Ertec PROJECT MASTER PLANNING AND CONTROL SCHEDULE

FORM PM 101

PROJECT NAME AND NUMBER: TENSION PILE STUDY	Date Issued 7-30-81	CUSTOMER NAME: CONOCO	PROJECT LOCATION
	Date Revised	PROJECT MANAGER: T.K. HAMILTON	SITE DESIGNATION

Prepared by
Revised by
Approved by
Revision Approval

TITLE: SCHEDULE 1 MILESTONES

MILESTONES/FUNCTIONS					BUDGETED HOURS/COST
Phase	Task	Act	Item	TASK DESCRIPTION	
				MILESTONES	
				AUTHORIZATION TO PROCEED	
				ALL SPECIFICATIONS TO CONOCO FOR BIDS	
				SITE INVESTIGATION COMPLETE	
				BEGIN PILE FABRICATION	
				DATA ACQUISITION SYSTEM COMPLETE	
				STRAIN GAGES AND EXTENSOMETERS AT FABRICATION YARD	
				PILE CALIBRATION COMPLETE	
				TEST PILE COMPLETE	
				PILE INSTALLATION AND TESTING COMPLETE	
				SMALL DIAMETER SEGMENT TEST COMPLETE	
				BEGIN MAJOR TEST SERIES	
				END MAJOR TEST SERIES	
				SITE SPECIFIC REPORT	
				RESULTS FROM THEORY DEVELOPMENT	
				FINAL REPORT	
					TOTAL

TIME SCHEDULE

Month	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12		
Week Beginning																	
			1981	1982											1982	1983	

SPECIAL TIME/SCHEDULE CONSTRAINTS

NOTES:

PLATE 35

Ertec PROJECT MASTER PLANNING AND CONTROL SCHEDULE

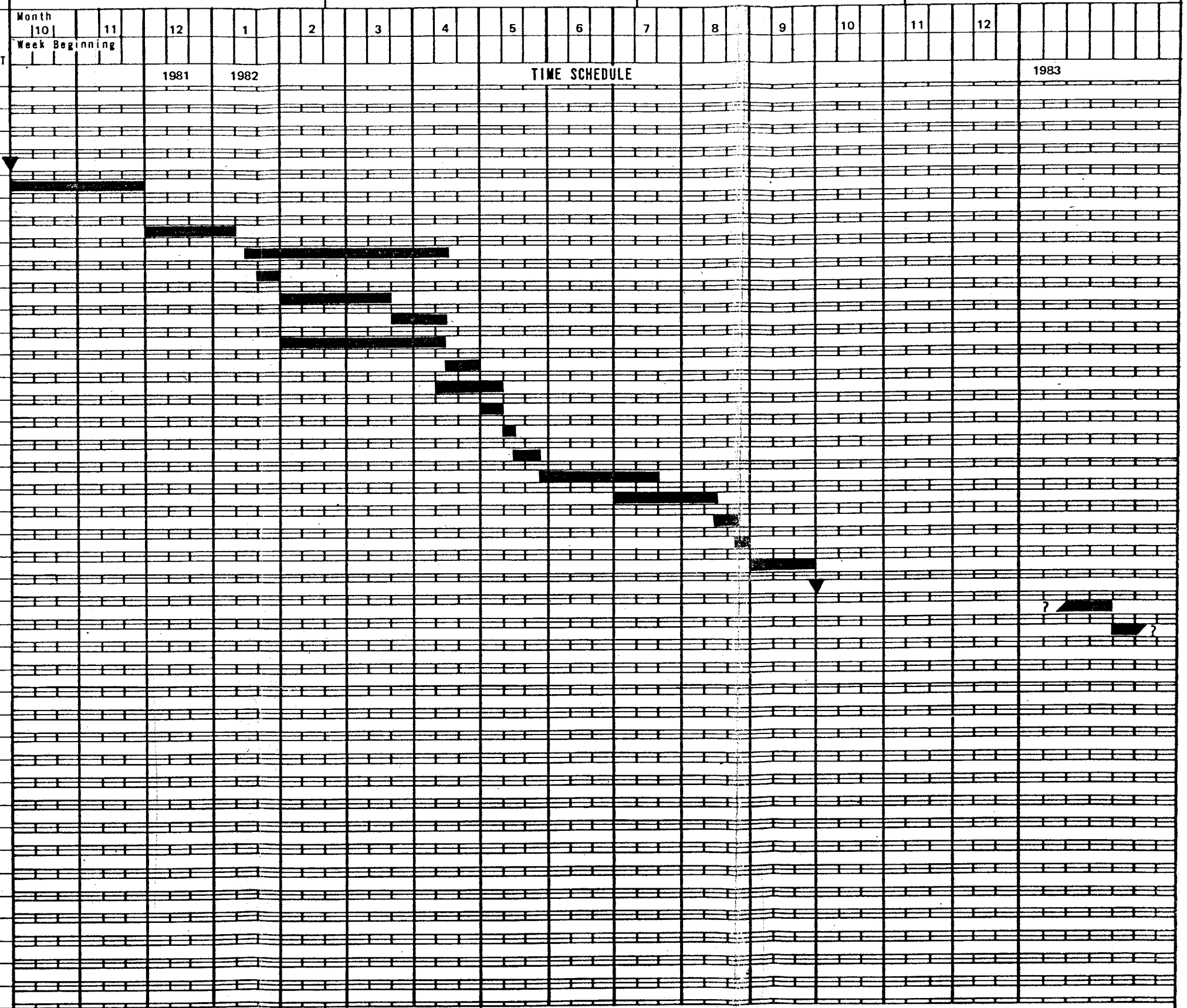
FORM PM 101

PROJECT NAME AND NUMBER: TENSION PILE STUDY	Date Issued: 7-30-81	CUSTOMER NAME: CONOCO	PROJECT LOCATION
	Date Revised	PROJECT MANAGER: G.L. HOLLOWAY	SITE DESIGNATION

Prepared by
Revised by
Approved by
Revision Approval

TITLE: SCHEDULE 2 OPERATIONS

Phase	Task	Act	Item	MILESTONES/FUNCTIONS — TASK DESCRIPTION	BUDGETED HOURS/COST
				OPERATIONS	
				AUTHORIZATION TO PROCEED	
				PREPARE FABRICATION AND INSTALLATION SPECIFICATIONS FOR CONOCO	
				PLAN AND PERFORM SITE INVESTIGATION	
				LABORATORY TESTING	
				PREPARE FABRICATION YARD	
				PILE FABRICATION (INSTRUMENTS NOT REQUIRED)	
				STRAIN GAGE INSTALLATION/CALIBRATION	
				FABRICATE LOAD FRAME, LOAD HEAD, SCAFFOLD	
				COMPLETE FABRICATION/PREPARE FOR TRANSPORT	
				PREPARE PLATFORM	
				TRANSPORT TEST PILE AND LOAD FRAME	
				INSTALL LOAD FRAME, TEST PILE, AND FIRST TEST	
				PERFORM SMALL DIAMETER PILE SEGMENT TESTS	
				PREPARE REPORT ON FABRICATION AND INSTALLATION	
				PREPARE FOR MAJOR TEST SERIES	
				PERFORM MAJOR TEST SERIES	
				DEMOBILIZATION	
				PREPARE REPORT ON OPERATIONS	
				SITE SPECIFIC REPORT	
				PREPARE FOR FOLLOW-UP TEST	
				PERFORM FOLLOW-UP TEST	



NOTES:

TOTAL

SPECIAL TIME/SCHEDULE CONSTRAINTS

Ertec PROJECT MASTER PLANNING AND CONTROL SCHEDULE
FORM PM 101

PROJECT NAME AND NUMBER: TENSION PILE STUDY	Date Issued: 7-30-81	CUSTOMER NAME: CONOCO	PROJECT LOCATION
	Date Revised	PROJECT MANAGER: R.L. BOGGESS	SITE DESIGNATION,

Prepared by
Revised by
Approved by
Revision Approval

TITLE: SCHEDULE 3 INSTRUMENTATION AND DATA ACQUISITION

Phase	Task	Act	Item	MILESTONES/FUNCTIONS — TASK DESCRIPTION	BUDGETED HOURS/COST
				INSTRUMENTATION AND DATA ACQUISITION	
				PILE INSTRUMENTS	
				DESIGN INSTRUMENTS	
				ORDER LONG LEAD TIME PARTS	
				PREPARE MACHINE DRAWINGS	
				MACHINE AND ASSEMBLE STRAIN GAGES	
				PROOF TEST AND CALIBRATE STRAIN GAGES	
				MACHINE AND ASSEMBLE PRESSURE UNITS	
				PROOF TEST AND CALIBRATE PRESSURE UNITS	
				PILE INSTALLATION AND TESTING	
				SMALL-DIAMETER PILE SEGMENT	
				DESIGN INSTRUMENT	
				PREPARE MACHINE DRAWINGS	
				MACHINE AND ASSEMBLE INSTRUMENT	
				INSTRUMENT CHECK-OUT	
				SEGMENT TEST	
				DATA ACQUISITION SYSTEM	
				ORDER DATA SYSTEM	
				DETERMINE SOFTWARE REQUIREMENTS	
				SOFTWARE DEVELOPMENT	
				DESIGN DATA PANELS	
				FABRICATE DATA PANELS	
				SET-UP DATA SYSTEM IN PORTABLE BUILDING	
				TRANSPORT TO FABRICATION YARD	
				FIELD CALIBRATION OF TEST PILE	
				TEST PILE MONITOR UNTIL INSTALLATION	
				PILE INSTALLATION AND TESTING	
				PILE SEGMENT TESTS	
				RETURN DATA SYSTEM TO HOUSTON	
				DATA PROCESSING IN HOUSTON	
				MOBILIZE DATA SYSTEM FOR MAJOR TEST	
				MAJOR TEST	
				DEMOBILIZE TO HOUSTON	
				DATA PROCESSING	
				FOLLOW-UP TEST	
					TOTAL

Month: 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12
Week Beginning
1981 1982 1982 1983
TIME SCHEDULE

NOTES:

SPECIAL TIME/SCHEDULE CONSTRAINTS

RDT - 00174

Ertec PROJECT MASTER PLANNING AND CONTROL SCHEDULE

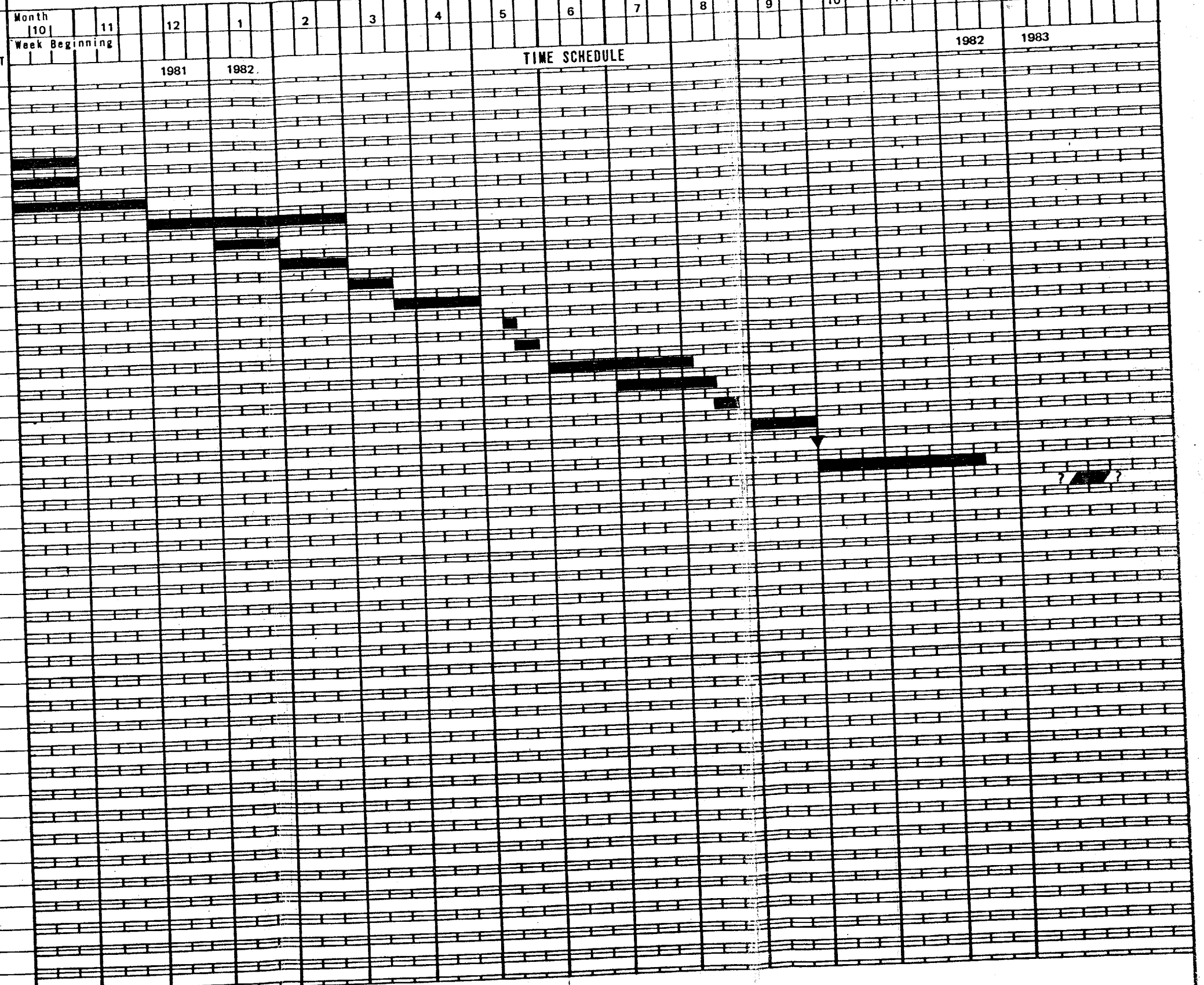
FORM PM 101

PROJECT NAME AND NUMBER: TENSION PILE STUDY	Date Issued 7-30-81	CUSTOMER NAME: CONOCO	PROJECT LOCATION
	Date Revised	MANAGER: J.D. BOGARD	SITE DESIGNATION

Prepared by
Revised by
Approved by
Revision Approval

TITLE: SCHEDULE 4
TESTING AND ANALYSIS

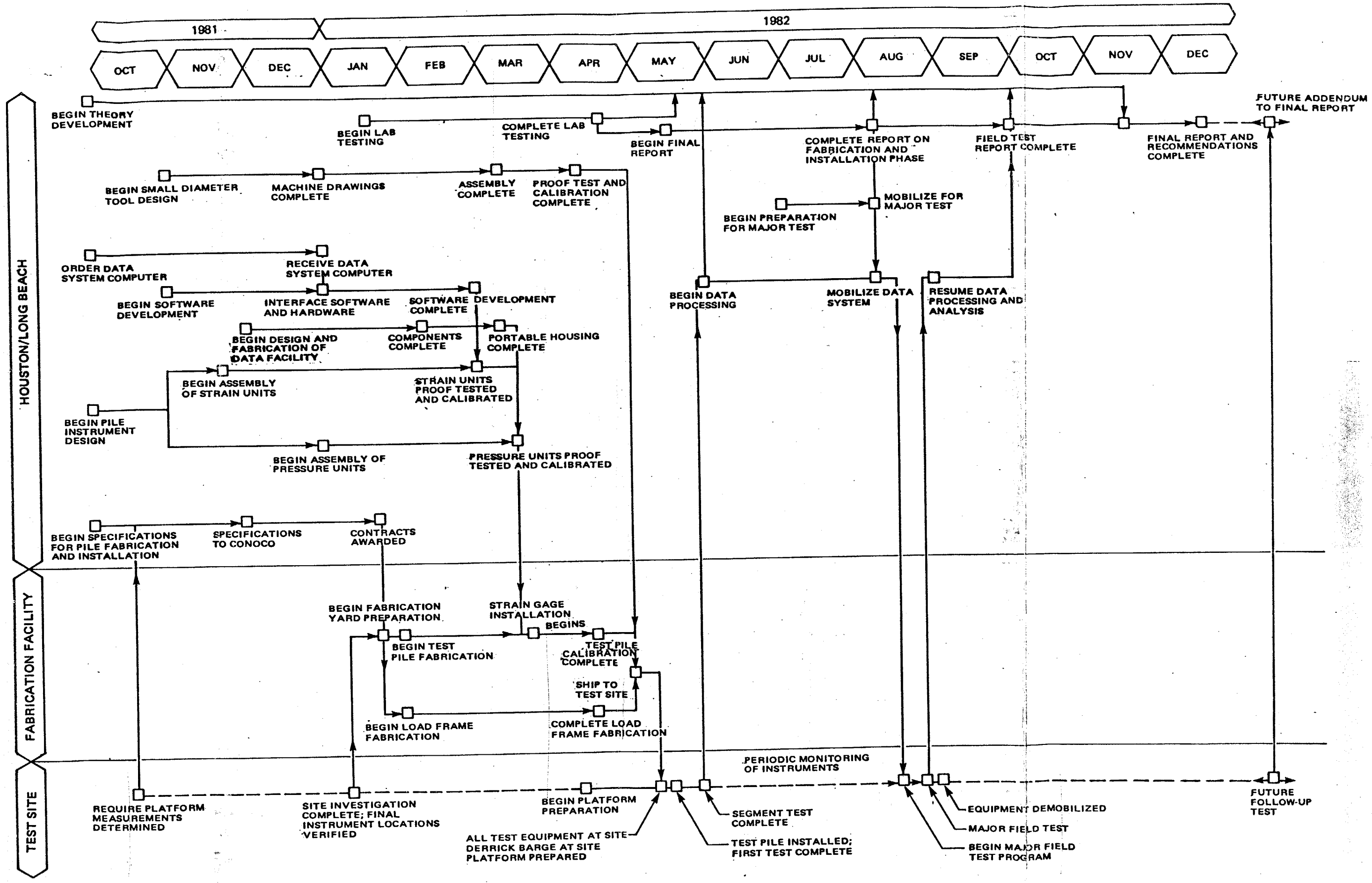
Phase	Task	Act	Item	MILESTONES/FUNCTIONS — TASK DESCRIPTION	BUDGETED HOURS/COST
				TESTING AND ANALYSIS	
				DETERMINE INSTRUMENT REQUIREMENTS	
				DETERMINE SOFTWARE REQUIREMENTS	
				CONSULT ON INSTRUMENT DESIGN	
				SOFTWARE DEVELOPMENT	
				PLAN INSTALLATION AND FIRST TEST	
				CALIBRATION AND SOFTWARE INTERFACING	
				PLAN TEST PILE INSTALLATION AND FIRST TEST	
				CALIBRATION OF TEST PILE	
				INSTALLATION OF PILE AND TESTING	
				SEGMENT TESTING	
				DATA PROCESSING AND ANALYSIS	
				PREPARE FOR MAJOR TEST	
				MAJOR TEST	
				DATA PROCESSING AND ANALYSIS	
				SITE SPECIFIC REPORT	
				ANALYSIS AND FINAL REPORT	
				FOLLOW-UP TEST	



NOTES:

TOTAL

SPECIAL TIME/SCHEDULE CONSTRAINTS



SCHEDULE 5 FLOW CHART FOR FIELD TEST PROGRAM

Ertec PROJECT MASTER PLANNING AND CONTROL SCHEDULE
FORM PM 101

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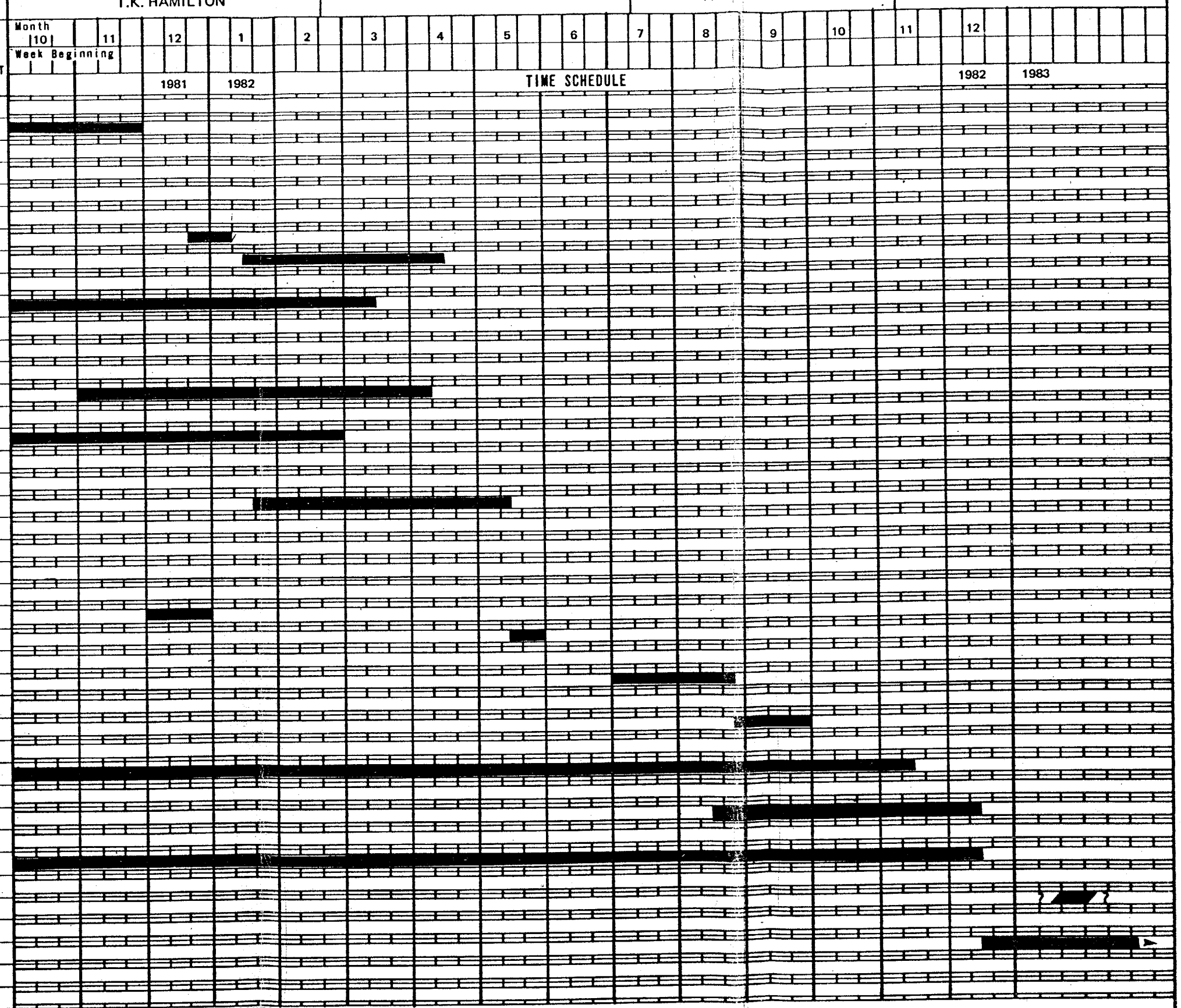
	Date Revised	PROJECT MANAGER: T.K. HAMILTON	SITE DESIGNATION

Prepared by
Revised by
Approved by
Revision Approval

TITLE: SCHEDULE 6 BUDGET TASKS

MILESTONES/FUNCTIONS					BUDGETED HOURS/COST
Phase	Task	Act	Item	TASK DESCRIPTION	
	1			PREPARATION OF DESIGN DRAWINGS AND SPECIFICATIONS FOR PHYSICAL TEST SYSTEM	
	2			SITE INVESTIGATION AND LABORATORY TESTING PROGRAM	
			1	SITE INVESTIGATION	
			2	LABORATORY TESTING	
	3			DESIGN, FABRICATION, TESTING AND CALIBRATION OF PILE INSTRUMENTS FOR LARGE-DIAMETER PILE	
	4			DESIGN MODIFICATIONS AND CALIBRATION OF SMALL DIAMETER PILE SEGMENT	
	5			DEVELOPMENT OF DATA ACQUISITION SYSTEM AND SOFTWARE	
	6			TEST PILE FABRICATION, INSTALLATION AND INITIAL TEST	
	7			PLANNING AND IMPLEMENTATION OF SMALL DIAMETER SEGMENT TEST	
			1	PLANNING	
			2	TESTING	
	8			PLANNING AND PERFORMING MAJOR FIELD TEST	
	9			DATA REDUCTION AND ANALYSIS	
	10			THEORY DEVELOPMENT	
	11			REPORT AND RECOMMENDATIONS	
	12			PROJECT ADMINISTRATION AND REVIEW	
	13			PLANNING AND PERFORMING FOLLOW-UP TEST	
	14			DESIGN SPECIFICATION FOR TENSION LEG PLATFORMS	



NOTES:

TOTAL

SPECIAL TIME/SCHEDULE CONSTRAINTS

PLATE 40

APPENDIX I

BUDGET

SUMMARY PROJECT COSTS

Task 1 -	Preparation of Design Drawings and Specifications for the Physical Test System		
	A. Personnel (Ertec)		$40,680
	B. Travel Expenses		1,690
	C. Reproduction/Printing		300
	D. Structural Analysis/Shop Drawings		10,000*
		Subtotal	52,670
Task 2 -	Site Investigation and Laboratory Testing Program		
	A. Personnel		
	A.1 Ertec		8,280
	A.2 Conoco (welders, operators)		700*
	B. Travel Expenses		
	B.1 Onshore		1,930
	B.2 Offshore		1,200*
	C. Services and Equipment Rental		78,750*
	D. Laboratory Test Program		21,645
		Subtotal	112,505
Task 3 -	Design, Fabrication, Testing, and Calibration of Instrumentation for Large-Diameter Pile		
	A. Personnel (Ertec)		89,500
	B. Instrumentation		184,580
	C. Miscellaneous		14,000
		Subtotal	288,080
Task 4 -	Design Modifications and Calibration of Small-Diameter Pile Segment		
	A. Personnel (Ertec)		23,400
	B. Materials		8,050
	C. Services		13,800
		Subtotal	45,250
Task 5 -	Development of Data Acquisition System and Software		
	A. Personnel (Ertec)		44,250
	B. Data Acquisition		49,100
	C. Dynamic Recording Measurements		11,200
		Subtotal	104,550

* Cost Paid by Conoco

Task 6 -	Test Pile Fabrication, Installation and Initial Test		
	A. Personnel (Ertec)		121,550
	B. Travel Expenses		
	B.1 Onshore		25,000
	B.2 Offshore		10,650*
	C. Fabrication of Test Pile		168,000*
	D. Platform Modifications		33,750*
	E. Equipment Rental		417,300*
	F. Material		90,820*
	G. Mobilization		840
		Subtotal	867,910
Task 7 -	Planning and Implementation of Small Diameter Segment Test		
	A. Personnel		
	A.1 Ertec		34,800
	A.2 Conoco (welders, operators)		1,050*
	B. Travel Expenses		
	B.1 Onshore		2,530
	B.2 Offshore		9,000*
	C. Services and Equipment Rental		89,800*
		Subtotal	137,180
Task 8 -	Planning and Performing Major Field Test		
	A. Personnel		
	A.1 Ertec		89,230
	A.2 Conoco (welders, operators)		2,100*
	B. Travel Expenses		
	B.1 Onshore		6,795
	B.2 Offshore		16,800*
	C. Mobilization & Demobilization		7,000
	D. Misc. Supplies & Materials		2,000
		Subtotal	123,925
Task 9 -	Data Reduction and Analysis		
	A. Personnel (Ertec)		47,600
	B. Shipping		200
	C. Computer		3,000
	D. Misc. Expenses & Supplies		15,000
		Subtotal	65,800

* Costs paid by Conoco

Task 10 - Theory Development

A.	Personnel (Ertec)		55,200
B.	Travel Expenses		2,950
C.	Computer		20,000
		Subtotal	78,150

Task 11 - Report and Recommendations

A.	Personnel (Ertec)		97,360
B.	Reproduction/Printing		4,000
C.	Shipping		400
D.	Misc. Expenses & Supplies		2,000
		Subtotal	103,760

Task 12 - Project Administration and Review

A.	Personnel (Ertec)		79,200
B.	Sponsor Meetings		20,000
C.	Travel Expenses		14,500
D.	Miscellaneous		1,050
		Subtotal	114,750

Task 13 - Planning and Performing Follow-up Test

A.	Personnel		
	A.1 Ertec		74,030
	A.2 Conoco (welders, operators)		2,100*
B.	Travel Expenses		
	B.1 Onshore		5,045
	B.2 Offshore		14,000*
C.	Mobilization & Demobilization		7,000
D.	Equipmental Rental		20,000*
E.	Misc. Supplies and Materials		2,000
		Subtotal	124,175

Task 14 - Design Specifications for Tension Leg Platforms

A.	Personnel (Ertec)		98,900
B.	Travel Expenses		17,880
C.	Reproduction/Printing		5,000
D.	Shipping		1,000
E.	Sponsor Meetings		25,000
F.	Computer		15,000
		Subtotal	162,780

* Cost Paid by Conoco

SUMMARY PROJECT COSTS

Ertec Estimated Costs	1,415,465
Ertec Risk & Uncertainties (25%)	353,866
Estimated Conoco Direct Costs	966,020
Estimated Total Project Costs	$2,735,351

GENERAL PROJECT COSTS

TASK 1 - Preparation of Design Drawings and Specifications for the Physical Test System

		Rate	Quantity	Cost
A.	Personnel (Ertec)			
A.1	Project Engineer	$60/hr	180 hr	$10,800
A.2	Staff Engineer	$55/hr	420 hr	23,100
A.3	Draftsman	$30/hr	180 hr	5,400
A.4	Technical Typist	$23/hr	60 hr	1,380
			Subtotal	40,680
B.	Travel Expenses			
B.1	Airfare	$135/trip	4 trips	540
B.2	Subsistence	$75/day	10 days	750
B.3	Transportation	$40/day	10 days	400
			Subtotal	1,690
C.	Reproduction/Printing			300
			Subtotal	300
D.	Structural Analysis/Shop Drawings			10,000
			Subtotal	10,000
			Total	$52,670

TASK 2 - Site Investigation and Laboratory Testing Program

A.	Personnel (Ertec)			
A.1	Project Engineer	$60/hr	72 hr	$ 4,320
A.2	Staff Engineer	$55/hr	72 hr	3,960
			Subtotal	8,280
B.	Personnel (Paid by Conoco)			
B.1	Welder	$30/hr	10 hr	300
B.2	Operator	$40/hr	10 hr	400
			Subtotal	700
C.	Travel Expenses			
C.1	Airfare (Long Beach/Houston)	$600/trip	2 trips	1,200
C.2	Subsistence (Onshore)	$75/day	6 days	450
C.3	Transportation	$40/day	7 days	280
C.4	Subsistence and Transportation (Offshore - Paid by Conoco)	$150/day	8 days	1,200
			Subtotal	3,130

		Rate	Quantity	Cost
D.	Services and Equipment Rental (Paid by Conoco)			
D.1	Drilling Engineer	$500/day	5 days	2,500
D.2	Drilling Crew	$3,600/day	5 days	18,000
D.3	Operators (CPT)	$1,200/day	5 days	6,000
D.4	Remote Vane	$600/day	5 days	3,000
D.5	CPT	$4,000/day	5 days	20,000
D.6	Drilling Rig	$1,200/day	5 days	6,000
D.7	Drilling, Sampling & Field Testing			6,000
D.8	Mobilization & Demobilization			6,500
D.9	Expendables (drilling mud, tubes, etc.)			4,000
D.10	Subsistence & Transportation (9)	$150/day	45 days	6,750
			Subtotal	78,750
E.	Laboratory Test Program			
E.1	Sample Shipment/Handling			4,000
E.2	X-Ray	$45/test	23 tests	1,035
E.3	Laboratory Tests			
	E.3.1 Liquid & Plastic Limits	$50/test	16 tests	800
	E.3.2 Miniature Vane Test	$30/test	16 tests	480
	E.3.3 Consolidation	$550/test	4 tests	2,200
	E.3.4 Specific Gravity	$30/test	4 tests	120
	E.3.5 Grain Size (hydrometer)	$50/test	4 tests	200
	E.3.6 Unconsolidated Undrained Triaxial Test	$110/test	16 tests	1,760
	E.3.7 Consolidated Undrained Triaxial Test			
	E.3.7.1 Isotropic	$285/test	6 tests	1,710
	E.3.7.2 Anisotropic	$600/test	4 tests	2,400
	E.3.8 Direct Simple Shear	$860/test	4 tests	3,440
E.4	Test Program Report			3,500
			Subtotal	21,645
			Total	$112,505

TASK 3 - Design, Fabrication, Testing, and Calibration of Instrumentation for Large-Diameter Pile

A.	Personnel (Ertec)			
A.1	Project Engineer	$60/hr	600 hr	$36,000
A.2	Staff Engineer	$55/hr	100 hr	5,500
A.3	Technician	$30/hr	1,400 hr	42,000
A.4	Draftsman	$30/hr	200 hr	6,000
			Subtotal	89,500

		Rate	Quantity	Cost
B.	Instrumentation (Material/Subcontractors Services)			
	B.1 Total Pressure Cell	$2,790/ea	14 ea	39,060
	B.2 Pore Pressure Cell	$3,900/ea	14 ea	54,600
	B.3 Strain Module	$2,650/ea	16 ea	42,400
	B.4 Extensometer	$2,510/ea	8 ea	20,080
	B.5 Tell-tale/Displacement Module	$1,800/ea	4 ea	7,200
	B.6 Extensometer Connectors	$3,540/ea	6 ea	21,240
			Subtotal	184,580
C.	Miscellaneous Materials, Supplies, and Equipment Rental			14,000
			Total	$288,080

TASK 4 - Design Modifications and Calibration of Small-Diameter Pile Segment

A.	Personnel (Ertec)			
	A.1 Project Engineer	$60/hr	150 hr	$ 9,000
	A.2 Staff Engineer	$55/hr	60 hr	3,300
	A.3 Technician	$30/hr	250 hr	7,500
	A.4 Draftsman	$30/hr	120 hr	3,600
			Subtotal	23,400
B.	Materials (DCDTS, Pressure Transducers, Strain Gages, etc.)			8,050
			Subtotal	8,050
C.	Services			
	C.1 Contract Labor			12,000
	C.2 Subcontractors Fee			1,800
			Subtotal	13,800
			Total	$45,250

TASK 5 - Development of Data Acquisition System and Software

A.	Personnel (Ertec)			
	A.1 Project Engineer	$60/hr	220 hr	$13,200
	A.2 Staff Engineer	$55/hr	510 hr	28,050
	A.3 Draftsman	$30/hr	40 hr	1,200
	A.4 Technician	$30/hr	60 hr	1,800
			Subtotal	44,250

	Rate	Quantity	Cost
B. Data Acquisition System			
B.1 Data Recording (Instrumentation)			
B.1.1 Computer/Console	$2,800/mo	12 mo	33,600
B.1.2 Lab/Printer/Plotter/ Control System	$3,100/mo	5 mo	15,500
		Subtotal	49,100
C. Dynamic Recording Measurements			
C.1 Pile Driving Analyzer and Operator	$1,400/day	6 day	8,400
C.2 Report on Dynamic Measurements			2,800
		Subtotal	11,200
		Total	$104,550
TASK 6 - Test Pile Fabrication, Installation, and Initial Test			
A. Personnel - Field Supervision (Ertec)			
A.1 Fabrication/Calibration of Test Pile/Load Frame			
A.1.1 Project Engineer	$60/hr	450 hr	$27,000
A.1.2 Staff Engineer	$55/hr	950 hr	52,250
		Subtotal	79,250
A.2 Platform Modification/Preparation			
A.2.1 Staff Enginee	$55/hr	180 hr	9,900
		Subtotal	9,900
A.3 Installation of Load Frame/Test Pile/First Test			
A.3.1 Project Engineer	$60/hr	240 hr	14,400
A.3.2 Staff Engineer	$55/hr	240 hr	13,200
A.3.3 Technician	$30/hr	160 hr	4,800
		Subtotal	32,400
B. Travel Expenses			
B.1 Fabrication/Calibration of Test Pile/Load Frame			
B.1.1 Airfare (New Orleans/Houston)	$135/trip	15 trips	2,025
B.1.2 Subsistence (Onshore)	$75/day	190 days	14,250
B.1.3 Transportation	$40/day	160 days	6,400
		Subtotal	22,675

	Rate	Quantity	Cost
B.2 Platform Modification/Preparation			
B.2.1 Airfare (New Orleans/Houston)	$135/trip	1 trip	135
B.2.2 Subsistence (Onshore)	$75/day	4 days	300
B.2.3 Subsistence & transportation (Offshore - Paid by Conoco)	$150/day	15 days	2,250
		Subtotal	2,685
B.3 Installation of Load Frame/Test Pile/First Test			
B.3.1 Airfare (New Orleans/Houston)	$135/trip	6 trips	810
B.3.2 Subsistence (Onshore)	$75/day	8 days	600
B.3.3 Transportation	$40/day	12 days	480
B.3.4 Subsistence & transportation (Offshore - Paid by Conoco)	$150/day	56 days	8,400
		Subtotal	10,290
C. Fabrication of Test Pile (Paid by Conoco)			
C.1 Personnel (Estimate)			
C.1.1 Welders	$30/hr	3200 hr	96,000
C.1.2 Supervisors	$40/hr	800 hr	32,000
C.1.3 Operators	$40/hr	350 hr	14,000
C.1.4 Inspectors	$50/hr	200 hr	10,000
		Subtotal	152,000
C.2 Fabrication Yard (Estimate)			
C.2.1 Welding Supplies	$150/day	70 days	10,500
C.2.2 Crane	$100/day	20 days	2,000
C.2.3 Miscellaneous	$50/day	70 days	3,500
		Subtotal	16,000
D. Platform Modification/Preparation (Paid by Conoco)			
D.1 Personnel (Estimate)			
D.1.1 Welders	$30/hr	450 hr	13,500
D.1.2 Supervisors	$40/hr	150 hr	6,000
D.1.3 Operators	$40/hr	150 hr	6,000
		Subtotal	25,500
D.2 Material (Estimate)			
D.2.1 Material for platform modification			5,000
D.2.2 Welding Supplies	$150/day	15 days	2,250
D.2.3 Misc. material & supplies			1,000
		Subtotal	8,250

	Rate	Quantity	Cost
E. Installation of Load Frame/Test Pile/First Test (Paid by Conoco)			
E.1 Equipment Rental (Estimate)			
E.1.1 Derrick barge (500 ton)			
E.1.1.1 Rental	$60,000/day	3 days	180,000
E.1.1.2 Mobilization & Demobilization			80,000
E.1.1.3 Down Time (20%)			36,000
E.1.2 Work barge/tug	$6,500/day	7 days	45,500
E.1.3 Pile hammer (D62-12)			11,000
E.1.4 Hydraulic rams/system		6 mo	50,000
E.1.5 Storage buildings/office			
E.1.6.1 Building rental	$800/mo	6 mo	4,800
E.1.6.2 Mobilization/ Demobilization	$1,000	2	2,000
E.1.6 Generators	$1,600/mo	5 mo	8,000
		Subtotal	417,300
F. Material			
F.1 Test Pile (Paid by Conoco)			
F.1.1 Pile material	$104/ft	330 ft	34,320
F.1.2 Misc. steel (access tubes, channels, angles, etc.)			39,500
F.1.3 Steel for load head			6,000
F.2 Load Frame (Paid by Conoco)			
F.2.1 Additional steel for load frame			10,000
F.2.2 Wood & misc. material for decking			1,000
		Subtotal	90,820
G. Mobilization of Ertec Equipment (Houston to Fabrication Yard)	$. 60/mi	1,400 mi	840
		Subtotal	840
		Total	$867,910

TASK 7 - Planning and Implementation of Small-Diameter Segment Test

A. Personnel (Ertec)			
A.1 Project Engineer	$60/hr	240 hr	14,400
A.2 Staff Engineer	$55/hr	240 hr	13,200
A.3 Technician	$30/hr	240 hr	7,200
		Subtotal	34,800
B. Personnel (Paid by Conoco)			
B.1 Welder	$30/hr	15 hr	450
B.2 Operator	$40/hr	15 hr	600
		Subtotal	1,050

	Rate	Quantity	Cost
C. Travel Expenses			
C.1 Airfare (Long Beach/Houston)	$600/trip	12 trips	1,200
C.2 Subsistence (Onshore)	$75/day	6 days	450
C.3 Transportation	$40/day	22 days	880
C.4 Subsistence & transportation (Offshore - Paid by Conoco)	$150/day	60 days	9,000
		Subtotal	11,530
D. Services and Equipment Rental (Paid by Conoco)			
D.1 Drilling Crew	$3600/day	10 days	36,000
D.2 Drilling Engineer	$500/day	10 days	5,000
D.3 Equipment Rig	$1,200/day	12 days	14,400
D.4 Drilling and Sampling	$10/ft	600 ft	6000
D.5 Expendables (drilling mud, fuel,etc.)			8,400
D.6 Mobilization & Demobilization			6,500
D.7 Subsistance & Transportation (9)	$150/day	90 days	13,500
		Sub-Total	89,800
		Total	$137,180

TASK 8 - Planning and Performing Major Field Test

A. Planning phase			
A.1 Personnel (Ertec)			
A.1.1 Project Engineer	$60/hr	160 hr	$ 9,600
A.1.2 Staff Engineer	$55/hr	160 hr	8,800
A.1.3 Technician	$30/hr	120 hr	3,600
		Subtotal	22,000
A.2 Personnel (Ertec) (Monitor instrumentation between initial and major test)			
A.2.1 Project Engineer	$60/hr	36 hr	2,160
A.2.2 Technician	$30/hr	144 hr	4,320
		Subtotal	6,480
A.3 Travel Expenses (Monitor instrumentation between initial and major test)			
A.3.1 Airfare (New Orleans/ Houston)	$135/trip	15 trips	2,025
A.3.2 Subsistence	$40/day	15 days	600
A.3.3 Transportation (Offshore)	$400/trip	12 trips	4,800
		Subtotal	7,425

	Rate	Quantity	Cost
B. Testing Phase			
B.1.1 Project Engineer	$60/hr	450 hr	27,000
B.1.2 Staff Engineer	$55/hr	450 hr	24,750
B.1.3 Technician	$30/hr	300 hr	9,000
		Subtotal	60,750
B.2 Personnel			
B.2.1 Welder	$30/hr	30 hr	900
B.2.2 Operator	$40/hr	30 hr	1,200
		Subtotal	2,100
B.3 Travel Expenses			
B.3.1 Airfare (New Orleans/Houston)	$135/trip	6 trips	810
B.3.2 Subsistence (Onshore)	$75/day	24 days	1,800
B.3.3 Transportation	$40/day	39 days	1,560
B.3.4 Subsistence & transportation (Offshore-Paid by Conoco)	$150/day	80 days	12,000
		Subtotal	16,170
C. Mobilization and Demobilization of Equipment (Houston to Offshore Site)			7,000
		Subtotal	7,000
D. Miscellaneous Supplies and Materials			2,000
		Subtotal	2,000
		Total	$123,925

TASK 9 - Data Reduction and Analysis

A. Personnel (Ertec)			
A.1 Project Engineer	$60/hr	500 hr	$30,000
A.2 Staff Engineer	$55/hr	320 hr	17,600
		Subtotal	47,600
B. Shipping (Air Courier) (Houston - Long Beach)			200
		Subtotal	200

	Rate	Quantity	Cost
C. Computer			15,000
		Subtotal	15,000
D. Miscellaneous Expenses and Supplies (Paper, Tapes, etc.)			3,000
		Subtotal	3,000
		Total	$65,800
TASK 10 - Theory Development			
A. Personnel (Ertec)			
A.1 Project Engineer	$60/hr	480 hr	$28,800
A.2 Staff Engineer	$55/hr	480 hr	26,400
		Subtotal	55,200
B. Travel Expenses			
B.1 Airfare (Long Beach/Houston)	$600/trip	3 trips	1,800
B.2 Subsistence (Onshore)	$75/day	10 days	750
B.3 Transportation	$40/day	10 days	400
		Subtotal	2,950
C. Computer			20,000
		Total	$78,150
TASK 11 - Report and Recommendations			
A. Personnel (Ertec)			
A.1 Project Engineer	$60/hr	480 hr	$28,800
A.2 Staff Engineer	$55/hr	960 hr	52,800
A.3 Draftsman	$30/hr	280 hr	8,400
A.4 Technical Typist	$23/hr	320 hr	7,360
		Subtotal	97,360
B. Reproduction/Printing			4,000
		Subtotal	4,000

	Rate	Quantity	Cost
C. Shipping (Air Courier) (Houston-Long Beach, and Norway)			400
		Subtotal	400
D. Miscellaneous Expense and Supplies (binders, photos, etc.)			2,000
		Subtotal	2,000
		Total	$103,760

TASK 12 - Project Administration and Review

A. Personnel (Ertec)			
A.1 Principal	$95/hr	200 hr	$ 19,000
A.2 Associate Professional	$90/hr	180 hr	16,200
A.3 Project Professional	$60/hr	200 hr	12,000
A.4 Project Administrator	$40/hr	800 hr	32,000
		Subtotal	79,200
B. Sponsor Meetings (Project Staff)			20,000
		Subtotal	20,000
C. Travel Expenses			
C.1 Airfare			
C.1.1 Long Beach/Houston	$600/trip	5 trips	3,000
C.1.2 Oslo/Houston	$1,740/trip	5 trips	8,700
C.2 Subsistence (Onshore)	$100/day	20 days	2,000
C.3 Transportation	$40/day	20 days	800
		Subtotal	14,500
D. Miscellaneous			1,050
		Subtotal	1,050
		Total	$114,750

	Rate	Quantity	Cost
TASK 13 - Planning and Performing Follow-up Test			
A. Planning Phase			
A.1 Personnel (Ertec)			
A.1.1 Project Engineer	$60/hr	80 hr	$ 4,800
A.1.2 Staff Engineer	$55/hr	80 hr	4,400
A.1.3 Technician	$30/hr	40 hr	1,200
		Subtotal	10,400
A.2 Personnel (Ertec) (Monitor instrumentations between test)			
A.2.1 Project Engineer	$60/hr	24 hr	1,440
A.2.2 Technician	$30/hr	48 hr	1,440
		Subtotal	2,880
A.3 Travel Expenses (Monitor instrumentations between test)			
A.3.1 Airfare (New Orleans/Houston)	$135/trip	5 trips	675
A.3.2 Subsistence (Onshore)	$40/day	5 days	200
A.3.3 Transportation (Offshore)	$400/day	5 days	2,000
		Subtotal	2,875
B. Testing Phase			
B.1 Personnel (Ertec)			
B.1.1 Project Engineer	$60/hr	450 hr	27,000
B.1.2 Staff Engineer	$55/hr	450 hr	24,750
B.1.3 Technician	$30/hr	300 hr	9,000
		Subtotal	60,750
B.2 Personnel (Paid by Conoco)			
B.2.1 Welder	$30/hr	30 hr	900
B.2.2 Operator	$40/hr	30 hr	1,200
		Subtotal	2,100
B.3 Travel Expense			
B.3.1 Airfare (New Orleans/Houston)	$135/trip	6 trips	810
B.3.2 Subsistence (Onshore)	$75/day	24 days	1,800
B.3.3 Transportation	$40/day	39 days	1,560
B.3.4 Subsistence & transportation (Offshore-Paid by Conoco)	$150/day	80 days	12,000
		Subtotal	16,170

		Rate	Quantity	Cost
C.	Mobilization and Demobilization of Equipment			7,000
			Subtotal	7,000
D.	Equipmental Rental (Paid by Conoco) (Rams, generators, etc.)			20,000
			Subtotal	20,000
E.	Misc. Supplies and Materials			2,000
			Subtotal	2,000
			Total	$124,175

TASK 14 - Design Specifications for Tension Leg Platforms

A.	Personnel (Ertec)			
	A.1 Principal	$95/hr	120 hr	$ 11,400
	A.2 Associate Professional	$90/hr	120 hr	10,800
	A.3 Project Engineer	$65/hr	420 hr	27,300
	A.4 Staff Engineer	$60/hr	520 hr	31,200
	A.5 Draftsman	$35/hr	280 hr	9,800
	A.6 Technical Typist	$28/hr	300 hr	8,400
			Subtotal	98,900
B.	Travel Expenses			
	B.1 Airfare			
	B.1.1 Oslo/Houston	$1740/trip	6 trips	10,440
	B.1.2 Long Beach/Houston	$600/trip	4 trips	2,400
	B.2 Subsistence (Onshore)	$100/day	36 days	3,600
	B.3 Transportation	$40/day	36 days	1,440
			Subtotal	17,880
C.	Reproduction/Printing			5,000
			Subtotal	5,000
D.	Shipping (Air Courier) (Houston-Long Beach, Norway)			1,000
			Subtotal	1,000
E.	Sponsor Meetings			25,000
			Subtotal	25,000
F.	Computer			15,000
			Subtotal	15,000
			Total	$162,780

APPENDIX II

REFERENCE SOURCE DOCUMENTS

REFERENCE SOURCE DOCUMENTS

1. Structural Drawings for Platform "A"
   West Delta Area, Block 58
   Drawing No. 00-07-1, Plan and Elevations for Tender Type Drilling Side Jacket and Decks
   Drawing No. C0-039-28, Elevations "A" and "D" and Deck Framing Plan After Conversion to Self-contained 16-Leg Platform
   Drawing No. C0-039-3A, Horizontal Bracing Plans
   Drawing No. (not shown), Original Equipment Layout for West Delta, Block 58 Platform "A"
   Sketch for Pile Make-up and Design Penetration

2. Platform completion report (Construction)
   Platform "A", West Delta, Block 58
   Well Data
   Pile Data
   Conductor Data
   Location Within West Delta Block
   General Construction Notes

3. Preliminary Geotechnical Information
   Boring 1, Block 137
   Green Canyon Area
   McClelland Engineers
   Job No. 0181-0181
   May 22, 1981

4. Soil and Foundation Investigation
   Block 48, Grand Isle Area
   "J" Structure
   McClelland Engineers, Inc.
   Report No. 72-251
   November 21, 1971

5. Soil and Foundation Investigation
   Block 63, East Cameron Area
   "B" Platform
   McClelland Engineers, Inc.
   Report No. 0276-048
   October 15, 1976

6. Well Site Survey of Viosca Knoll Blocks 864/908 Gulf of Mexico
   Intersea Research Corporation
   February 26, 1981

7. Deck Lifting Frame Drawings
   R-1, Deck Lifting Frame Plan, Sections and Details
   R-2, Deck Lifting Frame Sections and Details
   R-3, Lifting Frame Assembly Details of Types "A and "B" Lifting Eyes

8. Geotechnical Investigation
Boring 2, Block 58
West Delta Area
Gulf of Mexico
McClelland Engineers, Inc.
Report No. 0179-0003
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9. Foundation Investigation
Offshore Drilling Structure
West Delta Area, Block 58
McClelland Engineers, Inc.
Report No. 5692-5
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10. Ertec Memorandum
June 22, 1981
Meeting Notes on Operational
Aspects for offshore Pile Test

11. Engineering Geology and Geotechnical Considerations,
Upper continental Slope, Offshore Louisiana
McClelland Engineers, Inc.
June, 1981

12. Advance Final Design Information
Boring 1, Block 137
Green Canyon, Gulf of Mexico
McClelland Engineers, Inc.
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APPENDIX III

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REFERENCES

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Yegian, M. and Wright, S. G., "Lateral Soil-Resistance-Displacement Relationships for Pile Foundation in Soft Clays," Proceedings, 5th Annual Offshore Technology Conference, Paper OTC 1893, Houston, Texas, May, 1973.

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APPENDIX IV

RESUMES

HUDSON MATLOCK
VICE PRESIDENT, RESEARCH AND DEVELOPMENT

EDUCATION

1947 The University of Texas, B.S., Civil Engineering

1950 The University of Texas, M.S., Civil Engineering

EXPERIENCE

1977-present Ertec
Vice President, Research and Development.

1948-1977 The University of Texas, Department of Civil Engineering
Instructor to Professor, Chairman, 1972-1976.

PROFESSIONAL SOCIETIES AND ACTIVITIES

Member, Program Committee, Offshore Technology Conference, representing the American Society of Civil Engineers, 1970-1972
Member of Panel on Certification of Offshore Structures, Marine Board, National Research Council, 1976
Member, Committee on Offshore Energy Technology, Marine Board, National Research Council 1977-1979
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
Society for Experimental Stress Analysis
Registered Professional Engineer, Texas
Texas Society of Professional Engineers
Tau Beta Pi
Chi Epsilon

SELECTED PUBLICATIONS AND PAPERS

"Non-Dimensional Solutions for Laterally Loaded Piles, with Soil Modulus Assumed Proportional to Depth," coauthor with Lymon C. Reese, Proceedings of the Eighth Texas Conference on Soil Mechanics and Foundation Engineering, Special Publication No. 29, Bureau of Engineering Research, The University of Texas, Austin, 1956, 41 pp.

"Procedures and Instrumentation for Tests on a Laterally Loaded Pile," coauthor with E. A. Ripperger, Proceedings of the Eighth Texas Conference on Soil Mechanics and Foundation Engineering, Special Publication No. 29, Bureau of Engineering Research, The University of Texas, Austin, 1956, 39 pp.

Discussion of "Engineering Problems Related to the Design of Offshore Mobile Platforms," coauthor with Lymon C. Reese, a paper by E. C. Rechtin, J. E. Steele, and R. E. Scales, TRANSACTIONS, The Society of Naval Architects and Marine Engineers, New York, 1957, pp. 674-675.

HUDSON MATLOCK
ADDENDUM TO RESUME

PUBLICATIONS AND PAPERS

"Correlations for Design of Laterally Loaded Piles in Soft Clay," 1970 Offshore Technology Conference, Houston, Preprints, Vol. 1, Paper 1204, pp. 577-593.

"Analytical Model for Ice-Structure Interaction," coauthor with William P. Dawkins and John J. Panak, Journal of the Engineering Mechanics Division, American Society of Civil Engineers, Vol. 97, EM4, Paper No. 8282, August 1971, pp. 1083-1092.

"A Nonlinear Analysis of a Soil Supported Frame," coauthor with Clifford O. Hays, 1972 Offshore Technology Conference, Houston, Preprints, Vol. 2, Paper No. 1699, pp. 737-752.

"A Slab Foundation Subjected to Complex Loadings," coauthor with John J. Panak and David W. Fowler, Journal of the American Concrete Institute, Proceedings, Vol. 69, No. 10, October 1972, pp. 630-636.

"A Discrete-Element Method for Transverse Vibrations of Beam-Columns Resting on Linearly Elastic or Inelastic Supports," coauthor with Jack H. C. Chan, 1973 Offshore Technology Conference, Houston, Preprints, Vol. 2, Paper No. 1841, pp. 205-218.

"Nonlinear Discrete Element Analysis of Frames," coauthor with Clifford O. Hays, Journal of the Structural Division, American Society of Civil Engineers, Vol. 99, ST10, Paper No. 10091, October 1973, pp. 2011-2030.

"Prediction of Axially-Loaded Pile Behavior Using Nonlinear Support," coauthor with Patrick L. Meyer and Darrel V. Holmquist, 1975 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 1, Paper No. 2186, pp. 375-388.

"Resistance-Displacement Relationships for Axially-Loaded Piles in Soft Clay," coauthor with Darrel V. Holmquist, 1976 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 2, Paper No. 2474, pp. 553-569.

Discussion of "Full-Scale Lateral Load Tests of Pile Groupings," by Jai B. Kim and Robert J. Brungraber (ASCE Proceedings Paper No. 11849), coauthor with Stephen H. C. Foo, Journal of the Geotechnical Division, Proceedings Paper No. 12585, American Society of Civil Engineers, Vol. GT 12, December 1976, pp. 1921-1922.

"Analysis of Driving of Foundation Piles," coauthor with Stephen H. C. Foo and Patrick L. Meyer, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 2, Paper No. 2842, pp. 281-290.

"A Computer Program for the Analysis of Beam-Columns Under Static Axial and Lateral Loads," coauthor with Dewaine Bogard, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 3, Paper No. 2953, pp. 581-588.

"Three-Dimensional Analysis of Framed Structures with Nonlinear Pile Foundations," coauthor with Larry M. Bryant, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 3, Paper No. 2955, pp. 599-606.

DAVID F. LEAKE
ASSOCIATE AND MANAGER

EDUCATION

1963 U.S. Naval Academy, Annapolis, Maryland, B.S., General Engineering

1969 Georgia Institute of Technology, Atlanta, Georgia, B.S., Civil Engineering

1970 Georgia Institute of Technology, Atlanta, Georgia, M.S., Civil Engineering

EXPERIENCE

1980-present Ertec
Associate and Manager, Gulf States Region, with offices in Houston, Texas, responsible for serving those clients and projects located in the south-central United States.

1975-1980 Fugro Gulf, Inc., Consulting Engineers and Geologists
Initially employed as Project Engineer. Responsible for coordinating field work, laboratory test assignments, analysis of test results, evaluation of data and drafting of engineering reports. Involved primarily with land projects; however, as required, dealt with offshore soils projects such as pile design for offshore platforms.

In July 1977, progressed to Manager-Business Development responsible for marketing company services.

1974-1975 David L. Federer & Associates, Foundation and Soil Engineers
Chief Engineer and Manager of Operations in charge of office and field operations at branch office located in Indianapolis, Indiana, coordinating soils investigations and laboratory work and reviewing engineering reports.

1972-1974 Benton Engineering, Inc., Consulting Engineers in Applied Soil Mechanics
Progressed from Staff Engineer to Project Engineer. Responsible for soils investigations, laboratory test assignments, analysis of test results, and drafting of engineering reports prescribing recommendations for a variety of soil problems, including structural fill, bearing capacity, slope stability, pavement, retaining wall and pile design, and expansive soil treatment.

1963-1972 U.S. Navy
Lieutenant. After five years of duty as line officer, transferred to Civil Engineering Corps. Final duty station - Public Works Center, San Diego, as Assistant Operations Officer and Officer-in-Charge of Contracts, administering government contracts with total annual value of $2.5 million.

HUDSON MATLOCK
VICE PRESIDENT, RESEARCH AND DEVELOPMENT

EDUCATION

1947 The University of Texas, B.S., Civil Engineering

1950 The University of Texas, M.S., Civil Engineering

EXPERIENCE

1977-present Ertec
Vice President, Research and Development.

1948-1977 The University of Texas, Department of Civil Engineering
Instructor to Professor, Chairman, 1972-1976.

PROFESSIONAL SOCIETIES AND ACTIVITIES

Member, Program Committee, Offshore Technology Conference, representing the American Society of Civil Engineers, 1970-1972
Member of Panel on Certification of Offshore Structures, Marine Board, National Research Council, 1976
Member, Committee on Offshore Energy Technology, Marine Board, National Research Council 1977-1979
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
Society for Experimental Stress Analysis
Registered Professional Engineer, Texas
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SELECTED PUBLICATIONS AND PAPERS

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"Procedures and Instrumentation for Tests on a Laterally Loaded Pile," coauthor with E. A. Ripperger, Proceedings of the Eighth Texas Conference on Soil Mechanics and Foundation Engineering, Special Publication No. 29, Bureau of Engineering Research, The University of Texas, Austin, 1956, 39 pp.

Discussion of "Engineering Problems Related to the Design of Offshore Mobile Platforms," coauthor with Lymon C. Reese, a paper by E. C. Rechtin, J. E. Steele, and R. E. Scales, TRANSACTIONS, The Society of Naval Architects and Marine Engineers, New York, 1957, pp. 674-675.

SELECTED PUBLICATIONS AND PAPERS (Cont.)

Discussion of "Soil Modulus for Laterally Loaded Piles," by Bramlette McClelland and John A. Focht, Jr. (ASCE Proceedings Paper 1081) TRANSACTIONS, American Society of Civil Engineers, Vol. 123, 1958, pp. 1079-1081.

"Measurement of Soil Pressure on a Laterally Loaded Pile," coauthor with E. A. Ripperger, Proceedings, American Society for Testing Materials, Vol. 58, pp. 1245-1259, Boston, 1958.

"Numerical Analysis of Laterally Loaded Piles," coauthor with Lymon C. Reese, Proceedings, Second Structural Division Conference on Electronic Computation, American Society of Civil Engineers, Pittsburgh, September 1960, pp. 657-668.

"Foundation Analysis of Offshore Pile-Supported Structures," coauthor with Lymon C. Reese, Proceedings, Fifth International Conference, International Society of Soil Mechanics and Foundation Engineering, 3B/14, Paris, July 1961, pp. 91-97.

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"Inelastic Bending and Buckling of Piles," coauthor with T. Allan Haliburton, Session I, Proceedings, Conference on Deep Foundations, Mexican Society of Soil Mechanics, Mexico City, December 1964, Vol. I, pp. 111-125.

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"Behavior of a Two-Dimensional Pile Group Under Inclined and Eccentric Loading," coauthor with Lymon C. Reese, Proceedings, Offshore Exploration Conference, Long Beach, California, February 1966, pp. 123-129.

"Finite Difference Methods for Plate Vibration Problems," coauthor with Harold J. Salane, Journal of the Structural Division, American Society of Civil Engineers, Vol. 95, ST3, Paper No. 6477, March 1969, pp. 441-456.

"A Model for the Prediction of Ice-Structure Interaction," coauthor with William P. Dawkins and John J. Panak, 1969 Offshore Technology Conference, Houston, Preprints, Vol. 1, Paper 1066, pp. 687-694.

HUDSON MATLOCK
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PUBLICATIONS AND PAPERS

"Correlations for Design of Laterally Loaded Piles in Soft Clay," 1970 Offshore Technology Conference, Houston, Preprints, Vol. 1, Paper 1204, pp. 577-593.

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"A Nonlinear Analysis of a Soil Supported Frame," coauthor with Clifford O. Hays, 1972 Offshore Technology Conference, Houston, Preprints, Vol. 2, Paper No. 1699, pp. 737-752.

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"A Discrete-Element Method for Transverse Vibrations of Beam-Columns Resting on Linearly Elastic or Inelastic Supports," coauthor with Jack H. C. Chan, 1973 Offshore Technology Conference, Houston, Preprints, Vol. 2, Paper No. 1841, pp. 205-218.

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"Prediction of Axially-Loaded Pile Behavior Using Nonlinear Support," coauthor with Patrick L. Meyer and Darrel V. Holmquist, 1975 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 1, Paper No. 2186, pp. 375-388.

"Resistance-Displacement Relationships for Axially-Loaded Piles in Soft Clay," coauthor with Darrel V. Holmquist, 1976 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 2, Paper No. 2474, pp. 553-569.

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"Analysis of Driving of Foundation Piles," coauthor with Stephen H. C. Foo and Patrick L. Meyer, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 2, Paper No. 2842, pp. 281-290.

"A Computer Program for the Analysis of Beam-Columns Under Static Axial and Lateral Loads," coauthor with Dewaine Bogard, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 3, Paper No. 2953, pp. 581-588.

"Three-Dimensional Analysis of Framed Structures with Nonlinear Pile Foundations," coauthor with Larry M. Bryant, 1977 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 3, Paper No. 2955, pp. 599-606.

PUBLICATIONS AND PAPERS (Cont.)

"Simulation of Lateral Pile Behavior Under Earthquake Motion," coauthor with Stephen H. C. Foo and Larry M. Bryant, Proceedings, Specialty Conference on Earthquake Engineering and Soil Dynamics, Geotechnical Division, American Society of Civil Engineers, Pasadena, California, 1978.

"Example of Soil-Pile Coupling Under Seismic Loading," coauthor with Stephen H. C. Foo and L. C. Cheang, 1978 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 4, Paper No. 3310, pp. 2261-2269.

"Axial Analysis of Piles Using a Hysteretic and Degrading Soil Model," coauthor with Stephen H. C. Foo, Proceedings of the International Conference on Numerical Methods in Offshore Pilings, London, May 1979.

"Design of Pile Foundations," coauthor with I. Lam, Proceedings, International Symposium on Marine Soil Mechanics, Mexico City, February 1980.

"Field Tests of the Lateral-Load Behavior of Pile Groups in Soft Clay," coauthor with W. B. Ingram, A. E. Kelly, and D. Bogard, 1980 Offshore Technology Conference, Houston, Texas, Proceedings, Vol. 4, Paper No. 3871, pp. 163-174.

"Various Aspects of Soil-Structure Interaction as Related to Offshore Drilling Platforms," Proceedings, First Indian Conference in Ocean Engineering, Madras, India, February 1981.

"Soil-Pile Interaction in Liquefiable Cohesionless Soils During Earthquake Loading," coauthor with G. R. Martin, I. P. Lam, and C. F. Tsai, Proceedings, International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, April 1981.

"Evaluation of Concepts for Guyed Tower Foundations," coauthor with I. P. Lam and L. Cheang, Paper No. 4147, Proceedings, Thirteenth Annual Offshore Technology Conference, Houston, Texas, May 1981.

DAVID F. LEAKE
ASSOCIATE AND MANAGER

EDUCATION

1963 U.S. Naval Academy, Annapolis, Maryland, B.S., General Engineering

1969 Georgia Institute of Technology, Atlanta, Georgia, B.S., Civil Engineering

1970 Georgia Institute of Technology, Atlanta, Georgia, M.S., Civil Engineering

EXPERIENCE

1980-present Ertec
Associate and Manager, Gulf States Region, with offices in Houston, Texas, responsible for serving those clients and projects located in the south-central United States.

1975-1980 Fugro Gulf, Inc., Consulting Engineers and Geologists
Initially employed as Project Engineer. Responsible for coordinating field work, laboratory test assignments, analysis of test results, evaluation of data and drafting of engineering reports. Involved primarily with land projects; however, as required, dealt with offshore soils projects such as pile design for offshore platforms.

In July 1977, progressed to Manager-Business Development responsible for marketing company services.

1974-1975 David L. Federer & Associates, Foundation and Soil Engineers
Chief Engineer and Manager of Operations in charge of office and field operations at branch office located in Indianapolis, Indiana, coordinating soils investigations and laboratory work and reviewing engineering reports.

1972-1974 Benton Engineering, Inc., Consulting Engineers in Applied Soil Mechanics
Progressed from Staff Engineer to Project Engineer. Responsible for soils investigations, laboratory test assignments, analysis of test results, and drafting of engineering reports prescribing recommendations for a variety of soil problems, including structural fill, bearing capacity, slope stability, pavement, retaining wall and pile design, and expansive soil treatment.

1963-1972 U.S. Navy
Lieutenant. After five years of duty as line officer, transferred to Civil Engineering Corps. Final duty station - Public Works Center, San Diego, as Assistant Operations Officer and Officer-in-Charge of Contracts, administering government contracts with total annual value of $2.5 million.

PROFESSIONAL SOCIETIES AND ACTIVITIES

Registered Professional Engineer - Texas, California, Louisiana, and Indiana
American Society of Civil Engineers
American Society of Military Engineers
The Society for Marketing Professional Services

PUBLICATIONS AND PAPERS

"A Study of the Reliability of the Multi-Stage Triaxial Test," unpublished paper, Master's Degree Program, Georgia Institute of Technology, 1969.

JEAN M. E. AUDIBERT
ASSOCIATE AND MANAGER OF ENGINEERING

EDUCATION

1968 Ecole Nationale Supérieure d'Arts et Métiers, Paris, France; Diplôme d'Ingénieur, Engineering

1972 Duke University, Durham, N.C.; Ph.D., Civil Engineering

EXPERIENCE

1981-present Ertec Western, Inc.
Manager of Engineering and Associate. Responsible for overall supervision and coordination of engineers and scientists and for technical direction and management of projects including site investigations, soil characterization, foundation design, pipeline routing and engineering, and research and development studies, both onshore and offshore.

1977-1981 Woodward-Clyde Consultants; Houston, Texas.
Progressed from Project Engineer (1977-1978) to Senior Project Engineer (1979-1980) to Manager of Engineering of Offshore Services Division and Associate of the firm (1981).

While at Woodward-Clyde, developed extensive experience in platform foundation and pipeline projects, both for site specific designs and general State-of-the-Art technology development. Directed or worked in a major capacity in more than 30 pile-supported and jack-up platform projects located in the Gulf of Mexico, off the U. S. East and West Coasts, Lower Cook Inlet and Norton Sound, Alaska, off the coast of Chile and in the Gulf of Cadiz, Spain. Also directed the foundation design and analyses for the feasibility study of a guyed tower as a production platform in 1,000 feet of water for the Gulf of Mexico and directed the site investigation and foundation engineering for deep water template structures.

Served as the main investigator in studies of the State-of-Practice and State-of-the-Art for the design and analysis of foundations for offshore pile-supported and gravity structures. Participated in the direction of a technology development project to create new analyses procedures for pile-supported structures subjected to intense wave loadings and strong earthquake ground motions. Also directed State-of-the-Art reviews on Pile Group Foundations and on Pile Foundations in Calcareous Soils.

Since 1975, performed research in soil-pipeline interaction, and has applied the results to the design of pipelines subjected to seafloor instabilities. In 1979, was awarded the Collingwood Prize for this research by the American Society of Civil Engineers. Directed the geotechnical evaluation of the performance and behavior of 13-ft diameter offshore concrete intake conduits laid in the Persian Gulf and of an 11-ft diameter concrete ocean outfall crossing the Barrier Islands, in Nasaugh County, L.I. Also directed projects associated with the routing and design of offshore pipelines laid across mudslide areas off the Mississippi Delta.

1976 — Geotechnical Engineers, Inc. Winchester, Massachusetts.
Assistant Project Manager. Participated in geotechnical studies associated with the Pilgrim II Nuclear Power Station, Plymouth, Massachusetts, the design of a tank farm foundation for the Mystic Oilfired Power Station, Everett, Massachusetts and the foundation studies for, and the design of, the Constance M. Fiske Dam, Framingham, Massachusetts.

1974-1975 — Stone & Webster Engineering Corporation, Boston, Massachusetts
Lead Geotechnical Engineer. While with S&W gained extensive experience in onshore geotechnical engineering was in charge of all geotechnical aspects associated with nuclear power plant projects (North Anna Power Station, Mineral, Virginia; Beaver Valley Power Station, Shippingport, Pennsylvania; fossil fired power plants (proposed Pointe Coupee Power Station, Baton Rouge, Louisiana), refineries and tank farms (Paulsboro Refinery, Paulsboro, New Jersey). Participated in the performance inspection of the North Anna Main Dam, Louisa County, Virginia. Also served as a member of an advisory team to the Netherlands government on the foundation design and analysis for offshore concrete structures used in the closure of the Oosterscheldt.

1972-1973 — Universite Laval, Quebec, Canada.
Visiting Research Associate at Laval University. Taught an introductory course on the finite element method, pursued studies on the wave equation method for pile driving, participated in research on embankments built on sensitive Canadian clays, supervised the construction of plane strain devices for the testing of clays and participated in various aspects of research on testing and sampling of quick clays.

1968-1972 — Duke University
As a Research Associate, was involved in research studies on the behavior of sand under plane strain conditions, the evaluation of constitutive relationships to be used in finite element studies and the teaching of undergraduate soil laboratory courses.

PROFESSIONAL SOCIETIES AND ACTIVITIES

Professional Engineers: Massachusetts and Texas
Societe des Ingenieurs Arts et Metiers
International Society of Soil Mechanics and Foundation Engineering
American Society of Civil Engineers
Engineering Science Society
Chi Epsilon
1980 ASCE James Croes Medal
1979 ASCE Collingwood Prize
1978 Woodward-Clyde Consultants' Young Professional Award
1968-69 Fullwright Fellow

Publications

Over 25 publications in the areas of geotechnical engineering, marine foundations design, dynamic reponse of site foundations and pipeline-soil interaction.

THOMAS K. HAMILTON
PROJECT ENGINEER

EDUCATION

1970 Texas A & M University, College Station, Texas, B.S., Civil Engineering

1977 Texas A & M University, College Station, Texas, M.S., Civil Engineering

EXPERIENCE

1981-present — Ertec
Project Engineer. Responsible for field investigations, laboratory studies, and geotechnical engineering. Other duties include marketing, program development, and participation in special research and development and sponsored projects.

1977-1981 — Fugro Gulf, Inc., Consulting Engineers and Geologists
Staff Engineer to Project Engineer. Initially assigned to supervise geotechnical field investigations for onshore and offshore projects; responsibilities included formulation of laboratory testing programs and performance of engineering analyses to develop foundation design parameters. On select projects, employed advanced in-situ testing tools. Other duties included operational management of cone penetrometer (CPT) equipment and interpretation of CPT test results. Later assigned to Technical Services Group responsible for special geotechnical projects. Major assignment in this group was Project Manager for all phases of an instrumented large-scale pile load test for a major oil company. Requirements included site selection and validation, design of test pile and test system, fabrication and installation of test pile, performance of three-phase test program, data reduction and analysis, and report preparation.

1975-1977 — Texas A & M University, College Station, Texas
Research Assistant. Assigned to project for USGS to examine self-burial capabilities of offshore pipelines. Responsibilities included offshore surveying and data interpretation, laboratory model testing and analysis, computer simulations, and report writing. Also performed independent consulting including contract laboratory testing and engineering analysis for special projects; e.g., sheet-pile bulkhead failure.

1970-1975 — United States Air Force
Captain. Served as jet transport pilot in global operations. Responsibilities included command of aircraft and crew. Also served as instructor pilot and flight examiner.

PROFESSIONAL SOCIETIES AND ACTIVITIES

American Society of Civil Engineers, Associate Member
Registered Professional Engineer in Texas, No. 49212

SHORT COURSES AND SYMPOSIUMS

Offshore Geologic Hazards Short Course, Houston, 1978

Symposium on Site Exploration in Soft Ground Using In-Situ Techniques, Washington, D.C., 1978

Workshop on Pore Pressures in Submarine Sediments, Miami, 1979

PUBLICATIONS AND PAPERS

"The Validity of Analytical Methods for Predicting Self-Burial of Offshore Pipelines," unpublished Master's Thesis, Texas A & M University, August 1977.

IGNATIUS P. LAM
PROJECT ENGINEER

EDUCATION

1976 — California Institute of Technology, Pasadena, California, Engineering Degree in Civil Engineering.

1974 — California Institute of Technology, M.S. in Civil Engineering.

1973 — Ohio State University, Columbus, Ohio, B.S., Civil Engineering.

EXPERIENCE

1976-present — Ertec

Project Engineer for Research and Development. Provides technical consultation on analytical and computation aspects of engineering. Updates and develops new computer programs for in-house usage. Organizes in-house research activities including professional publications. Supervises small teams of engineering staff in developing new methodologies on special analytical jobs. Actively involved in areas of offshore structures, soil-pile interactions, and constitutive modeling of soils.

Staff Engineer for Soil Dynamics Group (1976-79). Performed analytical and computer analyses as well as report writing. Participated in setting up and maintenance of in-house computer library. Assisted and provided consultation on computer analyses to other engineering groups. Areas of study included: slope stability; ground-water seepage; settlements; computer graphics; soil dynamics aspects such as earthquake site response, soil-structure interactions, and offshore pile responses; and earthquake engineering problems such as response spectra and artificial strong ground motion generations.

1974-1976 — California Institute of Technology

Research Assistant involved in testing of sampler and footpad of Viking project for the Jet Propulsion Laboratory, Pasadena, California.

PROFESSIONAL SOCIETIES AND ACTIVITIES

Registered Professional Engineer, California, 1979
American Society of Civil Engineers, Member
Seismological Society of America, Member
International Society for Soil Mechanics and Foundation Engineering

PUBLICATIONS AND PAPERS

"Stress-Strain Laws for Cyclic Loading: From Theory to Practice," Proceedings, Symposium on Implementation of Computer Procedures and Stress-Strain Laws in Geotechnical Engineering at Chicago, Illinois, August 1981, coauthor with G. R. Martin.

"Evaluation of Concepts for Guyed Tower Foundations," Proceedings, 1981 Offshore Technology Conference, Houston, Texas, Vol. 4, Paper No. 4147, pp. 319-330, coauthor with H. Matlock and L. C. C. Cheang.

"Soil-Pile Interaction in Liquefiable Cohesionless Soils During Earthquake Loading," Proceedings, International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, Vol. 2, April 1981, coauthor with H. Matlock, G. R. Martin, and C. F. Tsai.

"A Parametric Study of an Effective Stress Liquefaction Model," Proceedings, International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, Vol. 2, April 1981, coauthor with G. R. Martin, S. L. McCaskie, and C. F. Tsai.

"Design of Pile Foundations," Proceedings, International Symposium on Marine Soil Mechanics, Mexico City, February 1980, coauthor with H. Matlock.

"Pore Pressure Dissipation During Offshore Cyclic Loading," Journal of the Geotechnical Engineering Division, ASCE, September 1980, coauthor with G. R. Martin and C. F. Tsai.

"Seismic Response of Cohesive Marine Soils," Journal of the Geotechnical Engineering Division, ASCE, September 1980, coauthor with G. R. Martin and C. F. Tsai.

"Seismic Response of Soft Offshore Soils - A Parametric Study," Proceedings, Second U.S. National Conference on Earthquake Engineering at Stanford, California, August 1979, coauthor with G. R. Martin, C. F. Tsai, and D. G. Anderson.

"Seismic Response of Cohesive Marine Soils," Symposium on Soil Dynamics in the Marine Environment, ASCE National Convention, Boston, Mass., April 1979, coauthor with C. F. Tsai and G. R. Martin.

"Dissipation of Pore Pressures During Offshore Cyclic Loading," Symposium on Soil Dynamics in the Marine Environment, ASCE National Convention, Boston, Mass., April 1979, coauthor with G. R. Martin and C. F. Tsai.

"SPASM 8 - A Dynamic Beam Column Program for Seismic Pile Analysis with Support Motions," Documentation Report prepared for Chevron Oil Field Research Company, La Habra, California, January 1979, coauthor with H. Matlock, S. H. C. Foo, and C. F. Tsai.

"Determination of Site Dependent Spectra Using Non-Linear Analysis," Proceedings, Second International Conference on Microzonation, San Francisco, California, November 1978, coauthor with C. F. Tsai and G. R. Martin.

"Edge Function Method Applied to Plates on Spring Foundations," Engineer's Thesis, California Institute of Technology, 1976.

IGNATIUS P. LAM
PROJECT ENGINEER

EDUCATION

1976 — California Institute of Technology, Pasadena, California, Engineering Degree in Civil Engineering.

1974 — California Institute of Technology, M.S. in Civil Engineering.

1973 — Ohio State University, Columbus, Ohio, B.S., Civil Engineering.

EXPERIENCE

1976-present — Ertec

Project Engineer for Research and Development. Provides technical consultation on analytical and computation aspects of engineering. Updates and develops new computer programs for in-house usage. Organizes in-house research activities including professional publications. Supervises small teams of engineering staff in developing new methodologies on special analytical jobs. Actively involved in areas of offshore structures, soil-pile interactions, and constitutive modeling of soils.

Staff Engineer for Soil Dynamics Group (1976-79). Performed analytical and computer analyses as well as report writing. Participated in setting up and maintenance of in-house computer library. Assisted and provided consultation on computer analyses to other engineering groups. Areas of study included: slope stability; ground-water seepage; settlements; computer graphics; soil dynamics aspects such as earthquake site response, soil-structure interactions, and offshore pile responses; and earthquake engineering problems such as response spectra and artificial strong ground motion generations.

1974-1976 — California Institute of Technology

Research Assistant involved in testing of sampler and footpad of Viking project for the Jet Propulsion Laboratory, Pasadena, California.

PROFESSIONAL SOCIETIES AND ACTIVITIES

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International Society for Soil Mechanics and Foundation Engineering

PUBLICATIONS AND PAPERS

"Stress-Strain Laws for Cyclic Loading: From Theory to Practice," Proceedings, Symposium on Implementation of Computer Procedures and Stress-Strain Laws in Geotechnical Engineering at Chicago, Illinois, August 1981, coauthor with G. R. Martin.

"Evaluation of Concepts for Guyed Tower Foundations," Proceedings, 1981 Offshore Technology Conference, Houston, Texas, Vol. 4, Paper No. 4147, pp. 319-330, coauthor with H. Matlock and L. C. C. Cheang.

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"A Parametric Study of an Effective Stress Liquefaction Model," Proceedings, International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, Vol. 2, April 1981, coauthor with G. R. Martin, S. L. McCaskie, and C. F. Tsai.

"Design of Pile Foundations," Proceedings, International Symposium on Marine Soil Mechanics, Mexico City, February 1980, coauthor with H. Matlock.

"Pore Pressure Dissipation During Offshore Cyclic Loading," Journal of the Geotechnical Engineering Division, ASCE, September 1980, coauthor with G. R. Martin and C. F. Tsai.

"Seismic Response of Cohesive Marine Soils," Journal of the Geotechnical Engineering Division, ASCE, September 1980, coauthor with G. R. Martin and C. F. Tsai.

"Seismic Response of Soft Offshore Soils - A Parametric Study," Proceedings, Second U.S. National Conference on Earthquake Engineering at Stanford, California, August 1979, coauthor with G. R. Martin, C. F. Tsai, and D. G. Anderson.

"Seismic Response of Cohesive Marine Soils," Symposium on Soil Dynamics in the Marine Environment, ASCE National Convention, Boston, Mass., April 1979, coauthor with C. F. Tsai and G. R. Martin.

"Dissipation of Pore Pressures During Offshore Cyclic Loading," Symposium on Soil Dynamics in the Marine Environment, ASCE National Convention, Boston, Mass., April 1979, coauthor with G. R. Martin and C. F. Tsai.

"SPASM 8 - A Dynamic Beam Column Program for Seismic Pile Analysis with Support Motions," Documentation Report prepared for Chevron Oil Field Research Company, La Habra, California, January 1979, coauthor with H. Matlock, S. H. C. Foo, and C. F. Tsai.

"Determination of Site Dependent Spectra Using Non-Linear Analysis," Proceedings, Second International Conference on Microzonation, San Francisco, California, November 1978, coauthor with C. F. Tsai and G. R. Martin.

"Edge Function Method Applied to Plates on Spring Foundations," Engineer's Thesis, California Institute of Technology, 1976.

G. LEON HOLLOWAY
STAFF ENGINEER

EDUCATION

1977 Texas A & M University, College Station, Texas, B.S., Civil Engineering

1978 Texas A & M University, College Station, Texas, M.S., Civil Engineering

EXPERIENCE

1981-present — Ertec
Staff Engineer. Responsibilities include field investigations, laboratory studies, engineering analysis, and report preparation. Other duties include coordination of activities for operational projects, proposals preparation, and marketing.

1978-1981 — Fugro Gulf, Inc.
Staff Engineer to Senior Staff Engineer. Responsible for evaluation and reporting of geotechnical aspects for the design of offshore structures. Duties included the supervision of site investigations worldwide, planning laboratory test programs, engineering analyses and design, data analysis pertaining to large-scale pile load tests, report and proposal preparation, and training new engineers in offshore drilling techniques and operations.

Coordinated field geotechnical engineering operations and investigations for work in both the Bay of Campeche and the West Coast of Africa. Supervised pile driving operations for a major tanker terminal in the Red Sea off Saudi Arabia and a state-of-the-art investigation in foundation conditions along the entire Venezuelan coastline.

Designed foundations for offshore structures in the Gulf of Mexico, Red Sea, Baltimore Canyon area, Venezuela, Brazilian and West African coasts.

Recently supervised the planning, construction, and testing of a large-scale pile test near Iwaki, Japan.

Responsible for site investigation, evaluation, and reporting of mobile drilling rig leg penetrations in the Gulf of Mexico, Bay of Campeche, and Venezuela.

1977-1978 — Texas Transportation Institute
Research Assistant. Involved in experimental and analytical studies to develop a new design criteria for laterally loaded drilled shafts in cohesive soils.

1977-1978 — Texas A & M University, Department of Civil Engineering
Short Course Instructor. Served as an individual and group instructor for the use and application of the wave equation (pile driving).

1976-1977 — American Society of Civil Engineers
Student Worker. Worked directly with the Executive Director for the Texas Section, ASCE, in coordinating the printing and mailing of the TEXAS CIVIL ENGINEER magazine.

EXPERIENCE (Cont.)

1976 Texas A & M University, Department of Civil Engineering
Student Research Assistant. Responsible for data collection and interpretation of problems dealing with drawdown of wells along the Texas Gulf Coast. Example problems and illustrative pictorials were also made for short course which was taught throughout Texas.

PROFESSIONAL SOCIETIES AND ACTIVITIES

American Society of Civil Engineers
Chi Epsilion - National Civil Engineering Honorary Fraternity
Tau Beta Pi - National Engineering Honorary Fraternity
Phi Kappa Phi - National Scholastic Honor Society
Phi Eta Sigma - Freshman Engineering Honor Fraternity

PUBLICATIONS AND PAPERS

"Design of Drilled Shafts in Clay for Supporting Precast Panel Retaining Walls," with H. M. Coyle, R. E. Burtoskewitz, and W. G. Sarver, Research Report No. 211-2, Texas Transportation Institute, Texas A & M University, October 1978.

J. DEWAINE BOGARD
PROJECT ENGINEER

EDUCATION

1970 The University of Texas at Austin, B.S. in Civil Engineering

1979 The University of Texas at Austin, M.S. in Civil Engineering

EXPERIENCE

1981-present — Ertec
Project Engineer. Responsible for field investigations, laboratory studies, and geotechnical engineering. Duties include marketing, business development, and Research and Development and special projects.

1979-1981 — Fugro Gulf, Inc., Consulting Engineers and Geologists
Project Engineer. Responsibilities included the planning, design, instrumentation, and fabrication of two large-scale axial test piles; the performance of the load tests; collection and analysis of data; and the preparation of reports. Other duties included the consultation with staff engineers on nonstandard pile foundation design problems, including the analysis of group pile test data and pile drivability studies.

1975-1979 — The University of Texas at Austin
Research Assistant. Responsibilities included the performance of laboratory studies of axially-loaded pile models, development of instrumentation for field studies of expansive clays, and the development of computer solutions for axially and laterally loaded beam columns. Duties included the planning, design, and instrumentation of pile models to measure shear transfer, pore pressure, and displacement; the development of instrumentation to measure negative pore pressures in partially saturated clay soils; the collection and analysis of data from laboratory and field tests; and the preparation of reports and technical papers.

1970-1975 — Hudson Matlock, Consulting Engineer
Research Engineer. Responsibilities included the planning, design, and fabrication of laboratory models for studies of cyclic load behavior in a confined soft clay; computer studies of the dynamic lateral behavior of piles during pile driving; and the design of instrumentation for installation in existing foundation piles. Duties included the instrumentation and fabrication of laboratory models, the collection of data during static and cyclic load tests, the analysis of data, and report preparation.

1967-1970 — The University of Texas at Austin
Technical Staff Assistant. Responsibilities included the maintenance of laboratory equipment and instruments used in the strength of materials and experimental mechanics laboratory courses; the preparation of instrumented and noninstrumented specimens for laboratory experiments; and assistance in teaching a laboratory course in experimental mechanics.

EXPERIENCE (Cont.)

1966-1967 Matlock, Hudson, Dawkins, and Panak, Consulting Engineers
Engineering Technician. Responsibilities included participation in field tests of the lateral-load behavior of piles and pile groups and laboratory studies of the lateral-load behavior of skirt-plates in soft clay soils. Duties involved instrumentation and calibration of models, the performance of static and cyclic tests, and the collection and reduction of data.

PUBLICATIONS AND PAPERS

"Lateral Load Behavior of Piles and Pile Groups Under Surcharge," with H. Matlock, unpublished report to Chevron Oil Field Research Company, Austin, Texas, 1973.

"Pile-Model Scale Effects and Cyclic Vane Shear Tests," with H. Matlock, an unpublished report to Chevron Oil Field Research Company, Austin, Texas, 1975.

"Observation of an Expansive Clay Under Controlled Conditions," with J. P. Stevens, P. N. Brotcke, and H. Matlock, Research Report 118-9F, Center for Highway Research, The University of Texas at Austin, 1976.

"A Computer Program for the Analysis of Beam-Columns Under Static Axial and Lateral Loads," 1977 Offshore Technology Conference, Houston, Paper No. 2953.

"A Model Study of Axially Loaded Pile Segments, Including Pore Pressure Measurements," with H. Matlock, a report to the American Petroleum Institute, Austin, Texas, 1979.

"Field Tests of the Lateral-Load Behavior of Pile Groups in Soft Clay," with H. Matlock, W. B. Ingram, and A. E. Kelley, 1980 Offshore Technology Conference, Houston, Texas, Paper No. 3871.

RONALD LEE BOGGESS
RESEARCH ENGINEER

EDUCATION

1972 — Texas A & M University, College Station, Texas, B.S. in Mechanical Engineering

EXPERIENCE

1981-present — Ertec
Research Engineer. Responsibilities include technical leadership of Houston-based Research and Development group in establishing and maintaining state-of-the-art instrumentation and equipment capabilities and providing systematic monitoring of data quality; and research search design and development of specialized tools and equipment. Other duties include assisting with marketing efforts, proposal preparation, and technical presentations.

1978-1981 — Fugro Gulf, Inc., Consulting Engineers and Geologists
Research Engineer. Responsible for electromechanical direction and technical planning for various research and development projects as well as commercial projects.

1972-1978 — Texas A & M University, Civil Engineering Department, and Texas Transportation Institute (TTI)
Engineering Research Associate (1976-78). Responsibilities included all phases of research from proposal to final report. Research included: Pavement evaluation - the development of nonstandard methods for nondestructive testing. Storm-related mudslides - instrumenting a region of the Mississippi Delta with piezometers to monitor pore pressure during storms. Fatigue and thermal cracking of asphaltic concrete - the construction of a machine that simulates the cyclic thermal stress condition in flexible pavement overlays.

Electronic Technician II (1972-1976). Half-time Civil Engineering Department duties consisted of setting up new soil test equipment for graduate as well as undergraduate soils lab course. Equipment included direct shear, consolidation and triaxial compression, Atterberg limits, vane shear, permeability, flow net and capillarity. Other duties included assisting professors in teaching the lab portion of the course as well as planning experiment schedules, maintaining equipment, ordering expendable and capital equipment, and ensuring generally smooth operation of the laboratory facility for both classroom and research use.

Half-time TTI pavement design division duties consisted of experimental design, instrumentation, and computer analysis of experimental data. Experiments consisted of dynamic modulus measurement of base course material and study of methods available to detect and objectively record pavement cracking while traveling at or near highway speeds. Instruments developed included a noninterconnected electromagnetic displacement transducer with an accuracy better than $\pm$0.0005 inch at a spacing of 2 inches.

EXPERIENCE (Cont.)

1969-1972 — Texas A & M University, Terramechanics Laboratory
Electronic Technician. Responsible for instrumentation at the Terramechanics Lab. Also responsible for gathering data on tests performed, including soil testing to ensure target consistency (i.e., density, moisture content, shear strength). Work dealt with penetration of soil with instrumented projectiles. Data acquisition systems were electronics, still photography, and high speed movies.

1967-1969 — J. W. Hall, Consulting Engineers
Designer-Draftsman. Designed air-conditioning and plumbing.

1966 — Watkins-Johnson
Mechanical Designer. Designed mechanical packages for prototype systems. Hired originally as an electronic technician, but the responsibility of the division was shifted to mechanical design. Designed mechanical packages for prototype microwave systems.

PROFESSIONAL SOCIETIES AND ACTIVITIES

American Society of Mechanical Engineers
Texas Professional Photographers Association
Texas Society of Professional Engineers
Registered Professional Engineer, Texas

PUBLICATIONS AND PAPERS

"Characteristics of Expansive Clay and Roughness of Pavements," coauthor with R. L. Lytton and J. W. Spotts, presented at the Transportation Research Board, 54th Annual Meeting, 1975.

"The Duomorph - A Complex Modulus Transducer," coauthor with J. Noel and Dr. Saylak, presented to the Instrument Society of America, Albuquerque, New Mexico, 1978.

LINO CHOI-CHI CHEANG
STAFF ENGINEER

EDUCATION

1978 The University of Texas, Austin, Texas, B.S., Civil Engineering

1979 The University of Texas, Austin, Texas, M.S., Civil Engineering

EXPERIENCE

1981-present Ertec
Staff Engineer. Duties include computer development and application on soil-pile interaction problems and organization of in-house research activities.

1979-1981 Fugro Gulf, Inc., Consulting Engineers and Geologists, Houston, Texas
Staff Engineer. Responsibilities included supervision of offshore site investigation from drilling vessel and jack-up rig. Other duties included driveability study and nonstandard foundation design problems such as pile group, guyed tower platform, and jack-up rig leg penetration.

1977-1979 The University of Texas, Civil Engineering Research, Austin, Texas
Research Assistant. Responsibilities included the design, fabrication, and instrumentation of model test piles for pile group study. Also computer application to develop soil models to analyze dynamic and cyclic response of pile foundations.

PROFESSIONAL SOCIETIES AND ACTIVITIES

American Society of Civil Engineers

PUBLICATIONS AND PAPERS

"Evaluation of Concepts for Guyed Tower Foundations," with H. Matlock and I. P. Lam, Proceedings, Offshore Technology Conference, Houston, Texas, May 1981, OTC 4147.

"Example of Soil-Pile Coupling Under Seismic Loading," with H. Matlock and S. H. C. Foo, Proceedings, Offshore Technology Conference, Houston, Texas, May 1981, OTC 3310.