see ltr to Linehan fm. Neff 1/3/85 106

SUMMARY MEETING NOTES

DOE/NRC QUALITY ASSURANCE MEETING

SALT REPOSITORY PROJECT OFFICE

COLUMBUS, OHIO

DECEMBER 18-19, 1984

ATTENDEES: Attachment 1

BACKGROUND

This meeting is the first of a series of visits to the SRPO to review and discuss the DOE QA program for the site characterization phase and later phases. The primary purposes of the first visit were for the staff to become familiar with the details of the DOE QA program, and to identify questions concerning implementation and interpretation of NRC QA requirements. The ultimate goal of the site visits is to achieve early agreement between DOE and the NRC staffs on what constitutes an acceptable QA program for licensing.

The scope of review for the first visit was consistent with its overview nature. The SRPO-ONWI QA and project management organizations and programs to be utilized during site characterization phase were presented. The DOE and NRC staffs discussed implementation of various QA program requirements as applicable to site characterization activities through discussion of technical procedures utilized by Stone & Webster under contract to ONWI.

The agenda for the visit is presented in Attachment 2.

DEVELOPMENTS

NRC Comments - Attachment 3

OPEN ITEMS

NRC follow-up actions are contained in Attachment 4.

Attachment 5 - presentation material

This report was agreed to by DOE and NRC prior to adjournment.

DOE R A Schuler for Jeff Neff Date 12/19/84

NRC [signature] Date 12/19/84

Attachment 1

SRPO DOE/NRC QUALITY ASSURANCE MEETING
DECEMBER 18, 1984

LIST OF ATTENDEES

Name	Organization	Phone
Bob Wunderlich	DOE/SRPO	FTS 976-5916
William M. Bland, Jr.	NRC-Consultant	713-333-4580
Mike Bell	USNRC	FTS 427-4200
Jim Kennedy	USNRC	FTS 427-4786
Bill Altman	Ditto	FTS 492-8490
Warren Rehfeldt	"	FTS 427-4681
Tilak (Teek) Verma	"	FTS 976-5916
Ira Allan Levy	S&W	617-589-6584
Al Foster	S&W	617-589-2098
Don Clark	ONWI/Engineering	FTS 976-7913
Jack Fitch	Fluor Engineers	FTS 976-5916
Bill Ember	HQ/DOE/OQAS	FTS 233-5637
Victor J. Potent	DOE/CH-PMED/QA	FTS 972-2430
Clarence Williams	Battelle	FTS 976-5494
Neal Carter	Battelle	FTS 976-7359
William Bruce	Battelle	FTS 976-4333
Bruce Kitchen	Sav River Lab	FTS 239-5331
C. N. Knudsen	Battelle	FTS 976-4290

SRPO DOE/NRC QUALITY ASSURANCE MEETING

DECEMBER !8, 1984

LIST OF ATTENDEES

Name	Organization	Phone
Merritt E. Langston	DOE-HQ-OCRWM	FTS 252-1252
Jerry Reese	DOE/SRPO-QA	FTS 976-5916
Carl Newton	DOE-HQ	252-1248
Ram Lahoti	DOE/SRPO	FTS 976-5916
Leslie Casey	DOE/SRPO	FTS 976-5916
Ted Taylor	DOE/SRPO	Ditto
Gordon Appel	DOE/CH/SRPO	"
Jesse L. England	DOE/CH/SRPO	"
JoAnn Sherwin	DOE/CH/SRPO	"
Albert M. LaSala, Jr.	USGS/Col OH	"
Philip S. VanLoan	DOE/CH/SRPO	"
Margaret Suttman	Battelle	
E. A. Patzer	BPMD QAD	FTS 976-6329
D. M. Dawson	ONWI Licensing	FTS 976-7803
John H. Malvin	Weston QA Spec	301-963-5220
Wayne A. Carbiener	BPMD/ONWI Manager	FTS 976-4507
Nancy S. Conrad	Rockwell/Basalt Isolation	509-376-6310
Stan Echols	DOE-GC	FTS 252-6947
Don Lozier	BPMD QAD	FTS 976-5996
C. G. Walenga	NRC-IE	FTS 492-7846

SRPO DOE/NRC QUALITY ASSURANCE MEETING

DECEMBER 19, 1984

LIST OF ATTENDEES

Name	Organization	Phone
CG Walenga	NRC-IE	FTS 492-7846
William M. Bland, Jr.	NRC Consultant	713-333-4580
Mike Bell	NRC	FTS 427-4200
Jim Kennedy	NRC-NMSS	FTS 427-4786
Bill Altman	NRC-IE	FTS 492-8490
Warren Rehfeldt	NRC-NMSS	FTS 427-4681
Tilak (Teek)	NRC-NMSS	FTS 976-5916
Ira Allan Levy	S&W	617-589-6584
Al Foster	S&W	617-589-2098
Albert M. LaSala, Jr.	USGS/Col	FTS 976-5916
Don Clark	ONWI Engineering	FTS 976-7913
Jack Fitch	Fluor Engineers	FTS 976-5916
Bill Ember	HQ-DOE-OQAS	FTS 233-5637
Vic Potent	DOE-CH-PMED/QA	FTS 972-2430
Clarence Williams	Battelle	FTS 976-5494
Dennis Boruszewski	Battelle	614-424-6354
Nancy S. Conrad	Rockwell-BWIP	509-376-6310
Bruce Kitchen	Sav Riv Lab-DuPont	FTS 239-5331
Merritt E. Langston	DOE-HQ-OCRWM	FTS 252-1252
Philip S. VanLoan	DOE/CH/SRPO	FTS 976-5916
Jerry Reese	DOE/SRPO	Ditto
Ram Lahoti	DOE/CH/SRPO	"
Leslie Casey	DOE/CH/SRPO	"
Carl Newton	DOE-HQ	252-1248
Alan Funk	Battelle/ONWI	614-424-4118
Wayne Carabiener	Battelle/ONWI	FTS 976-4507
Gordon Appel	DOE/CH-SRPO	FTS 976-5916
Margaret Suttman	Battelle	
E. A. Patzer	BPMD QAD	FTS 976-6329
D. M. Dawson	ONWI Licensing	FTS 976-7803
C. N. Knudsen	ONWI Regulatory	FTS 976-4290
M. E. Balmert	ONWI Repository	FTS 976-5428
John H. Malvin	Weston QA	301-963-5220
N. E. Carter	Battelle	FTS 976-7359
Stan Echols	DOE/GC	FTS 252-6947
Don Lozier	BPMD QA	FTS 976-5996
William Bruce	ONWI QA	FTS 976-4333
Bill Altman	USNRC	FTS 492-8490

NRC/DOE QA MEETING

DECEMBER 19, 1984

EXIT MEETING

NAME	ORGANIZATION	TELEPHONE
Jerry Reese	DOE/SRPO	FTS 976-5916
Bill Ember	HQ-DOE-OQAS	FTS 233-5637
Ram Lahoti	DOE/CH/SRPO	FTS 976-5916
Leslie Casey	DOE/CH/SRPO	FTS 976-5916
Gordon Appel	DOE/CH/SRPO	FTS 976-5916
Carl Newton	DOE-HQ	252-1248
Merritt E. Langston	DOE-HQ-OCRWM	FTS 252-1252
Margaret Suttman	Battelle	
Willaim M. Bland, Jr.	NRC-Contractor	713-333-4580
W.D. Altman	NRC-16	301-492-8490
J.E. Kennedy	NRC/NMSS	301-424-4786
Mike Bell	NRC	FTS 424-4200
Warren Rehfeldt	NRC/NMSS	FTS 427-4681
Vic Potent	DOE/CH/PMED-QA	FTS 972-2430
Tilak Verma	NRC	FTS 976-5916
Philip S. Van Loan	DOE/CH/SRPO	FTS 976-5916
Nancy S. Conrad	Rockwell/BWIP-QA	509-376-6310
John H. Malvin	Weston	301-963-5220
Stan Echols	DOE-GC	FTS 252-6947
E.A. Patzer	BPMD QAD	FTS 976-6329
Wayne Carbiener	BPMD/ONWI	FTS 976-4507
Jack Fitch	Fluor Engineers	FTS 976-5916
Clarence Williams	Battelle	FTS 976-5994

5277B

AGENDA

Attachment 2

DOE/NRC QUALITY ASSURANCE MEETING
SALT REPOSITORY PROJECT OFFICE
December 18-19, 1984

Location: Holiday Inn on the Lane
328 West Lane Avenue
Columbus, Ohio
General Custer Room, Ground Floor

December 18, 1984

7:30 a.m.	COFFEE	
8:00 a.m.	DOE INTRODUCTION AND WELCOME DOE/Contractor Staffs Goals of Meeting Agenda Discussion/Changes	J. Neff
8:15 a.m.	NRC INTRODUCTION NRC Staff Goals of Meeting NRC Standard Review Plan	J. Kennedy
9:15 a.m.	QUESTIONS FROM PUBLIC	
9:30 a.m.	DOE/SRPO PROGRAM Organization History of SRPO QA QA Philosophy and Procedures Objective Planning (COFFEE BREAK WHEN APPROPRIATE)	 J. Neff R. Lahoti J. Reese R. Wunderlich
12:00 Noon	LUNCH	
1:00 p.m.	DOE/SRPO PROGRAM, Continued Peer Reviews Procurement Document Control Review of Technical Documents Audits Q List QA Near Term Planning (COFFEE BREAK WHEN APPROPRIATE)	 R. Wunderlich J. England P. Van Loan T. Taylor R. Lahoti J. Sherwin J. Reese L. Casey J. Reese
4:00 p.m.	CLOSING REMARKS AND QUESTIONS FROM PUBLIC	J. Neff

December 19, 1984

7:30 a.m.	COFFEE	
8:00 a.m.	INTRODUCTION/AGENDA	J. Reese
8:10 a.m.	CONTRACTOR PRESENTATION	
	Review of BPMD Organization	N. Carter
	Review of ONWI Organization	W. Carbiener
	National Labs/Government Agencies	W. Carbiener
	BPMD Contractors	W. Carbiener
	BPMD QA Program for SRPO	C. Williams, Jr.
	QA Implementation Procedures	C. Knudsen
		D. Clark
		M. Balmert
		A. Funk
	(COFFEE BREAK WHEN APPROPRIATE)	
12:00 Noon	LUNCH	
1:00 p.m.	SUB-CONTRACTOR PRESENTATION	
	QA Program Controls	I. Levy
	Field QA Procedures (Rock Coring/Log Preparation)	C. Foster
	Field QA Procedures (Pump Testing/Fluid Sampling)	C. Foster
2:00 p.m.	CLOSING/QUESTIONS/PUBLIC COMMENTS	J. Reese
2:15 p.m.	EXIT MEETING PREPARATION	
	Participants caucus to prepare for exit meeting	
3:30 p.m.	EXIT MEETING	
	Discussion of meeting results and conclusions	
	Preparation of meeting minutes	
	(COFFEE BREAK WHEN APPROPRIATE)	
5:00 p.m.	ADJOURN	

ATTACHMENT 3

COMMENTS

C-1 o DOE and ONWI staff indicated that limited use has been made to date of QA surveillances on the Salt Repository Project. The NRC team considers an active surveillance program employing ad hoc surveillances an essential part of a QA program. The team considers a surveillance program utilizing technically qualified staff in conjunction with independent QA staff to be a key ingredient in assessing the effectiveness of subtier QA programs.

C-2 o As noted in the opening comments, this meeting was intended to be and has been primarily fact finding in nature and limited in scope. In our discussions we identified a number of areas where additional follow-up and discussion between DOE and NRC staffs is needed. Examples noted in this meeting include peer review, the role and interface of line QA activities versus independent QA activities, software QA, and records management.

C-3 o NRC QA regulations require the establishment of an independent QA organization free of cost and schedule pressures which has open access to top levels of management. It is not clear whether the existing SRPO QA organizational relationship provides sufficient independence to meet NRC requirements. This subject, and the general issue of tiered QA oversight within DOE (Headquarters, operations offices, project offices, contractors and subcontractors) and reporting and responsibility chains should be the subject of further NRC-DOE discussions.

C-4 o During the meeting, DOE representatives indicated that the guidance provided to contractors for developing a QA program consisted principally of Appendix B, NQA-1, the SRP and DOE orders. The NRC team believes that an SRPO umbrella form and content document providing project-wide guidance on development, description, and implementation of contractor and subcontractor QA programs would be useful and provide a basis for greater uniformity in project QA programs. This type of approach is being utilized on the NNWSI project.

C-5 o Even considering the extensive project management support provided by the BPMD, the NRC QA team is concerned that the projected size of the DOE/SRPO technical and quality assurance staffs may not be able to provide sufficient basis for technical direction of the project.

C-6 o In follow-up meetings, the NRC QA team would like to be kept informed as the SRPO plans an integrated design review for repository equipment, waste packages and other engineered barriers, and supporting data and analyses. NRC believes information needed includes schedule for reviews based on degree of design completion, items important to safety, items important to waste isolation and items in other classifications established by the SRPO; special analysis techniques to aid in the item classifications; interface with repository readiness reviews; interface with Configuration Management Plan; and participants in the above activities.

C-7 o Based on NRC's experience in overviewing and auditing reactors, a concern exists on the NRC staff about the effectiveness of the current implementation of the auditing program for contractors and subcontractors. The current level of overview may not be sufficient for the numerous complex work activities which will be ongoing during site characterization. A related concern is the size of the SRPO QA staff to provide an adequate overview function of the entire project's QA functions. Both concerns are noted for future follow-up with NRC staff.

C-8 o Most of the geotechnical work in the SRPO program is done by ONWI subcontractors. Technical reports prepared by the subcontractors are issued as ONWI reports. DOE and ONWI mentioned that there is a QA procedure for review and traceability of these ONWI reports to the original reports issued by the subcontractors. The NRC on-site licensing representative will meet with the SRPO data management staff to discuss the procedure.

C-9 o During the meeting, DOE indicated that the Quality Assurance Handbook for Geologic Investigations, which was prepared by DOE-HQ, will not be used in the program as guidance for implementing the requirements of Appendix B, Part 50. This document has not been reviewed by the NRC staff and may not meet all of the NRC requirements.

The comments provided by the NRC staff in Section C-10 were developed independently by the staff. DOE signoff of these meeting minutes does not constitute concurrence on this section of the minutes.

C-10 o A geologic repository is a disposal system that consists of both engineered (i.e., waste form and packaging) and natural barriers. The DOE license application must ensure that data of adequate quality are obtained for the waste form and packages as well as for the site and underground facility. An issue for follow-up with DOE-HQ is how DOE plans to assure that an appropriate level of quality is applied to the total geologic repository system (i.e., inclusion of West Valley and DWPF wastes, and data from WIPP which may be utilized in licensing a commercial repository).

ATTACHMENT 4

OPEN ITEMS

O-1 o During the meeting, it was indicated that SRPO has begun to develop the "Q" list, that is the list of items and activities that fall under the scope of the nuclear QA program. Contractor reports on this subject are due to be submitted in May 1985. Because of the difficulty in defining this list, the NRC staff recommends that SRPO work closely with the staff and other project offices and HQ in developing the approach to be used. DOE is receptive to a workshop on this subject.

A related topic is "graded QA," that is the application of quality assurance measures commensurate with the importance to safety of individual items or activities. Some approaches for developing a "Q" list also define the importance of individual items and activities and, therefore, provide a basis for grading QA. Any discussions at the "Q" list should also include graded QA.

It was also noted by SRPO staff during the meeting that focusing of attention on a subset of the total program through development of the "Q" list may be harmful to the achievement of the program's overall goals. The staff agrees in part. The primary reason for the development of the "Q" list is to define those items and activities which NRC may regulate in accordance with its statutory responsibilities, which are limited to radiological matters. Other items not falling within the "Q" list may have great importance to achieving mission success, and in affecting the nonradiological health and safety of workers. The NRC encourages going beyond the minimum requirements in its regulations so that these other important areas are adequately addressed. One of the characteristics of successful utilities in the nuclear power plant arena which we observed in the Ford Amendment study was their willingness to go beyond the minimum requirements and to carry out a program which they believed met their overall needs.

O-2 o SRPO indicated during the meeting that previously generated data is being evaluated to establish its precision, accuracy, and the uncertainties associated with it. Based on this evaluation, these data may be used to support a license application. Since they may not have been collected under a fully implemented QA program in accordance with Appendix B of 10 CFR Part 50, the staff considers that the evaluation of and the rationale for using that data in licensing to be of great importance. We suggest that SRPO review the historical data and determine how that data will be treated for use in the licensing process, and to work with the NRC staff and other project offices in developing an acceptable approach.

The NRC staff is interested in reviewing the Stone & Webster procedure for data classification that was mentioned during the meeting, and other similar procedures as they are developed.

U.S. DEPARTMENT
OF ENERGY

SALT REPOSITORY PROJECT OFFICE

DEPARTMENT OF ENERGY
NUCLEAR REGULATORY COMMISSION

QUALITY ASSURANCE MEETING

DECEMBER 18-19, 1984

COLUMBUS, OHIO

AGENDA

DOE/NRC QUALITY ASSURANCE MEETING
SALT REPOSITORY PROJECT OFFICE
December 18-19, 1984

Location: Holiday Inn on the Lane
328 West Lane Avenue
Columbus, Ohio
General Custer Room, Ground Floor

December 18, 1984

7:30 a.m.	COFFEE	
8:00 a.m.	DOE INTRODUCTION AND WELCOME DOE/Contractor Staffs Goals of Meeting Agenda Discussion/Changes	J. Neff
8:15 a.m.	NRC INTRODUCTION NRC Staff Goals of Meeting NRC Standard Review Plan	J. Kennedy
9:15 a.m.	QUESTIONS FROM PUBLIC	
9:30 a.m.	DOE/SRPO PROGRAM Organization History of SRPO QA QA Philosophy and Procedures Objective Planning (COFFEE BREAK WHEN APPROPRIATE)	 J. Neff R. Lahoti J. Reese R. Wunderlich
12:00 Noon	LUNCH	
1:00 p.m.	DOE/SRPO PROGRAM, Continued Peer Reviews Procurement Document Control Review of Technical Documents Audits Q List QA Near Term Planning (COFFEE BREAK WHEN APPROPRIATE)	 R. Wunderlich J. England P. Van Loan T. Taylor R. Lahoti J. Sherwin J. Reese L. Casey J. Reese
4:00 p.m.	CLOSING REMARKS AND QUESTIONS FROM PUBLIC	J. Neff

December 19, 1984

7:30 a.m.	COFFEE	
8:00 a.m.	INTRODUCTION/AGENDA	J. Reese
8:10 a.m.	CONTRACTOR PRESENTATION	
	Review of BPMD Organization	N. Carter
	Review of ONWI Organization	W. Carbiener
	National Labs/Government Agencies	W. Carbiener
	BPMD Contractors	W. Carbiener
	BPMD QA Program for SRPO	C. Williams, Jr.
	QA Implementation Procedures	C. Knudsen
		D. Clark
		M. Balmert
		A. Funk
	(COFFEE BREAK WHEN APPROPRIATE)	
12:00 Noon	LUNCH	
1:00 p.m.	SUB-CONTRACTOR PRESENTATION	
	QA Program Controls	I. Levy
	Field QA Procedures (Rock Coring/Log Preparation)	C. Foster
	Field QA Procedures (Pump Testing/Fluid Sampling)	C. Foster
2:00 p.m.	CLOSING/QUESTIONS/PUBLIC COMMENTS	J. Reese
2:15 p.m.	EXIT MEETING PREPARATION	
	Participants caucus to prepare for exit meeting	
3:30 p.m.	EXIT MEETING	
	Discussion of meeting results and conclusions	
	Preparation of meeting minutes	
	(COFFEE BREAK WHEN APPROPRIATE)	
5:00 p.m.	ADJOURN	

SRP THEMES

- TECHNICAL EXCELLENCE
  - — EXPERIENCED TECHNICAL PERSONNEL IN DOE, DOE CONTRACTORS AND SUBCONTRACTORS
  - — MAXIMUM USE OF FEDERAL/STATE/LOCAL EXPERTISE
  - — USE OF PEER REVIEWS
- MANAGEMENT EXCELLENCE
  - — CLEAR STATEMENT OF OBJECTIVES, PRIORITIES, RESPONSIBILITIES AND AUTHORITIES
  - — REALISTIC AND WELL DEVELOPED PLANS "OWNED" BY TECHNICAL PERSONNEL
  - — EFFICIENT, EFFECTIVE MANAGEMENT INFORMATION SYSTEM WITH USER ORIENTATION
  - — AUDIT SYSTEMS TO ALLOW REVIEW, EVALUATION AND MODIFICATION OF INEFFICIENT AND INEFFECTIVE ACTIVITIES

OBJECTIVES

NEAR TERM

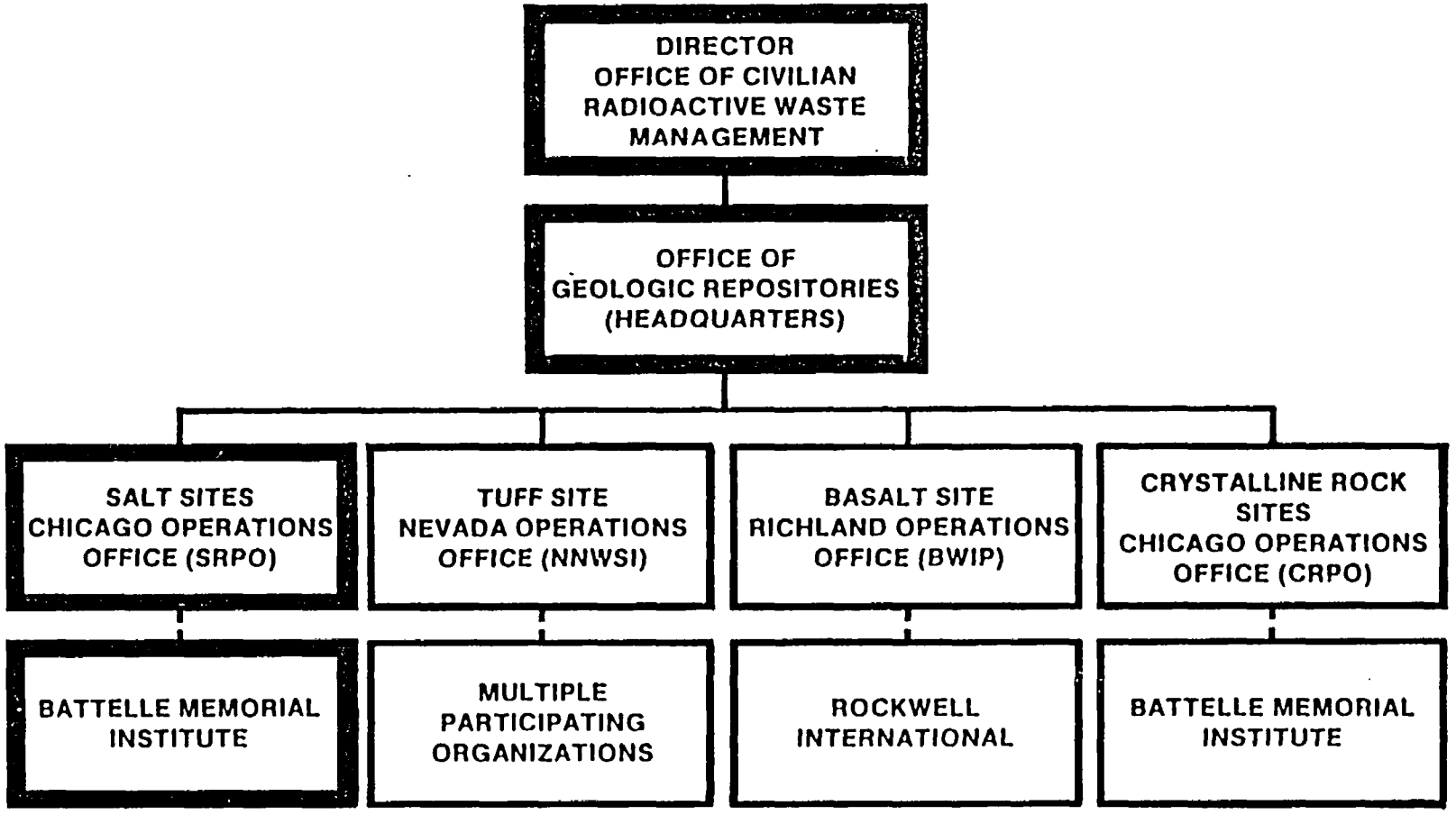
- COMPLETE DRAFT/FINAL EAs
- DEVELOP REALISTIC WORK PLAN AND COST PROJECTIONS FOR FY 1985 AND OUTYEARS
- INTEGRATE ALL NEW PERSONNEL INTO OFFICE STRUCTURE

LONG TERM (1-5 YRS.)

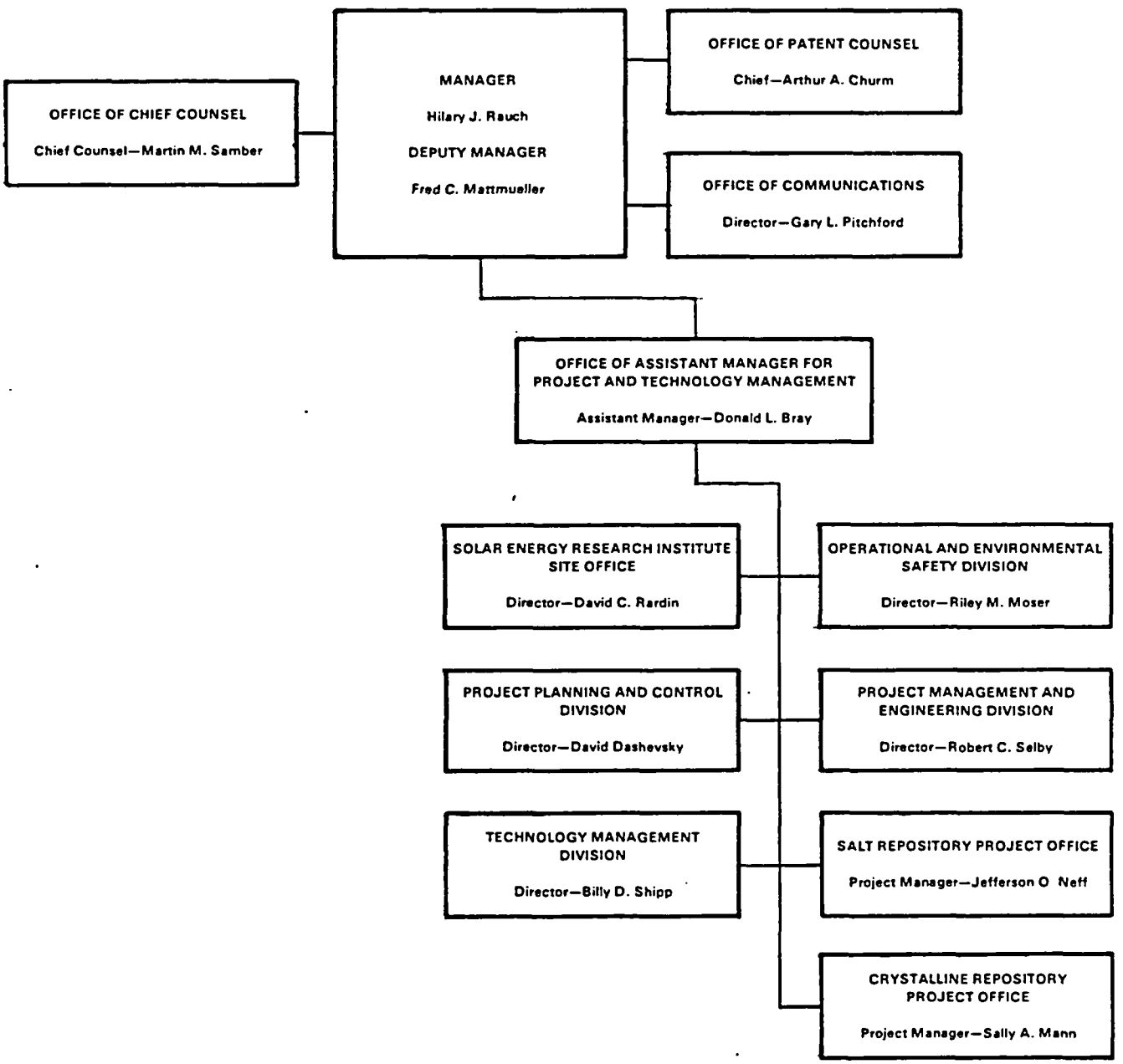
- DEPLOY SITE OFFICE NEAR RECOMMENDED SITE
- RESOLVE PERMITTING ISSUES FOR PROCEEDING AT RECOMMENDED SITES
- DETERMINE IF RECOMMENDED SALT SITE IS QUALIFIED AS A POTENTIAL REPOSITORY SITE

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

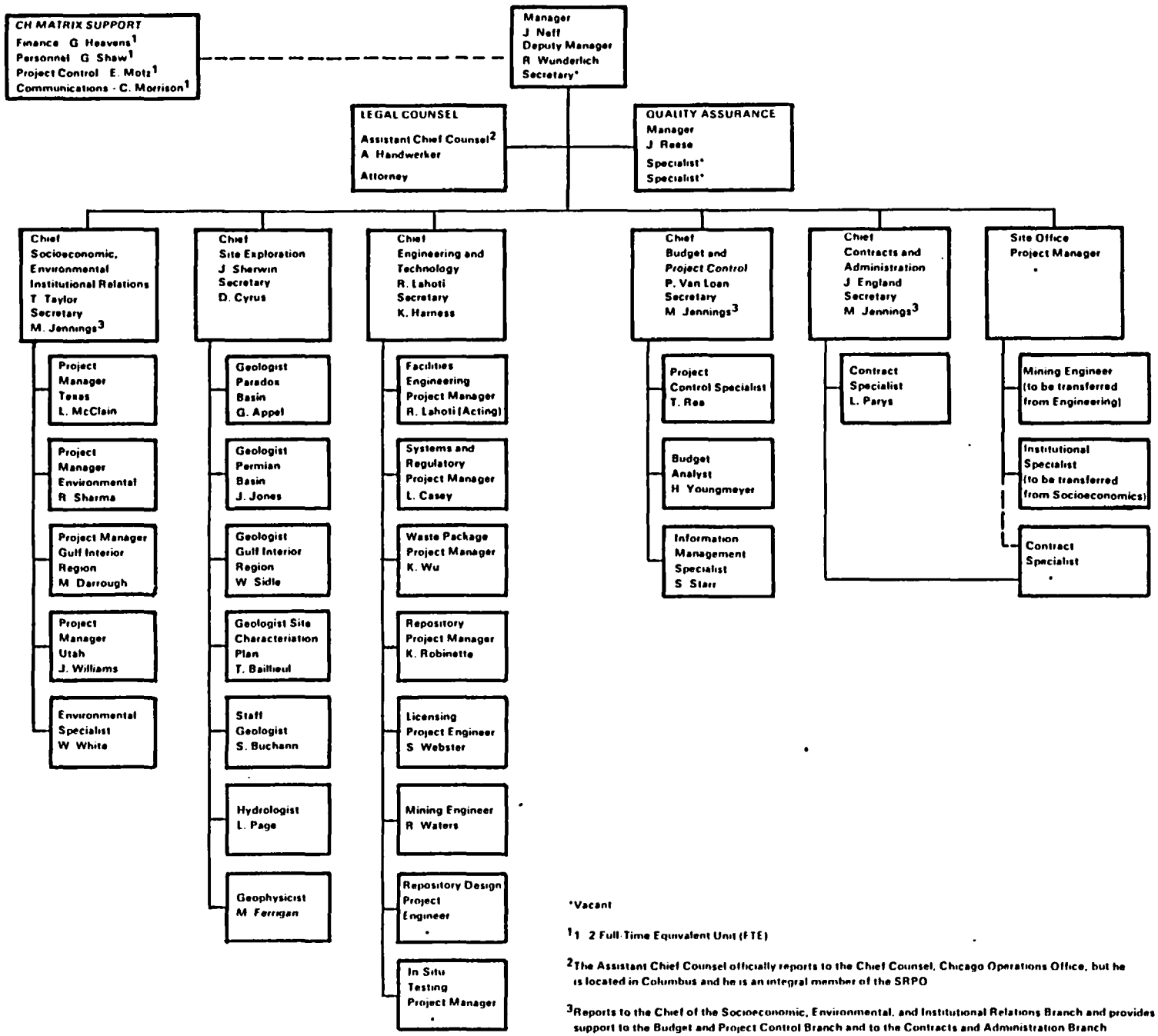
FIELD OFFICE AND CONTRACTOR MANAGEMENT RESPONSIBILITY FOR OGR PROJECTS



CHICAGO OPERATIONS OFFICE



SALT REPOSITORY PROJECT OFFICE CHICAGO OPERATIONS OFFICE



*Vacant

[1] 1 2 Full-Time Equivalent Unit (FTE)

[2] The Assistant Chief Counsel officially reports to the Chief Counsel, Chicago Operations Office, but he is located in Columbus and he is an integral member of the SRPO

[3] Reports to the Chief of the Socioeconomic, Environmental, and Institutional Relations Branch and provides support to the Budget and Project Control Branch and to the Contracts and Administration Branch

SRPO
POLICY ON QA

. . . . Quality assurance is a multidisciplinary system of management controls which addresses environmental protection, safety, reliability, maintainability, operability, performance, and other technical concerns. Quality assurance shall not be regarded as the sole domain of the SRPO Quality Assurance Manager; rather, line organizations should look to this person as an advisory resource in performing their quality assurance activities.

from SRPO QA Manual

QA MANAGER DUTIES

- INTERPRET DOE/HQ POLICY ON QA
- MAINTAIN LIAISON WITH HQ AND CH QA PEOPLE
- PROVIDE EVALUATIONS AND RECOMMENDATIONS ON QA
- DIRECT AUDITS OF SRPO CONTRACTORS
- NOTIFY MANAGEMENT RE. UNSATISFACTORY WORK (STOP WORK WITH MANAGER'S APPROVAL)
- PROVIDE QA GUIDANCE TO SRPO STAFF
- MAINTAIN THE SRPO QA MANUAL
- COORDINATE THE ANNUAL QA REVIEW

BPMD/ONWI QA

— PRINCIPLE AGENTS FOR DOE/SRPO

— DOCUMENTED IN ONWI QA MANUAL
  APPROVED BY DOE/SRPO
  VERIFIED THROUGH AUDIT (10/84)

— BASED UPON ANSI/ASME NQA-1-1983

— MORE TOMORROW

PARSONS REDPATH QA

— EXPLORATORY SHAFT FACILITY

— DOCUMENTED IN PR QA MANUAL

APPROVED BY DOE/SRPO

VERIFIED THROUGH ANNUAL AUDIT (11/84)

— BASED UPON ANSI/ASME NQA-1-1983

— RESIDENT QA MANAGER IN COLUMBUS TO WORK WITH STAFF OF ABOUT 16

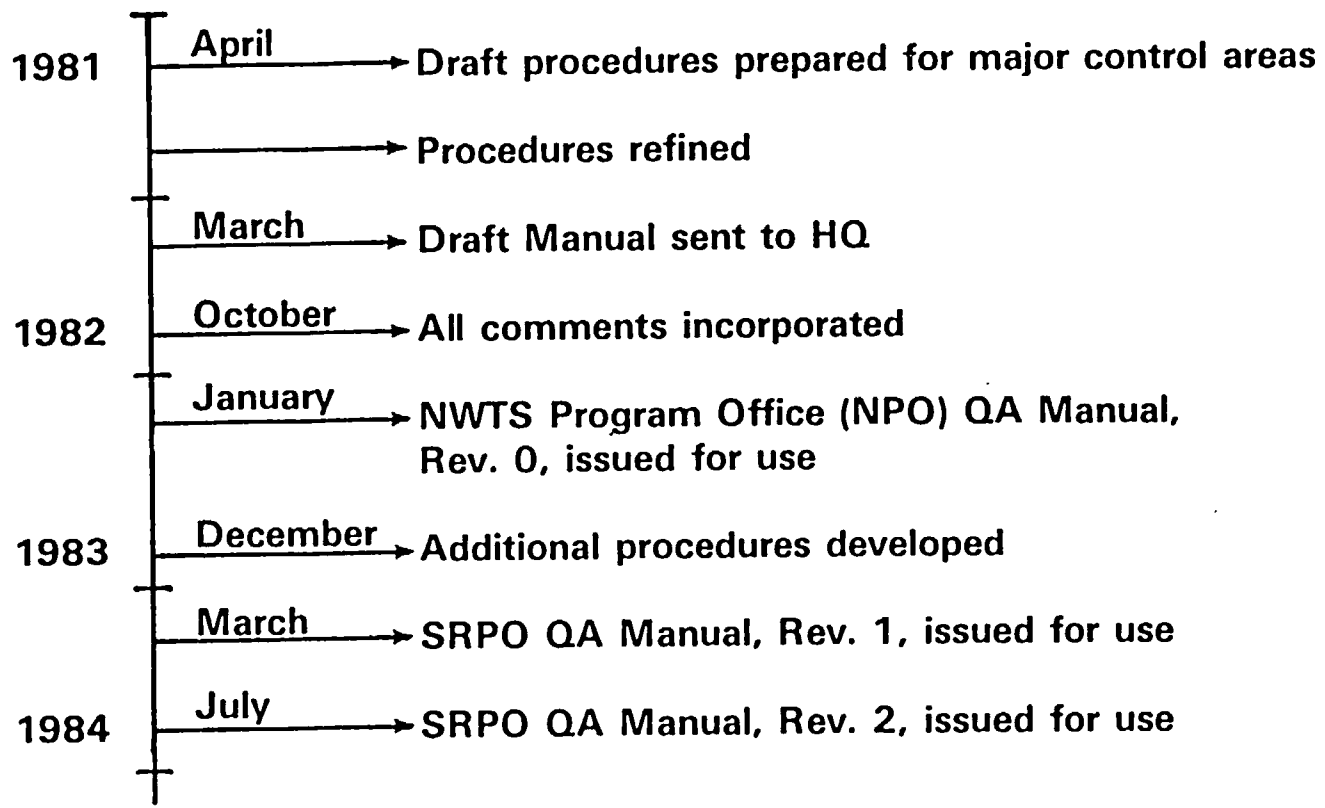
FLUOR QA

- REPOSITORY CONCEPTUAL DESIGN
- DOCUMENTED IN FLUOR QA MANUAL
  - APPROVED BY DOE/SRPO
  - VERIFIED THROUGH ANNUAL AUDIT (7/84)
- BASED UPON ANSI/ASME NQA-1-1983
- ONE LOCAL REPRESENTATIVE
- QA MANAGER IN IRVINE, CAL. WITH FLUOR SALT PROJECT TEAM
- OTHERS UNDER FLUOR INCLUDE:
  - MORRISON-KNUDSEN CO.
  - ENGINEERED SYSTEMS DEVELOPMENT CORP.
  - SCIENCE APPLICATIONS, INC.
  - WOODWARD-CLYDE CONSULTANTS

OTHER DOE CONTRACTORS

TBEG	— Texas Bureau of Economic Geology
BFEC	— Bendix Field Engineering Corporation
BNL	— Brookhaven National Laboratory
ORNL	— Oak Ridge National Laboratory
LLL/LBL	— Lawrence Livermore/Berkeley Laboratories
PNL	— Pacific Northwest Laboratories
USGS	— U.S. Geological Survey
WES/COE	— Waterways Exper. Station, Corps of Engineers
ANL	— Argonne National Laboratory

HISTORY OF SRPO QA

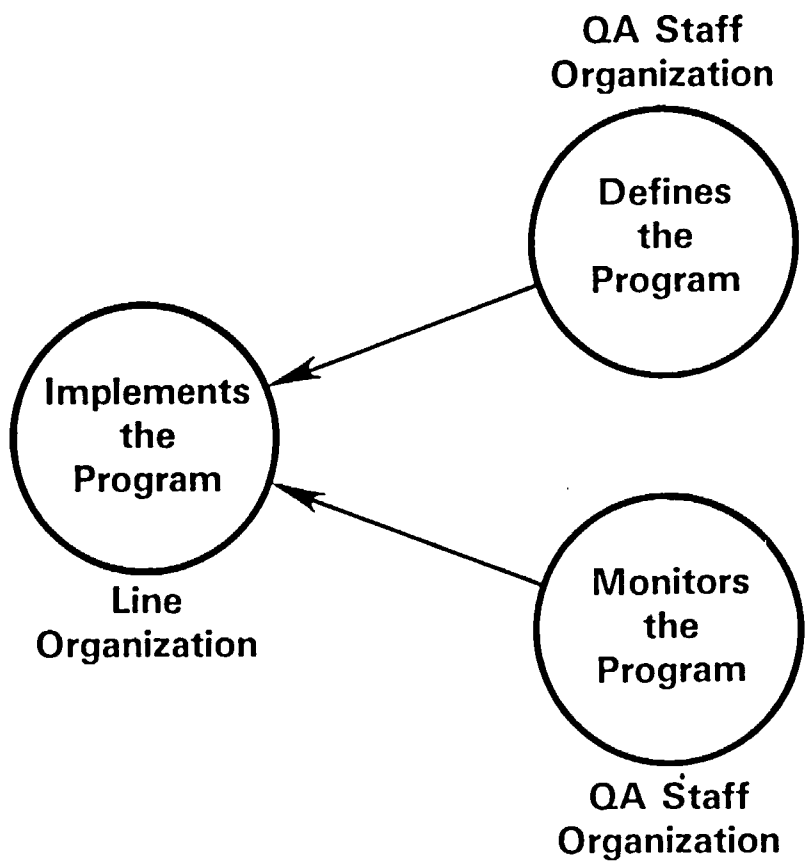


18 BASIC REQUIREMENTS

DOE FUNCTION TODAY

1. ORGANIZATION
2. PROGRAM
3. DESIGN CONTROL
4. PROCUREMENT DOCUMENT CONTROL
5. INSTRUCTIONS, PROCEDURES, AND DRAWINGS
6. DOCUMENT CONTROL
7. PURCHASED ITEMS AND SERVICES
15. NONCONFORMING MATERIAL
16. CORRECTIVE ACTION
17. QA RECORDS
18. AUDITS

QUALITY ASSURANCE ROLES



QA DIRECTION

DOE	NRC
Order 5700.6A—Quality Assurance	10CFR60
Order CH 5700.6A—Quality Assurance	10CFR50, Appendix B
NQA-1-1983	Standard Review Plan
OGR QA Plan	

QUALITY ASSURANCE MANUAL

Salt Repository Project Office (SRPO)

Salt Repository Project

QAP No

Rev 2 Issued 7/27/84

TITLE
TABLE OF CONTENTS

SRPO MANAGER	QA MANAGER	PREPARED BY

Procedure No TABLE OF CONTENTS	Rev 2	Issued 7/27/84	Page 2 of 2

OBJECTIVE PLANNING

QAP 2.1

TO PROVIDE FOR—

- LONG-RANGE PLANNING FOR THE SALT REPOSITORY EFFORT
- A CLEAR DEFINITION OF THE CONTRIBUTIONS OF THE VARIOUS PARTIES
- A SYSTEMATIC ANNUAL EXAMINATION OF SRPO AND CONTRACTOR CONTRIBUTIONS TO THE PROJECT

OBJECTIVE PLANNING

STATUS

- FIRST USE OF THIS PROCEDURE
- HQ BUDGET AND GUIDANCE MEETING 11/84
- HQ DIRECTION EXPECTED 12/84
- FIRST PLANS PREPARED 1/85
- PLANS ASSEMBLED AND ISSUED 2/85

OBJECTIVE PLANNING

FORMAT

1. OVERALL NATIONAL OBJECTIVE AND TIMING
2. CURRENT FY PLANNING
   - — GOALS
   - — CONTRACTOR CONTRIBUTION
   - — SRPO CONTRIBUTION
3. OUTYEAR PLANNING
   - — GOALS
   - — CONTRACTORS
   - — DELIVERABLES
4. APPROVALS

PEER REVIEWS

PURPOSE

TO VERIFY THE TECHNICAL WORK DONE BY CONTRACTORS

REQUIRED WHEN

- UNIQUE APPLICATION OF AN ESTABLISHED OR STANDARD PRACTICE
- WORK GOES BEYOND THE STATE OF THE ART
- NEW OR UNUSUAL EXPERIMENTAL TECHNIQUES USED BY A CONTRACTOR
- MAJOR CHANGES BEING MADE IN A GEOLOGIC INVESTIGATION OR REPOSITORY DESIGN
- REPORTS OF SIGNIFICANCE
- CORRECTIVE ACTIONS OF MAJOR IMPACT

PROCESS FOR PEER REVIEW

1. Develop List of Program Milestones
2. Select Documents Requiring Peer Review
3. Schedule Timing for Peer Review
4. Develop Guidance for Review (Identify Areas Requiring Review)
5. Select Review Team Members
6. Conduct Peer Review
7. Document Peer Review Recommendations and Comments
8. Provide Peer Review Report to Author and Resolve Comments and Recommendations
9. Perform Follow-up to Ensure Changes Are Incorporated
10. Approve or Reject Documents for Printing

CONTRACTING

- BPMD/ONWI
- PARSONS REDPATH
- UNIVERSITY OF TEXAS (BUREAU OF ECONOMIC GEOLOGY)
- FLUOR
- U.S. GEOLOGICAL SURVEY
- WATERWAYS EXPERIMENT STATION
- BUREAU OF MINES (PROPOSED)

NRC-21-A

DATE: _____

TO: Addresses Listed Below

FROM: Contract & Administration

SUBJECT: Contractual Document (s) For Review, Comments and Initialing

The document (s) listed below (is) (are) forwarded for your review, comments initials. Upon completion of your review, please attach your comments, if any, and forward to next in line. Expeditious handling of this matter will be appreciated.

(Synopsis of Action for Review) _____

Addressee	Recommend (X) Approval	Disapproval	Initial	Date
Q.A. Manager				

Return To:

Contract & Administration

BUDGET

Brookhaven—Chicago Operations

Pacific Northwest Labs—Richland Operations

Bendix—Idaho Operations/Grand Junction Area

Oak Ridge National Lab—Oak Ridge Operations

Lawrence Livermore—San Francisco Operations

Lawrence Berkeley—San Francisco Operations

TECHNICAL REVIEWS—SEIR

TYPICAL DOCUMENT TYPES

- CONTRACTOR SOCIOECONOMIC PROGRAM ACTIVITY PLAN
- SUBCONTRACTOR SOCIOECONOMIC DATA BASE REPORTS
- SUBCONTRACTOR COMPUTER MODEL DOCUMENTATION REPORTS
- CONTRACTOR REPORTS OF RESPONSES TO COMMENTS MADE IN PUBLIC HEARINGS
- CONTRACTOR REPORTS IDENTIFYING EXPRESSED PUBLIC ISSUES FOR INCORPORATION INTO STATUTORY ENVIRONMENTAL ASSESSMENTS
- CONTRACTOR AND SUBCONTRACTOR REPORTS ON ENVIRONMENTAL STUDIES

Procedure No 7.1	Rev 2	Issued 7/27/84	Page 5 of 5

ATTACHMENT B

REVIEW OF CONTRACTOR DOCUMENTS

Document Title:_____ I.D. No:_____

Contractor:_____

(1) REVIEW

Reviewer:_____ Date:_____

Comments (continue on additional sheets if necessary and attach to this form):

(2) RESOLUTION OF COMMENTS

Date Comments Sent to Contractor:_____ Date of Response: _____
(Attach copy of contractor's response)

Actions Required (continue on additional sheets if necessary and attach to this form).

All Actions Completed: _____ Date:_____
Reviewer

TECHNICAL REVIEW—ENGINEERING

TYPICAL DOCUMENTS

- ONWI ESF RECOMMENDATION FOR 2ND SHAFT
- ONWI FUNCTIONAL DESIGN CRITERIA
- BOREHOLE SEALING TEST IN SALT
- LARGE-SCALE LAB PERMEABILITY TESTING
- DEVELOPMENT OF CEMENTITIOUS MATERIAL FOR REPOSITORY SEALING

TECHNICAL REVIEW—ENGINEERING

CHECKLIST FROM QA MANUAL

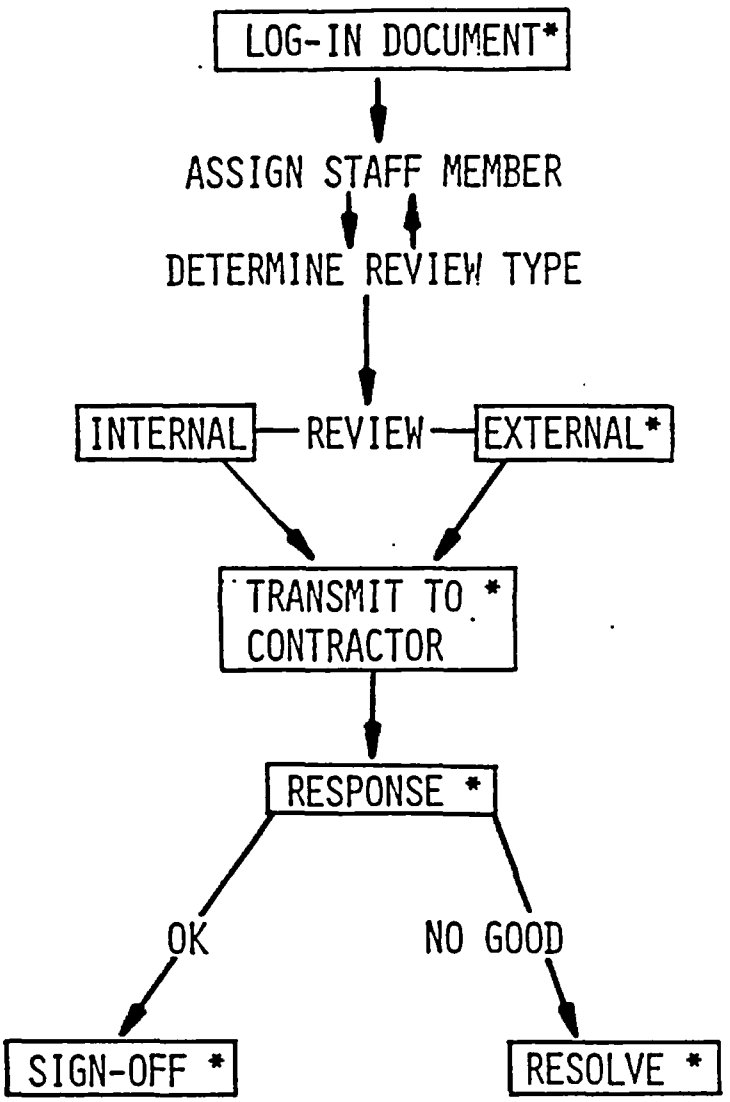
A. TECHNICAL CONCERNS

- — APPROACH
- — ASSUMPTIONS/LIMITATIONS
- — SPECULATIVE STATEMENTS IDENTIFIED
- — FIGURES, TABLES, MAPS APPROPRIATE
- — CONCLUSIONS SUPPORTED BY DATA
- — METHODS IDENTIFIED
- — DISCUSSION IS SOUND
- — CONCLUSIONS VALID AND MEET WORK OBJECTIVE
- — REPORT IS SUITABLE AND APPROPRIATE
- — QUALITY ASSURANCE PROGRAM ADEQUATE

B. EDITORIAL CONCERNS

- — TITLE IS CLEAR
- — PURPOSE IS CLEAR
- — WELL ORGANIZED
- — CLEARLY WRITTEN
- — ABSTRACT INCLUDED

TECHNICAL REVIEW PROCEDURE



* DOCUMENTATION STEP

ATTACHMENT A

CHECKLIST FOR REVIEW OF DOCUMENTS

A. TECHNICAL CONCERNS

1. Approach is correct.
2. Assumptions and limitations are adequately stated.
3. Speculative statements are clearly identified as such.
4. Figures, tables, and maps are appropriate and useful.
5. Data support interpretations and conclusions.
6. Reasoning by which interpretations and conclusions are reached is given adequately and clearly.
7. Technical discussions are sound.
8. Conclusions are sound (valid) and meet the work objective.
9. Report is suitable and appropriate for its intended use.
10. Report has been prepared under a suitable QA program. It may be desirable to request documentation from the contractor specific to the checks performed on the report.
11. If the QA program that was applied to the document is in doubt, perform the following:

    (a) Verify mathematics:

    - mathematical expressions are accurate
    - computations are correct
    - results are clearly and correctly stated

    (b) Verify tables, figures, and maps:

    - agree with sources
    - are consistent with text and other tables, figures, and maps
    - all locations in text are shown on maps or are adequately described

    (c) Verify references:

    - agree with sources
    - available to the public

B. EDITORIAL CONCERNS

1. Title clearly indicates subject.
2. Purpose of report is clearly and fully discussed.
3. Report is well organized.
4. Report is clearly written: proper grammer, sentence structure, word usage, and spelling.
5. Appropriate style guides have been used.
6. A clear and understandable abstract is included.

Procedure No 7.1	Rev 2	Issued 7/27/84	Page 5 of 5

ATTACHMENT B

REVIEW OF CONTRACTOR DOCUMENTS

Document Title:_____ I.D. No:_____

Contractor:_____

(1) REVIEW

Reviewer:_____ Date:_____

Comments (continue on additional sheets if necessary and attach to this form):

(2) RESOLUTION OF COMMENTS

Date Comments Sent to Contractor:_____ Date of Response: _____
(Attach copy of contractor's response)

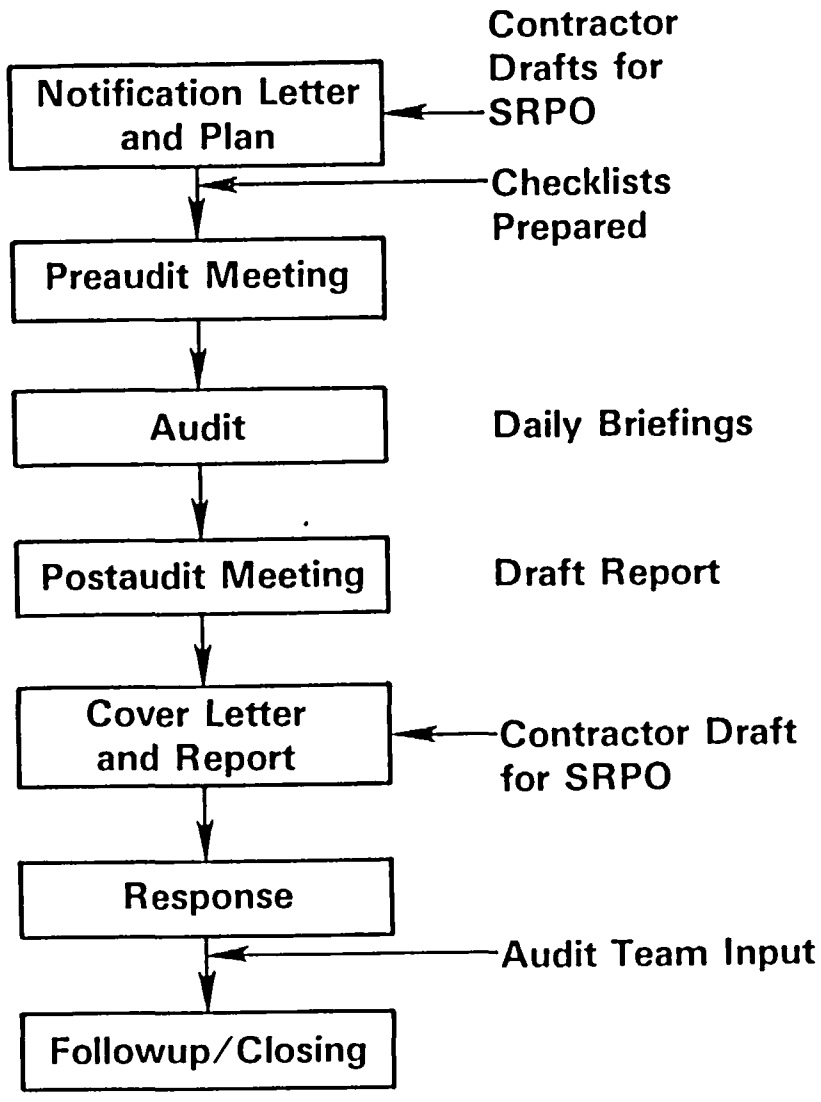
Actions Required (continue on additional sheets if necessary and attach to this form).

All Actions Completed: _____ Date:_____
Reviewer

AUDITS

- EXTERNAL
- INTERNAL
- PERFORMED ON SRPO BY OTHERS

AUDITS


Contractor Drafts for SRPO
Notification Letter and Plan
Checklists Prepared
Preaudit Meeting
Audit
Daily Briefings
Postaudit Meeting
Draft Report
Cover Letter and Report
Contractor Draft for SRPO
Response
Audit Team Input
Followup/Closing

AUDITS OF DOE-DIRECT CONTRACTORS
(1983 and 1984)

Audited Organization	Location	Date Conducted	Conducted by (ONWI or DOE)
TBEG	Austin TX	3-/29-30/83	ONWI
ONWI	Columbus OH	6/21-24/83	DOE (SRPO)
PNL	Richland WA	8/8-10/83	ONWI
LBL	Berkeley CA	11/30/83	DOE (SAN)
LLNL	Livermore CA	11/29-30/83	DOE (SAN)
Parsons-Redpath	Columbus OH	11/28-29/83	ONWI
ONWI	Columbus OH	12/6-8/83	DOE (SRPO)
TBEG	Austin TX	3/29-30/84	DOE (SRPO)
USGS	Denver CO	4/5-6/84	DOE SRPO)
Bendix	Grand Junction CO	5/15-17/84	ONWI
PNL	Richland WA	7/18-20/84	ONWI
COE (WES)	Vicksburg MS	8/7-8/84	ONWI
ONWI	Columbus OH	10/30-11/2/84	DOE (SRPO)
Parsons-Redpath	Columbus OH	11/19-20/84	DOE (SRPO)

AUDITS

AUDITS OF SRPO BY OTHERS:

- AUGUST 1983 BY HEDL
- DECEMBER 1984 BY CHICAGO AND HQ

AUDITS

GENERIC PROBLEMS UNCOVERED:

- QA REQUIREMENTS TO DOERS
- LACK OF PROCEDURES
- INADEQUATE RECORDS
- APPROPRIATE QA FOR RESEARCH

LICENSING COORDINATING GROUP

Member	Organization
Charles Head, Chairperson	
Carl Newton	DOE/HQS
Dick Baker	CRPO
Ken Yates	OCRD/Battelle
Leslie Casey	SRPO
David Dawson	ONWI
Larry Fitch	RHO
Jim Mecca	RL/BWIP
Jerry Szymanski	DOE/Nevada
Joe LaRue	SAI/Nevada
Mike Glora	SAI/Nevada
Bill Griffin	Fluor Engineers
Robert Rihs	Parsons/Redpath
Hank Bermanis	Weston

PRELIMINARY STUDIES ADDRESSING SAFETY DESIGNATIONS

- Guidance for Determining Safety-Related Features of Geologic Repositories
  - — Anticipated ONWI Publication Date: 5/85
- Structures, Systems, and Components Classification System Definitions
  - — Anticipated Fluor Publication Date: 5/85

FUTURE QA ACTIONS

- QA MANUAL REVISION—START IN JANUARY 85
  - — INCORPORATE COMMENTS TO DATE
  - — DEVELOP NEW PROCEDURES FOR CONSTRUCTION-TYPE ACTIVITIES
  - — INCORPORATE APPLICABLE PARTS OF NRC REVIEW PLAN
- REVIEW AND ANALYSIS OF SRP—START IN JANUARY 85
- REGULARLY SCHEDULED INTERNAL AUDITS
- START WORK ON "QA CHAPTER" FOR SALT SITE CHARACTERIZATION PLAN

I. BPMD ORGANIZATION

BATTELLE MEMORIAL INSTITUTE ORGANIZATION

OFFICE OF THE CHAIRMAN
Chairman of the Board and Chief Executive Officer
S. L. Fawcett

OFFICE OF THE PRESIDENT
President and Chief Operating Officer
R. S. Paul
Executive Vice President
D. E. Olesen

Business Operations

COLUMBUS DIVISION
Director and Vice President BMI
E. W. Ungar

BATTELLE-INSTITUT e.V.* (FRANKFURT)
Managing Director and Vice President BMI
H. Haeske

GENEVA DIVISION
Director General and Vice President BMI
V. Stingelin

BATTELLE DEVELOPMENT CORPORATION**
Chairman of the Board
S. L. Fawcett
President
T. J. Atterbury

PACIFIC NORTHWEST DIVISION
Director
W. R. Wiley

SCIENTIFIC ADVANCES, INC.**
Chairman of the Board
S. L. Fawcett
President
C. G. James

PROJECT MANAGEMENT DIVISION
General Manager and Vice President BMI
N. E. Carter

Corporate Functions

COMMUNICATIONS AND PUBLIC AFFAIRS
Corporate Director and Vice President BMI
C. R. Tipton, Jr.

LEGAL
General Counsel, Secretary and Vice President BMI
P. T. Santilli

FINANCE
Corporate Director, Treasurer and Vice President BMI
M. G. Stark

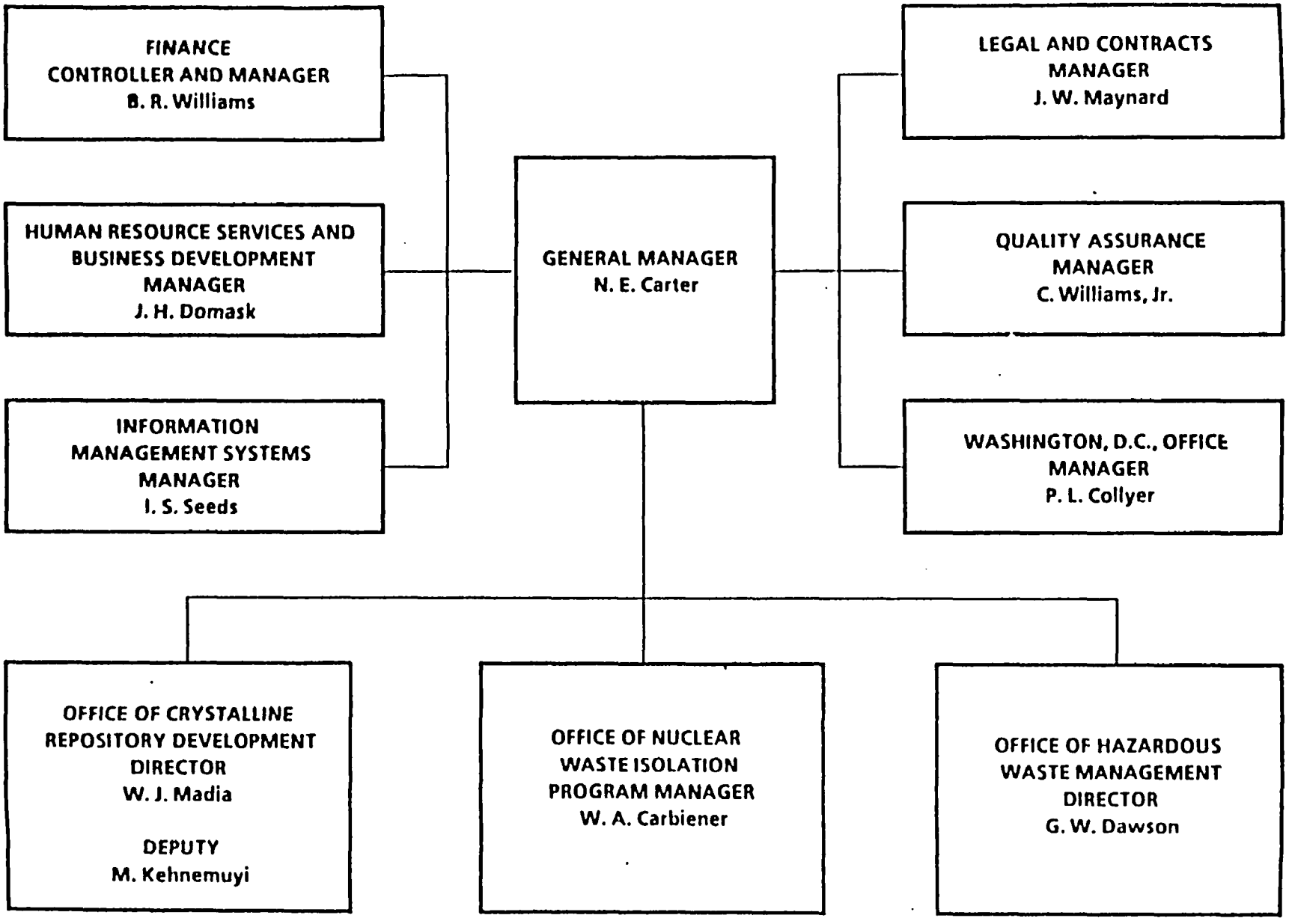
MARKETING
Corporate Director and Vice President BMI
G. B. Johnson

HUMAN RESOURCES
Corporate Director and Vice President BMI
L. L. German

MULTICOMPONENT OPERATIONS
Corporate Director and Vice President BMI
T. W. Ambrose

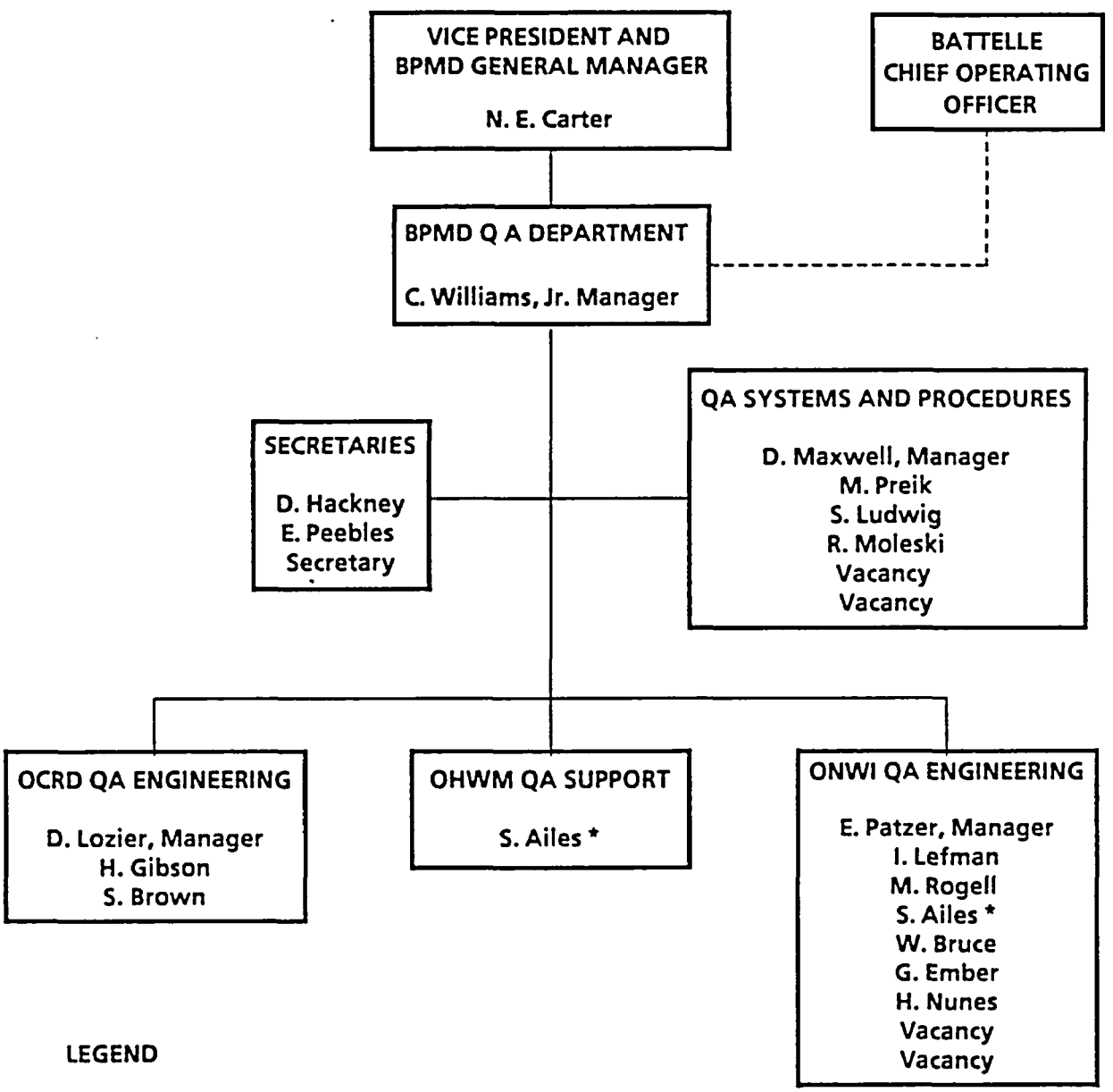
*An association: S. L. Fawcett and R. S. Paul, Chairman and Vice Chairman, respectively.
**Wholly owned subsidiaries.

July 1984


FINANCE
CONTROLLER AND MANAGER
B. R. Williams
HUMAN RESOURCE SERVICES AND
BUSINESS DEVELOPMENT
MANAGER
J. H. Domask
INFORMATION
MANAGEMENT SYSTEMS
MANAGER
I. S. Seeds
GENERAL MANAGER
N. E. Carter
LEGAL AND CONTRACTS
MANAGER
J. W. Maynard
QUALITY ASSURANCE
MANAGER
C. Williams, Jr.
WASHINGTON, D.C., OFFICE
MANAGER
P. L. Collyer
OFFICE OF CRYSTALLINE
REPOSITORY DEVELOPMENT
DIRECTOR
W. J. Madia
DEPUTY
M. Kehnemuyi
OFFICE OF NUCLEAR
WASTE ISOLATION
PROGRAM MANAGER
W. A. Carbiener
OFFICE OF HAZARDOUS
WASTE MANAGEMENT
DIRECTOR
G. W. Dawson

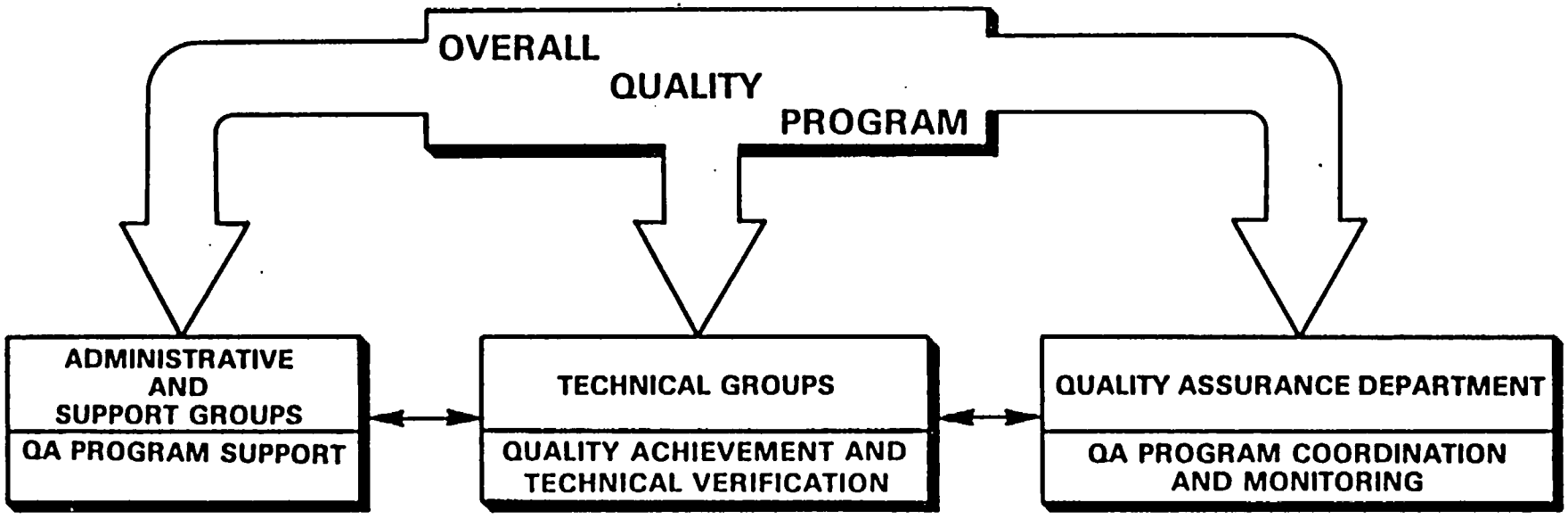
6/1/84

BPMD QA ORGANIZATIONAL STRUCTURE AND STAFFING



* Dual Assignment

BPMD QUALITY ASSURANCE— A TEAM EFFORT



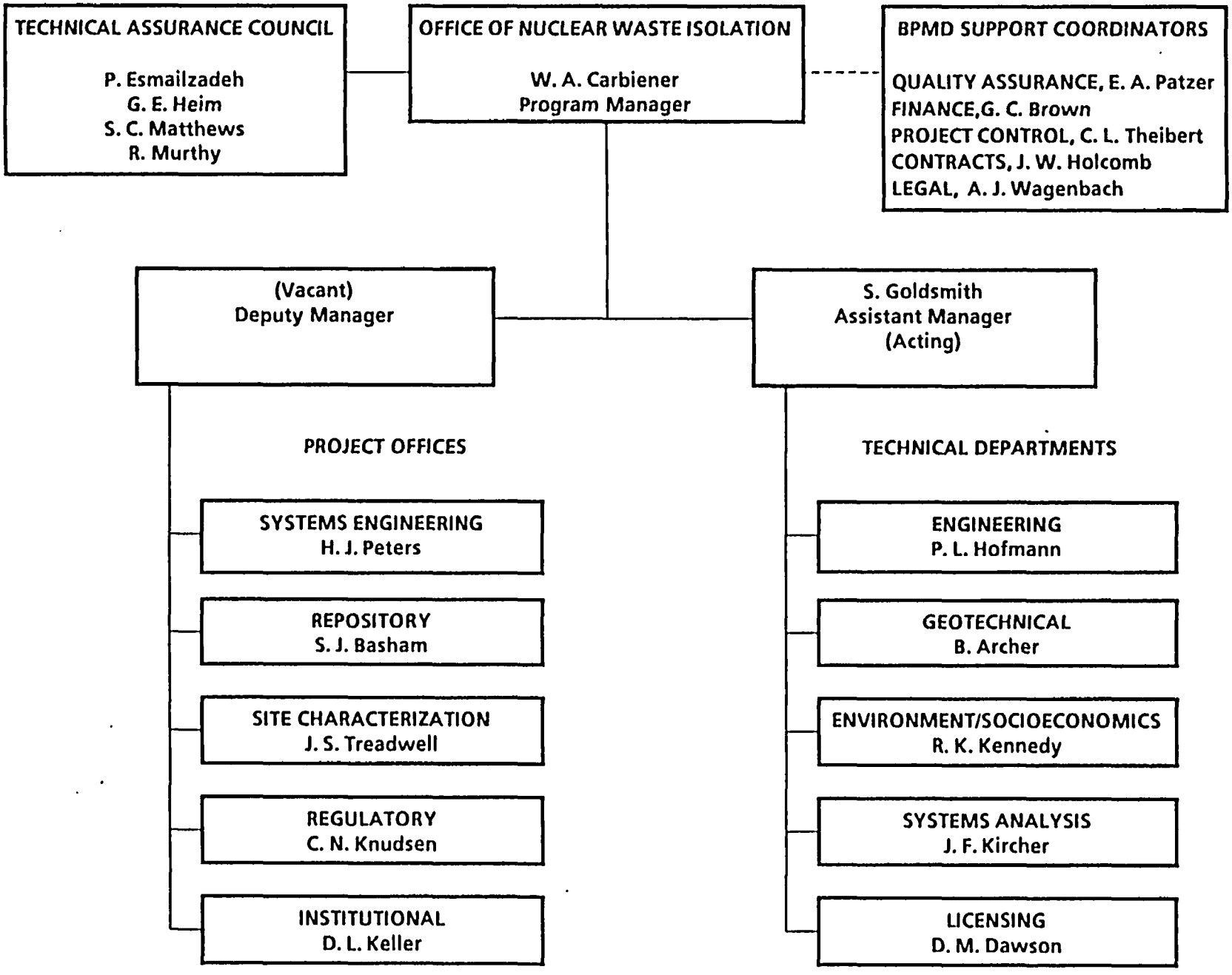
- PURCHASING
- RECORDS COLLECTION AND STORAGE
- DOCUMENT CONTROL CENTER
- COMPUTER SUPPORT
- MAIL DISTRIBUTION CENTER
- QA ADMINISTRATIVE/ SUPPORT PROCEDURES
- QA TRAINING FOR SUPPORT STAFF

- QUALITY/TECHNICAL PLANNING
- TECHNICAL PROCEDURES
- QA SPECIFICATIONS
- SAFETY CLASSIFICATIONS
- QA RECORDS
- QA TRAINING FOR TECHNICAL STAFF
- DESIGN CONTROL
- CONTROL OF SUBCONTRACTS
- PEER/TECHNICAL REVIEWS
- TECHNICAL REPORT
- TECHNICAL STUDIES
- COMPUTER PROGRAM VERIFICATION AND VALIDATION

- QA MANUAL
- QA PLANS
- QA PROCEDURES
- QA AUDITS/SURVEILLANCE
- TRAINING
- QA REVIEW OF DOCUMENTS
- CORRECTIVE ACTION REQUESTS
- STOP WORK AUTHORITY

II. ONWI ORGANIZATION

OFFICE OF NUCLEAR WASTE ISOLATION



III. WORK PERFORMED BY NATIONAL LABS AND GOVERNMENT AGENCIES IN SUPPORT OF SALT PROJECT

OVERVIEW OF WORK SCOPES OF NATIONAL LABORATORIES AND GOVERNMENT AGENCIES SUPPORTING THE SALT PROJECT

Laboratory or Agency	Scope of Work
Texas Bureau of Economic Geology	West Texas Palo Duro Basin Project, Geologic and Hydrologic Studies, Core Custodian
Bendix Field Engineering	Geochemical Assistance Project Geochemical Analyses Related to Selection and Characterization of the Repository Sites, Engineering Design, Performance Demonstration
Brookhaven National Laboratory	Salt Radiation Effects Project Characterize Radiation Damage in Rocks and Other Materials

OVERVIEW OF WORK SCOPES OF NATIONAL LABORATORIES AND GOVERNMENT AGENCIES SUPPORTING THE SALT PROJECT
(Continued)

Laboratory or Agency	Scope of Work
U.S. Geological Survey	Provide Independent Objective Technical Review and Evaluation of DOE-Contractor Hydrologic Models and Model Results, Applied to the Characterization of Salt Dome and Bedded Salt Potential Repository Sites
Waterways Experiment Station Corps of Engineers	Laboratory Services and Analytical and Evaluation Services on Materials That May Be Used in Repository Sealing
Argonne National Laboratory	Provide Technical Assistance for Environmental Assessment and Licensing Activities

NATIONAL LABORATORY AND GOVERNMENT AGENCIES SUPPORTING THE SALT PROJECT
(Continued)

Oak Ridge National Laboratory	Computer Technology and Environmental Assessment
Lawrence Livermore/Berkeley Labs	Computer Code Development Laboratory Thermal Mechanical Properties Tests
	Laboratory Experiments to Simulate and Measure Hydraulic Fracturing Stess in Rock Salt
Pacific Northwest Labs	Development and Application of Performance Assessment Models
	Waste Package Program Perform Shielding Calculations Laboratory Testing of Waste Forms and Package Materials

METHODS USED TO ESTABLISH WORK SCOPES

General statement of work, objectives, and required deliverables provided by SRPO/BPMD technical staff to contractor. Specifics for accomplishment provided by contractor for SRPO/BPMD review and approval in field task proposal agreement. Finalized FTPA, deliverables, and QA specification provided to contractor with fiscal year funding.

METHODS USED BY SRPO/BPMD TO CONTROL WORK ACTIVITIES

- SAFETY CLASSIFICATION DETERMINED BY TECHNICAL STAFF WITH QA CONCURRENCE (PMP-19)
- QUALITY ASSURANCE SPECIFICATIONS PREPARED BY BPMD JOINTLY BY TECHNICAL AND QA STAFFS USING GRADED APPROACH, SUBMITTED TO DOE/SRPO FOR REVIEW AND APPROVAL, TRANSMITTED TO LAB/AGENCY WITH FY FUNDING
- LAB/AGENCY QA PLANS, ACTIVITY PLANS, TECHNICAL PROCEDURES AND TECHNICAL DELIVERABLES SUBMITTED TO SRPO/BPMD FOR REVIEW AND APPROVAL
- LAB/AGENCY QA ADMINISTRATIVE PROCEDURES SUBMITTED FOR INFORMATION
- ANNUAL SRPO/BPMD QA AUDITS SUPPLEMENTED BY TECHNICAL AND QUALITY ASSURANCE VISITS

IV. WORK PERFORMED BY BPMD CONTRACTORS IN SUPPORT OF SALT PROJECT

OVERVIEW OF WORK SCOPES OF MAJOR BPMD/ONWI CONTRACTORS SUPPORTING THE SALT PROJECT

Contractor	Scope of Work
Stone-Webster	Geologic Project Manager for the Permian Basin—Field Geologic Investigations
Woodward-Clyde	Geologic Project Manager for the Paradox Basin—Field Geologic Investigations
NUS Corporation	Regulatory Project Manager for the Permian Basin—Environmental Field Studies
Earth Technology	Geologic Project Manager for the Southern Region Salt—Field Geologic Investigations

OVERVIEW OF WORK SCOPES OF MAJOR BPMD/ONWI CONTRACTORS SUPPORTING THE SALT PROJECT

(Continued)

Contractor	Scope of Work
Parsons-Brinckerhoff	Design of the Exploratory Shaft Facility and Technical Support Activities
Bechtel National	Regulatory Project Manager for the Gulf Interior Region and Paradox Basin—Environmental Field Studies
Intera Technologies	Performance Assessment Model Development and Application
RE/SPEC, Inc.	An Integrated Computational and Laboratory Effort to Predict the Response of the Host Rock

OVERVIEW OF WORK SCOPES OF MAJOR BPMD/ONWI CONTRACTORS SUPPORTING THE SALT PROJECT

(Continued)

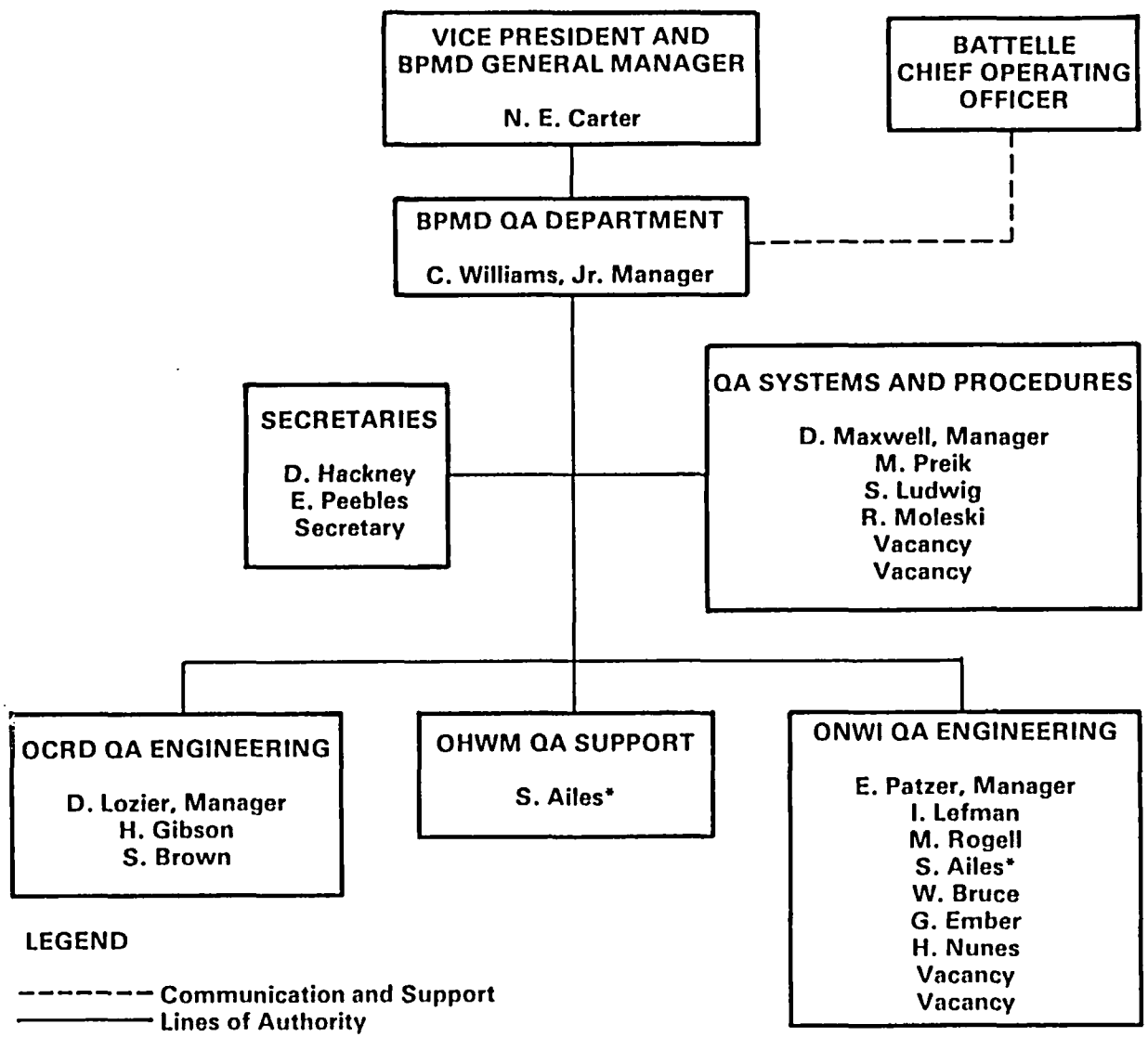
Contractor	Scope of Work
Ebasco Services	Licensing Project Manager—Responsible for Licensing Activity Support
Golder Associates	Design and Conduct In Situ Tests to Provide Site Characterization Data

METHODS USED TO CONTROL CONTRACTOR WORK ACTIVITIES

- STATEMENTS OF WORK PREPARED BY TECHNICAL STAFF, REVIEWED AND APPROVED BY QA
- SAFETY CLASSIFICATION DETERMINED BY TECHNICAL STAFF WITH QA CONCURRENCE (PMP-19)
- CONTRACTOR SELECTION, EVALUATION, AND CONTRACT AWARD MADE IN ACCORDANCE WITH BPMD'S APPROVED PROCUREMENT SYSTEM
- QA SPECIFICATION PREPARED JOINTLY BY TECHNICAL AND QA STAFFS USING GRADED APPROACH
- CONTRACTOR QA PLANS, ACTIVITY PLANS, TECHNICAL PROCEDURES AND TECHNICAL DELIVERABLES SUBMITTED TO BPMD FOR REVIEW AND APPROVAL
- CONTRACTOR QA ADMINISTRATIVE PROCEDURES SUBMITTED FOR INFORMATION
- MAJOR BPMD CONTRACTORS AUDITED ANNUALLY BY QA, SUPPLEMENTED BY TECHNICAL AND QUALITY ASSURANCE VISITS
- OTHER BPMD CONTRACTORS ARE AUDITED PERIODICALLY AS DETERMINED BY PERFORMANCE AND IMPORTANCE/COMPLEXITY OF WORK, SUPPLEMENTED BY TECHNICAL AND QUALITY ASSURANCE VISITS

V. BPMD'S QA PROGRAM FOR THE SALT PROJECT

BPMD QA ORGANIZATIONAL STRUCTURE AND STAFFING



*Dual Assignment

ONWI QUALITY ASSURANCE PROGRAM

- THE ONWI QUALITY ASSURANCE MANUAL COVERS THE 18 CRITERIA OF 10CFR50 APPENDIX B AND ANSI/ASME NQA-1-1983

- THE ONWI QUALITY ASSURANCE MANUAL, REV 6, HAS BEEN APPROVED BY DOE/SRPO

- THE ONWI QUALITY ASSURANCE MANUAL REQUIREMENTS ARE IMPLEMENTED BY:
  - PROJECT MANAGEMENT PROCEDURES
  - PROJECT TECHNICAL PROCEDURES
  - BPMD OPERATING GUIDE PROCEDURES
  - DIVISION DEPARTMENT PROCEDURES

ONWI QUALITY ASSURANCE MANUAL

ONWI QA Manual Section	Key Features
1. Organization	• Describes BPMD and ONWI Organizational Structure • Describes Organizational Responsibilities for the ONWI QA Program • Describes the QAD's Interfaces With BPMD and ONWI
2. Quality Assurance Program	• Describes the Development, Implementation, Maintenance and Evaluation of the ONWI QA Program • Describes BPMD's Approach for Graded Application of QA Requirements • Describes QA Indoctrination and Training Requirements • Makes Provisions for Annual QA Program Assessments • Establishes Authority for Stop Work Orders

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
3. Control of Design, Site Selection, and Site Characterization Activities	• Establishes Requirements for the Control of: — Design Activities — Activities Performed in Support of Site Selection and Site Characterization (e.g., Geotechnical Field and Laboratory Activities) • Describes Requirements for Interface Control • Describes Requirements for Verification and Validation, Including: — Management Review — Design Review — Peer Review — Technical Review • Establishes Change Control Requirements

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
4. Procurement Document Control	• Establishes Requirements for the Inclusion of Quality Assurance Requirements in Procurement Documents • Establishes Requirements for Quality Assurance Review and Approval of Procurement Documents
5. Instructions, Procedures, and Drawings	• Describes Requirements for the Development and Implementation of Instructions, Procedures, and Drawings for Quality-Related Activities • Establishes Requirement for the QAD to Monitor the Implementation of These Procedures
6. Document Control	• Establishes Requirements for Controlling Documents That Specify or Prescribe Requirements for ONWI Activities Affecting Quality • Describes Requirements for QAD Review and Approval of These Documents Including any Changes Thereto Prior to Issuance

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
7. Control of Purchased Services and Items	• Describes Measures for: — Procurement Planning — Evaluation and Selection of Procurement Sources — Evaluation of Contractor Performance — Verification of Purchased Services and Items — Control of Deficiencies • Establishes Requirements for QAD: — To Participate in Source Selection — To Monitor Contractor Performance and Acceptance — To Participate in the Review and Acceptance of Contractor Deliverables
8. Identification and Control of Items	• Establishes Requirements for Identifying and Controlling Items to Assure That Only Accepted Items Are Used in Performing ONWI Quality-Related Activities

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
9. Control of Processes	• Describes Requirements for Controlling Processes That Affect the Quality of ONWI Services and Items • Provides Requirements for QAD to Monitor Necessary Qualification of Personnel, Procedures, and/or Equipment
10. Inspection	• Establishes Requirements for the Inspection or Verification of ONWI Services and Items • Provides for QAD Participation in Inspection/ Verification Processes • Includes Provisions for Inspection Planning, Identifying Mandatory Hold Points, Inspection Personnel Qualifications, and Inspection Records
11. Test Control	• Describes Requirements for the Planning and Control of ONWI Test Activities • Includes Provisions for Developing and Documenting Test Requirements in Approved Test Plans, Procedures, or Specifications; Documenting and Verifying Test Results, and Test Records

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
12. Control of Measuring and Test Equipment	• Describes Requirements for the Calibration and Control of Measuring and Test Equipment Used for ONWI Quality-Related Activities
13. Handling, Storage, and Shipping	• Provides Requirements for Assuring Proper Physical Care of ONWI Items During Handling, Shipping, and Storage
14. Inspection, Test, and Operating Status	• Describes Requirements for Identifying the Inspection, Test, or Operating Status of ONWI Items
15. Nonconformances, Incidents, and Unusual Occurrences	• Establishes Requirements for the Identification, Control, Evaluation, and Disposition of Nonconformances, Incidents, and Unusual Occurrences

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
15. Nonconformances, Incidents, and Unusual Occurrences (Continued)	• Incident and Unusual Occurrence Reporting Are Required by DOE Orders 5484.1 and 5484.2 • Describes QAD Responsibilities for the Control of Nonconforming Items • Describes QAD Participation in the Evaluation of Incidents and Unusual Occurrences
16. Corrective Action	• Establishes Requirements for Identifying, Documenting, and Reporting Conditions Adverse to Quality; Determining and Implementing Corrective Action; and Verifying Satisfactory Resolution of These Problems • Describes QAD Responsibilities for Implementing a System to Identify and Obtain Resolution for Conditions Adverse to Quality

ONWI QUALITY ASSURANCE MANUAL
(Continued)

ONWI QA Manual Section	Key Features
17. Quality Assurance Records	• Describes Requirements for the Specification, Preparation, Storage, Maintenance, and Retrieval of QA Records • Includes Provisions for Safekeeping, Controlled Access, and Preservation of These Records
18. Audits	• Establishes Requirements for the QAD's Performance of Quality Audits of ONWI Activities Affecting Quality, Both Internally at BPMD and Externally at Contractor Facilities/Sites, to Evaluate the Effectiveness and Adequacy of Implementation of the ONWI QA Program. • Includes Provisions for the Qualification and Certification of Auditors; Preparation of Audit Schedules, Plans, and Checklists; and Documentation, Followup, and Close-out of Audit Results and Deficiencies

ISSUED QA ADMINISTRATIVE PROCEDURES BY 10CFR50 APPENDIX B CRITERIA

Criteria	Procedure Number
1	—
2	PMP-11, PMP-15, PMP-19, ENG-02, ENG-06, GEO-01, GEO-02, GEO-03, SCP-07, SCP-09
3	PMP-05, PMP-06, PMP-17, PMP-21, EAO-05, EAO-06, EAO-07, ENG-08, ENG-09, ENG-11, ENG-17, GEO-12, SCP-10, SCP-11, SCP-12, SYS-02, SYS-14
4	CP-02, FIN-02, PMS, C&P-1, C&P-2
5	PMP-01, OG-01, EAO-01, ENG-01, GEO-05, GEO-06, GEO-07, GEO-10, SCP-01, SCP-02
6	ADM-4, ADM-14, ADM-43, ADM-52, ADM-53, ADM-54, QAD-03, QAD-04, GEO-09, SCP-06
7	CP-2, PMP-16, QAD-06, EAO-03, SYS-13
8	CUR-02
9	SAO-02, SAO-03, SAO-04, ENG-02
10	GEO-08
11	ENG-19
12	—
13	CUR-01, CUR-03
14	—
15	PMP-08, PMP-10, QAD-09
16	PMP-09, PMP-13
17	PMP-02, PMP-04, C&P-1, QAD-10, ADM-6, ADM-8, ADM-9, ADM-10, ADM-11, ADM-12, ADM-13, ADM-20, ADM-44, EAO-02, EAO-04, ENG-04, ENG-05, ENG-07, ENG-10, ENG-18, GEO-04, SCP-08, SYS-12
18	QAD-01, QAD-02, QAD-12

PLANNED QA ADMINISTRATIVE PROCEDURES BY 10CFR50, APPENDIX B CRITERIA

Criteria	Procedure Number
1	—
2	—
3	PMP-12, PMP-20, PMP-24, PMP-25, PMP-26, PMP-28, PMP-29, PMP-31, PMP-33, PMP-38
4	PMP-22, C&P-03, C&P-04, C&P-05
5	PMP-30, PMP-35
6	PMP-27
7	IMS-01, C&P-06, C&P-07, C&P-08, C&P-09, C&P-10, C&P-11
8	—
9	—
10	—
11	—
12	PMP-36
13	PMP-37
14	—
15	—
16	—
17	—
18	—

FUTURE QA PROGRAM ACTIONS

- UPGRADING OF ONWI PROJECT QA PLAN AND QA ADMINISTRATIVE PROCEDURES TO FULLY MEET NRC REVIEW PLAN
- TRAINING FOR REVISED AND NEW PROCEDURES
- UPGRADING OF CONTRACTOR QA SPECIFICATIONS TO FULLY MEET NRC REVIEW PLAN
- IN-HOUSE SURVEILLANCE PROGRAM TO BE FORMALIZED AND STRENGTHENED.

VI. DISCUSS SEVERAL EXAMPLES OF QA ADMINISTRATIVE PROCEDURES

PMP-04—QUALITY RECORDS FOR EXTERNAL PROJECTS

Purpose: Provides Detailed Requirements for the Identification, Maintenance, and Turnover of Quality Records for External BPMD Projects

Key Provisions:

Inclusion of QA Records Requirements in BPMD Procurement/Agreement Documents

Review of External Project Records List (PRL)

Monitoring of Contractor's Records System

Submittal of Contractor Records Turnover Package (RTPs)

BPMD Review of RTPs for Acceptability

RTP Sent to Information Systems Services (ISS) for Entry Into ONWI Files

PMP-04 KEY PROVISIONS

Inclusion of QA Records Requirements in BPMD Procurement/Agreement Documents

- QA Records Requirements Are Included in the QA Specification for Each Project. The QA Specification Is Prepared by the Project Manager/QA Specialist and Then Approved by the QAD Manager.

- Submittal Requirements for the PRL, Interim and Final RTPs, and QA Program Documents (QA Manual, Plan, Procedures) Appear on the Deliverable Data and Reporting Requirements (DD&RR) Form in the BPMD Procurement/ Agreement Documents.

PMP-04 KEY PROVISIONS

Review of External Project Records List (PRL)

- PRL Is a Subject-Oriented Listing of Types of Project Records To Be Generated and Maintained Throughout Duration of the Project.
- A Master File Index Specifying the Location of the Records Is Maintained by the Contractor.
- Initial PRL and any Updates Are Submitted to BPMD for Review and Approval in Accordance With Procedure PMP-16.

PMP-04 KEY PROVISIONS

Monitoring of Contractor's Records System

- QA Specification Requires Contractor To Establish Controlled Filing System Ensuring That Records Are Legible, Identifiable, Retrievable, Authentic, and Preserved/Safeguarded To Preclude Damage, Loss or Deterioration.

- System is Formally Evaluated During BPMD QA Audits/ Surveillances

- System is Informally Evaluated During Visits From BPMD Technical and QA Personnel

PMP-04 KEY PROVISIONS

Submittal of Contractor Records Turnover Packages (RTPs)

- BPMD Project Manager Provides Contractor With "Declaration of Authenticity" Form To Be Completed and Guidelines for Packing, Handling and Shipping the RTP to BPMD.

- Contractor is Required to Submit an RTP at the Completion of a Project or at Specified Intervals (Not to Exceed 2 Years).

- The RTP is to Include the PRL, File Index, Completed "Declaration of Authenticity" Form, and the Project Records.

PMP-04 KEY PROVISIONS

BPMD Review for Acceptability

- Upon Receipt of the RTP, the Project Manager
  - — Reviews the RTP for Completeness, Order, Correctness, and Clarity
  - — Adds Any Internal Records Pertaining to the Project That Have Not Previously Been Sent to ONWI Files
  - — Requests QA to Review the RTP for Concurrence
- The QA Specialist
  - — Reviews a Sample of the RTP as Above
  - — Adds Any Internal QA Records Pertaining to the Project That Have Not Previously Been Sent to ONWI Files
  - — Documents Concurrence
- When an RTP is Deficient, Project Manager Transmits Letter Identifying Deficiency and Requiring Contractor to Take Corrective Action

PMP-04 KEY PROVISIONS

RTP Sent to Information Systems Services (ISS) for Entry Into ONWI Files

- After RTP Has Been Found To Be Acceptable, the QA Specialist Forwards it to ISS
- All of the Contained Records Can Be Retrieved by BPMD Personnel After the RTP Has Been Entered Into ONWI Files

PMP-05 DESIGN REVIEW

TYPE OF REVIEW

- Project Manager (Manager Approval)
  - — responsible to determine type of review
  - — PMP-16 review of contractor technical submittals
- Design Review Application
  - — conceptual
  - — preliminary (Title I)
  - — detail design (Title II)
  - — construction (Title III)

PURPOSE OF DESIGN REVIEWS

- Review and Verify
  - — criteria, specification, requirements, etc.
  - — design conformance to criteria
  - — interim stage

PMP-05 DESIGN REVIEW
(Continued)

REVIEW PROCESS

- Design Review Plan (Project Manager/ EFM Approval/QAD Concur)
  - — scope
  - — objectives
  - — documents
- Design Review Committee (EFM)
  - — adequate representation
  - — QA participation
  - — excluded members
- Meeting Notice (Chairman/EFM Approval)
  - — plan
  - — committee membership
  - — agenda
  - — technical checklist
  - — QA concurrence
- Meeting Preparation
  - — review design report
  - — prepare technical checklist

PMP-05 DESIGN REVIEW
(Continued)

REVIEW PROCESS (Continued)

- Review Meeting (Chairman)
  - — presentations
  - — deliberations
- Findings Report (Chairman/EFM Approval)
  - — minutes
  - — recommendations
  - — member reviews
- Completion Report (Chairman/DM, FM, QAD, Approval/Legal Review)
  - — resolutions
  - — documentation
  - — closing statement
  - — reviews and concurrence

PMP-05 DESIGN REVIEW
(Continued)

REVIEW PROCESS (Continued)

- Review Documentation
  - — review plan, meeting notice, findings, and completion reports
  - — file PM, QAD, ONWI, others
  - — process monitored by QAD

PMP-06 PEER REVIEW

PURPOSE

- Establishes Requirements for Performing Peer Review to Assure:
  - — completeness
  - — adequacy
  - — accuracy
  - — traceability of data and information

PMP-06 PEER REVIEW
(Continued)

DETERMINATION OF NEED

- Responsible Manager Determines When a Peer Review Is Required
- Occasions When Need for Peer Review May Be Determined
  - — planning of internal work or procurements
  - — receipt of contractor technical submittal
  - — completion of internally developed technical document

PMP-06 PEER REVIEW
(Continued)

PLANNING, SCHEDULING, AND SELECTION OF PERSONNEL

- Responsible Manager Prepares Peer Review Request Form That Identifies:
  - review chairman
  - document to be reviewed
  - type of review
  - objectives, requirements, and guidelines of review
  - schedule of review
  - qualified review personnel
  - specific sections of document to be reviewed by participants

PMP-06 PEER REVIEW
(Continued)

PERFORMANCE OF PEER REVIEW

- Reviewers Document Comments
  - — comment/resolution form
- Comments Are Resolved by Review Chairperson
  - — agreement on disposition of comments reached between reviewer and chairperson
    - accepted comments
    - modified comments
  - — comments that cannot be resolved are elevated to responsible manager for decision
  - — disposition of comments and rationale are documented
- Chairperson Assures That All Accepted Comments Are Incorporated Into Final Version of Document

PMP-06 PEER REVIEW
(Continued)

PERFORMANCE OF PEER REVIEW (Continued)

- Peer Review Report
  - — peer review request form
  - — completed comment/resolution forms
  - — completed checklist
  - — meeting minutes
  - — personnel qualifications
  - — other supporting material
  - — submitted to responsible manager for review and approval
- Participation in Review Process by QA Staff
  - — participates in reviews
  - — evaluates and approves peer review process for adequacy and compliance with ONWI QA program requirements

PMP-16 REVIEW OF CONTRACTOR TECHNICAL SUBMITTALS

Purpose: Establishes Methods for Reviewing Contractor Technical Submittals

Key Provisions:

- Receipt of Contractor Technical Submittals
  - — Performance of Management Review Upon Receipt of Technical Submittal
    - Project Manager to Review for Completeness, Correctness, Availability/Appropriateness of References, and Conformance With Contractual Requirements
    - Project Manager to Document Determination of Acceptability on Review Form
    - Project Manager to Determine Need for Additional Review (Peer, Design, Independent Technical), List Proposed Reviewers, and Obtain Approval of Responsible Manager for Type of Review Selected
    - Contractor Submittal and Review Form Forwarded to QAD for Review and Concurrence
  - — Types of Additional Review
    - PMP-05 to Perform Design Review
    - PMP-06 to Perform Peer Review
    - PMP-16 to Perform Independent Technical Review

PMP-16 REVIEW OF CONTRACTOR TECHNICAL SUBMITTALS
(Continued)

Key Provisions: (Continued)

- Independent Technical Review
  - — Project Manager Responsible for Planning, Scheduling, and Selecting Qualified Personnel to Perform Technical Review
    - Initiate Review Process by Preparing Review Package—Contractor Technical Submittal, Review/Comment Forms, and Review Instructions
    - Review Package Transmitted to Designated Review Personnel
  - — Review Performance and Documentation of Results
    - Designated Reviewers to Perform Technical Review in Accordance With Review Instructions and PMP-16 Requirements
    - Review Comments and Rationale Documented on Review/ Comment Form
    - Review Results Returned to Project Manager
  - — Evaluation and Resolution of Technical Review Comments
    - Project Manager to Evaluate Review Comments and Provide Disposition
    - Comments Designated as Mandatory Required to Be Incorporated or Resolved Between Project Manager and Reviewer, and Reviewer's Concurrence for Comment Resolution Documented
    - When Mandatory Review Comments Cannot Be Resolved, the Unresolved Comment to Be Transmitted to the ONWI Program Manager for Resolution
  - — Upon Resolution of All Comments, Project Manager to Complete and Submit Completed Review Forms to the Responsible Manager for Review and Concurrence

PMP-16 REVIEW OF CONTRACTOR TECHNICAL SUBMITTALS
(Continued)

Key Provisions: (Continued)

- Monitoring the Review Process
  - — QA Specialist to Review Completed Review Package to Assure Disposition and Resolution of All Comments, and Document Concurrence
- Technical Review Results
  - — Project Manager to Notify Contractor of Actions to Be Taken for Revision and Resubmittal of the Document Resulting From the Technical Review
  - — Upon Resubmittal of the Revised Document, Project Manager to Perform Review to Assure Incorporation/Compliance With Review Comments and to Document This Determination (e.g., Requires Additional Review/Return to Contractor, Final Acceptance)
  - — Project Manager to Transmit Completed Review Package and Review Forms to CDMS (Contractor Data Management System) to Input Into the ONWI Records File

VII. REVIEW EXAMPLES OF TECHNICAL PROCEDURE PREPARATION AND IMPLEMENTATION CONTROLS

GEOLOGIC PROJECT MANAGER – PERMIAN BASIN PROJECT

OFFICE OF NUCLEAR WASTE ISOLATION

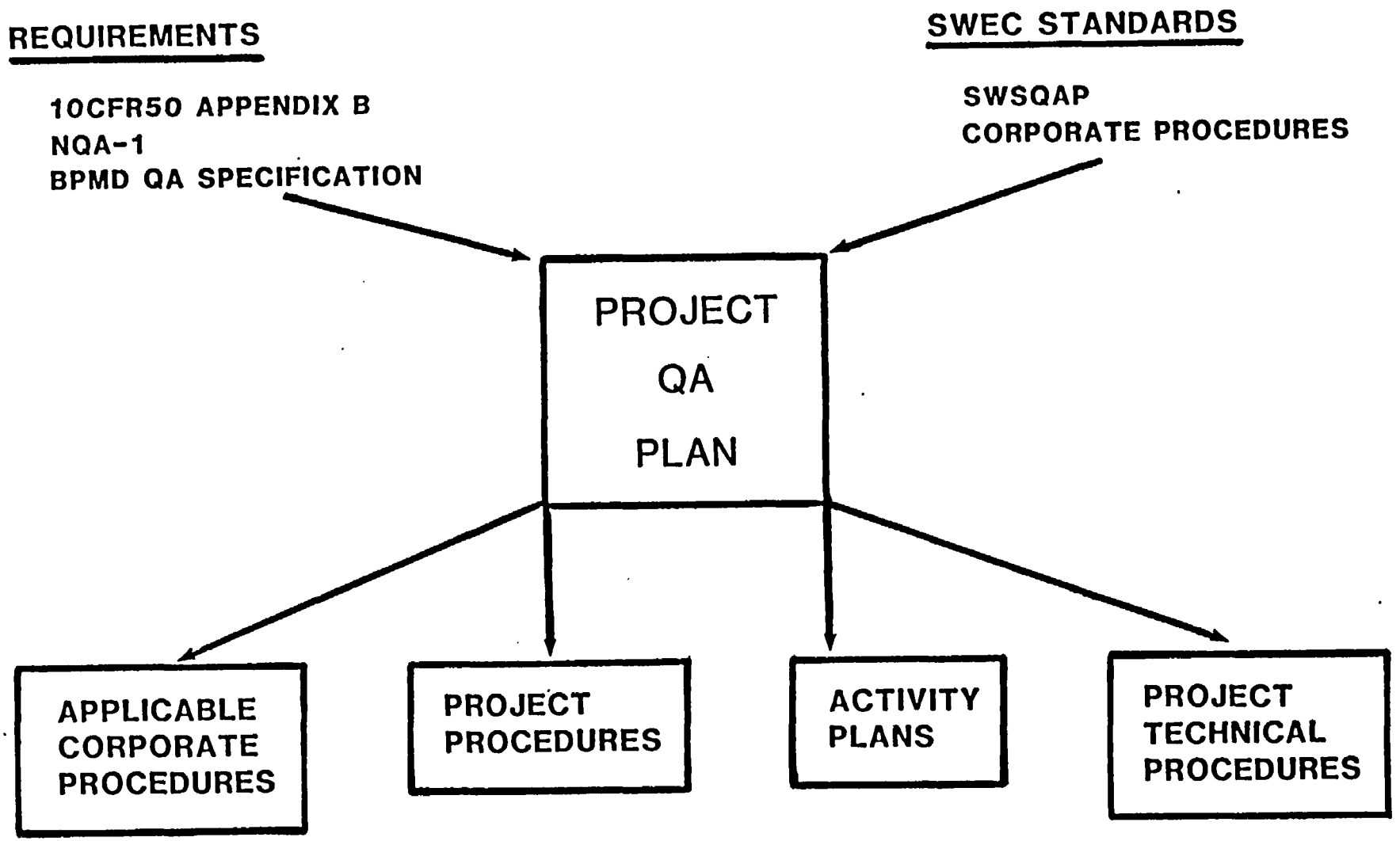
BATTELLE MEMORIAL INSTITUTE, PROJECT MANAGEMENT DIVISION

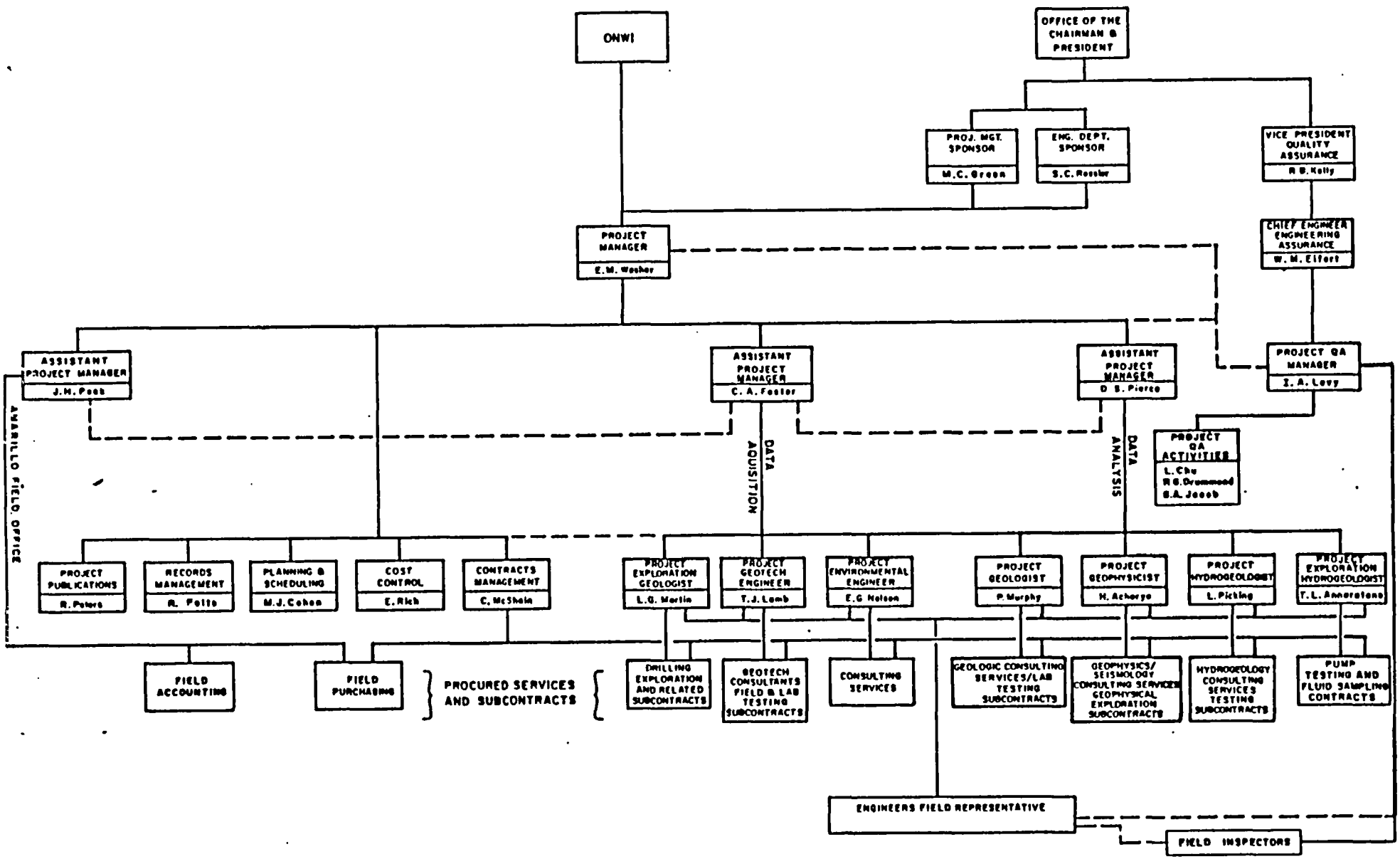
STONE & WEBSTER ENGINEERING CORPORATION

PRESENTATION

• PROJECT QUALITY ASSURANCE PROGRAM OVERVIEW	I.A. LEVY – PROJECT QUALITY ASSURANCE MANAGER
• CORING SERVICES AND CORE LOGGING AT THE J. FRIEMEL NO. 1 WELL	C.A. FOSTER – ASST. PROJECT MANAGER
• PUMP TESTING AND FLUID SAMPLING AT THE J. FRIEMEL NO. 1 WELL	C.A. FOSTER – ASST. PROJECT MANAGER

QA PROGRAM


REQUIREMENTS
10CFR50 APPENDIX B
NQA-1
BPMD QA SPECIFICATION
SWEC STANDARDS
SWSQAP
CORPORATE PROCEDURES
PROJECT QA PLAN
APPLICABLE CORPORATE PROCEDURES
PROJECT PROCEDURES
ACTIVITY PLANS
PROJECT TECHNICAL PROCEDURES

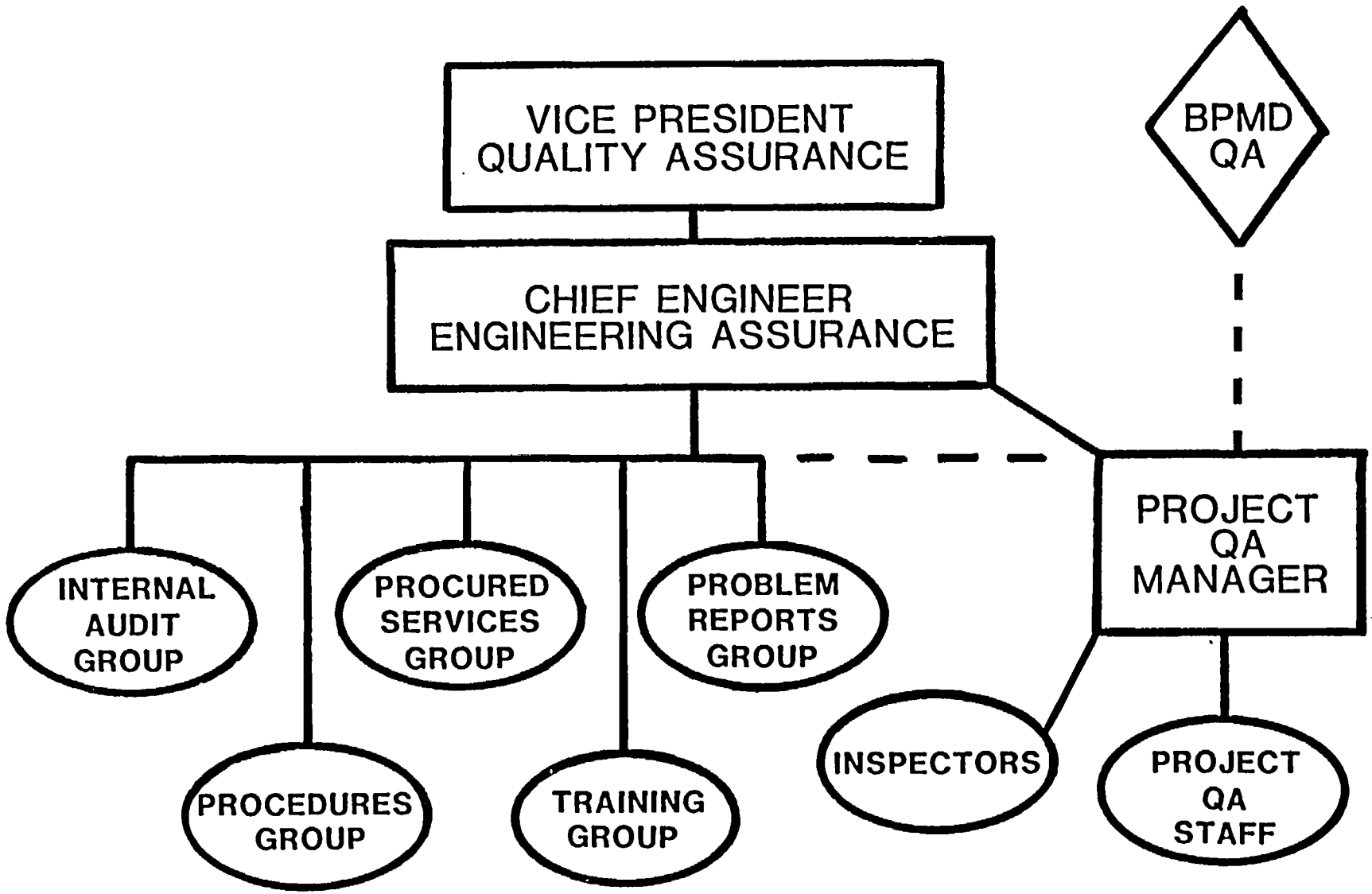


PROGRAM DIRECTION

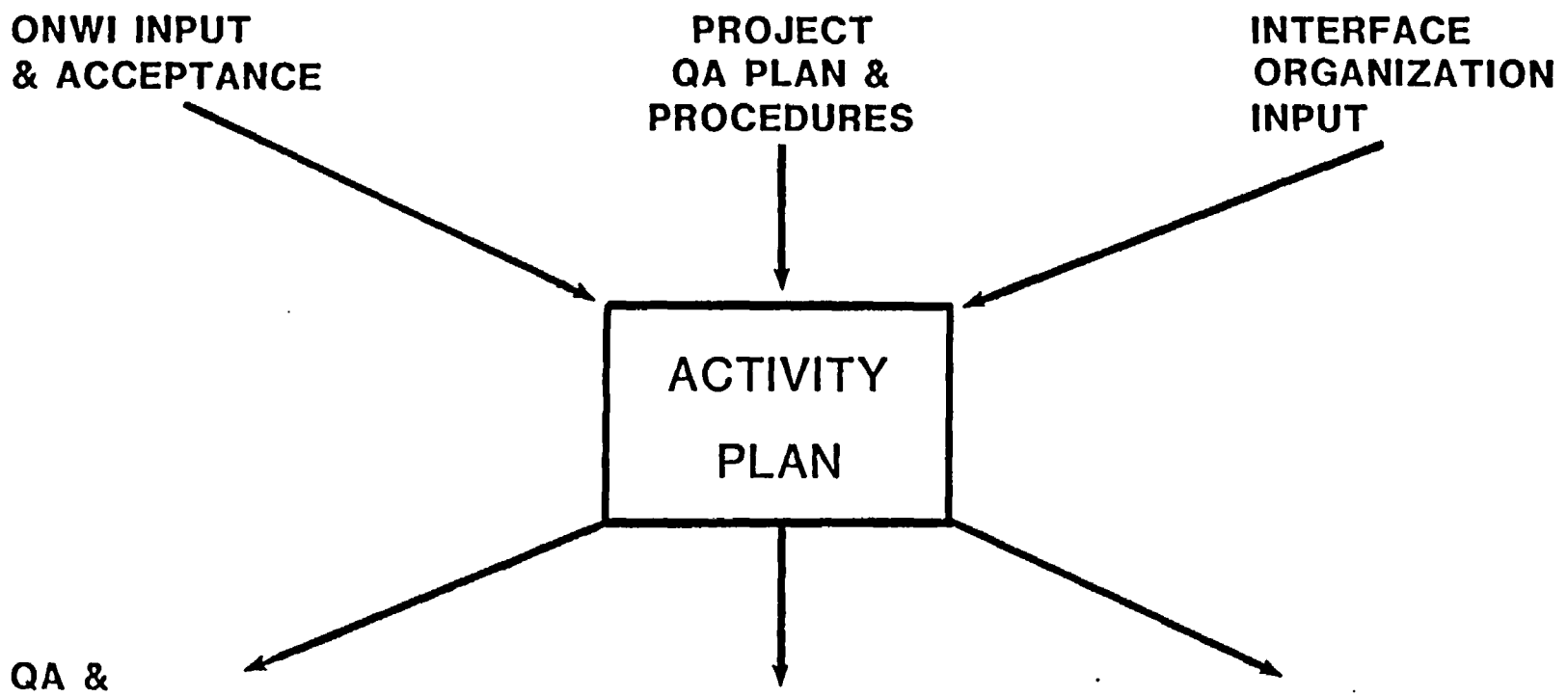
PROGRAM COORDINATION

STONE & WEBSTER ENGINEERING CORPORATION
PROJECT ORGANIZATION
PERMIAN BASIN GPM
JUNE 1984

QA ORGANIZATION



ACTIVITY CONTROL DOCUMENTS



ENGINEERING ASSURANCE (EAP)

ENGINEERING DEPARTMENT (EDPP)

PROJECT (PP)

GEOTECHNICAL DIVISION (GTP)

ENVIRONMENTAL DIVISION (ETP)

PROJECT (PTP)

ENGINEERING SERVICE SCOPE OF WORK (ESSOW)

PURCHASE REQUISITION (PR)

IMPLEMENTING DOCUMENTS[1]

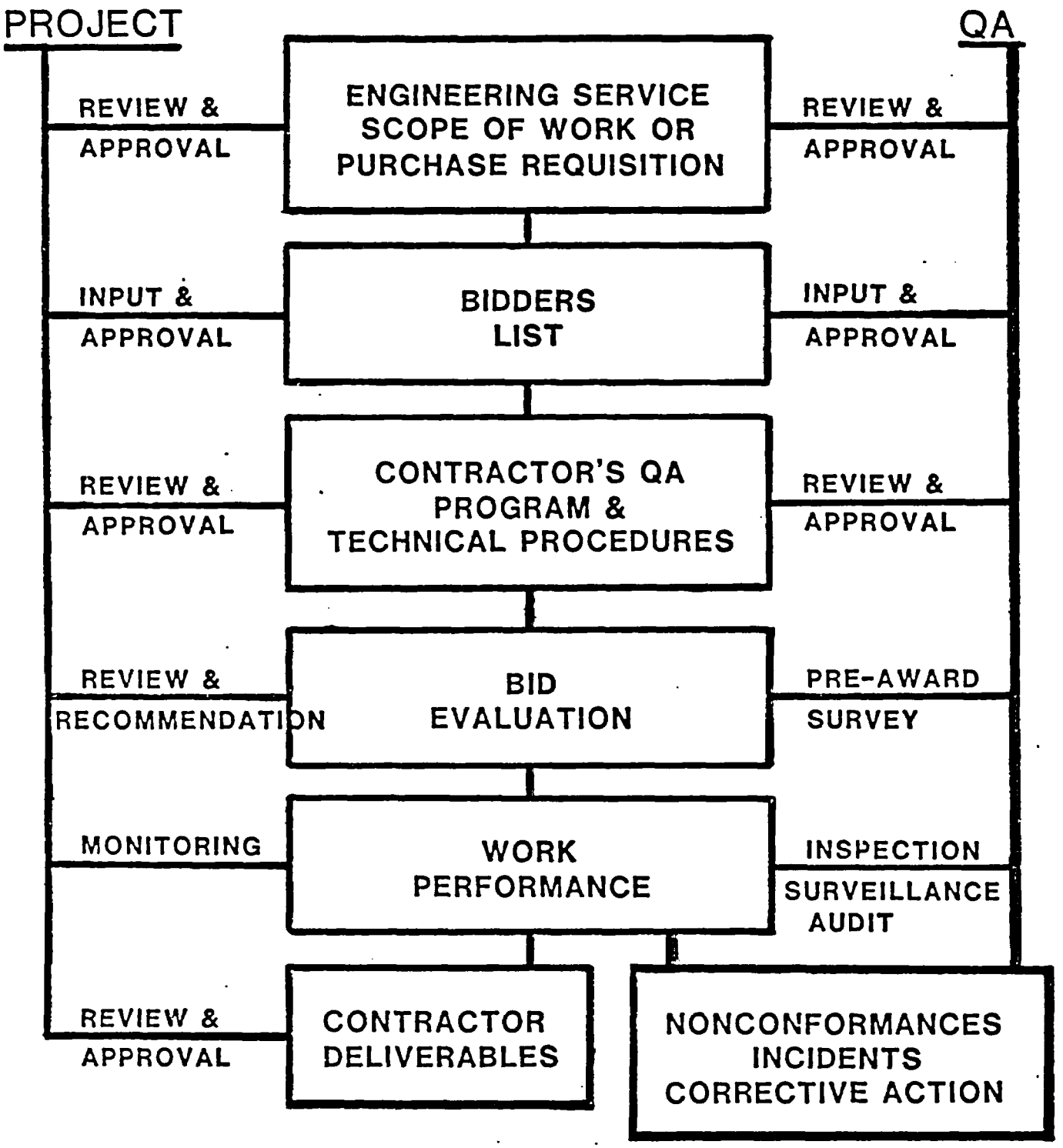
DOCUMENT	REVIEW AND APPROVAL			
	TECHNICAL	QA	INDEPENDENT TECHNICAL	PROJECT MANAGEMENT
QA PLAN [3]		X		X
PROJECT PROCEDURE (PP)		X [2]		X
ACTIVITY PLAN (AP)	X	X	X	X
PROJECT TECHNICAL PROCEDURE (PTP)	X	X	X	X
ENGINEERING SERVICE SCOPE OF WORK (ESSOW)	X	X	X	X
PURCHASE REQUISITION (PR)	X	X	X	X

(1) INVOKES APPLICABLE SWEC STANDARD PROCEDURES AND REQUIREMENTS.

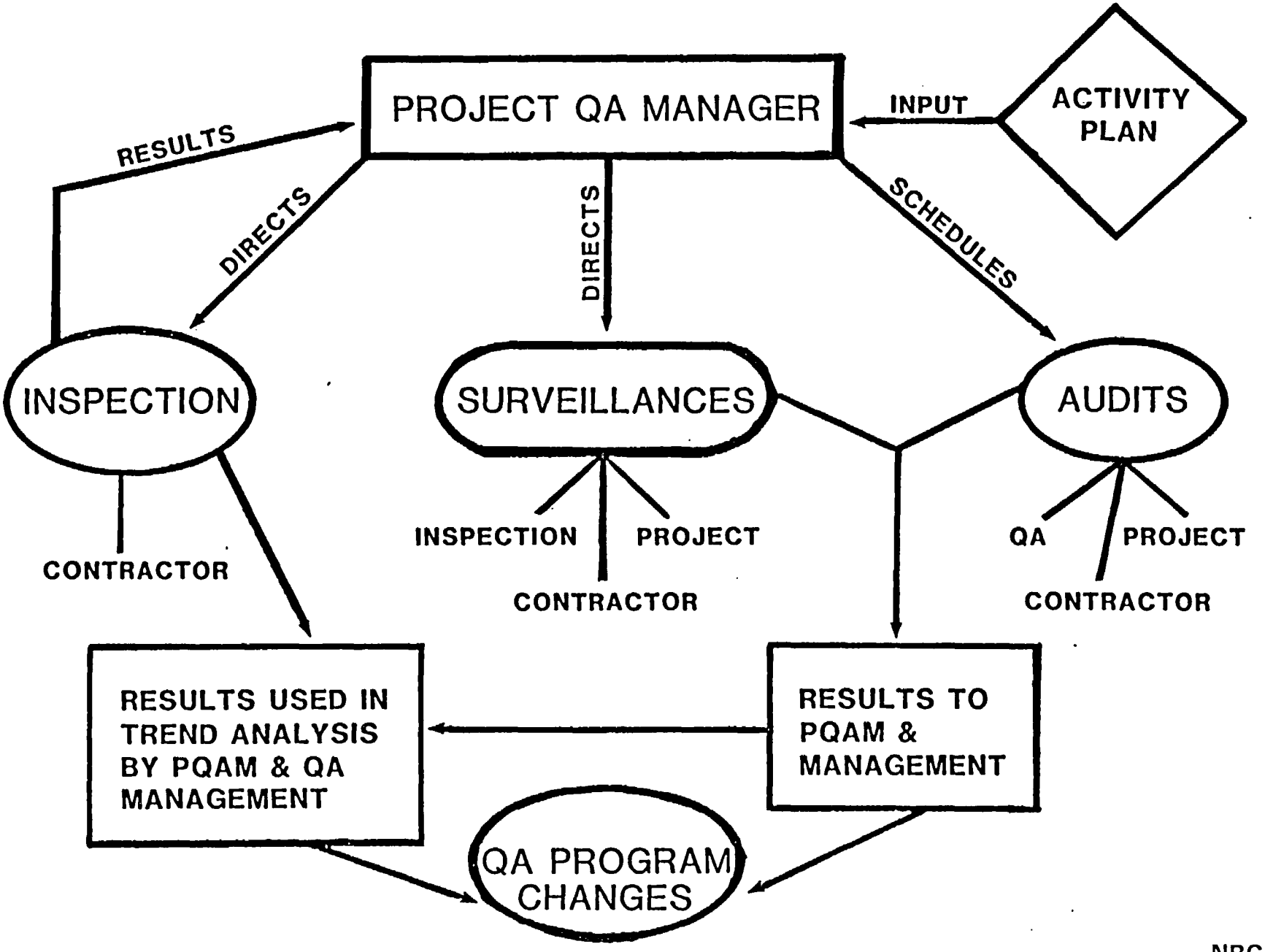
(2) FOR THOSE PROCEDURES AFFECTING QUALITY.

(3) ALSO REVIEWED/APPROVED BY EA CHIEF ENGINEER AND QA VICE PRESIDENT.

PROCUREMENT CONTROL



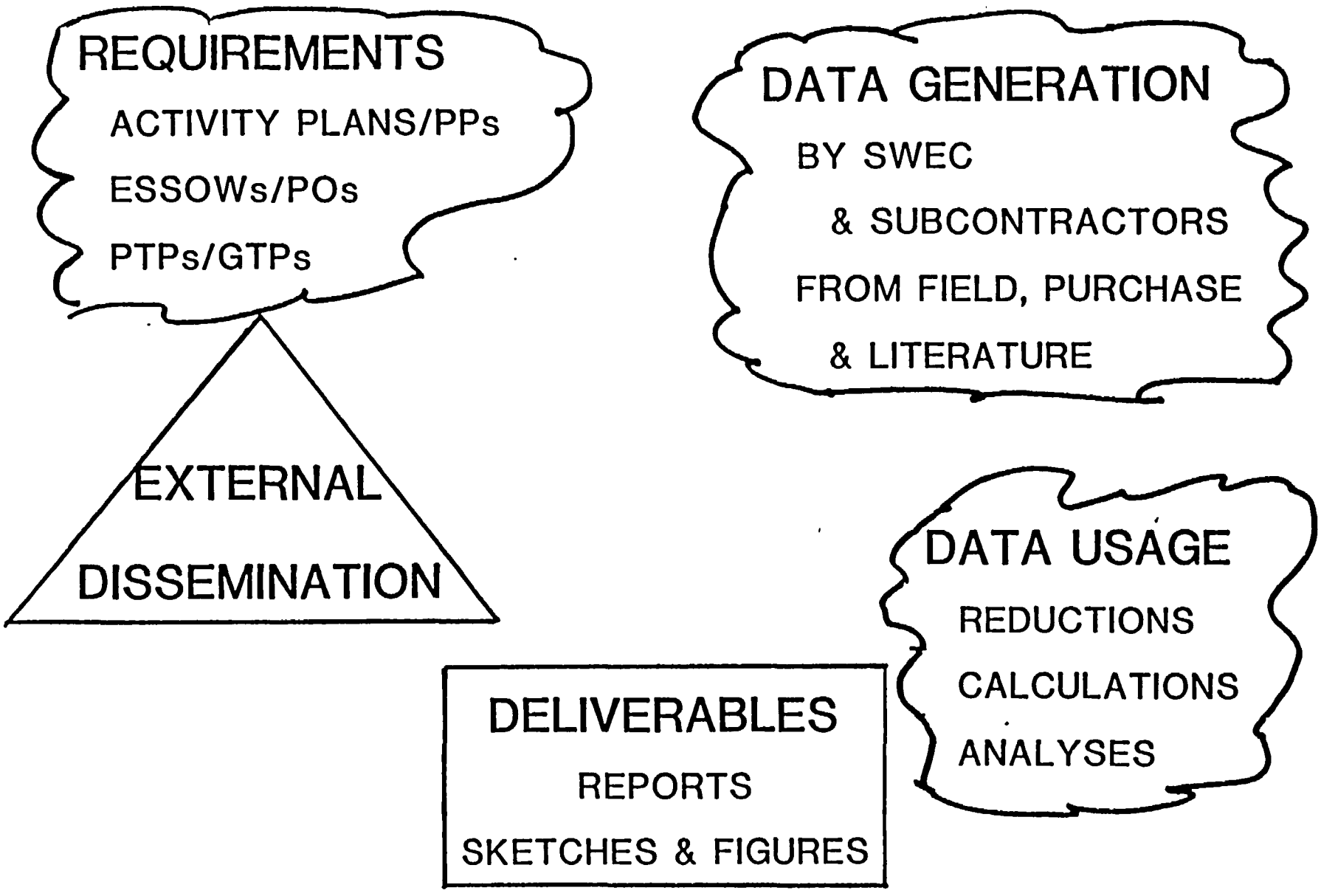
QA MONITORING



INSPECTION FUNCTIONS

INSPECTOR	PROJECT QA MANAGER
PERFORM INSPECTIONS DESIGNATED IN ESSOWs & POs	DIRECTS INSPECTION FUNCTION
DOCUMENTS INSPECTION o TEST, INSPECTION AND DOCUMENTATION REPORT (TID) o MATERIAL AND EQUIPMENT RECEIVING REPORT (MRR)	REVIEWS AND CLOSES TIDs MONITORS MRRs
INITIATES NONCONFORMANCE AND DISPOSITION REPORTS (N&D)	APPROVES INITIATION
REINSPECTS TO VERIFY N&D CORRECTIVE ACTION	CLOSES N&Ds
INITIATES INCIDENT REPORTS	ISSUES INCIDENT REPORTS
REPORTS OCCURRENCES TO PQAM THAT MAY RESULT IN A N&D, INCIDENT REPORT AND/OR STOP WORK ORDER.	EVALUATES OCCURRENCES AND DIRECTS INSPECTOR TO ISSUE N&D, INCIDENT REPORT OR STOP WORK.
PARTICIPATES IN EVALUATION MEETINGS	PARTICIPATES IN EVALUATION MEETINGS
QUALIFIED TO ANSI N45.2.6 FROM GEOTECHNICAL DIVISION	

DELIVERABLE DOCUMENT RELATIONSHIPS



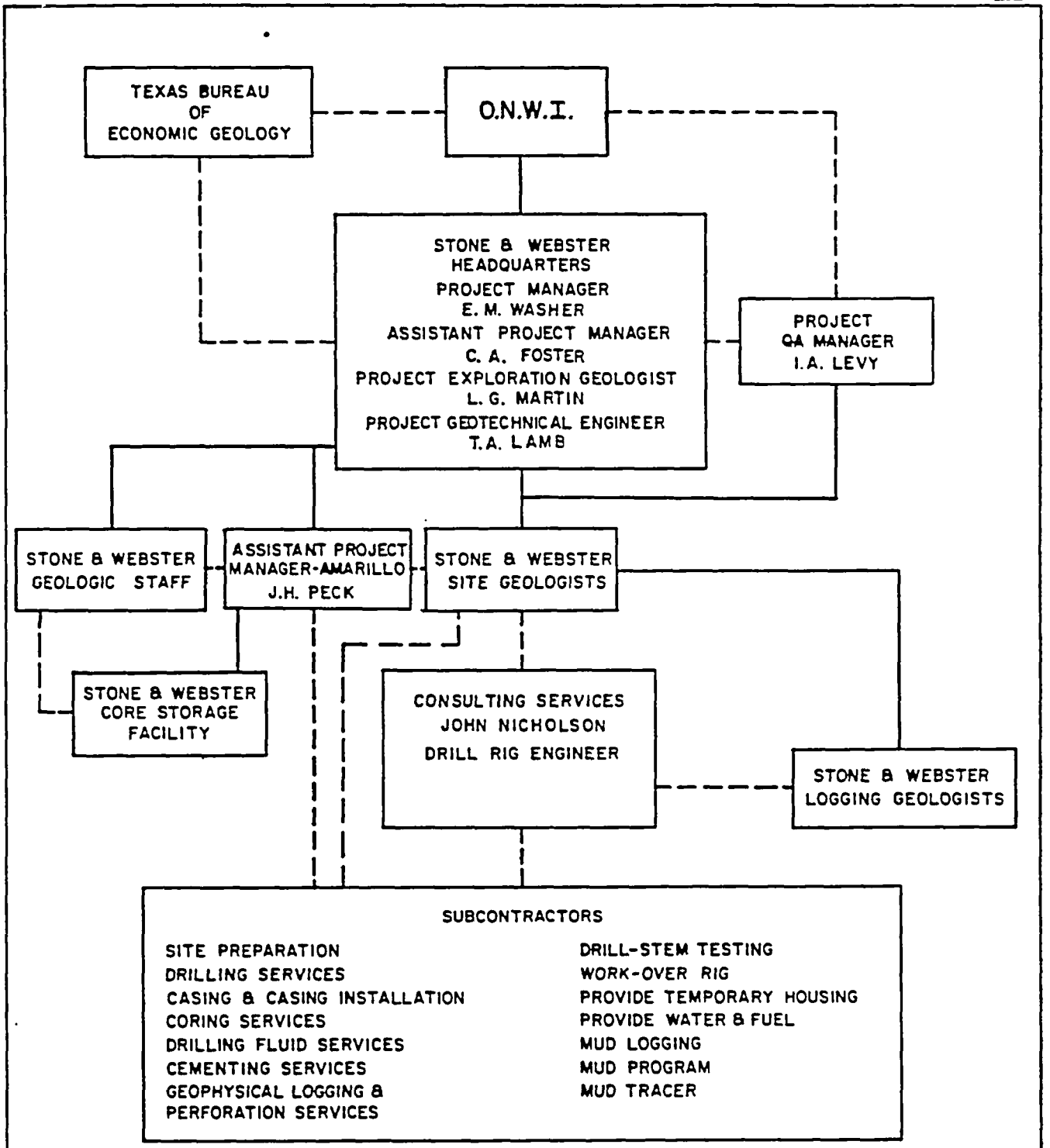
ONWI – PERMIAN BASIN PROJECT
GEOLOGIC PROJECT MANAGER

FIELD TESTING PROGRAM – DATA ACQUISITION

TYPICAL EXAMPLES:

J. FRIEMEL NO. 1 WELL

- **CORING SERVICES AND CORE LOGGING**
- **PUMP TESTING AND FLUID SAMPLING**



LEGEND

——— DIRECT AUTHORITY

- - - - - - CONSULTATION/COORDINATION

NOTE:

FOR MORE DETAIL ON HEADQUARTERS ORGANIZATION SEE PROJECT QUALITY ASSURANCE PLAN APPENDIX A

FIELD ORGANIZATION CHART

STONE & WEBSTER ENGINEERING CORPORATION

PROJECT CONTROL DOCUMENTS

CORING SERVICES & CORE LOGGING

AP-9- HYDROLOGIC TEST WELL - J. FRIEMEL NO. 1

- WELL LOCATION, DEPTH & DESIGN
- SEQUENCE OF CORING ACTIVITIES
- INTERVALS TO BE CORED & CORE SIZE

(CORING SERVICES)

SWEC SUBCONTRACTOR
ESSOW - G103C - ROCK CORING EQUIP. & SERVICES

- TECHNICAL & QA SECTION OF CONTRACT
- DETAILED REQUIREMENTS FOR EQUIP. & SERVICES
- PROCEDURES
- DOCUMENTATION
- INSPECTION

(CORE LOGGING)

SWEC GEOLOGISTS
PTP - 8 - FIELD LOGGING, PACKAGE, TRANSPORT OF CORE
PTP - 11 - TRANSPORT, LOGGING PHOTO, STORAGE OF CORE - AFO

- LOGGING PERSONNEL
- EQUIPMENT
- PROCEDURES & FORMS
- DOCUMENTATION
- DATA DISTRIBUTION
- INSPECTION

AP - 9 HYDROLOGIC TEST WELL - J. FRIEMEL NO. 1

TABLE OF CONTENTS 1.7

AP - 9 HYDROLOGIC TEST WELL J. FRIEMEL NO. 1

ATTACHMENT 4-0 1.19
HYDROLOGIC TEST WELL 1.20

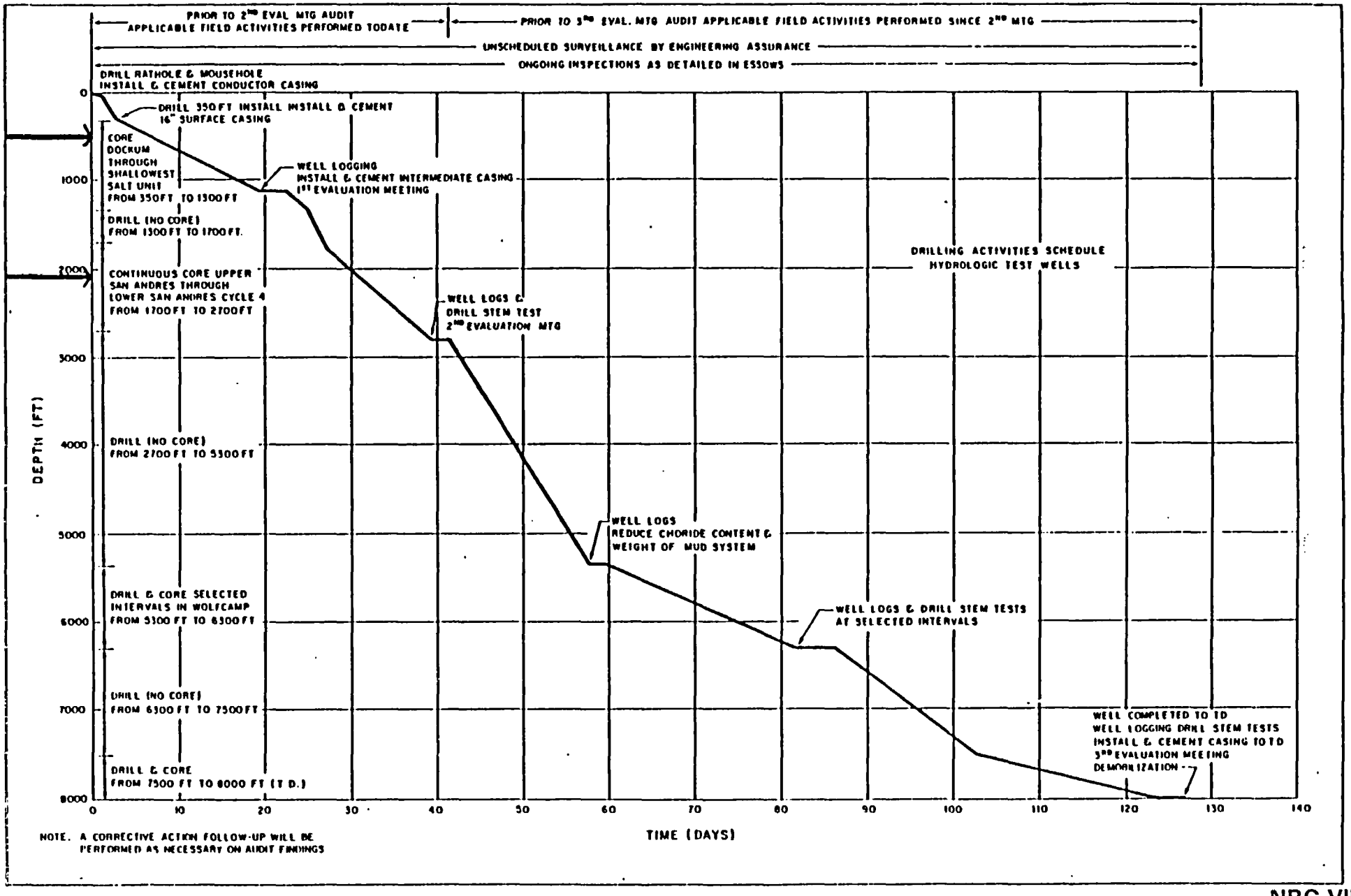
SWEC SUBCONTRACTORS 1.22

Name	General Description	Contract ESSOW or P.O. No.	1.25 1.26 1.27
Baker & Taylor	Drill Rig & Crew	G103A	1.29
Schlumberger	Geophysical Logging & Perforating Services	G103B	1.31 1.32
Hycalog	Rock Coring Equipment & Coring Engineer	G103C	1.34 1.35
Dresser-Magcobar	Mud Program - Drilling Fluids & Mud Engineer	G103D	1.37 1.38
Field Call-out	Cementing Supplies & Services	*	1.40 1.41
Field Call-out	Casing and Tubing		1.43
Johnston - Macco	Drill Stem Testing	G103G	1.45
FMC	Well Head Assembly	G103H	1.47
Field Call-out	Casing Installation Crew	*	1.49
Field Call-out	Fuel-Drill Rig, Other Onsite Equipment	*	1.51 1.52
Field Call-out	Water for Drilling	*	1.54
Exploration Logging	Mud Logging Services	G103Q	1.56
John Nicholson Amarillo, Texas	Drilling Consultant Petroleum Geologist	G112A	2.1 2.2
P. Cameron, Jr, Inc.	Consultant-Petroleum Engineer. Drill Rig Engineers	G112F	2.6 2.7 2.8
Glen Thompson Tucson, Arizona	Mud Tracer Consultant	G112D	2.11 2.12

*Field Purchase Orders

AP - 9 HYDROLOGIC TEST WELL - J. FRIEMEL NO. 1

AP - 9 - HYDROLOGIC TEST WELL - J. FRIEMEL NO. 1
ACTIVITIES SCHEDULE



NOTE. A CORRECTIVE ACTION FOLLOW-UP WILL BE PERFORMED AS NECESSARY ON AUDIT FINDINGS

ESSOW G103C - ROCK CORING EQUIPMENT & SERVICES

TABLE OF CONTENTS

1.6

1.9

1.11

1.13
1.14
1.15
1.16
1.17
1.18
1.19
1.20
1.21
1.22

1.24
1.25
1.26
1.27
1.28
1.29
1.30

STONE & WEBSTER ENGINEERING CORPORATION

SHOP / FIELD **T.I.D. REPORT FOR** Rock Coring Equipment and Services

▲ 5040.488 (QCD-101) ☐ REPORT NO._____ ☐ FINAL REPORT SHEET_____ OF_____

CLIENT: Battelle Memorial Institute	J.O. NO.: 13697	MARK NO.:
PROJECT: National Waste Storage Program	ORDER NO: G103C	ITEM NO.:
SELLER OR CONTRACTOR	SHOP ORDER NO	
SUBSUPPLIER OR SUBCONTRACTOR	SHOP NO.	
DESCRIPTION	SELLER OR CONTRACTOR'S IDENTIFICATION	
REFERENCE DRAWING(S)		
S & W SPECIFICATION NAME: ESSOW G103C - Rock Coring Equip. & Services	SPECIFICATION DATE	ADDENDA THRU NO

	TEST, INSPECTION, AND DOCUMENTATION RECORD	*	VERIFIED**	WITNESSED**	PERFORMED**	CERTIFIED*** BY (Signature)	CERTIFIED*** DATE	DEVIATION AUTHORIZATION TYPE	DEVIATION AUTHORIZATION NUMBER OR NAME	DEVIATION AUTHORIZATION DATE
1	Equipment & Materials (at start)	1								
2	Equipment (Primary)	1	x							
3	Equipment (Backup)	1	x							
4	Materials	1	x							
5	Daily Progress Report (Format)	1	x							
6	Equipment & Materials (ongoing)	1								
7	Equipment	1		x						
8	Materials	1		x						
9	Procedures	1		x						
10	Documentation									
11	Daily Progress Reports	2	x							
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

*FOR INSTRUCTIONS, SEE THIS NUMBER IN THE INSPECTION SUBSECTION.
**BY S & W INSPECTOR IF FILLED IN "x" (Purchaser's Field Representative)
VERIFIED — PERSONAL OBSERVATION OF DATA APPLICABLE TO THE WORK.
WITNESSED — PERSONAL OBSERVATION WHILE THE MANUFACTURER PERFORMS THE TASK.
PERFORMED — PERSONAL PERFORMANCE OF THE TASK
***AS IN CONFORMANCE WITH THE SPECIFICATION OR WITH THE DEVIATION AUTHORIZATION INDICATED.

REMARKS

OFFICE | REPORTED BY | DATE

PTP 13697-11-2
May 2, 1983

CONTENTS

1.7

The Logging Geologist is responsible for distributing data as indicated below:

Item	SWEC Project Exploration Geologist	TBEG Project Manager	ONWI Project Manager	SWEC Field Office Manager
Rock Core		X (Permanent)		X (Temporary)
Rock Core Logs				
Original	X			
Copies	X	X	X	X
Photographs				
Negatives	X			
Prints	X (2 sets)	X	X	X
Slides	X		X	

In addition, complete sets of prints will be sent to the following persons:

M.E. Steiner
Parsons Brinkerhoff/PB-KBB
11767 Katy Freeway
Houston, TX 77079

G.P. Callahan
RE/Spec, Inc.
P.O. Box 725
Rapid City, S.D. 57709

The remaining three sets will be kept at the Amarillo Field Office

ONWI - BATTELLE MEMORIAL INSTITUTE - PERMIAN BASIN PROJECT

WELL NAME AND No. _____ J.O. No. 13697 SHEET 1 OF ____

LOCATION _____

ELEVATION: KELLY BUSHING _____ FT. PLATFORM ELEVATION _____ FT.
GROUND SURFACE _____ FT.

LOGGED BY _____

DATE: START/FINISH ____/____ CONTRACTOR/TOOL PUSHER ____/____

DRILL RIG TYPE _____

DRILLING METHOD _____

MUD PROGRAM _____

DEPTH TO BEDROCK _____ FT. TOTAL DEPTH DRILLED _____ FT.

HOLE SIZE _____

CORE SIZE _____

CASING RECORD _____

SPECIAL TESTING OR INSTRUMENTATION _____

REMARKS _____

ELEVATION (FEET)	DEPTH (FEET)	SAMPLE RUN NO	SAMPLE BOX NO	RECOVERY (FT) ROD %	GRAPHIC LOG	SAMPLE DESCRIPTION

NOTE: SEE SWEC "SOIL & ROCK IDENTIFICATION MANUAL"

STONE & WEBSTER ENG. CORP.	APPROVED	DATE	SHEET OF

CORE STORAGE LOG - AMARILLO FIELD OFFICE

STONE & WEBSTER ENGINEERING CORPORATION

ATTACHMENT - 3
PTP 13697-11-2

WELL NAME & NO.

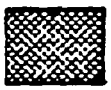
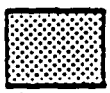
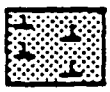
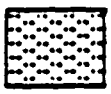
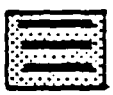
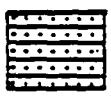
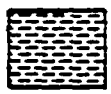
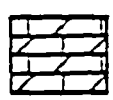
J.O NO. 13697

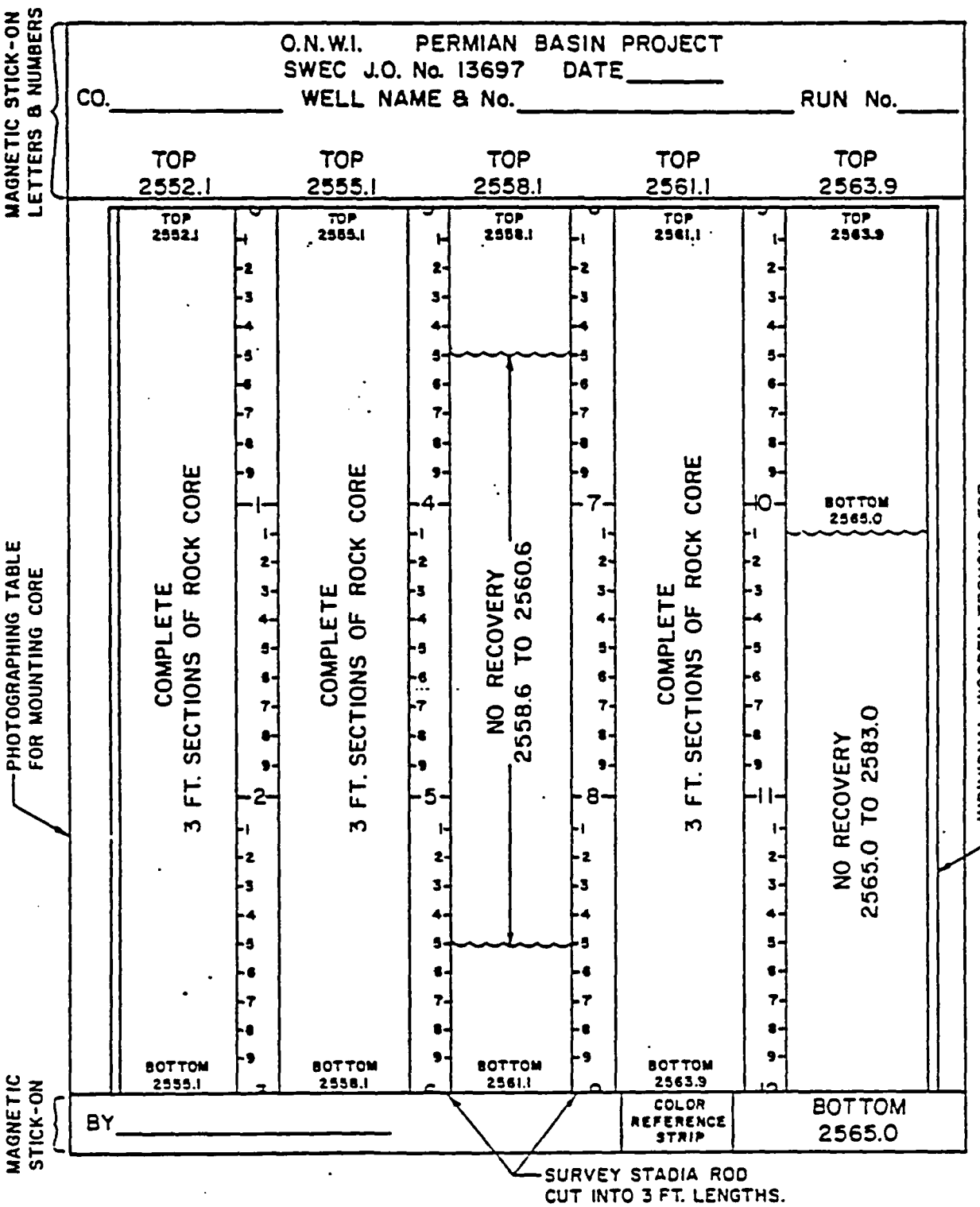
SHEET ____ OF ____

BOX NO.	DEPTH (FT)		ELEVATION		DATE REC.	LOGGED		TEMPORARY STORAGE LOCATION	CORE REMOVED			CORE RETURNED	
	TOP	BOT.	TOP	BOT.		DATE	BY		DATE	BY	INTERVAL	DATE	BY

NRC-VII-8
Page 13

GRAPHIC SYMBOL SHEET STONE & WEBSTER ENGINEERING CORP.

ROCK TYPE	GRAPHIC SYMBOL	LETRATONE No. (OR EQUIVALENT)	REMARKS
CONGLOMERATE		LT 182	
SANDSTONE			
MASSIVE-COARSE GRAINED		LT 11	
MASSIVE-FINE GRAINED		LT 8	
CALCAREOUS		LT 8	ADD LINES BY HAND (SIMILARLY FOR DOLOMITIC S.S.)
BEDDED		LT 145	
CROSS BEDDED		LT 89	
W/SHALE PARTINGS		LT 8	ADD LINES BY HAND
SANDSTONE & SHALE (EQUAL)		LT 164	
SILTSTONE		LT 120	ADD DOTS BY HAND
MUDSTONE OR CLAYSTONE		LT 121	
SHALE		LT 169	
OIL SHALE		LT 169	ADD DARK LINES BY HAND
CALCAREOUS SHALE		LT 169	ADD LINES BY HAND
LIMESTONE		LT 123	
DOLOMITIC		LT 242	



NOTE:
TOP & BOTTOM DEPTHS PAINTED ON 3FT. SECTIONS OF ROCK CORE

SKETCH FOR SET-UP FOR PHOTOGRAPHING CORE
STONE & WEBSTER ENGINEERING CORP.

ONWI - BATTELLE MEMORIAL INSTITUTE - PERMIAN BASIN PROJECT

WELL NAME AND No. J. Friemel No.1 J.O. No. 13697 SHEET 1 OF 49

LOCATION Deaf Smith County, J. Friemel Lease, Block K-7, Section 3, 2778' from S.L., 221' from E.L.

ELEVATION: KELLY BUSHING 4024.9 FT. PLATFORM ELEVATION 4024.2 FT.
GROUND SURFACE 4015.9 FT.

LOGGED BY A.O. Siniscalo, D.A. Grover, H.W. Maxwell, S.D. Boyd

DATE: START/FINISH 10-15-82 / 3-18-83 CONTRACTOR/TOOL PUSHER Baker & Taylor / Eisenman

DRILL RIG TYPE Baker and Taylor - Rig #18

DRILLING METHOD Conventional rotary drilling
Diamond and stratopax coring

MUD PROGRAM Fresh base to 1210 ft, salt base from 1210 ft to 4695 ft, fresh base from 4695 ft to TD (8283 ft).

DEPTH TO BEDROCK Unknown FT. TOTAL DEPTH DRILLED 8283 FT.

HOLE SIZE 30" to 59'; 20" to 1210'; 14 3/4" to 4698'; 8 3/4" to 8283'.

CORE SIZE 4" dia. cored intervals: 352' to 1216'; 1239' to 1464'; 1846' to 2830'; 5519' to 6032'; 6421' to 6536.5'; 7698' to 7780'; 8047' to 8283'.

CASING RECORD
22"(2DSALO) to 57 ft; 16"(H-40 65#/ft) to 1210 ft; 10 3/4"(40.5#/ft, J-55) to 4698 ft; 5 1/2"(17 & 15.5#/ft, K-55) to 8282 ft.

SPECIAL TESTING OR INSTRUMENTATION DSTs : successful - 1279' to 1464', 2753'-2830', 5630'-5909'; unsuccessful - 787' to 850', 958' to 1216', 7692' to 7781' Geophysical Logs: complete suites - 60'-1216', 1000'-4649', 4695'-8282'; partial suites - 1201'-1450', 1201'-2825', 4698'-5908', 5700'-6535', 6300'-7780'.

REMARKS Box numbers refer to shipment from SWEC, Amarillo, Texas to TBEC, Austin, Texas, where core was reboxed. All depths measured from Kelly Bushing. Depths not normalized to geophysical logs.
Note: All box numbers from J. Friemal core have the identifying letter prefix "JF".

ELEVATION (FEET)	DEPTH (FEET)	SAMPLE RUN NO.	SAMPLE BOX NO.	RECOVERY (FT) ROD %	GRAPHIC LOG	SAMPLE DESCRIPTION
						Conventional drilling to 352.0'.
3675	350					
3670		1	1	1.4 2'		352.0-353.4 Lt Brown SANDSTONE. No apparent bdg. Soft to v soft, fine-grained, rounded to subrounded grains in calcareous matrix. Bottom half: putty like.
			NR			353.4-382.0 No recovery.
	360	1				

STONE & WEBSTER ENG. CORP. | APPROVED CA Foster | DATE 11/30/83 | SHEET 1 OF 49

WELL NAME AND No. J. Friemel No. 1 J.O. No. 13897 SHEET 19 OF 49

ELEVATION (FEET)	DEPTH (FEET)	SAMPLE RUN NO.	SAMPLE BOX NO.	RECOVERY (FT) ROD %	GRAPHIC LOG	SAMPLE DESCRIPTION
						1846.0– Dk Red-Brown SILTSTONE. No app bdg. Widely-spaced drilling breaks. Fresh,
			321			1864.0 mod hard; numerous green-gray reduction spots often with carbonaceous
	1850		322			nuclei. Occasional thin anhydrite stringers.
			323			
2170			324			
			325			
	1860		326			
						@1863.3 & 1863.8: Irregular thin anhydrite stringers.
						1864.0– Mod Red-Brown CLAYSTONE. Slightly silty, no app bdg, no joints; mod close
2160			327			1870.4 drilling breaks at 0°; fresh, mod hard; numerous green-gray reduction spots;
						occasional vertical, thin, crystalline salt intergrowths; occ small white
			328			anhydrite pods and thin stringers.
	1870					@1865.3 – 1866.5 & 1869.3 – 1870.3: Vertical salt stringers.
						1870.4– Mod to Dk Red-Brown Arg SILTSTONE. No app bdg; no joints; mod close
						1872.7 0° drilling breaks; mod hard; thin closely-spaced salt stringers.
		28	329	58.8/98		Occasional anhydrite stringers.
						@1871.8: Thin white anhydrite stringers.
			330			1872.7– Mod Red-Brown CLAYSTONE, 10 to 50% salt; mod hard; mod close drilling breaks
2150						1877.9 at 0°. Salt is med to coarse crystalline and translucent to transparent.
			331			1872.7 – 1873.5: 20 to 30% salt.
						1873.5 – 1875.8: 40 to 50% salt.
	1880		332			1875.8 – 1877.9: 10 to 20% salt.
						1877.9– Translucent SALT. 5 to 30% red-brown ST/CS in pockets and stringers,
						1901.4 occ up to 1/2" thick. Widely-spaced drilling breaks, no joints, med to
			333			coarsely crystalline. Occ v thin anhydrite stringers.
2140						1877.9 – 1979.7: 15 to 30% siltstone with some claystone.
			334			1879.7 – 1881.7: 5 to 10% claystone.
			335			1881.7 – 1901.4: 5 to 8% v dk brown ST. Occ zones of nearly white pure salt.
	1890					1898.4 – 1899.6: Near vertical fracture with light orange salt filling
			336			approximately 2 to 2 1/2" thick.
2130			337			
			338			
	1900					
			339			1901.4– Med Red-Brown CLAYSTONE. Sl silty, no bdg, no joints. Mod close, fresh
						1904.8 drilling breaks. Fresh surface, med hard; occ v thin salt-filled cracks,
			340			reduction spots. Occasional sand-sized anhydrite bodies.
2120						1904.8– No recovery.
			NR			1906.0
						1906.0– Translucent SALT. Generally 5 to 20% red-brown ST bodies; ST med
		29	341	59.1/98		1940.1 to mod hard, as irr ang pods, and ang elongate stringers; close to
						mod close cone breaks; scattered wispy stringers and patches of
						anhydrite to 1". Occasional green siltstone bodies.

NOTE: FOR BORING SUMMARY AND LEGEND INFO. SEE SHEET 1.

STONE & WEBSTER ENG. CORP. | APPROVED C A Foster | DATE 11/30/93 | SHEET 19 OF 49

PROJECT CONTROL DOCUMENTS

PUMP TESTING AND FLUID SAMPLING

AP-9 HYDROLOGIC TEST WELL - J.FRIEMEL NO 1

- WELL DESIGN TO ACCOMMODATE PUMP TESTING
- OBTAIN DATA TO SELECT TEST ZONES

AP-17 PUMP TESTING AND FLUID SAMPLING

- IDENTIFIES TESTING ZONES
- SEQUENCE OF TESTING ACTIVITIES

SWEC SUBCONTRACTOR - ESSOW G103L - PUMP TESTS AND FLUID SAMPLING

- TECHNICAL & QA SECTION OF CONTRACT
- DETAILED EQUIP. & SERVICE REQUIREMENTS
- DOCUMENTATION
- CALIBRATION
- INSPECTION

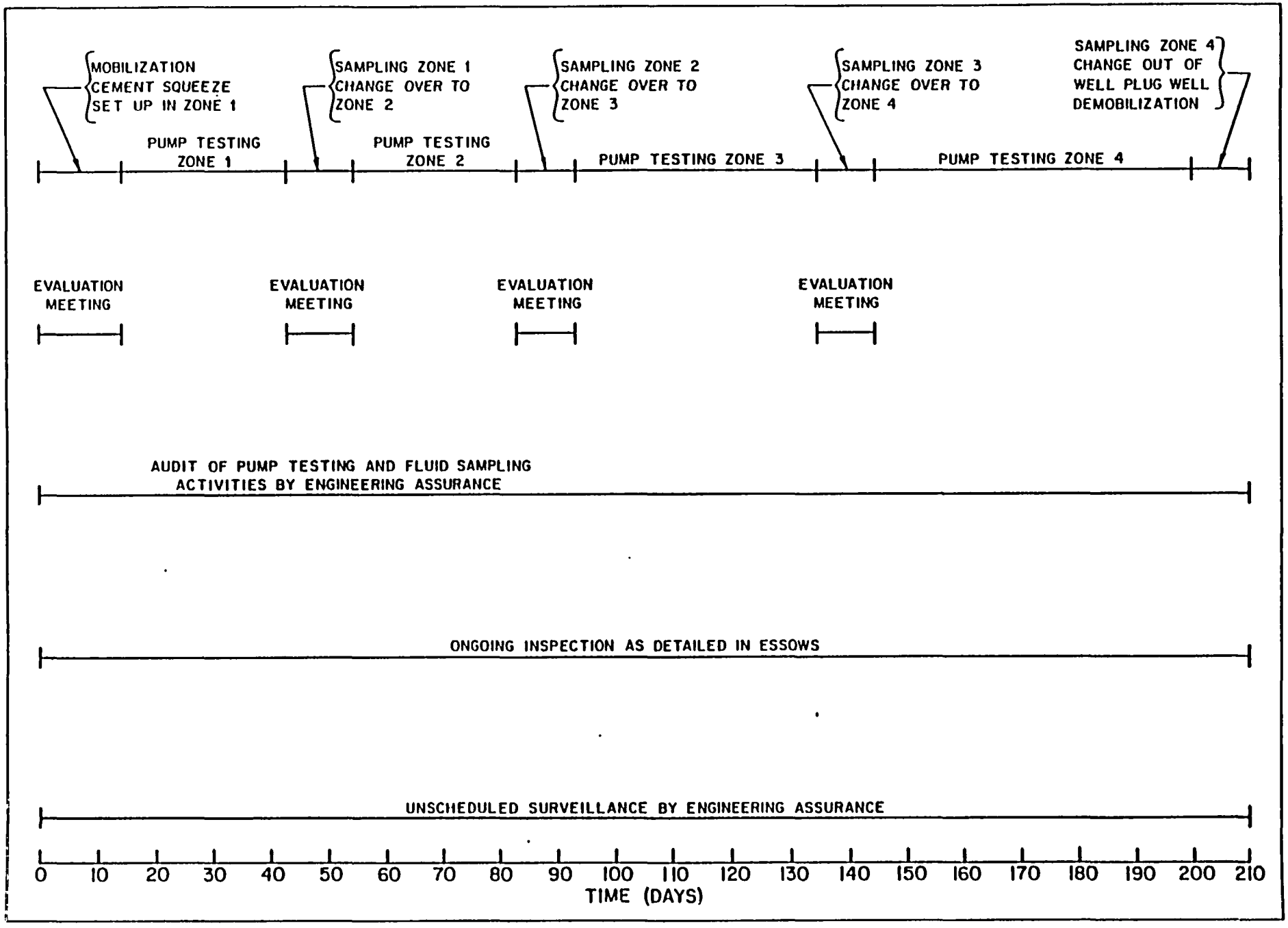
SWEC HYDROGEOLOGISTS PTP-13 - PUMP TESTS AND FLUID SAMPLING

- DETAILED TESTING PROCEDURES
- RECORDING DATA
- DATA DISTRIBUTION

OTHER SWEC, ONWI, & DOE SUBCONTRACTOR TESTING PROGRAMS

AP - 17 PUMP TESTING & FLUID SAMPLING

CONTENTS


MOBILIZATION
CEMENT SQUEEZE
SET UP IN ZONE 1
SAMPLING ZONE 1
CHANGE OVER TO
ZONE 2
SAMPLING ZONE 2
CHANGE OVER TO
ZONE 3
SAMPLING ZONE 3
CHANGE OVER TO
ZONE 4
SAMPLING ZONE 4
CHANGE OUT OF
WELL PLUG WELL
DEMOBILIZATION
PUMP TESTING
ZONE 1
PUMP TESTING
ZONE 2
PUMP TESTING ZONE 3
PUMP TESTING ZONE 4
EVALUATION
MEETING
EVALUATION
MEETING
EVALUATION
MEETING
EVALUATION
MEETING
AUDIT OF PUMP TESTING AND FLUID SAMPLING
ACTIVITIES BY ENGINEERING ASSURANCE
ONGOING INSPECTION AS DETAILED IN ESSOWS
UNSCHEDULED SURVEILLANCE BY ENGINEERING ASSURANCE
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
TIME (DAYS)

ESSOW G103L - PUMP TESTING AND FLUID SAMPLING

CONTENTS 1.4

ESSOW G103L - PUMP TESTING AND FLUID SAMPLING

DOCUMENTATION BY CONTRACTOR

Title	Copies	Submit to	6.17
Daily Progress Report including:	1	Purchaser's Field Representative	6.20 6.21
(1) Description of work performed during the day including any incidents			6.24 6.25 6.26 6.27
(2) Water samples obtained, depth, time and number of containers			6.29 6.30 6.31
(3) Break down of charges as outlined in the Contract and a listing of the personnel working on-site			6.44 6.45 6.46 6.47 6.48
Discs copies	1	Purchaser	6.51
Hard copy computer output of data listings and plots of drawdown and recovery data. A minimum of 2 complete sets of data and plots, per day, as required.	1	Purchaser's Field Representative	6.54 6.55 6.56 6.57 6.58 7.1 7.2
Final report describing test results for each zone	10	Purchaser	7.5 7.6
Calibration Reports for the pressure/ temperature transducers flowmeter	1	Purchaser	7.11 7.12 7.13 7.14
Procedure for downhole sampling and transfer of fluids.	1	Purchaser	7.16 7.17 7.18
API Subsurface Pump Classification	1	Purchaser	7.22 7.23

Each document submitted by the Contractor shall be clearly identified with the Purchaser's name, well number, the job title, the job order number, and a descriptive title. 7.33 7.34

STONE & WEBSTER ENGINEERING CORPORATION				T.I.D. REPORT		
CLIENT: BATTELLE MEMORIAL INSTITUTE				PROJECT: ONWI PERMIAN BASIN		J.O. NO.: 13697
ESSOW/PO TITLE: Pump Testing and Fluid Sampling				NO.: G103L	DATE:	ADDENDA THRU: Revision 2
CONTRACTOR: Baker Productions				SUBCONTRACTOR		
WORK LOCATION				REFERENCE DOCUMENTS: PTP 13697-13		

TEST, INSPECTION, AND DOCUMENTATION RECORD	*	VERIFIED**	WITNESSED**	PERFORMED**	CERTIFIED*** BY (Signature)	CERTIFIED*** DATE(S)****	DEVIATION AUTHORIZATION TYPE	DEVIATION AUTHORIZATION NUMBER OR NAME	DEVIATION AUTHORIZATION DATE	REMARKS
Equipment and Material	1									
at start		X								
ongoing		X								
Testing Procedures	2									
at start		X								
ongoing		X								
Pump Test Data Records	3									
at start		X								
ongoing		X								
Recovery Test Data Rec.	4									
at start		X								
ongoing		X								
Vertical Test Data Rec.	5									
at start		X								
ongoing		X								
Fluid Sampling	6		X							
Documentation	7			X						

*FOR INSTRUCTIONS, SEE THIS NUMBER IN THE INSPECTION SUBSECTION.
**BY S & W INSPECTOR IF FILLED IN "X"
VERIFIED — PERSONAL OBSERVATION OF DATA APPLICABLE TO THE WORK.
WITNESSED — PERSONAL OBSERVATION WHILE THE MANUFACTURER PERFORMS THE TASK.
PERFORMED — PERSONAL PERFORMANCE OF THE TASK.
***AS IN CONFORMANCE WITH THE SPECIFICATION OR WITH THE DEVIATION AUTHORIZATION INDICATED.
****SPECIFIC DATE(S) OR PERIOD OF INSPECTION, AS APPLICABLE.

TID REVIEWED & CLOSED BY _____ DATE _____

SHEET _____ OF _____

PTP 13 PUMP TESTING & FLUID SAMPLING

PTP 13697-13-1

1.7

CONTENTS

1.10

ATTACHMENT 2
PTP 13697-13-2

FLUID SAMPLE LOG
STONE & WEBSTER ENGINEERING CORP.

J.O. NO.	DATE

WELL NAME & NO.	ZONE NO.	FORMATION NAME	SITE REP.	PAGE NO.

SAMPLE NO.	DATE	SAMPLE			DATE SHIPPED	COMMENTS
		DEPTH	TEMP. °F*	PRESS. PSI*		

*RECORDED AT TUBING TRANSDUCER DEPTH _____ FT. BELOW WELL DATUM AT KELLY BUSHING

ATTACHMENT 3
PTP 13697-13-2

FLOW METER RECORD
STONE & WEBSTER ENGINEERING CORP.

CLIENT ONWI	J.O. No.
WELL NAME AND NO.	SITE REP.
	PAGE OF

DATE	TIME	READING	Δ READING	Δ TIME	Q GAL/MIN	Q BBL/DAY

ATTACHMENT 4

FLUID SAMPLING REQUIREMENTS

Sample Type	Sample Volume	Recipient	Sample Disposition
Surface, Tracer	0.5l	Dr. Glenn Thompson	Box and Ship to Dept. of Hydrology and Water Resources Att. Marc Malcomson A.E. Douglas Bldg. University of Arizona Tuscon, AZ 85721
Downhole	1 l. or as required by ONWI	Dr. Glenn Thompson	Crate and Ship to Dept. of Hydrology and Water Resources A.E. Douglas Bldg. University of Arizona Tucson, AZ 85721
Downhole	0.6 l. or as required by ONWI	Dr. Anthony Zaikowski	Crate and Ship to Bendix Field Engrng. 2599B 3/4 Road Grand Junction, CO
Surface	1 gal	Dr. Paul Knauth	Crate and Ship to Dept. of Geology Arizona State University Tempe, AZ 85287
Surface	1 gal	Dr. Harold Bentley	Crate and Ship to Hydro-Geology Chem. 744 North Country Club Road Tucson, AZ 85716
Surface	1 gal	Dr. Jeffrey Means	Crate and Ship to Battelle Columbus Laboratories 505 King Avenue Columbus, OH 43201

Sample Type	Sample Volume	Recipient	Sample Disposition	
Surface	1 gal	Dr. Anthony Zaikowski	Crate and Ship to Bendix Field Engineering 2599 B3/4 Road Grand Junction, CO	2.20 2.21 2.22 2.23 2.24
Surface	50 gal or as required by ONWI	Dr. J.C. Laul	To be collected and held at the well site or in the Amarillo field ofc. or as otherwise directed by ONWI	2.28 2.29 2.30 2.31 2.32 2.33
Downhole	1.01 or as required by ONWI	TBEG	Crate and Ship to University of Texas at Austin Bureau of Economic Geology University Station, Box X Austin, Texas, 78712-7508 Att. Steve Fisher	2.37 2.38 2.39 2.40 2.41 2.42 2.43 2.44 2.45 2.46

ATTACHMENT 5
FLUID SAMPLE TRANSMITTAL LETTER

PTP -13 - PUMP TESTING AND FLUID SAMPLING

STONE & WEBSTER ENGINEERING CORPORATION

245 SUMMER STREET, BOSTON, MASSACHUSETTS

ADDRESS ALL CORRESPONDENCE TO P.O. BOX 2325, BOSTON, MASS. 02107

W U TELEX 94-0001
94-0977

BOSTON
NEW YORK
CHERRY HILL, N.J.
DENVER
CHICAGO
HOUSTON
PORTLAND, OREGON
WASHINGTON, D.C.

DESIGN
CONSTRUCTION
REPORTS
EXAMINATIONS
CONSULTING
ENGINEERING

Name and
Address of
Recipient

Date

Please be aware that No., (Size) container(s) of (surface or downhole) formation fluid sampled from the (No.) production zone at (Name) Well No. ___. will be shipped to your office. The production zone was perforated between depths of _____ and _____ feet. This fluid sample was collected on (Date) at (Time). Following receipt of this shipment, please notify:

Mr. T. Annaratone 245/12
STONE & WEBSTER ENGINEERING CORPORATION
P. O. Box 2325
Boston, MA 02107

at you earliest convenience.

Very truly yours,

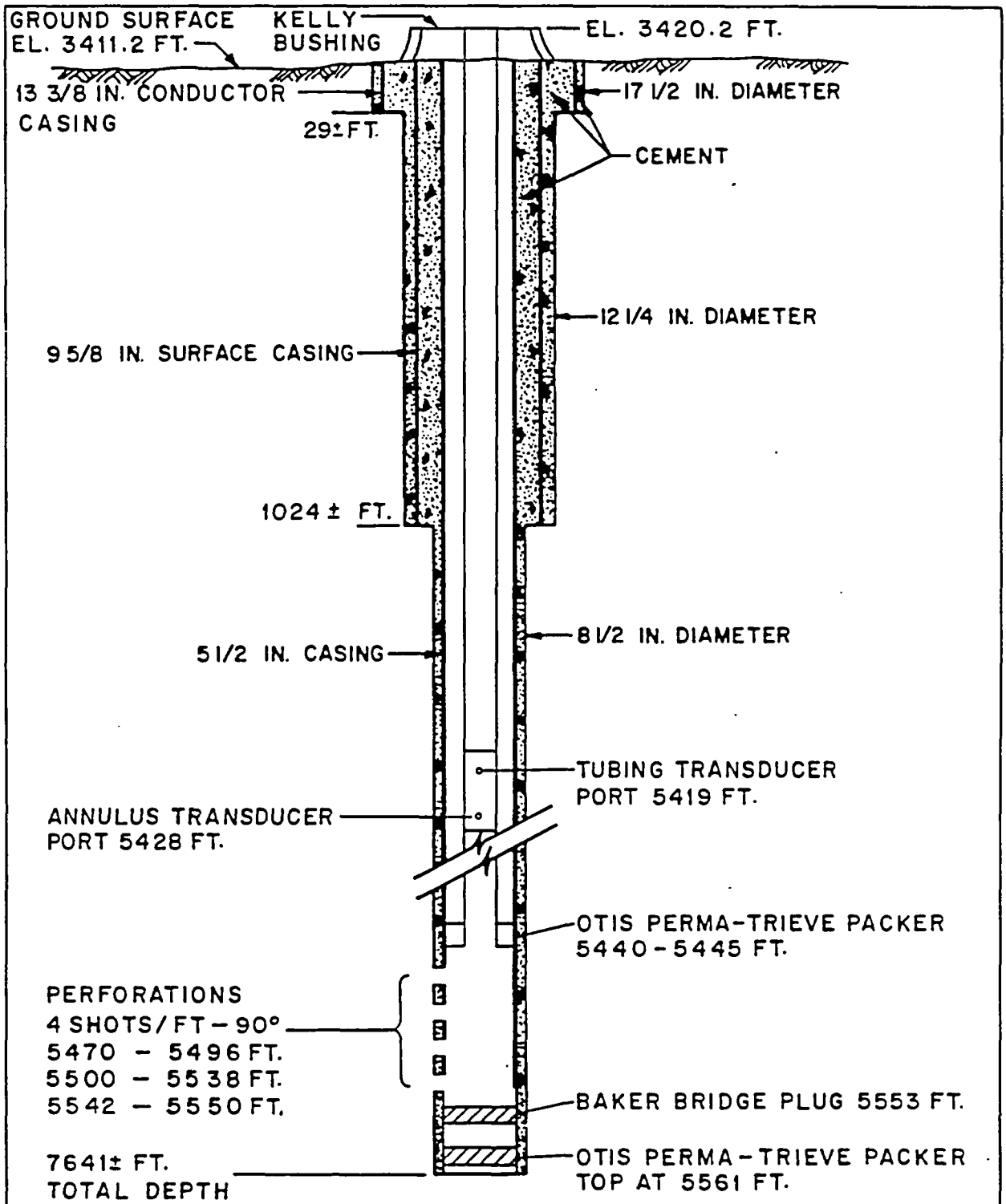
(SWEC Site Representative)

DAILY REPORT FORM
STONE & WEBSTER ENGINEERING CORP.

REPORT NO.			
CLIENT: ONWI-BATTELLE MEMORIAL INSTITUTE		J.O. NO.: 13697	DATE
WELL NAME & NO.	ZONE	FORMATION NAME	SITE REPRESENTATIVE
TEST TYPE	TEST NO.	TEST SAMPLING	

TIME LOG	DETAILS OF OPERATIONS

MEASUREMENTS	N	TIME	DATE	COMMENTS
TEST START				
TEST STOP				
TEST ZONE PRESSURE				
ANNULAR PRESSURE				
TEST ZONE TEMP				
DISCHARGE RATE				
DISCHARGE RATE CHECK				
TOTAL ZONE PRODUCTION				
PUMP STROKE RATE				
TRACER CONCENTRATION				



Explanation:

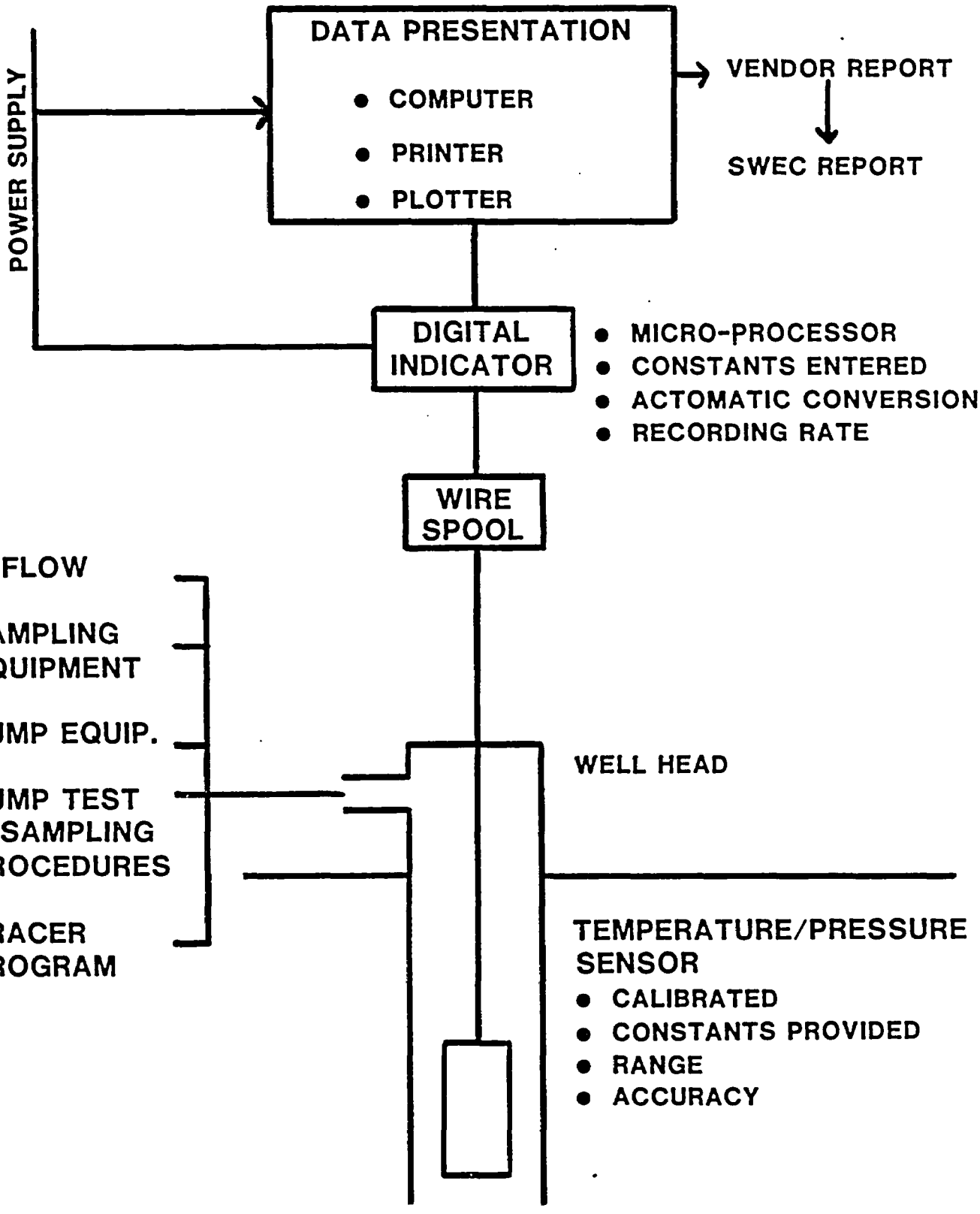
All Depths Measured
From the Kelly Bushing

Not to Scale

As-Built Drawing of
Test Zone No. 3, Upper Permian Wolfcamp
Zeeck No. 1 Well

Figure D-10

PUMP TESTING
INSTRUMENTATION & DATA RECORDING

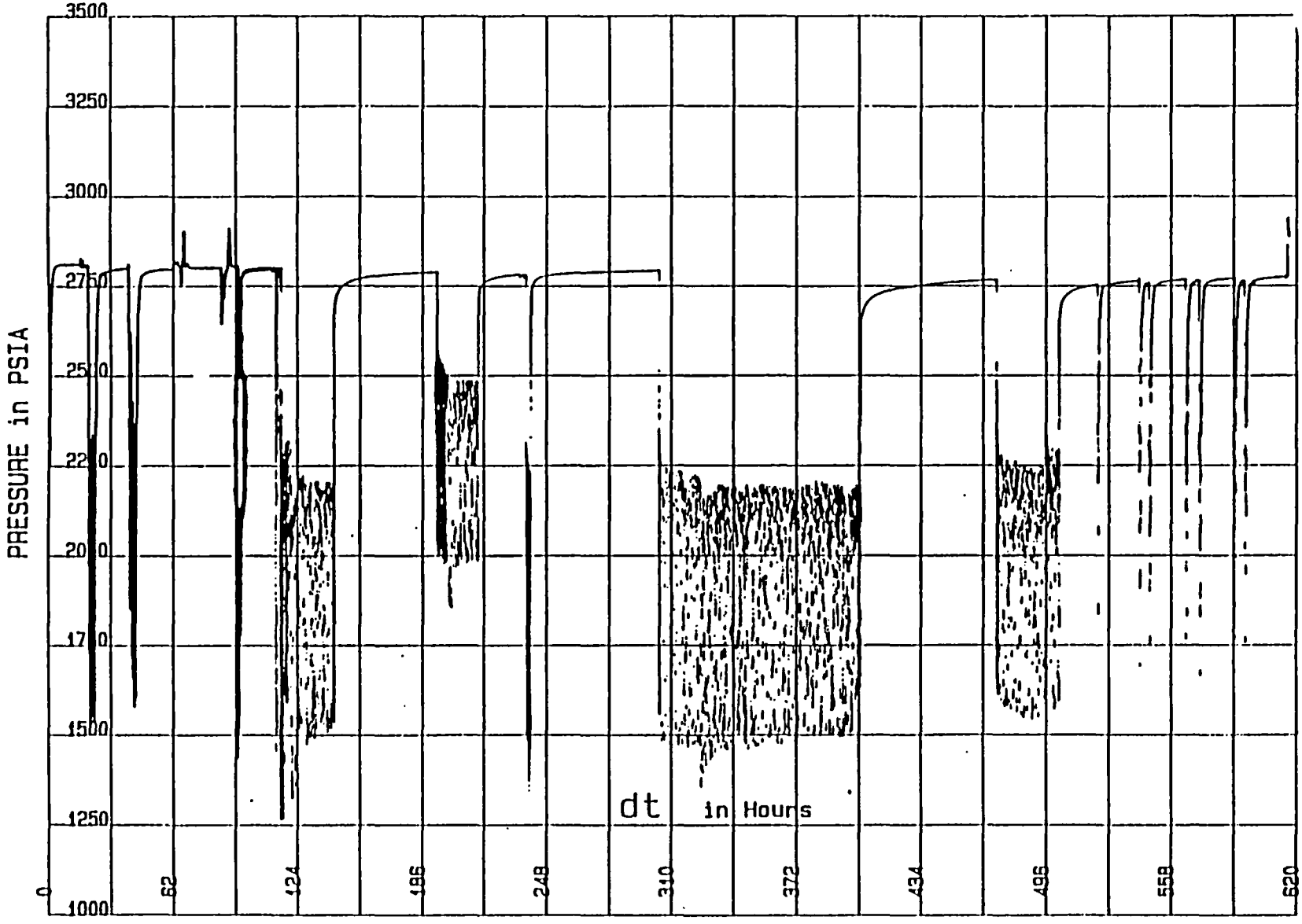


COMPANY: Stone & Webster
by BAKER Engineer: B.H. REAGAN
TEST DATE : 6/26/83 DISC: 404 FILE: 20

WELL: J. Friemel #1
COMMENTS: WILDCAT

REAL TIME	ELAPSED TIME	TUBING PRESSURE psia	TUBING dPRESSURE psia	TUBING TEMP °F	TUBING dTEMP °F	ANNULUS PRESSURE psia	ANNULUS dPRESSURE psia	ANNULUS TEMP °F	ANNULUS dTEMP °F	R#
18:23:28	47:39:22	2791.12	0.12	130.1	0.0	3064.19	-0.45	129.9	-0.1	1
18:33:28	47:49:22	2791.34	0.22	130.1	0.0	3064.69	0.50	129.9	0.0	2
18:43:27	47:59:21	2791.22	-0.12	130.1	0.0	3064.48	-0.21	130.0	0.1	3
18:53:27	48:09:21	2791.46	0.24	130.1	0.0	3064.60	0.12	130.0	0.0	4
19:03:27	48:19:21	2791.47	0.01	130.1	0.0	3064.24	-0.36	130.0	0.0	5
19:13:27	48:29:21	2791.38	-0.09	130.1	0.0	3064.17	-0.07	130.0	0.0	6
19:23:27	48:39:21	2791.46	0.08	130.1	0.0	3064.26	0.09	129.9	-0.1	7
19:33:27	48:49:21	2791.64	0.18	130.1	0.0	3064.62	0.36	129.9	0.0	8
19:43:27	48:59:21	2791.86	0.22	130.1	0.0	3064.50	-0.12	129.9	0.0	9
19:53:27	49:09:21	2791.05	-0.81	130.1	0.0	3064.41	-0.09	129.9	0.0	10
20:03:27	49:19:21	2791.49	0.44	130.1	0.0	3064.58	0.17	130.0	0.1	11
20:13:27	49:29:21	2791.44	-0.05	130.1	0.0	3063.95	-0.63	129.9	-0.1	12
20:23:27	49:39:21	2791.54	0.10	130.1	0.0	3064.27	0.32	130.0	0.1	13
20:33:27	49:49:21	2791.28	-0.26	130.1	0.0	3064.04	-0.23	130.0	0.0	14
20:43:27	49:59:21	2791.61	0.33	130.1	0.0	3064.25	0.21	129.9	-0.1	15
20:53:27	50:09:21	2791.45	-0.16	130.1	0.0	3064.61	0.36	130.0	0.1	16
21:03:26	50:19:20	2791.71	0.26	130.1	0.0	3064.02	-0.59	129.9	-0.1	17
21:13:26	50:29:20	2792.13	0.42	130.1	0.0	3064.65	0.63	129.9	0.0	18
21:23:26	50:39:20	2791.90	-0.23	130.1	0.0	3064.15	-0.50	129.9	0.0	19
21:33:26	50:49:20	2791.71	-0.19	130.1	0.0	3063.92	-0.23	129.9	0.0	20
21:43:26	50:59:20	2791.91	0.20	130.1	0.0	3063.97	0.05	130.0	0.1	21
21:53:26	51:09:20	2791.90	-0.01	130.1	0.0	3063.64	-0.33	129.9	-0.1	22
22:03:26	51:19:20	2791.70	-0.20	130.1	0.0	3064.22	0.58	129.9	0.0	23
22:13:26	51:29:20	2791.79	0.09	130.1	0.0	3063.72	-0.50	130.0	0.1	24
22:23:26	51:39:20	2791.93	0.14	130.1	0.0	3063.82	0.10	129.9	-0.1	25
22:33:26	51:49:20	2791.64	-0.29	130.1	0.0	3063.97	0.15	129.9	0.0	26
22:43:26	51:59:20	2791.60	-0.04	130.1	0.0	3064.01	0.04	129.9	0.0	27
22:53:26	52:09:20	2791.68	0.08	130.1	0.0	3063.83	-0.18	130.0	0.1	28
23:03:26	52:19:20	2791.93	0.25	130.0	0.1	3063.84	0.01	129.9	-0.1	29
23:13:26	52:29:20	2791.63	-0.30	130.1	0.1	3064.18	0.34	130.0	0.1	30
23:23:26	52:39:20	2792.04	0.41	130.0	0.1	3063.56	-0.62	130.0	0.0	31
23:33:25	52:49:19	2792.25	0.21	130.1	0.1	3063.27	-0.29	129.9	-0.1	32
23:43:25	52:59:19	2792.26	0.01	130.1	0.0	3063.86	0.59	129.9	0.0	33
23:53:25	53:09:19	2791.77	-0.49	130.1	0.0	3063.47	-0.39	130.0	0.1	34
0:03:25	53:19:19	2791.89	0.12	130.1	0.0	3063.31	-0.16	130.0	0.0	35
0:13:25	53:29:19	2792.22	0.33	130.1	0.0	3063.43	0.12	129.9	-0.1	36
0:23:25	53:39:19	2791.83	-0.39	130.0	-0.1	3063.60	0.17	129.9	0.0	37
0:33:25	53:49:19	2791.69	-0.14	130.1	0.1	3063.63	0.03	129.9	0.0	38
0:43:25	53:59:19	2792.04	0.35	130.1	0.0	3063.23	-0.40	129.9	0.0	39
0:53:25	54:09:19	2792.09	0.05	130.1	0.0	3063.44	0.21	129.9	0.0	40
1:03:25	54:19:19	2792.35	0.26	130.1	0.0	3063.54	0.10	129.9	0.0	41
1:13:25	54:29:19	2792.20	-0.15	130.1	0.0	3063.31	-0.23	129.9	0.0	42
1:23:25	54:39:19	2792.05	-0.15	130.1	0.0	3063.32	0.01	129.9	0.0	43
1:33:25	54:49:19	2792.19	0.14	130.1	0.0	3063.30	-0.02	129.9	0.0	44
1:43:25	54:59:19	2791.73	-0.46	130.1	0.0	3063.84	0.54	129.9	0.0	45
1:53:24	55:09:18	2792.16	0.43	130.0	-0.1	3063.54	-0.30	129.9	0.0	46
2:03:24	55:19:18	2792.23	0.07	130.0	0.0	3063.06	-0.48	130.0	0.1	47
2:13:24	55:29:18	2792.20	-0.03	130.1	0.1	3063.54	0.48	130.0	0.0	48
2:23:24	55:39:18	2792.33	0.13	130.1	0.0	3063.24	-0.30	129.9	-0.1	49
2:33:24	55:49:18	2792.22	-0.11	130.1	0.0	3063.09	-0.15	129.9	0.0	50
2:43:24	55:59:18	2792.68	0.46	130.1	0.0	3062.93	-0.16	129.9	0.0	51
2:53:24	56:09:18	2792.38	-0.30	130.1	0.0	3063.16	0.23	129.9	0.0	52

Pw vs dt



BAKER Production Services - 4165 Hwy. 521, Fresno, Tx., 77545, (713) 431-2514

COMPANY: Stone & Webster WELL: J. Friemel #1 PLOT INTERVAL:

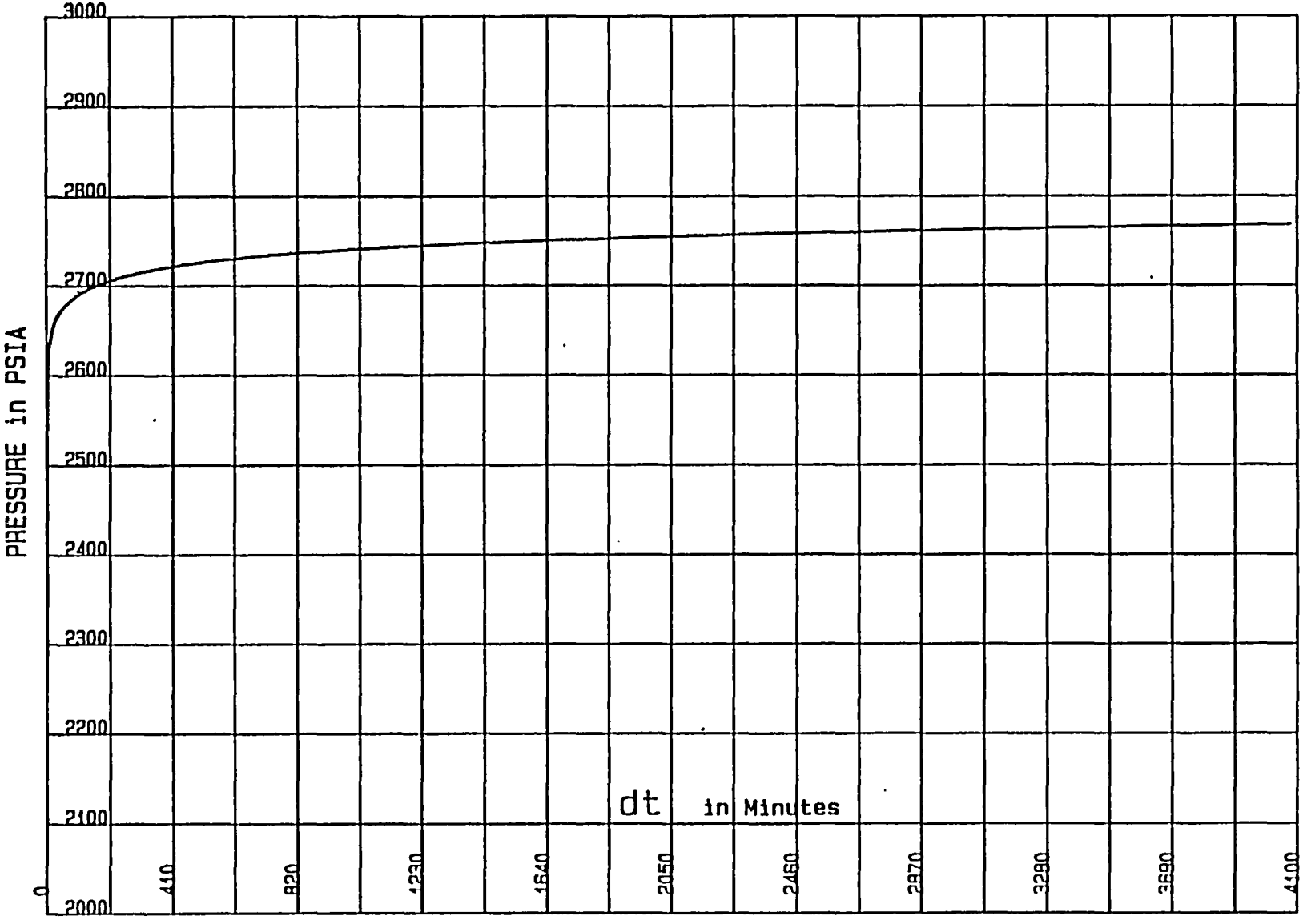
by BAKER Engineer: B.H. REAGAN START: 6 / 14 / 83 - 18 : 42 : 10

PROGRAM SERIAL NUMBER: TXP80883CU343F1 STOP : 7 / 10 / 83 - 10 : 54 : 48

GAUGE SERIAL NUMBER: 3.1077

COMMENTS: HISTORY - ZONE #1 ZONE #1 8188-8204'

Pw vs dt



BAKER Production Services - 4165 Hwy. 521, Fresno, Tx., 77545, (713) 431-2514

COMPANY: Stone & Webster WELL: J. Friemel #1 PLOT INTERVAL:

by BAKER Engineer: B.H. REAGAN START: 7 / 1 / 83 - 14 : 15 : 52

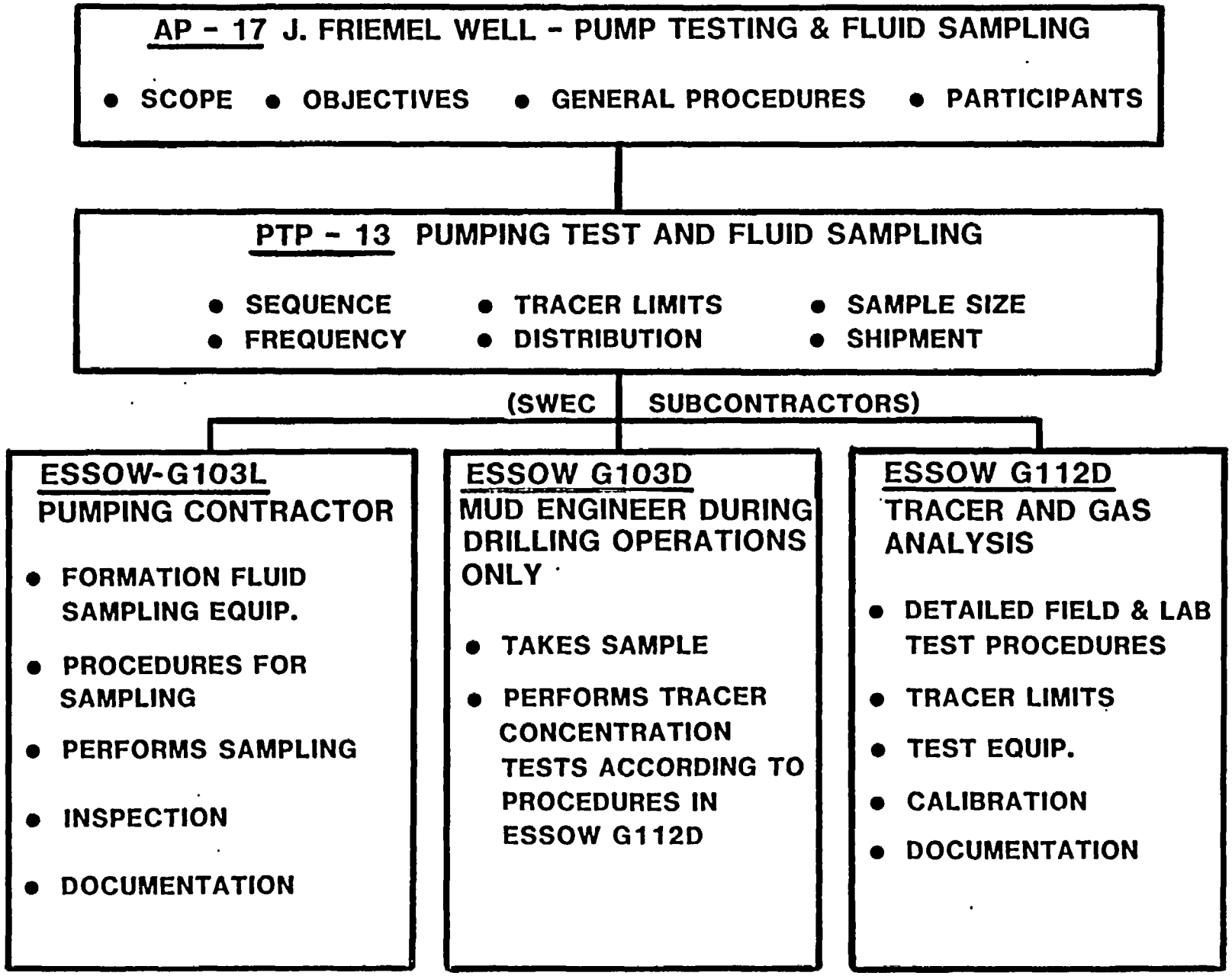
PROGRAM SERIAL NUMBER: TXP80883CU343F1 STOP : 7 / 4 / 83 - 10 : 13 : 4

GAUGE SERIAL NUMBER: 3.1077

COMMENTS: SHUT-IN RECOVERY #4 ZONE #1 8168-8204'

BAKER PRESSURE TESTING SYSTEM

FLUID SAMPLING AND TRACER PROGRAM



QA 5/12/82

PROCEDURE 11 REVISION 1

DATE 10/4/82

FORM 4F

LOG OF SAMPLES AND FIELD MEASUREMENTS OF TRACER CONCENTRATIONS IN DRILLING FLUID - J. FRIEMAL #1

Site	Depth	Collection Date	Type of Sample	Concentration	Comments	Performed By

**This form can be applied to other future wells which require a tracer metering system as approved by Glenn Thompson

Log reviewed by Program Director