with vendor's equipment construction consultants. This group follows the construction contractor's day-to-day operations in the field and is the first line of defense in the quality assurance program.

The PEG comprises both SMUD and Bechtel engineering personnel. PEG is responsible for the plant design; detailed material, equipment and construction standards; inspection of vendor equipment; and plant test specifications. A key member of PEG is the quality assurance engineer (QAE) who is responsible for quality assurance procedures and ensures proper attention to quality control requirements in all equipment, material and construction specifications, test procedures, inspections and records. As the project advances into the construction phase, the QAE will be located at the jobsite with a staff of properly qualified inspectors in the required disciplines. The QAE has authority to accept or reject all work. The QAE is not responsible to the construction management group. The QAE is not responsible for project costs or schedule. The QAE is the second line of defense in the quality assurance program.

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In addition, PEG includes the start-up engineering group, located on site and responsible for equipment check out, system tests and records, operational releases and plant startup.

SMUD personnel will participate in site operations to the maximum extent possible, e.g. the QAE staff will include SMUD representation. In addition, the station senior operating staff will be on-site at least 12 months before fuel loading to observe final erection and system checkout, and to participate in station startup testing. SMUD personnel onsite will have direct access to the project manager and will be charged with reporting on the quality of design and its implementation. This is the third line of defense in the quality assurance program.

3.0 PLANT START-UP GROUP

The contribution which the plant start-up group make toward the ultimate goal of a safe plant warrants some mention in connection with quality assurance.

The plant start-up group (SUG) are an on-site group responsible to PEG and comprising both Bechtel, SMUD and Babcock & Wilcox and Westinghouse personnel.

SUG will be responsible for testing and adjusting equipment, systems and controls and for demonstrating compliance with performance specifications and design criteria. This group will direct and control all operations from the inception of the start up program to commercial operation. They will coordinate the activities of construction, operating and vendor service personnel engaged in start-up work or supporting activity.

SUG will be responsible for post-critical tests and will coordinate work on deficiencies and completion items.

SUG will prepare and maintain appropriate test records and start-up data.

4.0 QUALITY ASSURANCE OPERATIONS

The control of quality of procedures, materials and workmanship during the construction of the Rancho Seco Nuclear Generating Station will be maintained in accordance with written procedures, which will cover the following areas.

In the initial stages, the QAE operating within PEG will establish the special procedures, specifications, standards and criteria to be applied to the project. He will relocate to the jobsite for the construction phase. Primary control in the field will be performed by the field engineering staff. This staff will consist of a group of capable and qualified engineers in each of the following branches:

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a. Civil-Structural
b. Electrical
c. Mechanical, equipment and piping
d. Welding

Their number will be sufficient to insure a complete coverage of all activities. The QAE will provide personal surveillance of field engineering operations. He will acquaint the field engineering staff with the specifications and will in return receive the results of checks, tests and inspections from the field engineers. He will verify and record this information, using special forms, copies of which will be retained in the station records and made available to AEC Compliance Division as required. The general inspection and control procedure routines will be set up as follows.

4.1 EQUIPMENT AND FABRICATED MISCELLANEOUS ITEMS

Where necessary, PEG will perform all inspections on equipment in vendor's fabricating plants. This includes progressive and final inspection, as well as witnessing the final performance tests.

Commodity items such as structural steel, fabricated pipe spools, and reinforcing steel, will be included in addition to equipment and apparatus.

The shop inspection covers the following areas; materials used, dimensional checks, workmanship, cleanliness, type and thickness of prime coat of paint and final painting, non-destructive testing of materials and welds, and detailed compliance with the specifications and applicable codes.

4.2 CIVIL-STRUCTURAL FIELD INSPECTIONS

The QAE will be assisted in maintaining the quality control by properly qualified Field Engineers.

The Soil Engineer will assist in the control of engineered fills and other earthwork as outlined in Section 9 of Appendix 2E.

In general, the control of concrete for the entire job will be as outlined in Section 5.4, Construction Practices and Quality Assurance.

The control of structural steel will be in accordance with the specifications and design drawings. Particular attention will be given to field welding as outlined in Appendix 5H, Quality Control Procedure for Field Welding.

4.3 ELECTRICAL FIELD INSPECTION

The field electrical engineers will assure themselves that the contractor's crafts will install according to PEG furnished single line, elementary and

wiring diagrams, circuit schedules and cable and wire pull sheets. They will see to it that a proper method of identification for cable and wire will be applied and that the specified termination lugs are being used, as well as the prescribed method and tools for terminations. They will witness the continuity check of all circuits off current and potential transformers, and a check of all control circuits by means of an operational test. They will inspect the grounding system and will witness the meggering or hi-potting of equipment or circuits where necessary. They will have rotation checks made on high voltage motors prior to connecting and witness bumping for rotation prior to coupling up.

4.4 MECHANICAL FIELD INSPECTION

Field engineers will assure themselves that the contractor's crafts will erect and install all equipment, piping and instrumentation in accordance with PEG furnished equipment layout and piping and instrumentation drawings.

4.5 EQUIPMENT

PCM and the field engineers will have the assistance of the PEG in verifying rigging procedures for the extra heavy pieces of equipment (reactor vessel - steam generators, etc.).

No piece of equipment such as pumps, turbines, compressor, etc., will be coupled up before the field engineers have approved the alignment. QAE will retain a copy of alignment records. Major equipment will not be put into operation before a manufacturer's representative has approved alignment readings, piping and electrical installation furnished with the equipment, grouting, lubrication, system cleanliness, etc. Hot-checks on alignment readings will be performed on such equipment where this is deemed necessary.

4.6 PIPING

All piping 2-1/2" diameter and larger will be installed to detailed drawings prepared by PEG. PEG will also supply standards and details as necessary to insure proper installation of smaller piping. No small piping or instrumentation will be installed by any contractor prior to the field engineer's approval of sketches, showing layout, compliance with process and instrument diagrams, drawings and specifications. The field engineer will further assure himself that this piping is properly supported.

The field engineer will constantly check the piping erection procedures for proper line-up, proper use of backing rings, inert gas purging, pre-weld and post-weld heat treatment for stress relieving, cold pull stressing, cleanliness, etc. After the piping installation he will witness the proper setting of all spring supports, constant support hangers, sway braces and shock-absorbers under actual operating conditions and assure himself that piping and equipment moving by thermal expansion will have the proper

clearances. The welding inspector will see to it that the contractor, working on piping, follows qualified welding procedures and employs welders which in turn are qualified to these procedures. He in addition makes certain that the non-destructive testing of materials and welds takes place, wherever required by code or where otherwise doubts arise of the soundness of any material or weld.

Each contractor will be required to abide by the decision of the inspector where welds are to be cut or repaired, materials replaced, etc.

4.7 ORGANIZATION CHART

Figure 1B-1 is included to show project organization for quality assurance. 2

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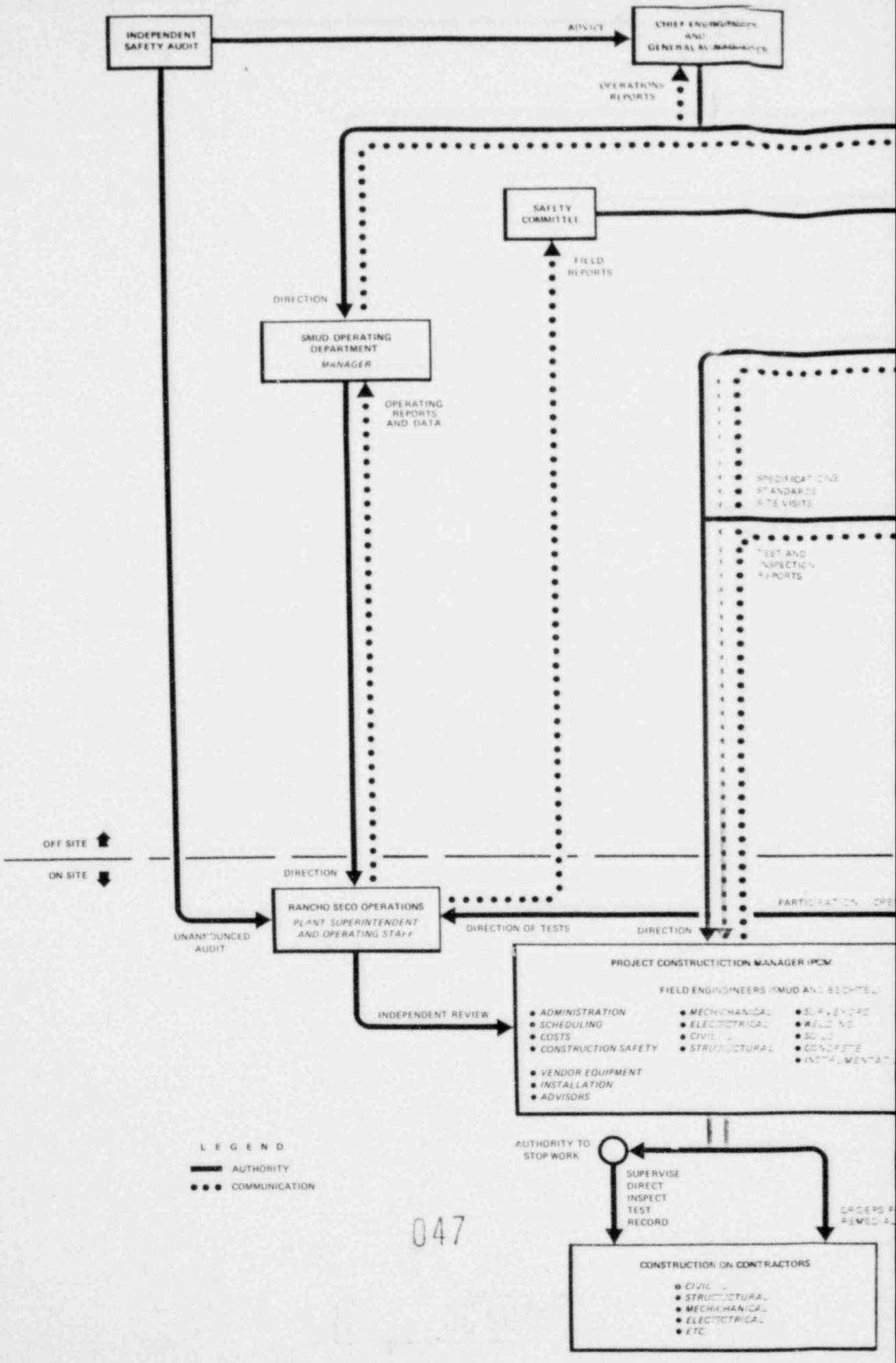
INDEPENDENT SAFETY AUDIT
ADVICE
OPERATIONS REPORTS
SAFETY COMMITTEE
FIELD REPORTS
DIRECTION
SMUD OPERATING DEPARTMENT
MANAGER
OPERATING REPORTS AND DATA
OFF SITE
ON SITE
DIRECTION
RANCHO SECO OPERATIONS
PLANT SUPERINTENDENT AND OPERATING STAFF
UNANNOUNCED AUDIT
DIRECTION OF TESTS
DIRECTION
INDEPENDENT REVIEW
PROJECT CONSTRUCTICTION MANAGER (PCM)
ADMINISTRATION
SCHEDULING
COSTS
CONSTRUCTION SAFETY
MECHANICAL
ELECTRICAL
STRUCTURAL
VENDOR EQUIPMENT
INSTALLATION
ADVISORS
AUTHORITY TO STOP WORK
SUPERVISE
DIRECT
INSPECT
TEST
RECORD
CONSTRUCTION ON CONTRACTORS
CIVIL
STRUCTURAL
MECHANICAL
ELECTRICAL
ETC
LEGEND
AUTHORITY
COMMUNICATION

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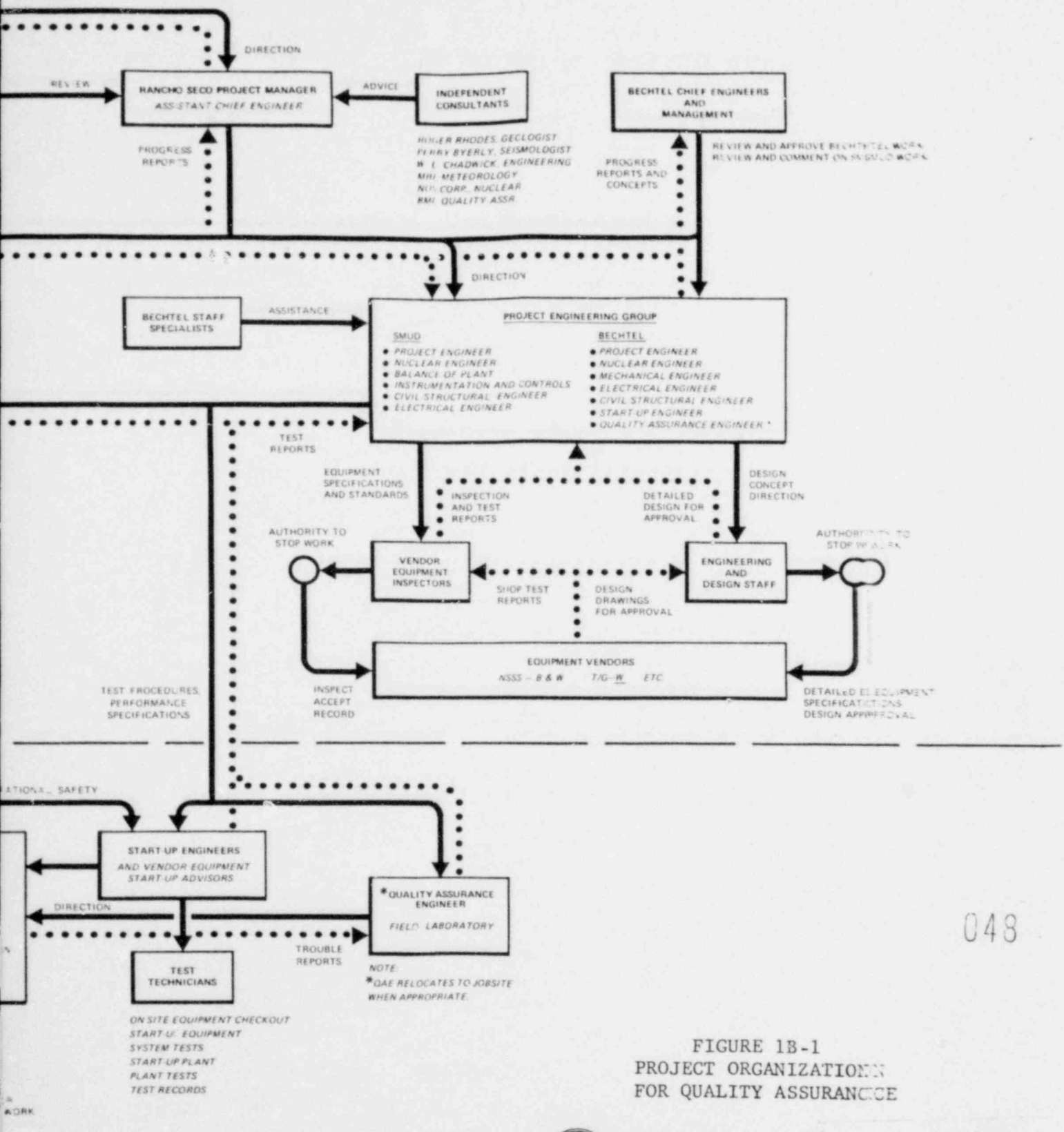

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FIGURE 1B-1
PROJECT ORGANIZATION
FOR QUALITY ASSURANCE

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT