DOE/BC/14865--4

Sept. 30th Report

TITLE: SUPPORT OF ENHANCED OIL RECOVERY TO INDEPENDENT PRODUCERS IN TEXAS

Grant/Cooperative Agreemnet: DE-FG22-94BC14865

Contractor Name and Address: Prairie View A&M University, Office of Fiscal Affairs, W.R. Banks Building, Room 101, Prairie View, Texas 77446

Date of Report: September 30, 1995

Award Date: October 1, 1994

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Anticipated Completion Date: December 1, 1996

Government Award for Current Fiscal Year: $86,582

Principal Investigator: Kamel H. Fotouh

Project Manager: Herbert A. Tiedemann, Bartlesville Project Office

Reporting Period: July 1, 1995 - September 30, 1995

Objective

The principal ojective of this project is to support Independent Oil Producers (IP's) in Texas and to improve the productivity of marginal wells utilizing enhanced oil recovery technology. The first year of the project was a very challenging one due to the lack of infra-structure and track record a historically black university (HBU) has in the area of petroleum production. The main tasks carried out in this quarter are:

1. An electronic database was generated internally with the help of student workers.

2. A proposal was submitted by Mr. Frank W. Cole of Comanche Energy regarding a joint demonstration EOR project in the Austin Chalk area of Texas.

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3. An effort was made to offer a one-and-half day workshop on reservoir characterization. Little response was received by Prairie View over 400 independents contacted.

Summary of Technical Progress

Generation of an Electronic Database:

Prairie View A&M University team has successfully prepared its own IP's database. Appendix 1 shows a partial print out of this database. This will be made available at no charge to any DOE sponsored projects in Texas.

Enhanced Oil Recovery Demonstration Project Proposals

A preliminary proposal was submitted to the principal investigator from Comanche Energy, Inc. in late June 1995. The proposal is to use continuous water injection to displace oil in the Austi Chalk area. Attached in Appendix 2 is a copy of the preliminary proposal submitted by Comanche Energy, Inc.

Technology Transfer Workshop:

A reservoir characterization workshop was organized by the project team. An announcement /registration form was sent out to over 350 independent oil producers in Texas. A mailing list prepared by Westport Research Center in Houston was also used.

Ms. Edith Allison of the DOE office of Fossil Energy, Class 1 and 3 Program Manager, Mr. Richard Drozd, and Jessy Jones both of Westport Research Center International, Mr. R. Bruce Farmer of Pennzoil, and Kamel H. Fotouh the principal investigator of this project were the workshop instructors. Mr. Herb Tiedeman of BPO was also scheduled to make a site visit on the proposed workshop date, September 22, 1995. The workshop did not materialize due to poor response from independents. Appendix 3 shows a copy of the registration flyer and the correspondence made with Ms. Edie Allison of BPO.

Presentation Prepared by Kamel H. Fotouh:

A presentation was prepared, by K. Fotouh, PI, on: "Economic Potential of Improved Oil Recovery (IOR) Projects for Independent Oil Producers (IP's) in Texas."

A copy of this presentation is given in Appendix 4.

Areas of Concern:

As of the date of this report a project coordinator was not found. The search is continuing. The principal investigator waited until the DOE budget for the second year of this project was confirmed before proceeding with the hiring.

DISCLAIMER

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Appendix 1

Appendix 2

Appendix 3

Appendix 4

Appendix (1)

A&A Oil Company
P.O. Box 25
Luling, Texas 78648

A&D Exploration Company
P.O. Box 571633
Houston, Texas 77257-1633

A.C.T. Operating Company
P.O. Box 323 Lockhart Highway
Luling, Texas 78648

A-G-B, Inc.
P.O. Box 440053
Houston, Texas 77244

ABI Management Group, Inc.
10400 Harwin Drive
Houston, Texas 77063

Accell Natural Gas Company
9821 Katy Freeway #500
Houston, Texas 77024-1210

Acco Oil & Gas Company
800 Tully #204
Houston, Texas 77079

Action Vacuum Service, Inc.
P.O. Box 56372
Houston, Texas 77256

Active Engergy, Inc.
922 Rochow
Houston, Texas 77019

ADA Crude Oil Company
P.O. Box 844
Houston, Texas 77001

Adams Resources Expl. Corp.
P.O. Box 844
Houston, Texas 77001

Adams, A. G., The Estate Of
P.O. Box 1171
Houston, Texas 77251-1171

Adams, K.S. Jr.
6910 Fannin, STE 318-s
Houston, Texas 77030

Adobe Gas Co.
1616 S Voss
Houston, Texas 77057

Adobe Gas Gathering & Process Co.
1616 South Voss Suite 700
Houston, Texas 77057

Adobe Gas Marketing Co.
1616 South Voss Suite 700
Houston, Texas 77057

Advantage Po; & Gas, Inc.
6111 FM 1960 West Ste 206
Houston, Texas 77069

Aectra Natural Gas Corporation
Three Riverway Suite 800
Houston, Texas 77056

AGIP Petroleum Co. Inc.
2950 North Loop West, STE 300
Houston, Texas 77092

AHABB Oil
P.O. Box 589
Luling, Texas 78648

Alcorn Prod. Co
P.O. Box 2879
Victoria, Texas 77902

Alexander Land & Dev. Co., Inc.
P.O. Box 833
Giddings, Texas 78942

Alexander, Herbert R. Inc.
9225 Katy Frwy Ste 203
Houston, Texas 77024

Alexander, W.B.
P.O. Box 589
Luling, Texas 78648

All Am, Inc.
1050 Bunker Hill
Houston, Texas 77055-6202

All American Pipeline Company
333 Clay Street Suite 2600
Houston, Texas 77002

Allegro Investments, Inc.
Box 2337
Victoria, Texas 77901

Allen Oil Co.
P.O. Box 1065
Luling, Texas 78648

Allen Operating Company, The
P.O. Box 772581
Houston, Texas 77215-2581

Allen, Herbert C. Jr.
6410 Fannin, Suite 100
Hermann Professional Bldg.
Houston, Texas 77030

Allied Oil
P.O. Box 111335
Houston, Texas 77016

Allison Gas Systems, Inc.
9821 Katy Freeway Ste 500
Memorial City Place
Houston, Texas 77024

Alltex Exploration, Inc.
Three Riverway #760 c/o E.T. Barrett
Houston, Texas 77056

Almeda Welding & Inspc. Co., Inc
2200 Post Oak Blvd., Ste. 702
Houston, Texas 77056

Alyana Energy Corporation
P.O. Box 27703-415-0
Houston, Texas 77027-7703

Amax Gas Gathering Inc.
P.O. Box 4838
Houston, Texas 77210-4838

Amax Gas Marketing Inc.
P.O. Box 4838
Houston, Texas 77210-4838

Amax Oil & Gas Inc.
P.O. Box 4838
Houston, Texas 77210-4838

Amber Refining, Inc.
P.O. Box 922021
Houston, Texas 77292-2021

Amend Energy Company
P.O. Box 22028
Houston, Texas 77227

American Banner Resources, Inc.
12707 North Freeway #149
Houston, Texas 77060

American Cascade Energy, Inc.
14825 St. Mary's Lane, Ste. 200
Houston, Texas 77079

American Coastal Energy, Inc.
1111 Fannin Suite 1470
Houston, Texas 77002

American Energy Exploration Co.
333 Clay Street, Ste 2000
Houston, Texas 77002

American Exploration Company
1331 Lamar St #900
Houston, Texas 77010-3088

American Exploration Gas Systems
1331 Lamar St #900
Houston, Texas 77010-3088

American Gathering, L.P.
333 Clay Street Ste 2000
Houston, Texas 77002

American Int'l energy Corp.
5701 Woodway, Suite 333
Houston, Texas 77057

American National Petroleum Co.
P.O. Box 27725
Houston, Texas 77227-7725

American Operating Company
P.O. Box 690585
Houston, Texas 77269-0585

American Pipeline Company
333 Clay Street, Suite 2000
Houston, Texas 77002

American Processing, L.P.
333 Clay Street Suite 2000
Houston, Texas 77002

American Well Servicing Company
333 Clay St. #2000
Houston, Texas 77002-4005

Ames Gas Gathering Company
P.O. Box 6597
Houston, Texas 77265-6597

Amoco Gas Company
P.O. Box 3092 Westlake III 17th fl
Houston, Texas 77253

Amoco Gas Marketing Company
P.O. Box 3092 Westlake III 17th fl
Houston, Texas 77253

Amoco Production Company
P.O. Box 3092 c/o Reg. Affairs 3.258
Houston, Texas 77253

Ampac Oil & Gas, Inc.
601 Jefferson Suite 3730
Houston, Texas 77002

Anadarko Gathering Company
P.O. Box 1330
Houston, Texas 77251-1330

Anadarko Petroleum Corp.
P.O. Box 1330
Houston, Texas 77251-1330

Anadarko Trading Company
P.O. Box 1330
Houston, Texas 77251-1330

Anderson Producting, Inc.
2400 Augusta, Ste 305
Houston, Texas 77057

Anderson, Arnold
2401 Fountainview, Ste 910
Houston, Texas 77057

Andrus Resources Corporation
1990 Post Oak Blvd, Ste 2400
Houston, Texas 77056

ANR Production Company
9 Greenway Plaza c/o Corp. Sec.
Houston, Texas 77046

Antara Resources, Inc.
1100 Louisiana Suite 3500
Houston, Texas 77002

Anthem Energy Company, L.P.
333 Clay Street Ste 2000
Houston, Texas 77002

Apache Corporation
2000 Post Oak Blvd #100 c/oS Garci
Houston, Texas 77056-4400

Apache Marketing, Inc.
2000 Post Oak Blvd #100 c/oC Epp
Houston, Texas 77056

Apache Natural Gas, Inc.
612 Palestine
Houston, Texas 77587

Apache Transmission Corp.-Texas
2000 Post Oak Blvd #100 c/o C Epp
Houston, Texas 77056

APB Oil Corporation
811 Dallas Suite 1416
Houston, Texas 77002

API Operating Co.
P.O. Box 57-0536
Houston, Texas 77257

Appling, R.C., Jr.
5519 Ettrick
Houston, Texas 77035

Aquila Energy Resources Corp.
10370 Richmond Ave Suite 700
Houston, Texas 77042-4137

Aran Energy Corporation
Three Allen Cntr Ste 4920
Houston, Texas 77002

Arbol Resources, Inc.
6430 Richmond Ave., Suite 430
Houston, Texas 77057

Arista Novelty, Inc.
P.O. Box 56372
Houston, Texas 77256-6372

Armour Properties
11 Greenway Plaza, Suite 3025
Houston, Texas 77046

Armour Resource Holdings, LTD.
11 Greenway Plaza, Ste 3025
Houston, Texas 77046

Ashland Exploration, Inc.
P.O. Box 218330
Houston, Texas 77218

Atapco
1331 Lamar Suite 1250
Houston, Texas 77010-3027

Atasca Resources, Inc.
1100 Louisiana Suite 2880
Houston, Texas 77002

Atlas Wireline Services
P.O. Box 1407 Attn Tax Dept
Houston, Texas 77251

Austin Resources Corporation
4265 San Felipe, Suite 1060
Houston, Texas 77027

Austin Ridge Energy Corporation
10575 Katy Freeway, Suite 277
Houston, Texas 77024

Axis Energy Corporation
P.O. Box 219303
Houston, Texas 77218-9303

Ayers, George C.
915 Americana Bldg.
Houston, Texas 77002

B&L Minerals, Inc.
7500 Bellaire Blvd 200
Houston, Texas 77036-5020

B&L Services
P.O. Box 1261
Luling, Texas 78648

B & M Oil Co.
212 North Cypress
Luling, Texas 78648

B & M Operating Co., Inc.
7880 San Felipe Rd., Ste 100
Houston, Texas 77063

B H & C Operating Company, Inc.
P.O. Box 92
Luling, Texas 78648

B. B. & S. Oil, Co.
P.O. Box 1150
Luling, Texas 78648

B. J. P. Operating
P.O. Box 71
Luling, Texas 78648

B. M. J. Oil Venture
212 N. Cypress St.
Luling, Texas 78648

B. M. A., Inc.
2001 Kirby, Ste 914
Houston, Texas 77019

Bair's Lease Service, Inc.
P.O. Box 1207
Luling,Texas 78648

Bairo Oil Company Inc
11767 Katy Frwy #395 c/o R Baird
Houston, Texas 77079

Baker Hughes Inteq
17015 Aldine-Westfield Rd
Houston, Texas 77032

Balcones Production Company
808 Travis Ste 806
Houston, Texas 77002

Ballard Exploration Company, Inc.
1021 Main St Ste 1705
Houston, Texas 77002-6602

Barker, Leonard
5300 Hollister, Ste 330
Houston, Texas 77040

Barksdale Oil & Gas, Inc.
P.O. Box 6597
Houston, Texas 77265-6597

Barnett, L.G.
800 E. Pierce
Luling, Texas 78648

Barnhart Co
2121 Sage Rd., Ste. 333
Houston, Texas 77056

Base Petroleum
807 Thornvine
Houston, Texas 77079

Baxter, Murphy H.
1200 Smith, Suite 2950
Houston, Texas 77002

Bayou Bend Petroleum Corporation
7715 San Felipe, Suite 200
Houston, Texas 77063

Bayou S. Gas Gathering Co., L.C.
9801 Westheimer Ste 310
Houston, Texas 77042

Becfield Drilling Services
P.O. Box 1789
Houston, Texas 77251-1789

Bechtel Energy Resources Corp.
P.O. Box 4253
Houston, Texas 77210-4253

Benchmark Oil & Gas Co.
P.O. Box 820729
Houston, Texas 77282-0729

Beneco, Inc.
P.O. Box 271549
Houston, Texas 77277-1549

Bennett & Davenport
P.O. Box 1167
Luling, Texas 78648

Bennett, Mills Estate
2603 Augusta Ste 1100
Houston, Texas 77057-5639

Beson, John
10938 Leaning Ash
Houston, Texas 77079

BHP Gas Marketing Company
5847 San Felipe #3600 c/o Reg Dept
Houston, Texas 77057

BHP Petroleum (Americas) Inc.
5847 San Felipe #3600 c/o Reg Dept
Houston, Texas 77057-3005

Big "6" Drilling Company
7500 San Felipe #666
Houston, Texas 77063

Big Three Industries, Inc.
P.O. Box 3047
Houston, Texas 77253

Big Wells Energy Corporation
11 Greenway Plaza Ste 1712
Houston, Texas 77046

Bishop Petroleum Inc.
500 Dallas #1000 One Allen Ctr
Houston, Texas 77002

Bishop, J.E. Inc.
820 Gessner Ste 1255
Houston, Texas 77024

BJ Services Company
P.O. Box 4442
Houston, Texas 77210

BKN Oil & Gas, Inc.
333 N Sam Houston Pkwy E #900
Houston, Texas 77060

Black Bronco Oil
Rt 2 Box 275x
Luling, Texas 78648

Black Creek Production Co., Inc.
800 Tully Rd #250
Houston, Texas 77079-5426

Black Marlin Pipeline Company
P.O. Box 1188 Attn Legal b84790
Houston, Texas 77251

Black Stone Oil Company
1001 Fannin Suite 4750
Houston, Texas 77002

Blackjack Exploration
1235 Shadowdale
Houston, Texas 77043

Blackmar, Jim Oil Operator
P.O. Box 351
Luling, Texas 78648

Blue Star Resources, Inc.
P.O. Box 690605
Houston, Texas 77269

Boaz, Ford
14825 St Mary's Lane #130 c/o TDK
Houston, Texas 77079

Bock & Bacon, Inc.
3120 Southwest Freeway #616
Houston, Texas 77098

Bollman & Bailey
820 S. Oak
Luling, Texas 78648

Boniuk, Milton, Dr., Trustee
1111 Hermann Dr. #29E
Houston, Texas 77004

Bousaid Trust
8830 Sandstone
Houston, Texas 77036

BP Exploration & Oil Inc.
P.O. Box 4587
Houston, Texas 77210

Brandywine Industrial Gas, Inc.
P.O. Box 2197-CH-1002-Reg. Affairs
Houston, Texas 77252

Brask-Dumont Ranch, Inc.
P.O. Box 55287
Houston, Texas 77255

Bright Star Gathering, Inc.
1221 Lamar Site 1600
Houston, Texas 77010-3039

Bris-Tex Enterprises, Inc.
P.O. Box 19130
Houston, Texas 77224

Brooklyn Inter Natural Gas Corp
2121 Sage Rd Suite 380
Houston, Texas 77081

Brooklyn Union Explor. Co., Inc.
1331 Lamar, Ste 1065
Houston, Texas 77010

Brown, George R. Partnership, The
4700 1st City Twr, 1001 Fannin
Houston, Texas 77002-6708

Bruns, H.D.
14450 T C Jester Blvd Ste 140
Houston, Texas 77014-1332

BT Operating Co
P.O. Box 56532
Houston, Texas 77256

Buffalo Operating
P.O. Box 777
Luling, Texas 78648

Bullock, John M. Operating
P.O. Box 948
Luling, Texas 78648

Burkard Petroleum Comany
6363 Woodway Drive Suite 920
Houston, Texas 77057

Burke & Ferguson
9733 Neuens Suite 10
Houston, Texas 77080

Burke, Harry Petroleum
1817 Pine Village
Houston, Texas 77080

Burns Production Corporation
2401 Fountainview, Ste. 802
Houston, Texas 77057

Burris Operating Co.
P.O. Box 802
Luling, Texas 78648

Butler Energy
P.O. Box 87765
Houston, Texas 77287

C. Oil Company, Inc.
11522 Gaymoor Dr
Houston, Texas 77035

C/A Limited
13430 Northwest Freeway #316
Houston, Texas 77040

Cabot Oil & Gas Marketing Corp.
P.O. Box 4544
Houston, Texas 77210-4544

Cactus Petroleum Corporation
4801 Woodway Drive Ste 300 E
Houston, Texas 77056

Caddell Well Service
P.O. Box 981
Luling, Texas 78648

Cain Oil Company
Box 485
Luling, Texas 78648

Caldwell, J.H., Tr.
6910 Fannin, Ste 318N
Houston, Texas 77030

Cameron Pipeline, Inc.
P.O. Box 40456
Houston, Texas 77240-0456

Cameron, Paul E., Jr., Inc.
8300 Bissonnet, Ste 660
Houston, Texas 77074

Camexco, Inc.
2437 Bay Area Blvd #241
Houston, Texas 77058

Campbell Wells Corporation
1225 North Loop West Suite 550
Houston, Texas 77008

Canput Resources
450 N Sam Houston PKY E 276A
Houston, Texas 77060-3520

Caprock Pipeline Co.
333 Clay Street, Suite 2000
Houston, Texas 77002

Carillion Resources, Inc.
9821 Katy Fwy #500
Houston, Texas 77024-1210

Carrizo Oil & Gas, Inc.
3 Riverway Suite 2010
Houston, Texas 77056

Caskids Operating Company
3637 W. Alabama, #400
Houston, Texas 77027-5907

Castex Energy, Inc.
333 North Belt, Ste 620
Houston, Texas 77060

Cavalier Houston Resources, Inc.
P.O. Box 460664
Houston, Texas 77056

Cavalla Energy Exploration Co.
1010 Lamar, Ste. 1110
Houston, Texas 77002

Cavallo Pipeline Company
1001 Fannin #1700 - Corp. Sec.
Houston, Texas 77002

Cayuse Pipeline, Inc.
P.O. Box 4286/BIN 2C3
Houston, Texas 77210

CCV, Inc.
2001 Kirby Dr., Suite 901
Houston, Texas 77019

CD Resources Company
2901 Wilcrest #350
Houston, Texas 77042

CDD Gas Company USA, Inc.
5447 Lymbar
Houston, Texas 77096

Cedar Energies, Inc.
1100 Milam Ste 3000
Houston, Texas 77002

Cedar Gas Company
1100 Milam Ste 3000
Houston, Texas 77002

Cedar Pipeline Company
1100 Milam Ste 3000
Houston, Texas 77002

Cenergy, Inc.
2727 Allen Parkway Ste 760
Houston, Texas 77019

Centana Energy Corporation
P.O. Box 1642
Houston, Texas 77251-1642

Centana Gathering Company
P.O. Box 1642
Houston, Texas 77251-1642

Central Texas Pipeline Company
14825 St. Mary's Lane, Ste 285
Houston, Texas 77079

Chain Oil & Gas, Inc.
12134 Meadow Lake
Houston, Texas 77077

Challenger Minerals Inc.
P.O. Box 4509
Houston, Texas 77210-4509

Champion International Corp.
Two Greenspoint Plaza, Ste. 800
Houston, Texas 77060-6095

Champion Petroleum Company
2550 Grey Falls Ste 200
Houston, Texas 77077

Champion Petroventures, Inc.
14300 Ella #105
Houston, Texas 77014

Channel Industries Gas Co.
P.O. Box 2511-Karl A. Stewart
Houston, Texas 77252-2511

Charga Energy, Inc.
1100 Augusta Ste 83
Houston, Texas 77057

Chartex Petroleum Company
13430 Northwest Freeway #316
Houston, Texas 77040

Cherry Oil & Gas
Box 471
Luling, Texas 78648

Chessher, Otto Drilling Company
P.O. Box 1150
Luling, Texas 78648

Chevron U.S.A. Inc.
P.O. Box 36366
Houston, Texas 77236

Cheyenne Minerals, Inc.
2121 Sage Rd #220
Houston, Texas 77056-4305

Cheyenne Oil & Gas, Inc. (1)
15600 JFK BLVD Suite 220
Houston, Texas 77032

Chippen Options Corp.
5373 W Alabama Ste 502
Houston, Texas 77056

Chisos Exploration Company
363 N Sam Houston Pkwy E #1450
Houston, Texas 77060-2409

Choctaw II Oil & Gas, LTD.
P.O. Box 690928 c/o PPI-Seahawk Ser.
Houston, Texas 77269-0928

Christensen & Matthews
7014 Empire Central
Houston, Texas 77040

Christeve Oil Company, Inc.
4422 FM 1960 West, Ste. 425
Houston, Texas 77068

Christopher Oil & Gas Inc
18103 Longcliffe Dr.
Houston, Texas 77084

Cico Oil & Gas Co.
750 Bering Dr, Ste 100
Houston, Texas 77057

CIG Exploration, Inc.
9 Greenway Plaza c/o Corp Sec
Houston, Texas 77046

Citation Oil & Gas Corp.
8223 Willow Place South, Ste#250
Houston, Texas 77070-5623

CJW Corporation
P.O. Box 19527
Houston, Texas 77224

Claron Corporation
P.O. Box 56585
Houston, Texas 77256-6585

Cleaveland Well Service
715 S. Pecan Street
Luling, Tx 78648

Clements Operating Company, Inc.
P.O. Box 750
Luling, Texas 78648

Cloughly, Ernest M.
P.O. Box 1045
Luling, Texas 78648

CMV Production
1120 Nasa Rd One Suite 320
Houston, Texas 77058

Co-Kal Oil Company
13350 Oak Leaf Ln.
Houston, Texas 77015

Coastal Border Gas Sales, Inc.
9 Greenway Plaza c/o Corp Secy
Houston, Texas 77046

Coastal Gas Gathering Co.
P.O. Box 820905
Houston, Texas 77282-0905

Coastal Oil & Gas Corporation
9 Greenway Plaza c/o Corp. Secy.
Houston, Texas 77046

Coastal Pipeline Co.
P.O. Box 820905
Houston, Texas 77282-0905

Coastal Plains Exploration Co.
6430 Richmond Ave., Ste 430
Houston, Texas 77057-5920

Coastal Prod. Of Tx., Inc.
15810 Park Ten Place Suite 300
Houston, Texas 77084

Coastal Refining & Marketing Inc
9 Greenway Plaza, Attn: Corp. Sec.
Houston, Texas 77046

Coastal States Crude Gath. Co.
9 Greenway Plaza c/o Corp. Secy
Houston, Texas 77046

Coastal States Gas Marketing Co.
Nine Greenway Plaza c/o Corp. Sec.
Houston, Texas 77046

Coastal States Gas Trans. Co.
9 Greenway Plaza, Attn: Corp. Sec.
Houston, Texas 77046

Coastal States Trading, Inc.
9 Greenway Plaza c/o Corp. Secy.
Houston, Texas 77046

Coastal Well Service, Inc.
14811 St. Mary's Lane Ste 165
Houston, Texas 77079

Coastline Exploration, Inc.
10375 Richmond Ste #900
Houston, Texas 77042

Coastline Gas Pipeline Company
P.O. Box 4758
Houston, Texas 77210-4758

Cockburn Oil Corporation
5075 Westheimer, Suite 960
Houston, Texas 77056

Coffield Pipe Line Company
P.O. Box 8
Luling, Texas 78648-0008

Cogen Lyondell, Inc.
P.O. Box 4411
Houston, Texas 77210-4411

Cokinos Gas Transmission Company
5718 Westheimer Suite 900
Houston, Texas 77057

Cokinos Natural Gas Company
5718 Westheimer Suite 900
Houston, Texas 77057

Cokinos, Michael
5718 Westheimer Ste 900
Houston, Texas 77057

Columbia Gas Development Corp.
P.O. Box 1350
Houston, Texas 77251

Columbia Gulf Transmission Co.
P.O. Box 683-Attn: Legal Dept.
Houston, Texas 77001

Complete Saltwater Disposal Serv
10575 Katy Frwy Ste 277
Houston, Texas 77024

Complete Saltwater Hauling Serv
10575 Katy Frwy Ste 277
Houston, Texas 77024

Concord Operating Incorporated
1201 Louisiana Suite 3312
Houston, Texas 77002-5608

Conoco Inc.
P.O. Box 2197, Pr 2040
Houston, Texas 77252

Continental Carbon Co.
P.O. Box 42817
Houston, Texas 77242

Continental Gulf Corp.
P.O. Box 109
Luling, Texas 78648

Continental Operating Co.
1111 Fannin Suite 1700
Houston, Texas 77002

Convest Energy Corporation
2401 Fountain View Dr. Ste 700
Houston, Texas 77057

Copano Gas Co., Inc.
P.O. Box 1412
Houston, Texas 77251-1412

Copano Gathering System, Inc.
P.O. Box 56787
Houston, Texas 77256-6787

Coperco, Inc.
6363 Woodway, Suite 1100
Houston, Texas 77057

Coquina Oil Corporation
P.O. Box 27725
Houston, Texas 77227-7725

Corpus Christi Gas Marketing, LP
2001 Kirby Suite 814
Houston, Texas 77019

Corum Production Company
2901 Wilcrest #120
Houston, Texas 77042

Cougar Oil & Gas Co., Inc.
P.O. Box 691187
Houston, Texas 77269-1187

Cowboy Pipeline Service Company
1100 Milam Ste 2160
Houston, Texas 77002

Cox & Perkins Exploration, Inc.
6363 Woodway, Ste 1100
Houston, Texas 77057

Crest Resources & Expl. Corp.
901 Threadneedle Ste. 110
Houston, Texas 77079

Crown Central Pipe Line Co.
P.O. Box 1759
Houston, Texas 77251

CSA Exploration Company, Inc.
8 Greenway Plaza Ste 800
Houston, Texas 77046

CTX Energy Corporation
P.O. Box 56327
Houston, Texas 77256

Culberson Well Service, Inc.
Box 2266
Victoria, Texas 77902

Cyclone Exploration, Inc.
16815 Royal Crest Suite A6
Houston, Texas 77058

Cypress Petroleum Resources, Inc.
13006 Advance Drive
Houston, Texas 77065

Cypress-Sabine Gas Company
1304 McKinney St #700
Houston, Texas 77010-3030

D.C.R.A. Oil Company
Rt 1, Box 191
Luling, Texas 78648

D.S.I. Transports, Inc.
P.O. Box 674421 Attn Tax Dept
Houston, Texas 77267-4421

COMANCHE ENERGY, INC.

Appendix 2

September 6, 1995

Dr. Kamel H. Fotouh
Department of Chemical Engineering
Prairie View A&M University
P. O. Box 2553
Prairie View, Texas 77446-2553

Dear Dr. Fotouh:

Attached is an Oil and Gas Directory published by the Railroad Commission of Texas. It contains the names and addresses of all oil and gas operators in Texas.

You may want to have an assistant take the names of those operators in the Houston area, and the Luling-Lockhart-Victoria-Bastrop-Giddings area. These are the people who would probably be most interested in your services.

Sincerely,

Frank W Cole / lm

Frank W Cole
President

FWC/lm
Attachment

8111 LBJ Freeway, Suite 787 • Dallas, Texas 75251
(214) 235-6869 • FAX (214) 783-0444

COMANCHE ENERGY, INC.

June 12, 1995

Dr. Kamel H. Fotouh
Department of Chemical Engineering
Prairie View A&M University
P.O. Box 2553
Prairie View, Texas 77446-2553

Dear Dr. Fotouh:

This letter confirms our recent telephone conversation concerning a proposed DOE sponsored Enhanced Oil Recovery Project. You stated that the Preliminary Report, Federal Expressed to you on June 1, 1995, would be sufficient for the time being, in as much as your current information is that future DOE funding of these types of projects may be severely limited.

Since June 1, we have continued to review and update our material. We now have:

1. About 200 logs of wells in the area;

2. Additional core analysis data;

3. Additional geology;

4. Complete list of independent producers in the fields.

You did mention that you were unsure of the proposed cost of the project. Pages seven through ten of our "Preliminary Report" show these costs, which total $1,300,400. In this amount is $270,000 for Prairie View A&M use. This latter number was our estimate, and of course, if the project is continued, we would need to review this part in more detail, Comanche's contribution for wells and equipment would be $2,074,500, as detailed in Exhibit 10 of the Report.

I have appreciated having the opportunity to work with you on this proposal, and in the event you wish to proceed, I would pleased to assist.

Sincerely,

Frank W Cole

Frank W Cole
President

8111 LBJ Freeway, Suite 787 • Dallas, Texas 75251
(214) 235-6869 • FAX (214) 783-0444

Preliminary Proposal

to

Department of Energy

from

Prairie View A&M University

and

Comanche Energy, Inc.

for

Enhanced Oil Recovery
Demonstration Project

Shallow Austin Chalk Formation
Caldwell County, Texas

June 1995

COMANCHE ENERGY, INC.

PROPOSED DEMONSTRATION PROJECT
ENHANCED OIL RECOVERY

Project Location:

Eklund-Davenport Leases
Salt Flat Field
Caldwell County, Texas
(See Exhibit 1, Area Map and Exhibit 2, Field Map).

Operator and Manager:

Comanche Energy, Inc.
(an independent producer)
8111 LBJ Freeway, Suite 787
Dallas, Texas 75251
Tel: 214/235-6869
Fax: 214/783-0444

President: Frank W Cole

Comanche Energy will sub-contract the reporting operations to the Texas Railroad Commission to Frank W Cole Engineering, a sole proprietorship owned by Frank W Cole. Frank W Cole Engineering has a long history with the Texas Railroad Commission (Operator Number 167054), and has the necessary permits, bonds, insurance, etc. to operate oil and gas properties in the State of Texas.

Proposal:

To install and operate a demonstration enhanced oil recovery project by injecting water into a mature oil producing chalk reservoir in south central Texas.

Need for the Project:

1. Several hundred independent oil producers operate in the area. (See Exhibit 3 for a list of these producers).

2. Large amounts of presently unrecoverable oil remain in the reservoir. A successful project could result in the recovery of millions of barrels of additional oil, most of which could be produced by independent producers.

3. The Project could be used as an on-site training facility to train:

   a. other independent operators
   b. Faculty and students from Prairie View A&M University and personnel (faculty and students) from other universities.

4. The Project would operate as an environmentally sound injection project, and could serve as a model for other similar injection projects.

5. If the project is successful in this chalk formation, the technology developed could be transferred to other chalk formations, of which there are many, such as the chalk formations in the Pine Island Field of northwest Louisiana and the Annona Chalk in east Texas and north Louisiana.

Proposed Program:

A five-spot water injection pattern in the shallow Austin Chalk Formation, is proposed. Nine complete five-spots are proposed. This would result in 16 injection wells and 9 producing wells. See Exhibit 5 for a schematic diagram of the Project, and Exhibit 6 for a typical electrical log of the Austin Chalk Formation. Exhibit 5 is a Structure Map of the base of the Austin Chalk, in the vicinity of the proposed Project.

Reservoir Data:

Formation:	Austin Chalk Well
Depth:	1,900' to 2,500'
Well Spacing:	2.1 acres/well
Thickness:	180 feet
Initial Pressure:	900 to 1,100 psig
Current Pressure:	100 psig
Formation Temperature:	100°F
Oil Gravity:	37° API
Initial solution gas oil ratio:	1,000 cubic feet/barrel
Interstitial water saturation:	40%
Permeability:	0.1 to 1.0 millidaries
Water salinity:	30,000 ppm chlorides
Initial formation volume factor:	1.10

Summary:

A review of Texas Railroad Commission, Oil and Gas Division, records shows that no water injection programs have been approved by the Commission. Two small, one-well, imbibition, projects were approved. Results of these two one-well projects are not available.

One of the principal negative factors in operating a successful enhanced recovery project in the shallow Austin Chalk Formation is that the formation is thick (about 200 feet), heterogeneous and low permeability.

On the positive side, there are numerous examples of independent operators pumping relatively large volumes (12,000 barrels) of salt water into a producing well at relatively high rates (25 barrels per minute). The well is shut-in for a few days and returned to production. Initial oil producing rates approach 40 barrels per day, gradually decreasing with time. In recent years, this has been a common technique for temporary increases in oil producing rates.

Based on the foregoing, it appears that a continuous water injection program maybe feasible, and could displace oil. Thus, a full-scale water injection program could result in substantial additional oil recovery.

A very important aspect of this program, is that primary recovery in the shallow Austin Chalk Formation, throughout the producing area in Caldwell and Guadalupe Counties, Texas, has probably been less than six percent of the initial oil in place. More than 260,000,000 barrels of oil have been produced from the Salt Creek and Luling-Branyon Fields in Caldwell and Guadalupe Counties from about 5,000 wells. The principal production from these fields has been from the Austin Chalk. Smaller volumes have been produced from the Edwards Limestone, and still smaller volumes have been produced from the Buda Limestone. It is conservatively estimated that at least 150,000,000 barrels of the reported 260,000,000 barrels produced from these two fields was produced from the Austin Chalk Formation.

Initial Oil in Place:

Based on 2.5 acre spacing, a thickness of 180 feet, porosity of 18%, water saturation of 40%, and an initial formation volume factor of 1.10, the initial oil in place is:

$N = 7{,}758\ Ah\ \varnothing\ (1\text{-}Swi/Boi)$

Where:

N	=	Initial oil in place, stock tank barrels
A	=	Acres (spacing)
h	=	Net pay thickness, feet
Ø	=	Porosity, fraction
Swi	-	Interstitial water saturation, fraction
Boi	=	Initial oil formation volume factor
7,758	=	Conversion factor to barrels

$N = 7{,}758 \times 2.5 \times 180 \times 0.18\ (1-0.40)/1.10 = 327{,}762$ barrels/well

The average Austin Chalk well will produce about 20,000 barrels of oil by primary production, or about 6% of the initial oil in place, leaving about 300,000 barrels per 2.5 acres unrecoverable by primary methods. There are 5,000 Austin chalk wells, which means that there is at least 1,500,000,000 barrels of oil, unrecoverable by primary methods. If 10% of this oil could be recovered by water injection, this means that another 150,000,000 barrels of oil could be recovered. Recovery of this magnitude would have a significant economic impact on the area.

Proposed Plan of Operation:

The water injection project would be placed in operation as follows:

1. All available data on the Austin Chalk Formation would be collected, organized, and evaluated. If, during the data accumulation stage, a more appropriate pilot test area were found, the project would be moved to the most appropriate area. This is expected to require about four months.

2. After the specific site has been selected, and all data have been evaluated, computer simulation studies will be performed to determine optimum injection rates on a well-by-well basis, and predict performance of the project. This phase of the project is expected to require about two months.

3. During the two months the model studies are being prepared, work will proceed on:

   a. converting wells to injection.
   b. installing the necessary injection lines and related equipment.
   c. installing injection equipment, including pumps, tanks, etc.
   d. rearranging producing equipment as necessary
   e. logging and perforating producing wells.

4. It is expected that actual injection operations will commence about six months after initiation of the project.

5. Predicted response time:

   Because of the close spacing between wells, response to water injection should occur within a few months. One of the objectives of the model studies will be to determine this response time. However, some preliminary calculations will be prepared to give some indication of response time. The pore volume of a typical 2.5 acre five-spot is:

   $$V = 7{,}758\ Ah\ \varnothing$$

   Where:

V	=	pore volume, barrels
A	=	acres
h	=	net pay thickness, feet
∅	=	porosity, fraction
7,758	=	conversion factor to barrels.

   $$V = 7{,}758 \times 2.5 \times 180 \times 0.18 = 628{,}398 \text{ barrels}$$

Assuming the following conditions exist at initiation of injection:

Cumulative oil produced	=	20,000 barrels
Cumulative water produced	=	40,000 barrels
Oil shrinkage due to pressure decline	=	60,000 barrels
Total		120,000 barrels

6. The duration of the proposed project is two years. If injection commences six months after initiation of the project, then water will be injected for a total of 18 months. At 300 barrels per day, for 18 months, a total of 162,000 barrels of water would be injected into one five-spot, which is equal to 1.35 fill-up volumes. This should be sufficient to demonstrate the feasibility of water flooding the shallow Austin Chalk.

7. During the period of water injection, it is expected that Prairie View A&M University will conduct several seminars, starting on the University campus, and concluding with a field trip to the injection site. Seminars will be held for:

a. independent producers in the area.
b. faculty and students from other universities who could benefit from the program.

8. The two principal technical people on the project will be:

   a. Frank W Cole, President of Comanche Energy, and Manager of the project. (Resume attached - Exhibit 7)
   b. Daryl R. Gaumer, Consultant to Comanche Energy, and Technical Manager of the Project. (Resume attached - Exhibit 8)
   c. Both Cole and Gaumer have had extensive experience with water injection projects. Both will be available to assist the faculty of Prairie View A&M University to conduct the seminars.
   d. Comanche Energy has the necessary field operating personnel to properly conduct this project. See Exhibit 9 for a profile of Comanche Energy.

9. It should be emphasized that this is an experimental project. Although water injection is a well-recognized method for enhancing oil recovery, it has never been applied to the shallow Austin Chalk Formation. Experience gained from this project could have some very important results:

   a. Significant oil recovery from this Formation, and other similar formations, which might otherwise remain unrecoverable.
   b. Provide the means for transfer of technology to hundreds of other independent producers in the area.
   c. Provide a field laboratory, relatively near the Prairie View A&M campus, where faculty, students, and independent producers could gain from the combined experience of the A&M faculty, the Project leaders, and the on-site injection operation.

PROJECT SCHEDULE

Proposed Project:

Austin Chalk Water Injection

Project Size:
Nine Five Spots
16 injection wells
Spacing:
2.1 acres/well
See attached Exhibit 4

I. Operator would furnish:

1. Nine producing wells, fully equipped to produce (See Exhibit 10 for list of equipment and itemized replacement costs).

2. Sixteen well bores, with casing. Cemented and ready for conversion to injection. (See Exhibit 10 for list of equipment and itemized replacement costs).

3. Tank battery for accumulating and measuring produced fluids (oil, gas, and water, and the flow lines from both producing and injection wells. (See Exhibit 10 for list of equipment and itemized replacement costs).

Total replacement cost of this equipment is $2,074,500.

II. The proposed Department of Energy (DOE) grant would furnish funds for the following:

A. Data accumulation:

Assemble logs, core analysis data, well records, geological data, production data, maps, and other available information.

This information will be obtained from independent producers in the area, the Texas Railroad Commission, oil well service companies and service bureaus.

Estimated time to assemble and collect the data	-	2 months
Estimated costs:		
Consultants		
30 days @ $500/day	-	$15,000
Purchase of maps and data	-	5,000
Sub-total	-	$20,000

B. Data evaluation:

Assemble, organize and evaluate all available information. Prepare basic geology, including cross-sections, isopachous and structure maps.

Summarize and detail all available completion and production data, including a well-by-well evaluation of all wells in the project area.

Estimated time:	-	2 months
Estimated cost:		
Consultants		
30 days @ $500/day	-	$15,000
Drafting, etc. - 20 days @ $250/day	-	5,000
Purchase of materials	-	3,000
Sub-total	-	$23,000

C. Simulation studies:

After all data are assimilated, collated, and evaluated, simulation studies will be prepared, which will show:

1. Optimum pattern for injection.
2. Injection rates on a well-by-well basis.
3. Probable injection pressures.
4. Projected producing rates (oil, water, and gas, on a well-by-well basis) as a function of time.
5. Prepare a model which can be used to monitor the progress of injection on a periodic basis.

Estimated time:	-	2 months
Estimated costs:	-	$30,000

D. Implementing the Injection Program:

1. Make application to the Texas Railroad Commission, and other appropriate agencies for approval of the injection program. (This application will be made as soon as data are available for filing. Approval is expected prior to completion of the simulation model studies).

2. Convert 16 wells to injection.
    a. Run gamma ray-collar logs to confirm existing perforations and total depth.
       Estimated costs: $1,500/well x 16 wells = $24,000
    b. Perforate additional intervals as necessary.
       Estimated costs: $1,000/well x 10 wells = $10.000
    c. Run tubing and packers in all wells.
       Estimated costs: $1,200/well x 16 wells = $19,200

d. Conduct injectivity profile test on all wells.
Estimated costs: $2,000/well x 16 wells = $32,000
Sub-total = $85,200

3. Pull rods and tubing on the nine producing wells. Run gamma ray-collar logs to locate existing perforations. Perforate additional intervals as necessary. Repair subsurface pumps, and place wells back on production.

Estimated costs:

Well service units		
10 hours @ $80/hr x 9 wells	-	$ 14,000
Gamma ray logs		
$1,000/well x 9 wells	-	9,000
Perforating		
$1,000/well x 5 wells	-	5,000
Repair subsurface pumps		
$500/well x 9 wells	-	4,000
Miscellaneous equipment	-	3,000
Repair existing lines & equipment	-	5,000
Supervision		
3 days/well x 9 wells x $400/day	-	10,800
Road repairs	-	$ 10,000
Sub-total	-	$146,900

E. Install water supply facilities:

1.	Tanks for water		
	4 - 400 bbl tanks with walkway & stairway	-	$12,000
2.	Injection pumps (2)	-	8,000
3.	Water supply lines and fittings	-	10,000
4.	Water meters - 20 @ $1,000/meter	-	20,000
5.	Injection control facilities	-	3,500
	Sub-total	-	$53,500

F. Operating Pilot Project:

1.	Well operating expenses		
	$500/well/month x 25 wells x 18 months	-	$225,000
2.	Initial injectivity tests		
	$500/well x 16 wells	-	8,000
3.	Periodic injectivity tests		
	$500/well x 16 wells x 6 tests	-	48,000
4.	Water supply costs		
	$5,000/month x 18 months	-	90,000
5.	Project monitoring		
	$4,000/month x 18 months	-	72,000

6.	Simulation model studies throughout the duration of the test (Bi-monthly) $10,000/test x 10 tests	-	100,000
7.	Final analysis of test results	-	50,000
8.	Project termination costs	-	50,000
9.	Monthly accounting and auditing $5,000/month x 24 months	-	$120,000
	Sub-total	-	$763,000

G. Other costs:

1.	Prairie View A&M, Faculty consultation and project monitoring $5,000/month x 24 months	-	$120,000
2.	Seminars for:		
	a. independent producers		
	b. faculty and students seminars will be conducted by Prairie View A&M faculty, assisted by Frank W Cole, Daryl R. Gaumer, and other Comanche employees. $15,000/seminar x 10 seminars	-	150,000
	Sub-total	-	$270,000

Estimated Total Costs:

2A.		$ 20,000
2B.		23,000
2C.		30,000
2D.		146,900
2E.		53,500
2F.		763,000
2G.		270,000
	Total	$1,306,400

HISTORY OF AUSTIN CHALK PRODUCTION IN THE LULING AREA

Oil and gas have been produced from the chalk reservoirs in Caldwell and Guadelupe counties for the more than 70 years. Some of the earliest production in the area came from the dolomitic streaks in the Eagleford Shale which underlies the chalk. Then came the chalk production which was incidental to the discovery of giant fields. The Luling-Branyon Field has produced more than 165,000,000 barrels and the Salt Flat Field has produced more than 80,000,000 barrels of oil. It was by the efforts of the United North and South Oil Company (an independent oil company) that the Luling-Branyon Field commenced production in the early twenties. Since that time, about twenty-five fields, both large and small, have been produced along the Luling fault line.

The Luling-Branyon and Salt Flat Fields in Caldwell and Guadelupe counties, Texas are located on the Luling fault which is en echelon some 20 miles southeast of the main Balcones fault line. The Fields are about 8.2 miles long by up to 11 miles wide with about 3,700 productive acres. They produce 36 degree API oil from the Austin Chalk and Edwards Formations. The trap is an up to the coast faulted, southeast dipping monocline. Closure is caused by faults with 450 foot displacements on the northwest, northeast, and southwest. The strike of the northwest fault is North 35 degrees East which approximates that of the regional strike of the formation. The Fields were discovered in 1922.

GEOLOGY

The Austin Chalk is a Cretaceous Limestone. Pure chalk is composed mainly of calcareous unicellular algal remains called cocospheres and their disarticulated gear shaped skeletal plates (cocoliths). The algae lived in the open ocean, died, and their skeletons fell to the ocean floor and disintegrated into very small uniform grain sizes. They were preserved on wide shallow low energy ancient shelves which resulted in large deposits of chalk. The chalks are chemically stable, therefore there is no secondary porosity due to leaching. Impurities included with the chalk are quartz, glauconite, chert and clay; however, they are all secondary constituents. Chalk is found in all stages from ooze to very hard limestone. Chalk is deposited over wide areas including all of North America, Europe, and South America. Chalk accounts for about 65 percent of the limestone in the world. The various chalk facies are named in a variety of ways including, but not limited to the following: Austin, Annona, Saratoga, Pine Island, Selma, Monroe Gas Rock, Ozan, Niobrara, Greenhorn, and Eutaw. These formations are relatively shallow and contain enormous quantities of hydrocarbons.

The very small uniform grain size of the deposit contributes to the possible existence of high porosity. That is, a porosity of more than 50 percent is possible with no compaction. As the ooze is buried, its porosity and permeability are diminished. The exception to this exists when the chalk is buried in an over pressured area. In this case, large porosity (30 to 40 percent) is retained and the related millidarcy-feet of pay allows for significant production rates and reserves like those at Ekofisk in the North Sea.

The chalk porosity is directly related to the depth of the overburden in normally pressured formations. Thus, the reservoir potential and characteristics and completion techniques change with depth. When the chalk is encountered at depths of less than 5,000 feet, the porosity can be as high as 20 percent and possess from zero to 2.0 millidarcy permeability. Thus, water can be produced. It then becomes necessary to have a trap in order to fill the reservoir with hydrocarbons. At this point, initial economics is governed by thickness of the reservoir (md-ft). This occurs at the Luling-Branyon and Salt Flat Fields. If the chalk is encountered from 5,000 to 9,000 feet, the primary porosity and permeability has been almost lost, but secondary porosity in the form of fractures provides capacity and permeability. This is the case at the Pearsall field. If chalk is encountered below 9,000 feet, the reservoir has very low porosity and permeability, but gas exists. This is the case at the Giddings Field. Thus, the mobility ratio allows gas to be produced while the inntersitial water is retained. These reservoirs can contain fractures which enhance production. In all cases, hydraulic fracturing will increase the rate of production and shorten payout. However, recovery efficiency is low, probably less than 10 percent.

In this area, the Austin Chalk has the following average reservoir parameters; solution gas drive, depth 1,900 to 2,500 feet, 300 foot oil column, 180 feet thick, 40% percent water saturation, 37 degree API gravity, 900 to 1,100 psi initial bottom hole pressure, a 30% percent residual oil saturation, 18% percent porosity, and 1.0 millidarcy permeability.

PRODUCTION HISTORY

As stated, production of hydrocarbons from chalk in the Gulf Coast started some 70 years ago. In Texas, Alta Vista field was discovered in 1912, Luling-Branyon in 1922, Darst Creek in 1922, and Pearsall in 1936. In northern Louisiana, Swell Field began production in 1928, and Pine Island in 1906. Production summaries prior to the late twenties are difficult to obtain.

Initial chalk production rates vary from a few to several hundred barrels per day. Current production in the Luling area averages about two barrels per day per well. There are currently about 4,000 wells in the Luling-Branyon and Salt Flat Fields. Along the Luling fault, more than 5,000 wells have produced in excess of 150,000,000 barrels on about 2 acre spacing. The spacing is 150/300 feet per well.

POTENTIAL

Very little enhanced recovery has been attempted. The reservoirs have solution gas drives and have recovered less than 20 percent of the oil in place. Along the Luling fault trend, there is more than one billion barrels of oil remaining in place. Railroad Commission Records show that two attempts at secondary recovery took place at Luling-Branyon. both were imbibition projects on a small lease that had 18 producing wells. The Number 7 and number 2 wells had between 7 and 25 thousand barrels of salt water injected into them after which the wells were returned to production. The results are not available because of commingled production records with the other 16 wells. Currently, various operators are pumping limited amounts of water at high rates as if it were a sand-less fracture treatment. This could be construed to be "forced imbibition." This type of EOR is profitable at $20.00/barrel oil, but may only break even with $15.00 oil.

Enlarging the scenario to include the millions barrels that have been estimated to be produced from the various chalk formations in the United States, it can be seen that there is a very large amount of remaining reserves to be recovered with the application of technology. Studies should be undertaken to find an adaptable technique to recover this oil.

A project utilizing nine five spots is proposed for the pilot water flood. This entails 16 injection wells and 9 producing wells. This would result in one completely enclosed five spot. Since there are a very large number of independent oil operators in the area, a successful project would benefit many people and provide new jobs. Environmental protection techniques would also be incorporated and taught to students and operators alike.

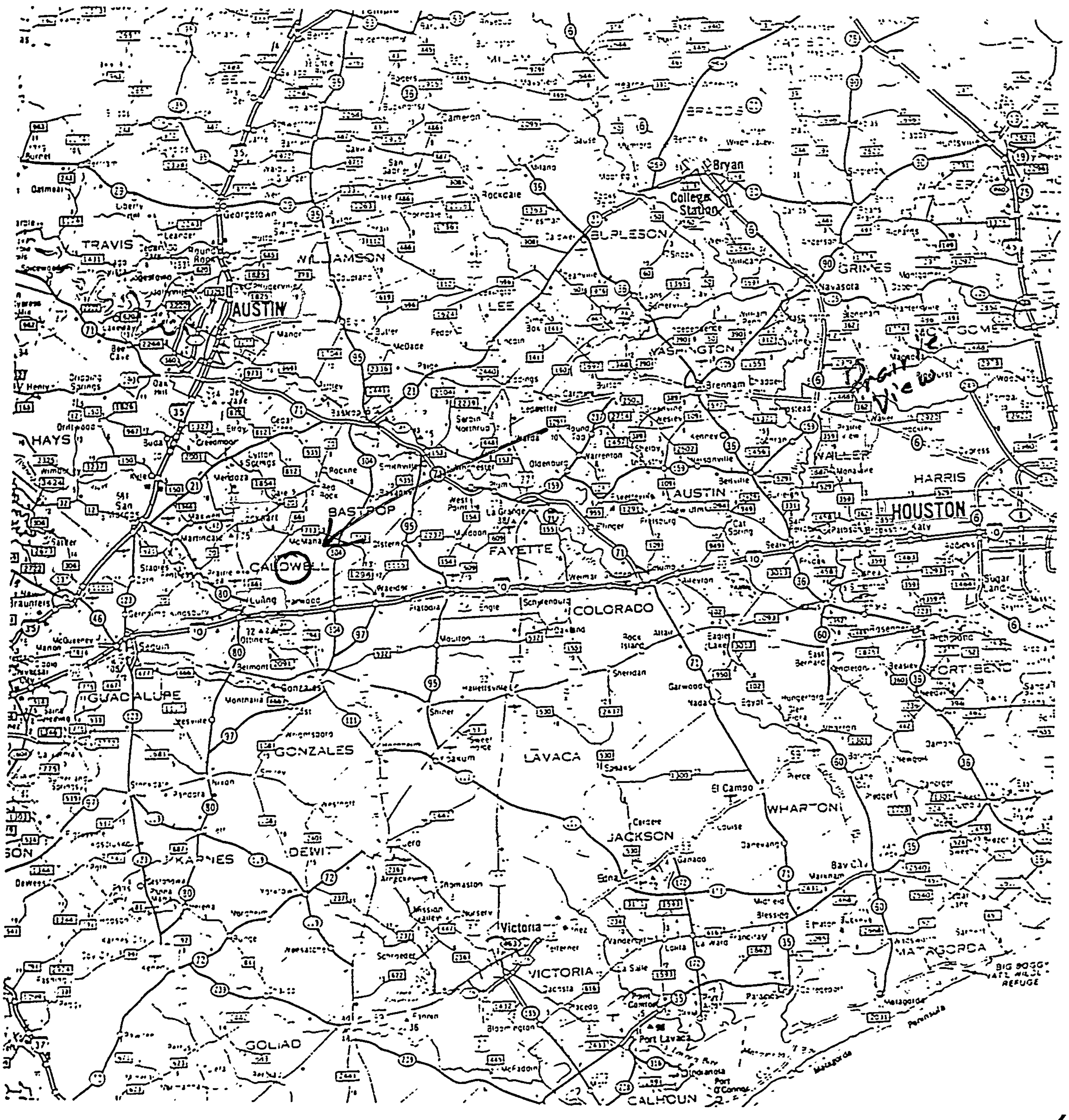


Exhibit 1

Area Map

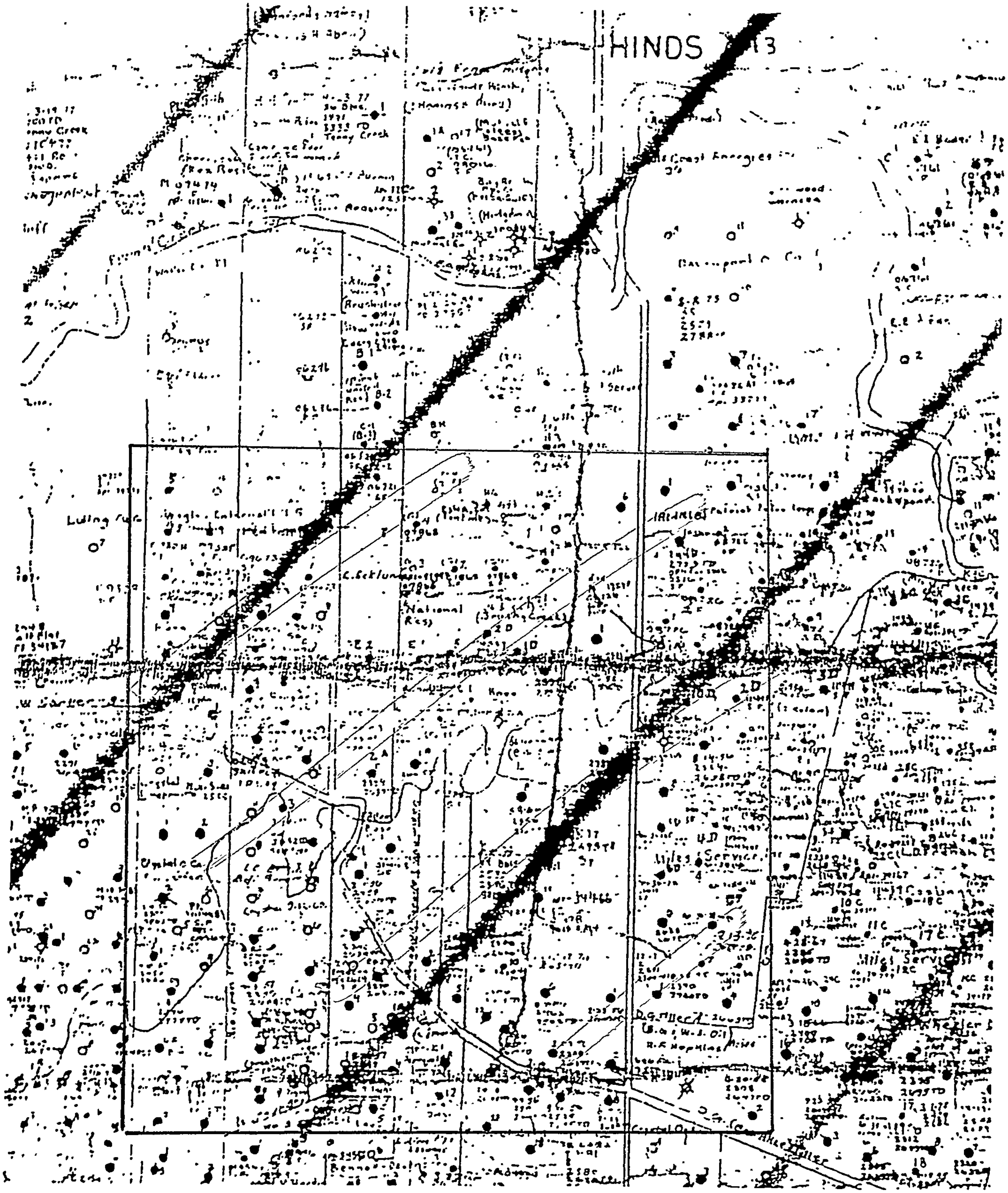


EXHIBIT 2
Field Map -- Project Area

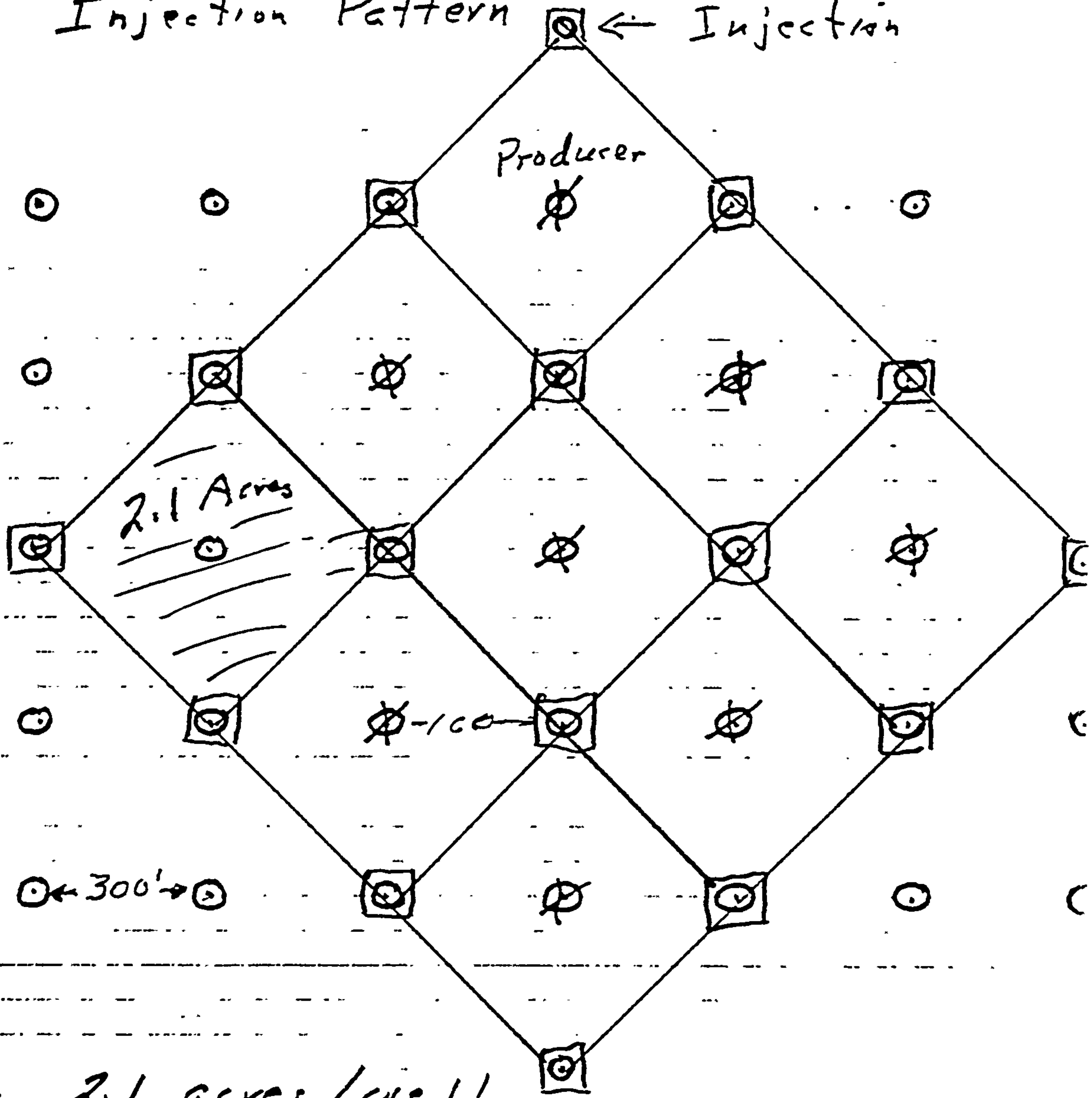
EXHIBIT 3

List of Independent Operators in the Area

(now being compiled)

Preliminary Proposal
Austin Chalk Water Flood

Injection Pattern



Spacing - 2.1 acres/well

Injection well

Producing well

EXHIBIT 4

FWC
5-18-95

LANE-WELLS | ELGEN *Electrolog*

COUNTY Caldwell FIELD Luling Branyon WELL Frank Koehler #2 COMPANY J. W. Wortley	COMPANY J. W. Wortley WELL Frank Koehler #2 FIELD Luling, Branyon LOCATION Not Available COUNTY Caldwell STATE Texas

OTHER SURVEYS

WELL LOCATION

Elevation KB 471
DF 468
GL 464

FILE NO.

MEASUREMENTS TAKEN FROM K.B. or 7' above G.L.

Run No.	1	2	3	4	5
First reading	2264				
Last reading	190				
Feet measured	2074				
Casing, Lane-Wells	—				
Casing, Driller	—				
Bottom, Lane-Wells	2265				
Bottom, Driller	2266				
Max. temp °F	103				
Mud characteristics	@ 70 °F	@ °F	@ °F	@ °F	@
Resistivity	1.0 Ω				
Resist. BHT	0.68 Ω				
Nature	Native				
Density	9.5				
Viscosity	40				
Water Loss-cc 30 min					
Mud Ph.					
Bit size	7 7/8				
Spacings:					
Short normal	16"				
Long normal	64"				
Lateral	216"				
Rig time	1 hr				
Recorded by	Marquis				
Witnessed by	Mr. Staub				
Date	3/26/57				

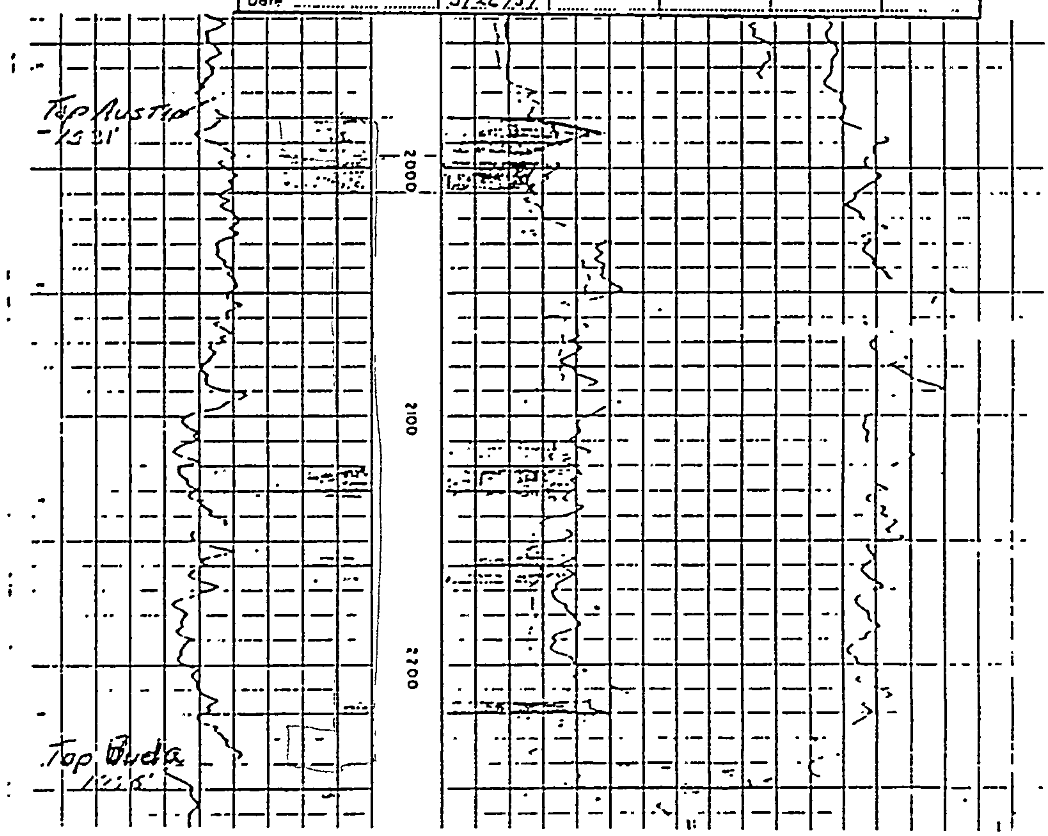


EXHIBIT 5
Typical Electric Log - Austin Chalk Section

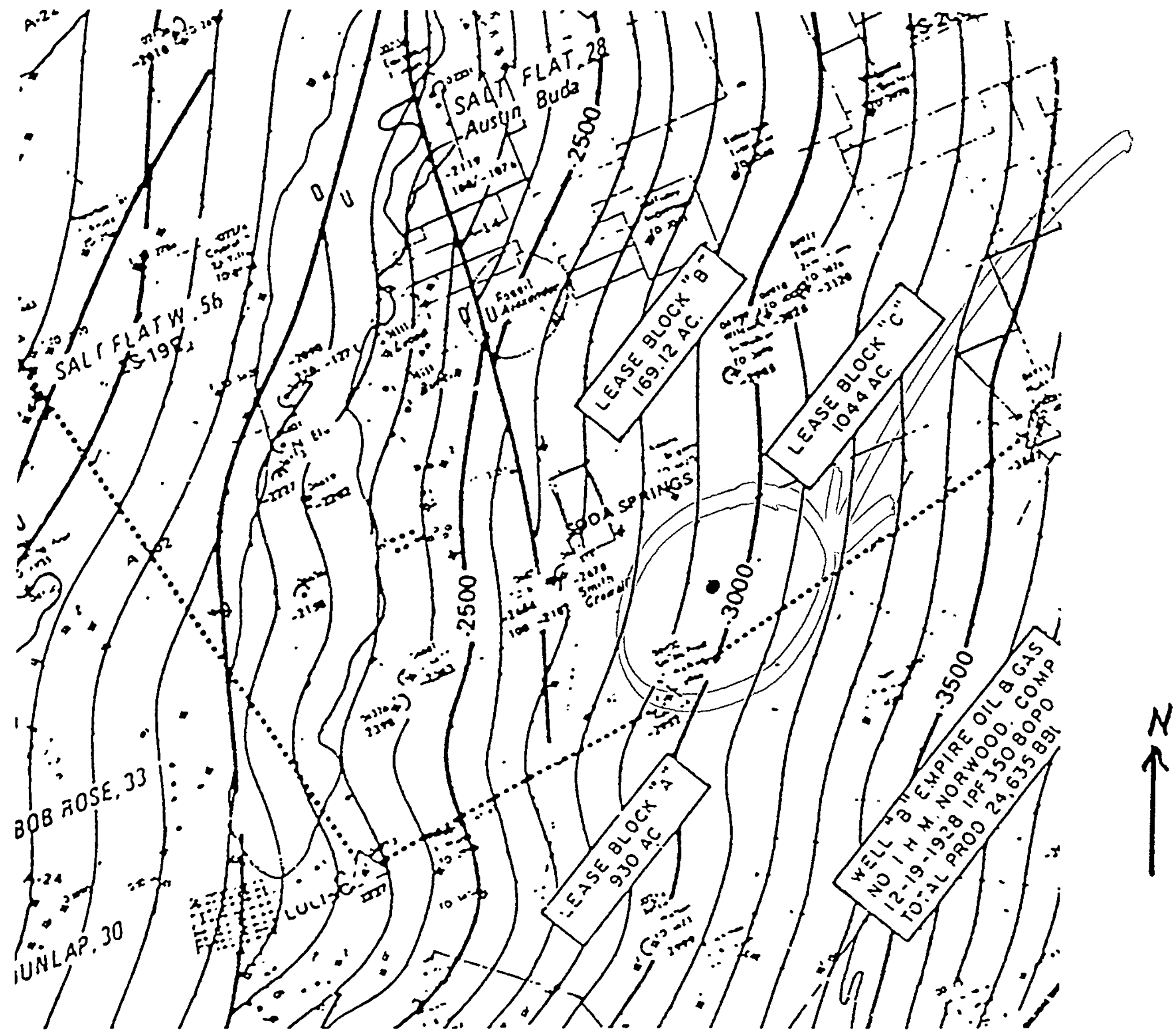


EXHIBIT 6
Structure Map . . Base of Austin Chalk
Caldwell County, Texas

Scale: One Inch = 1.4 Miles

RESUME

FRANK W COLE

May 1995

Office Address: 8111 LBJ Freeway, Suite 787
Dallas, Texas 75251
Tel: (214) 235-6869
Fax: (214) 783-0444

Home Address: 6130 Spring Valley Road
Dallas, Texas 75240
Tel: (214) 239-6647

Age: 69

Education: BS in Petroleum Engineering
University of Oklahoma, 1948

Master's Degree in Petroleum Engineering
University of Oklahoma, 1949

Professional Societies: Registered Engineer in Texas
Member of SPE - AIME

Experience:

January 1995 - Present	President and principal shareholder of Comanche Energy, Inc., an independent oil and gas producer, headquartered in Dallas. Comanche has oil and gas operations in Oklahoma and Texas.
January 1987 - Present	Consulting petroleum engineer and owner of Frank W Cole Engineering. Actively acquiring producing oil and gas properties, and improving the producing rates of mature oil and gas properties for clients, including installation of enhanced oil recovery projects.
1983 - 1987	Founder and President of Normandy Oil and Gas Company, Inc. Retired January 1, 1987. Remained a consultant to the Company until May 1992.
1971 - 1982	Founder and President Amcole Energy Corporation, Dallas, Texas. Retired July 1, 1982.

EXHIBIT 7
Resume -- Frank W Cole

1963 - 1972

Owner of Frank W Cole Engineering, Norman, Oklahoma and Dallas, Texas.

The Company conducted major engineering studies for companies in the United States, Canada, Europe, the Middle East, and North Africa. Clients included:

a. Exxon
b. Georgia Pacific
c. Compagnie Francaise des Petrole
d. Coastal States Gas
e. Iranian National Oil Co.
f. Iraq National Oil Co.
g. Egyptian National Oil Co.
h. Petrobras (Brazilian National Oil Company)
i. Brazos Oil & Gas (Subsidiary of Dow Chemical)
j. Numerous Independent Oil Companies

Several hundred reservoir engineering studies, and evaluation reports, were prepared for these clients. I prepared periodic reviews of several carbon dioxide projects in the U.S. for the company which owned the CO 2 injection patents. I developed a steam flood mathematical model which was used extensively to study and monitor steam injection projects in the United States and Canada. I also developed two-dimensional and three-dimensional mathematical models for evaluating the performance of oil and gas reservoirs, and for monitoring enhanced recovery projects. These models were used extensively to predict performance and monitor on-going water injection, steam injection and high pressure gas injection projects in the United States, Canada and Africa.

During the period 1963 - 1982, I was the principal negotiator in the purchase of more than 30 separate acquisitions, involving more than 300 separate producing oil and gas properties.

1955 - 1963

Associate Professor of petroleum Engineering, University of Oklahoma, Norman, Oklahoma. During this time I was on retainer with a major oil company to review their problem water floods in the Southwestern U. S.

1949 - 1955

Petroleum Engineer, Humble Oil and Refining Company (Exxon) except for a two year period of active duty in the U. S. Navy.

Exhibit 7
(Continued)

Publications: Author of the following textbooks:

1. Reservoir Engineering Manual, Gulf Publishing Co. This has been a widely-used text in Petroleum Engineering Schools.

2. Well Spacing in the Aneth Reservoir, University of Oklahoma Press.

3. Basic Principles of Reservoir Engineering, University of Oklahoma.

Co-Author of the following textbooks:

1. Oil Well Drilling Technology, University of Oklahoma Press. This has been a widely-used text. It has been reprinted in Spanish more than 20 times.

2. Drilling Practices Manual, Petroleum Publishing Company.

Author of more than 30 technical articles published in Journals in the U. S., Canada, and the Middle East.

Author of the Chapter entitled "Volumetric Methods and Production Data", in Determination of Residual Oil Saturation, published by the Interstate Oil Compact Commission.

Other Activities:

1960 - 1973	Taught numerous 4-week Reservoir Engineering and Drilling Engineering Courses to engineers in the United States, Canada, Europe, Middle East and Indonesia.
1962	Consultant to the United Nations, establishing a College of Petroleum Engineering in Egypt.
1966 - 1973	National Lecturer for the American Association of Petroleum Geologists on the subject: Oil & Gas Reserves and Economics. This lecture series was presented to various groups in the United States, Europe, South America, the Middle East, and Canada.
1975 - 1980	Member, Research Committee, Interstate Oil Compact Commission.
1982 - Present	Founder, University of Oklahoma Energy Center.
1986 - 1990	Member, Advisory Group, Integrated Energy Systems (United States, Canada, West Germany), representing the University of Oklahoma.

Exhibit 7
(continued)

EXHIBIT 8

Resume
of
Daryl R. Goumer
(to be furnished)

EXHIBIT 9

Comanche Energy, Inc.
Profile

Comanche Energy, Inc. is an independent oil and gas producer headquartered in Dallas, Texas. It owns oil wells in the shallow Austin Chalk Formation of south central Texas, plus oil wells in other formations in the same area.

The Company also owns oil and gas wells in southwestern Oklahoma, where it also has a low-pressure gas gathering system in operation. The Company owns one water injection project in southwestern Oklahoma, and is preparing to start another water injection project in the same area.

Company management believes that the future of independent oil and gas producers lies in their ability to apply advanced technology to their properties, principally in the form of enhanced oil recovery techniques.

Most of the oil and gas wells owned by the independent producers are in their "stripper" or late stage of life. It is very important for them to be able to extend the economic life of their properties.

Company management has an ongoing program to develop ways of applying existing technology to increase the life of its projects.

EXHIBIT 10

Replacements Costs

I.	Nine producing wells:	
	Footage costs, 2600' @ $6/ft.	$15,600
	Location costs, drilling fluids & misc.	6,000
	Casing, 2600' @ $4/ft.	10,400
	Cementing	2,000
	Logging	4,000
	Perforating	2,000
	Fracture treating	25,000
	Tubing, 2400' @ $2.50/ft.	6,000
	Rods, 2400' @ $.75/ft.	1,800
	Well service unit, 30 hrs. @ $80/hr.	2,400
	Misc. equipment	3,000
	Supervision, 8 days @ $400/day	3,200
	Pumping unit, motor & controls	3,000
	Sub-total	**$84,400**
	TOTAL: $84,400/WELL X 9 WELLS	**$759,600**
II.	Sixteen injection wells:	
	Footage costs, 2600' @ $6/ft.	$15,600
	Location costs, drilling fluids & misc.	6,000
	Casing, 2600' @ $4/ft.	10,400
	Cementing	2,000
	Logging	4,000
	Perforating	2,000
	Fracture treating	25,000
	Tubing, 2400' @ $2.50/ft.	6,000
	Packer	800
	Well service unit, 30 hrs. @ $80/hr.	2,400
	Misc. equipment	3,000
	Supervision, 8 days @ $400/day	3,200
	Sub-total	**$80,400**
	TOTAL: $80,400/well x 16 wells	**$1,286,400**
III.	Tank battery costs:	
	4 - 210 bbl. oil tanks, with stairway and walkway	$12,000
	1 - Gun barrel	2,000
	1 - Water tank	1,500
	1 - Gas/oil separator	1,000
	Flow lines & connections	10,000
	Misc. equipment	2,000
	Sub-total	**$28,500**
	TOTAL COSTS	**$2,074,500**

Appendix 3

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ANNOUNCEMENT AND REGISTRATION FORM

Prairie View A&M University

RESERVOIR CHARACTERIZATION WORKSHOP
September 21 , 10.00 AM to 4.00 PM, at Prairie View A&M University Graduate Center (Compaq Computer Facilities, Map included) and September 22, 1995 from 9.00 AM to 12.00 Noon at Westport Technology Center International.

Funded by: DOE Grant No. BC 14865

Objective: This workshop will address "how to" and "What is involved" in reservoir characterization. It will complements DOE's Reservoir Class Program and allows small and independent producers to best determine how class projects are applicable to their particular field.

Speakers: The speakers have extensive knowledge of applied characterization for assessment of field exploration, development and exploitation. They are: Edith Allison, DOE office of Fossil Energy, Class 1&3 Program Manager. Kamel Fotouh, Associate Professor of Chemical Engineering with strong background and experience in economic evaluations and feasibility studies. Dick Drozd, a Senior Manager overseeing Geoscience, Petroleum Geochemistry, Formation Evaluation and Reservoir Fluids and Jessy Jones, Research Geoscientist and Project Leader with experience in unconsolidated core retrieval, handling, and analysis; also operates the laboratories XRD, SEM, and performs routine Petrographic analysis at Westport Research Center International. R. Bruce Farmer, Geological Advisor for Pennzoil Exploration and Production Company.

Registration: The workshop is offered free of charge for Texas Independent Oil Producers. To register please, complete form and return, or call before September 15.

Name: (Last)____________________(First)____________________(M.I.) _____

Nickname: (for badge)______________ Affiliation: ____________________

Phone: ____________________ Fax: ____________________

Mailing Address: ____

City: ______________ State: ______________ Zip: ______________

Return to: Dr. Kamel Fotouh, Prairie View A&M University, P.O. Box 2553, Prairie View, Texas 77446. Phone: (409) 857 2427 / 2458 / 4166 and Fax: (409) 857 2222.

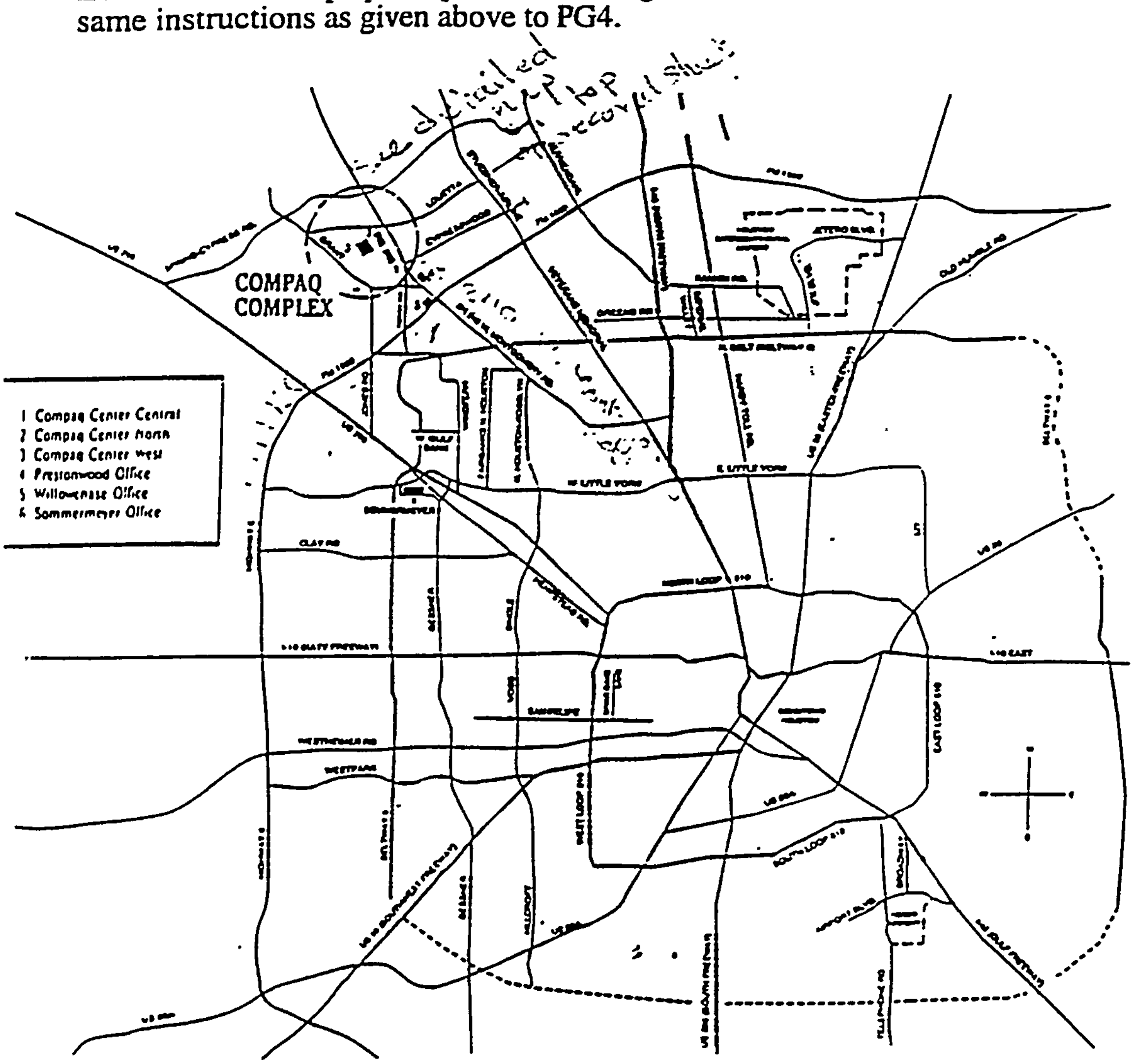
DIRECTIONS TO THE GRADUATE CENTER LOCATED OFF CAMPUS IN THE COMPAQ COMPLEX ON HIGHWAY 249 IN THE NW AREA OF HOUSTON:

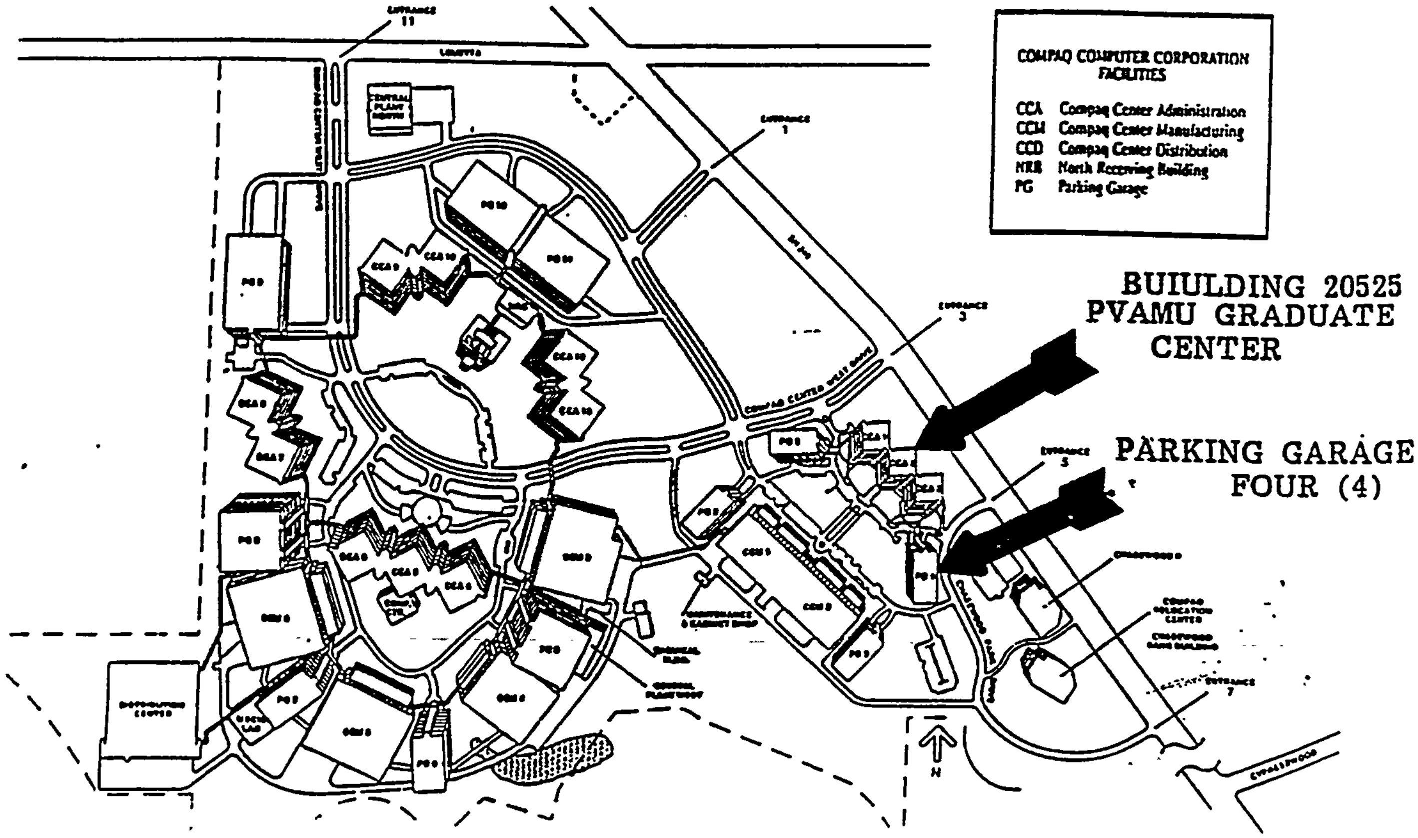
From Texas Highway 290 and FM 1960:

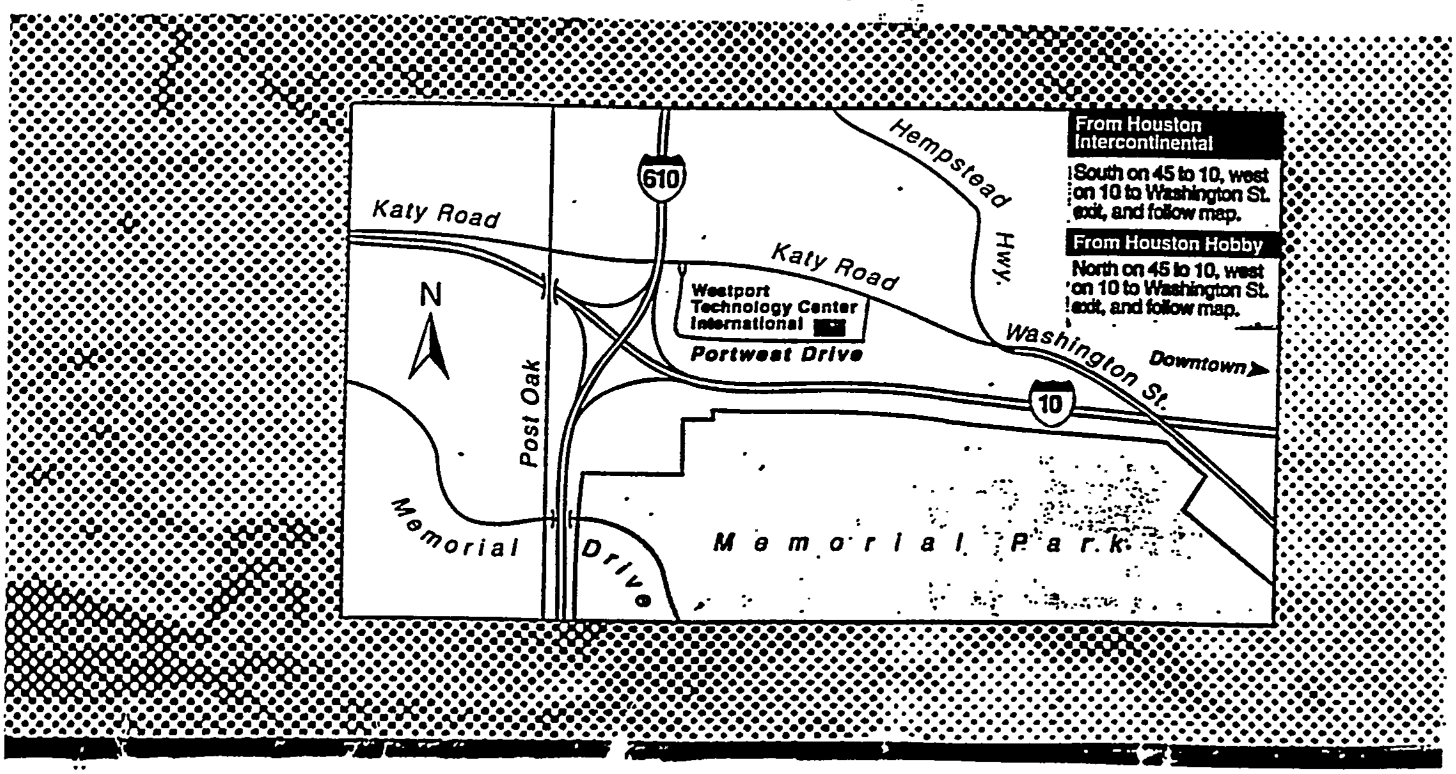
Travel FM 1960 to FM 249. Take 249 going north until it crosses Cypresswood Drive. The Compaq Complex is located on the left side of the 249. You will pass entrance 7 (marked) and entrance 6 (unmarked). Turn into entrance 5. Turn right at the next drive which leads to parking garage 4 (PG4). Prairie View offices are located in Building 20525. Map is attached for reference.

From Texas Highway 290 and FM 2920 (To Tomball):

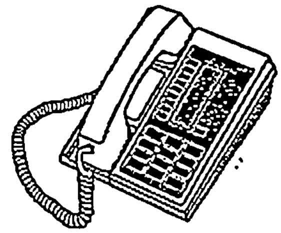
Travel FM 2920 to FM 249. Travel South on FM 249 toward FM 1960 crossing Louetta. The Compaq Complex is on the right hand side. Turn into entrance 5. Follow the same instructions as given above to PG4.




COMPAQ COMPUTER CORPORATION FACILITIES
CCA Compaq Center Administration
CCM Compaq Center Manufacturing
CCD Compaq Center Distribution
NRB North Receiving Building
PG Parking Garage
BUIULDING 20525
PVAMU GRADUATE
CENTER
PARKING GARAGE
FOUR (4)


Katy Road
610
Hempstead
Hwy.
Katy Road
From Houston Intercontinental
South on 45 to 10, west on 10 to Washington St. exit, and follow map.
From Houston Hobby
North on 45 to 10, west on 10 to Washington St. exit, and follow map.
N
Westport Technology Center International
Portwest Drive
Washington St.
Downtown
Post Oak
10
Memorial
Drive
Memorial Park

U.S. Department of Energy
Bartlesville Project Office
P.O. Box 1398
220 N. Virginia Ave.
Bartlesville, OK 74005



TELECOMMUNICATION MESSAGE

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VERIFICATION . . . . (918) 337-4402

Number of pages 3
(including transmittal)

Date 8-31-95

TO: (Name, Organization, Location, Telephone Number)

Dr. Kamil Fotouch.
Prairie View A&M

FAX NO. ~~713/492-8133~~ 409/857-2222

FROM: (Name, Organization, Location, Telephone Number)

Edie Allison, BPO, 918-337-4390

MESSAGE:

Edith Allison, US Department of Energy, Bartlesville Project Office, Bartlesville OK
Presentation to the Prairie View A & M University Reservoir Characterization Workshop
September 21-22, 1995

Applications of the Department of Energy's Cooperative Field Demonstration Program to Marginal Wells

This presentation will start by briefly describing opportunities for cooperative field work between small operators and the Department of Energy: one program of small awards (up to $50,000) provides support to independents with urgent production problems. In the second program, production engineering and geologic staff at the National Institute for Petroleum and Energy Research (NIPER) work with teams of operators and producers to develop improved, cost-effective reservoir management techniques. Applications for both programs will be available at the meeting.

The second part of the presentation summarizes two joint industry-DOE field demonstration projects in which improved reservoir characterization technologies were used to design and implement technologies to recover more oil from mature water floods in reservoirs deposited in fluvial-deltaic environments. The projects in the Northeast Oklahoma Shelf and Denver Basin are just two of the 32 field tests of advanced secondary and tertiary recovery technologies being investigated by industry in partnership with Department of Energy (DOE). The demonstrated technologies have application to Gulf Coast fields

Glennpool Waterflood, Northeast Shelf, Oklahoma

The project, conducted by the University of Tulsa, had two objectives: first, to determine the cost benefit of advanced reservoir characterization using geostatistics and cross-well tomography compared to conventional subsurface analysis; and second, to evaluate the benefit of using horizontal wells to increase waterflood productivity. The reservoir characterization assessment shows that stochastic modeling provides a more accurate and more conservative model of reservoir performance. Cross-well tomography only slightly enhanced the reservoir model. Stochastic simulations suggested that although a horizontal well would produce more oil, recompleting existing vertical wells would be more cost effective. The recompletions are expected to yield significant incremental oil.

Sooner Unit Field, Denver Basin

The objective of this project, conducted by Diversified Operating Corporation, is to demonstrate the effectiveness of geologically targeted infill drilling and improved reservoir management using 3-D seismic and well testing to define reservoir compartmentalization. Poor secondary recovery in the Sooner Unit waterflood was due to reservoir compartmentalization that led to poor sweep and early water breakthrough. The unit is currently producing 100 BOPD above pre-project levels and the project is expected to recover an additional 10% of the OOIP.

Economic Analysis

Economic analysis of the joint industry-DOE projects shows that a prudent operator applying appropriate technology can recoup investments and add reserves to wells in danger of being abandoned for less than the cost of purchasing wells with reserves or exploring for new reserves.

Biographical Information

Edith C. Allison
Team leader, Program Development and Outreach
US Department of Energy, Bartlesville Project Office

Address:

P.O. Box 1398
Bartlesville, OK 74005
Telephone: 918/337-4390
FAX: 918/337-4418

Education:

BS, Geology, West Texas State University
MS, University of Utah

Work Experience:

- Instructor of Geology - Paleontology, University of Utah, 1974 - 1979

- Petroleum Geologist - primary responsibility in field demonstration geology, Mid-continent and Permian Basin, for Argonaut Energy and Mesa Petroleum, 1979 - 1986

- Project Manager Department of Energy, 1986 to present
  areas of responsibility have included Geoscience research, Field Demonstration program and International cooperation

Appendix 4

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DOE-Project No. 14865

THE ECONOMIC POTENTIAL OF IMPROVED OIL RECOVERY (IOR) PROJECTS FOR INDEPENDENT OIL PRODUCERS (IP'S) IN TEXAS

Speaker

Dr. K. Fotouh, P.E.

Department of Chemical Engineering
Prairie View A&M University
Prairie View, TX 44776

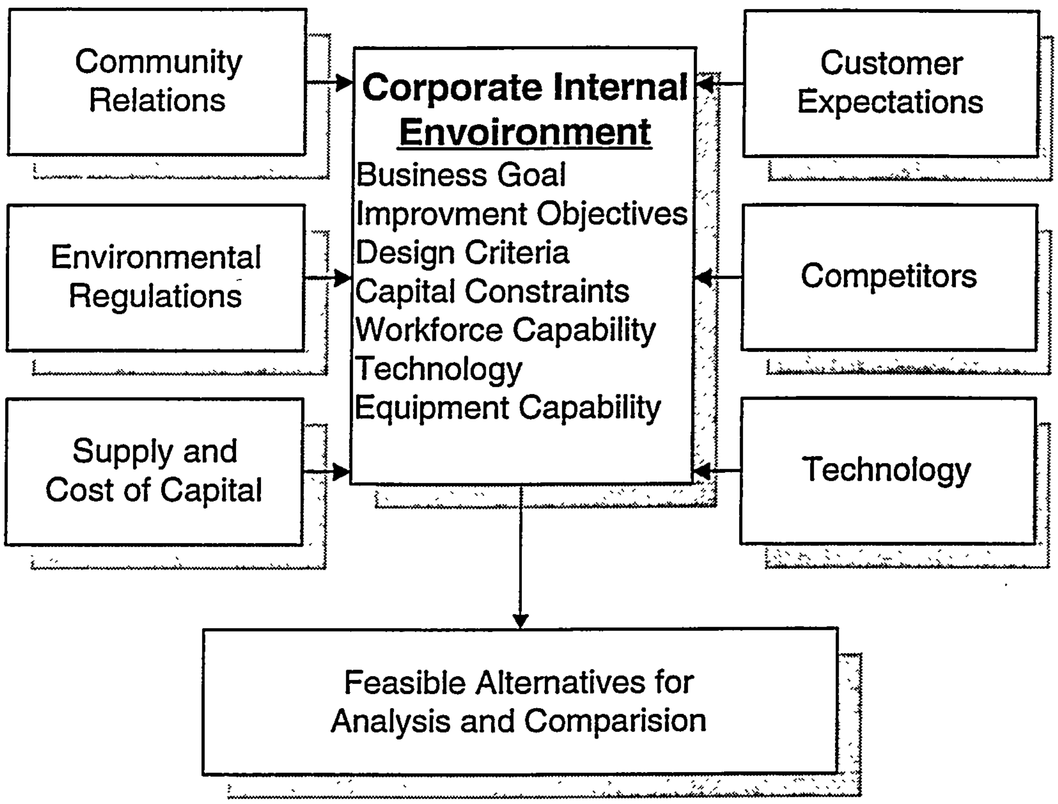
Contractor Technical Manager

Mr. H. Tiedman

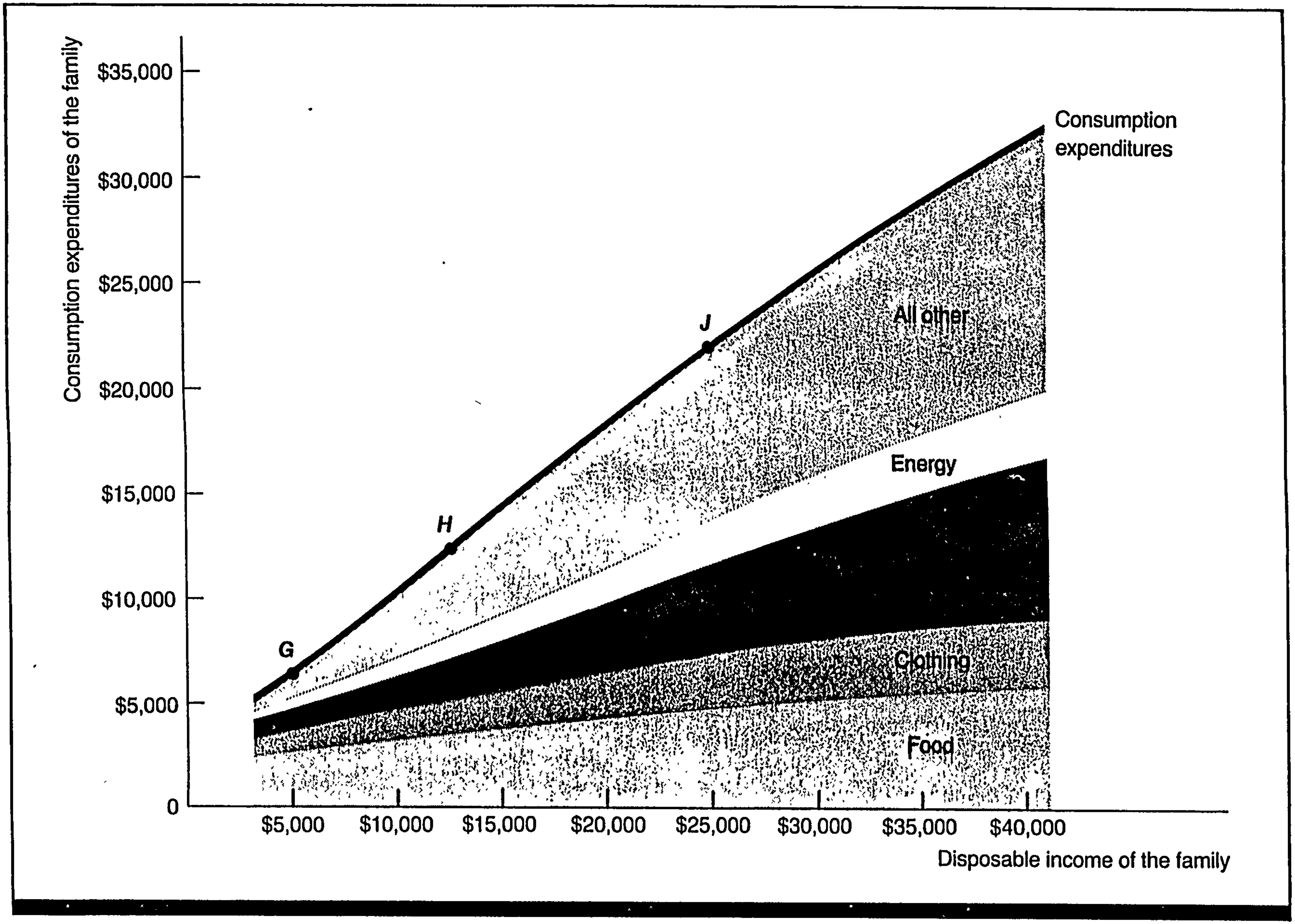
Project Manager
DOE-Petroleum Project Office
Bartlesville, Oklahoma

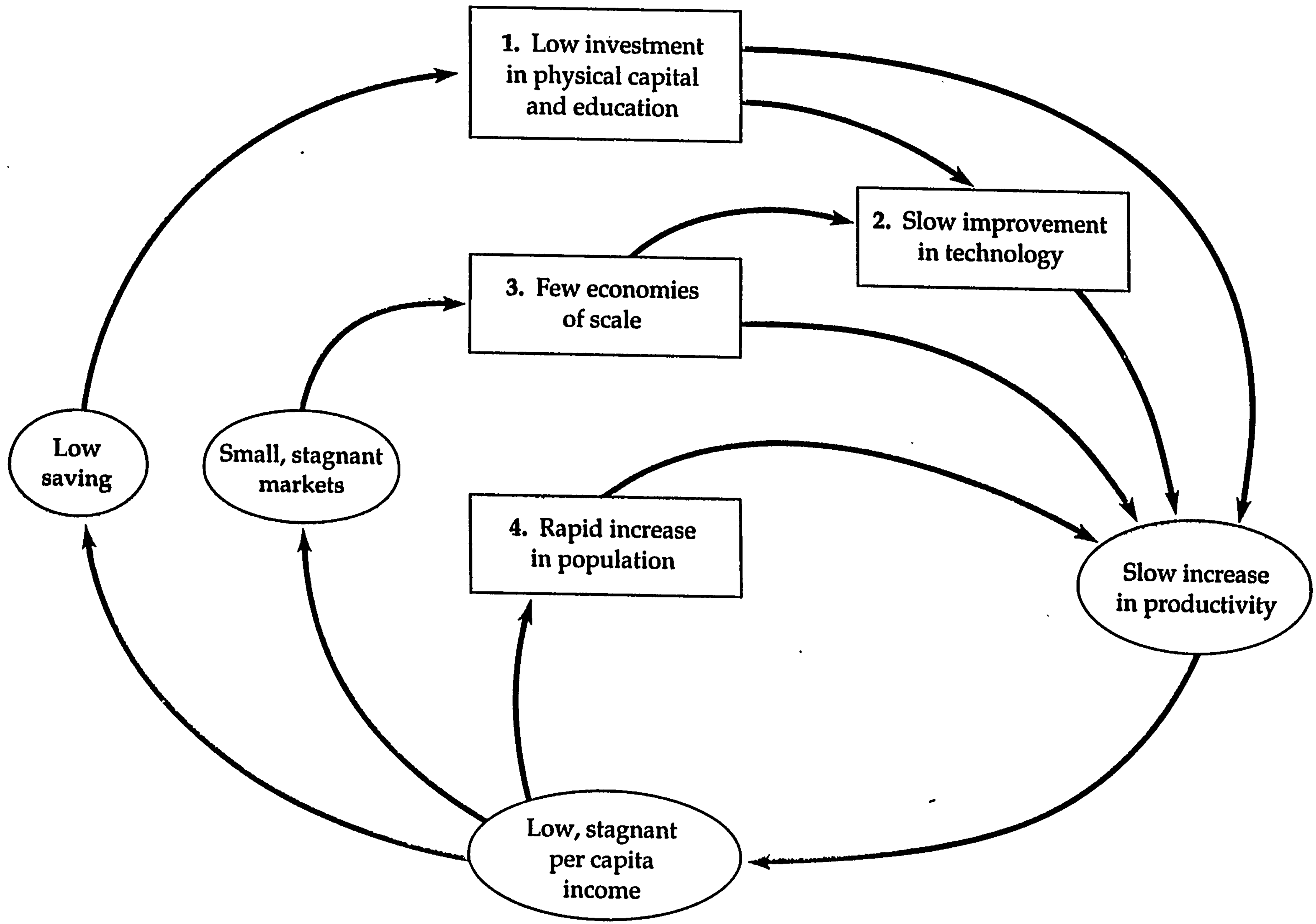
RESERVOIR CHARACTERIZATION WORKSHOP
Prairie View A&M University
September 21 and 22, 1995

Global and Internal Economic Factors

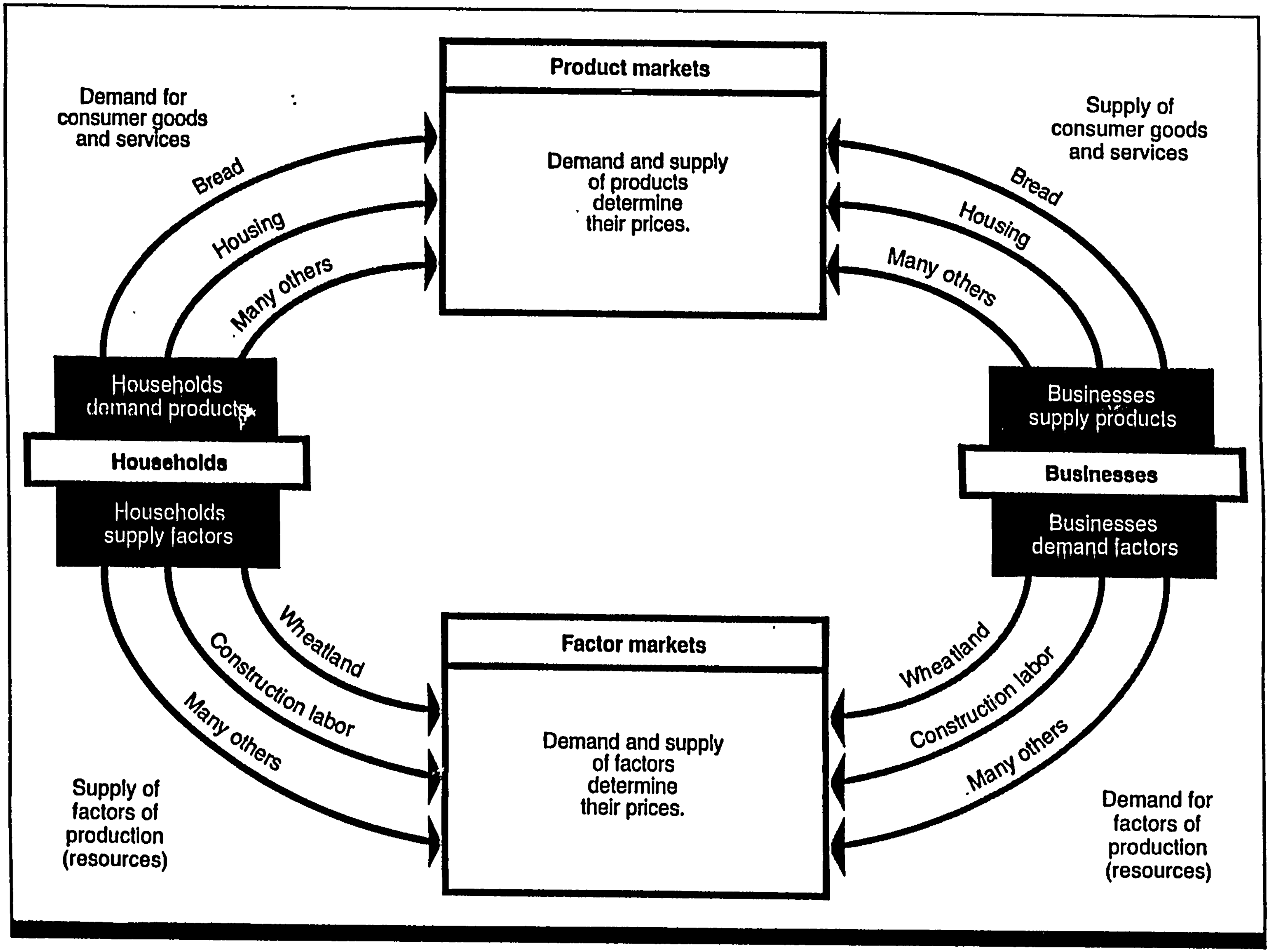


Consumption expenditures at different income levels, 1985

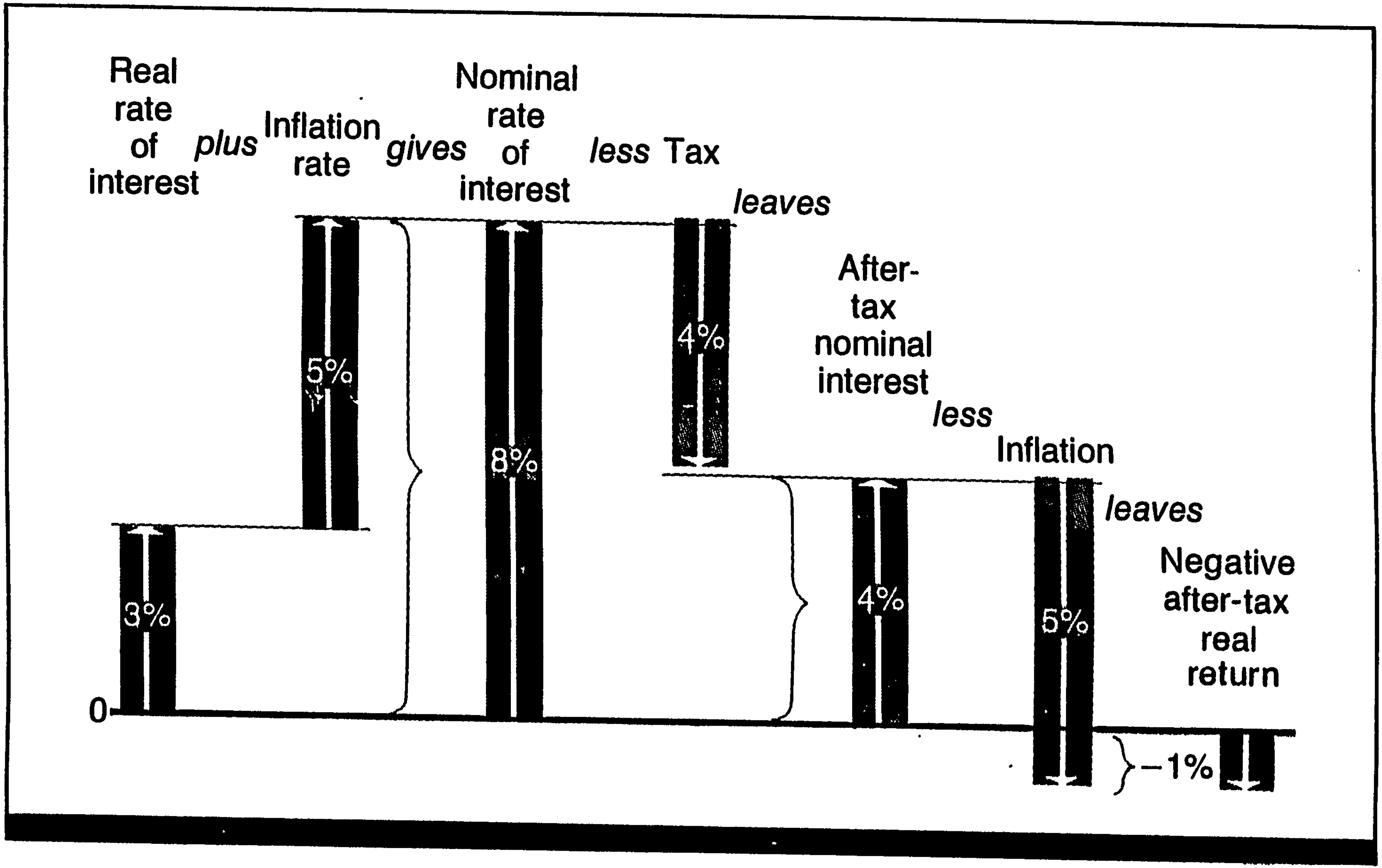



1. Low investment in physical capital and education
2. Slow improvement in technology
3. Few economies of scale
4. Rapid increase in population
Low saving
Small, stagnant markets
Slow increase in productivity
Low, stagnant per capita income

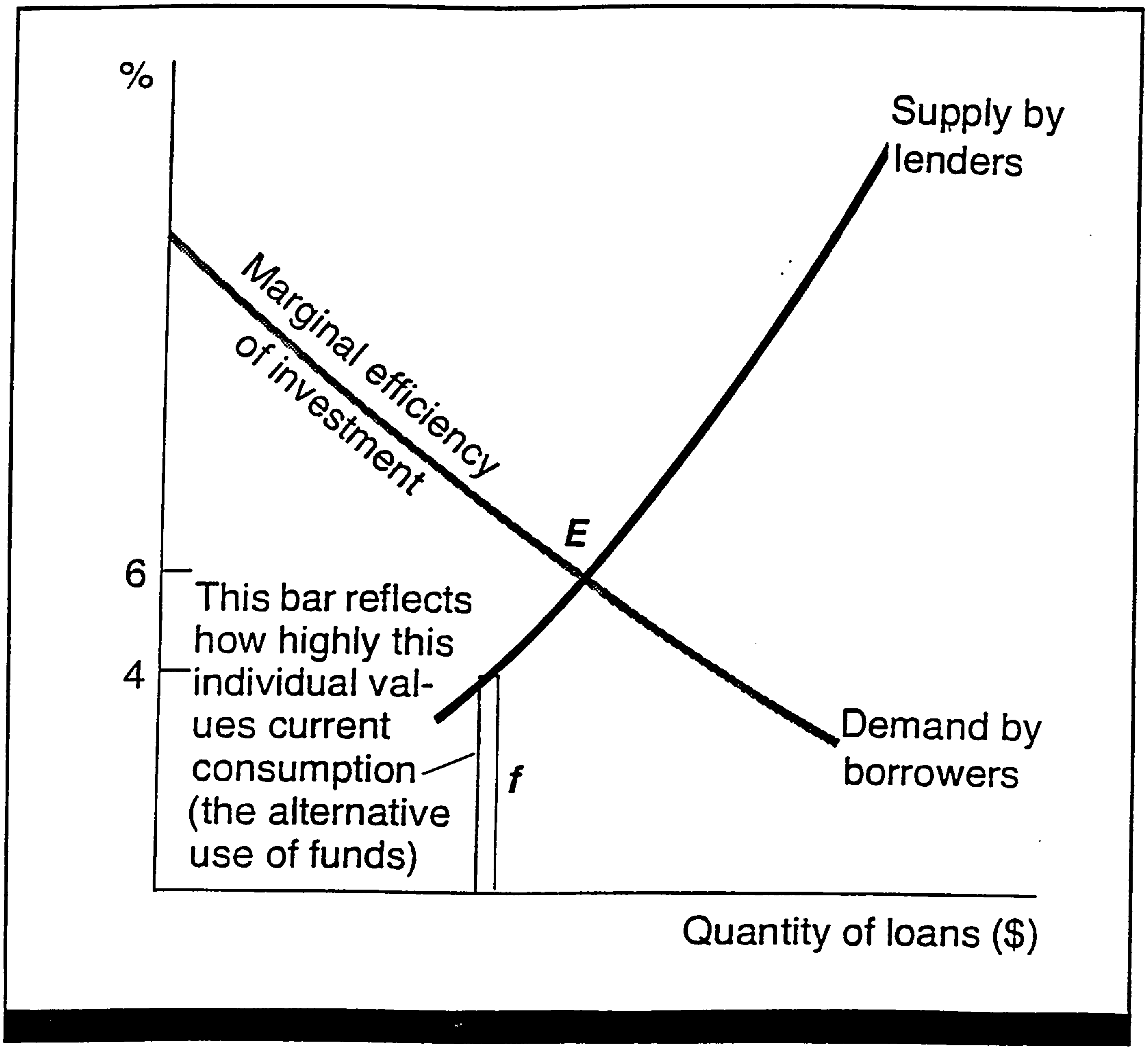
Markets answer the basic questions of what, how, and for whom



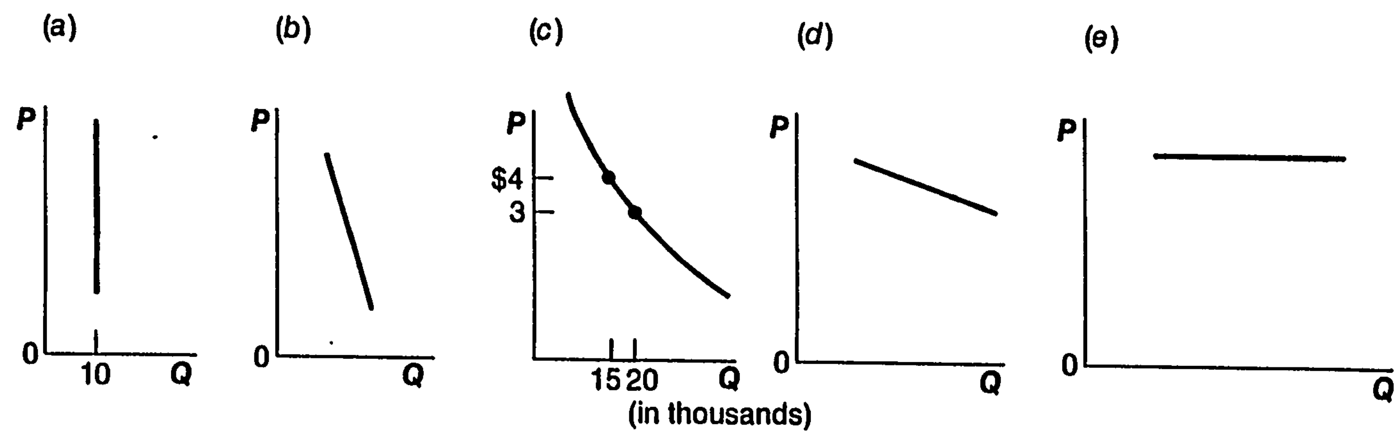
Effect of 50% tax, with 3% real rate of interest



The market for loans

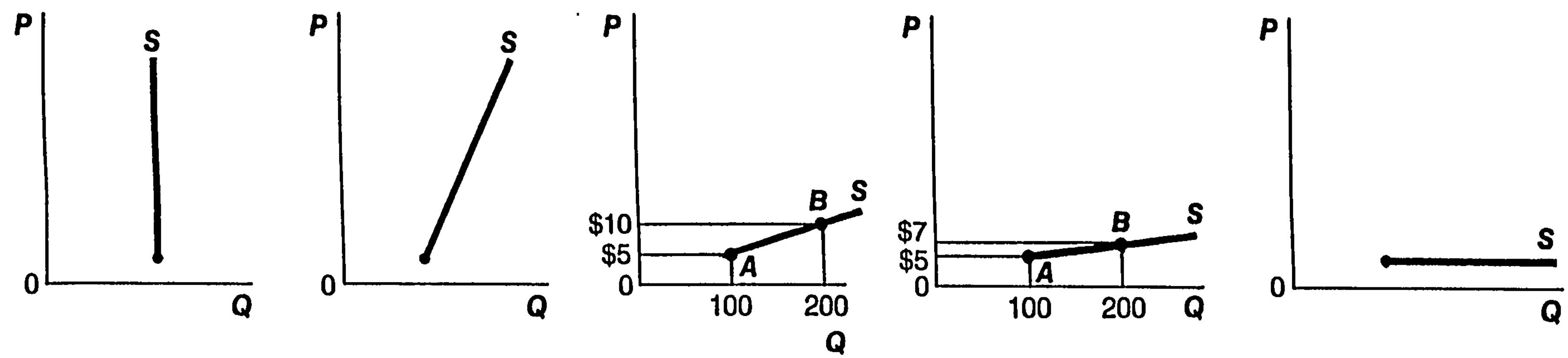


Varying degrees of elasticity



The two important questions that elasticity answers are:	Inelastic ($\epsilon_d=0$ to $\epsilon_d<1$)	Unit elasticity ($\epsilon_d=1$)	Elastic ($\epsilon_d>1$ to $\epsilon_d=\infty$)
1. How responsive is the quantity demanded to a price change?	Quantity is relatively unresponsive.	Quantity responds at the same rate as price changes.	Quantity is relatively responsive.
2. What happens to total revenue?	It moves in the same direction as price: As price falls, so does total revenue.	It remains constant. (In this example, it is $ 60,000 at any point on the demand curve.)	It moves in the opposite direction to price: As price falls, total revenue increases.
Examples:	Salt (0.1); coffee (0.25); gasoline (in the short run 0.2, in the long run 0.6).	Approximations: housing (0.9); china and tableware (1.1).	Foreign travel (in the long run 4.0).

Different elasticities of supply



(a) $\epsilon_S = 0$. Completely inelastic.

(b) $\epsilon_S < 1$. Inelastic.

(c) $\epsilon_S = 1$. Unit elasticity.

(d) $\epsilon_S > 1$. Elastic.

(e) $\epsilon_S = \infty$. Completely elastic.

Economic Potential(EP):

There are various levels of calculating the economic potential. The accuracy of an EP is dependent on the level of details included. Among these are:

1. Order of magnitude estimate
2. Feasibility estimate
3. Conceptual design estimate
4. Budget authorization estimate
5. Firm or contractor's estimate

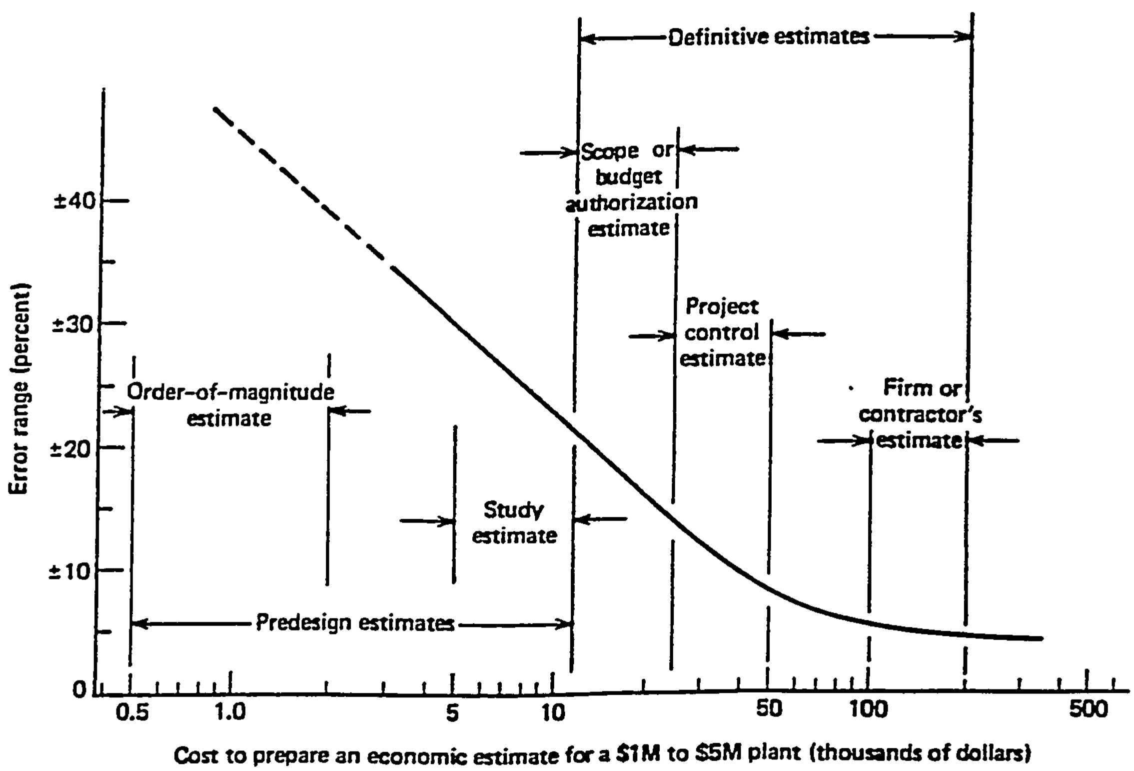
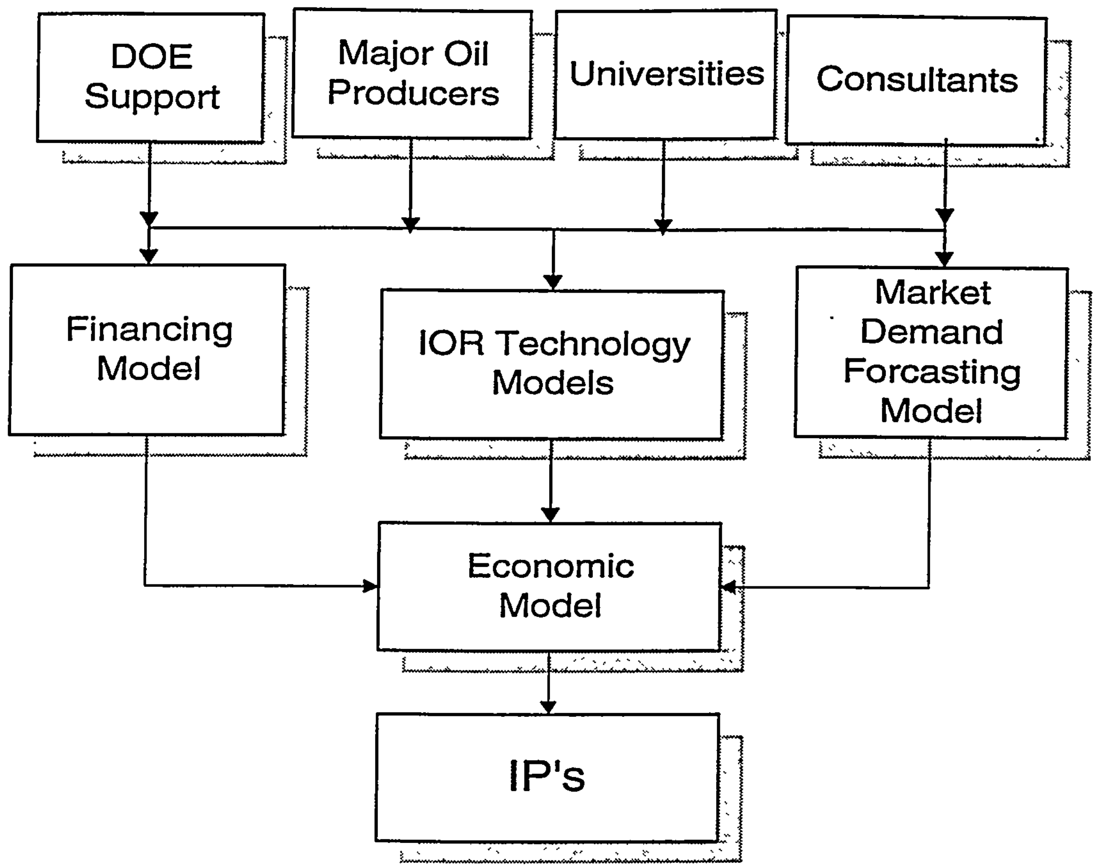


Figure 1-1 The relative precision of various types of economic evaluation and the costs incurred in their preparation.

Economic Assessment of IOR for IP's



An engineering venture must be technically feasible and economically attractive.

A. Technical Feasibility :

1. **Proven Reserve**
   - Reservoir Historical Production Data
   - Reservoir Characterization Studies
   - Reservoir Management
2. **Incremental Increase In Recovery**
3. **Improved Recovery Technology**
4. **Selection Among Alternatives IOR Methods**
5. **Technological Transfer**
   - Matching Needs With Technology

B. Economic Attractiveness

Economic evaluation models use economic analysis and the assumption that the depletion process of a reservoir production can be segmented into successive pseudo-steady state time increments.

The objective of any economic analysis is to minimize the cost and/or maximize the profit of a project. In the petroleum industry, the cumulative production costs, cumulative sales revenue, cumulative gross profit , return on investment (ROI) and cumulative net profit may be expressed, when evaluated at present time, as follows

$$CSR = \int_0^T Q(SP)(PWF)dt$$

$$CSR = \int_0^T Q(SP)(PWF)dt$$

$$CGP = \int_0^T Q[SP - LC](PWF)dt$$

$$ROI = \frac{\int_0^T Q[SP - LC](PWF)dt}{[LGC + DC]}$$

$$NPV = \int_0^T Q[SP - LC](PWF)dt - [LGC + DC]$$

$$NPV = [ROI - 1][LGC + DC]$$

Where

CC	Cumulative Production Costs
CSR	Cumulative Sales Revenue
CGP	Cumulative Gross Profit
ROI	Return on Investment, dimensionless
Q	Total HC's Production rate (STB/D or MSCF/D)
SP	Oil Sales Price $/STB
LC	Lifting Cost $/STB
LGC	Logistics Cost $/STB
DC	Drilling Costs
PWF	Present Worth Factor, dimensionless
T	Cumulative Production Time, days
t	Time, days
NPV	Net Present Value

Some of these variables are complex functions of other variables, e.g.;

Q(t)	Production demand profile must be generated and forecasted
SP(t)	Complex function of global supply and demand, domestic gross national product index, and inflation rate
LC(t)	Complex function of reservoir and IOR technology used and cost of money. The law of diminishing returns indicates that the lifting costs tends to increase with time as a reservoir is depleted.

Deterministic Economic Model:

Discrete and deterministic modeling where Q, SP and LC are treated as constants within each pseudo steady-state time increment (Δt), and no unforeseen fluctuations. Adding the latter part into the model will make it a stochastic model with probabilistic variations. Also, assumed in this deterministic model that profit received at any time is immediately reinvested at an interested rate of r per annum compounded continuously. Therefore, the cash flow during the ith time step constitutes a uniform series of payments.

The periodic payment is $Q_i[SP_i-LC_i]$

$$GP_i = \frac{Q_i\left[SP_i - LC_i\right]}{e^{\left(\frac{i\Delta tr}{365}\right)}}\left[\frac{e^{\left(\frac{\Delta tr}{365}\right)}-1}{e^{\left(\frac{r}{365}\right)}-1}\right]$$

Where

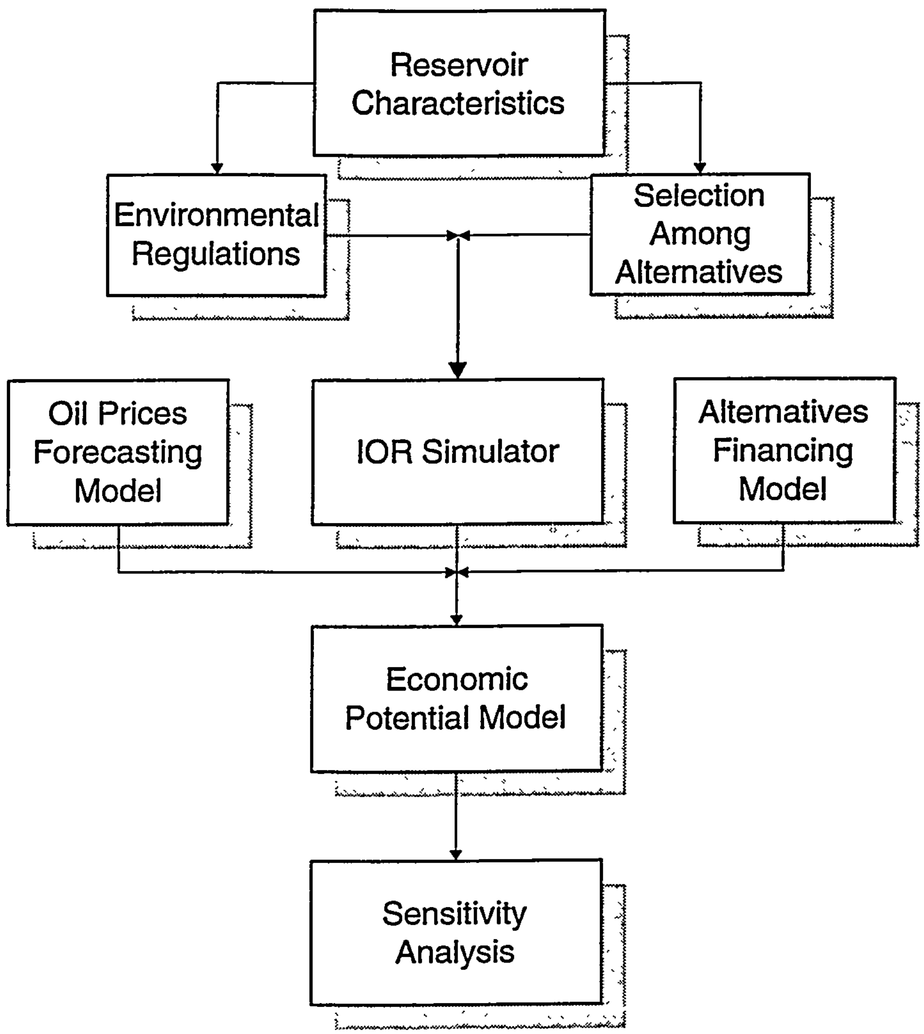
GP_i	Gross profit evaluated at present time from ith time step
SP_i	Oil sale price
r	Interest rate per annum compounded continuously

With annual inflation rate only taken into account,

$$SP_i = SP_P e^{\left(\frac{i\Delta t\hat{q}}{365}\right)}$$

$$LC_i = LC_P e^{\left(\frac{i\Delta t\hat{q}}{365}\right)}$$

Recommended Evaluations Path



Financing Alternatives