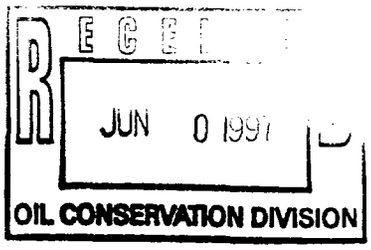
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION



IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6987
CASE NO. 11792

AMENDED APPLICATION OF DOYLE HARTMAN
TO GIVE FULL FORCE AND EFFECT TO
COMMISSION ORDER R-6447, TO REVOKE
OR MODIFY ORDER R-4680-A, TO
ALTERNATIVELY TERMINATE THE
MYERS LANGLIE-MATTIX UNIT,
LEA COUNTY, NEW MEXICO

AFFIDAVIT OF CRAIG W. VAN KIRK, PH.D.
IN SUPPORT OF HARTMAN'S OPPOSITION
TO OXY'S MOTION TO DISMISS

STATE OF COLORADO)
) ss.
COUNTY OF DOUGLAS)

I, Craig W. Van Kirk, being first duly sworn and under oath, state as follows:

1. My name is Craig W. Van Kirk. I am presently the head of the petroleum engineering department at the Colorado School of Mines and a practicing petroleum engineering consultant. A copy of my curriculum vitae is attached hereto as Exhibit A.

2. I have been retained as an expert witness on behalf of Doyle Hartman in this matter. In that capacity, I have reviewed numerous documents, including certain records pertaining to the Myers Langlie-Mattix Unit ("MLMU"), including MLMU waterflood and secondary recovery studies and reports; records pertaining to select MLMU injection wells, including but not limited to those in close proximity to the Myers "B" Federal No. 30 well; MLMU records which demonstrate waterflows within the physical boundaries of the MLMU; correspondence between Hartman and Oxy from 1994 to the present; Oxy's AFEs related to the 1994 Redevelopment Program; correspondence between Hartman and Oxy related to the 1994 Redevelopment Program, Hartman's objections to the program, and Oxy's responses to Hartman's objections; well records related to the Myers "B" Federal No. 30 well which Hartman attempted to drill in November, 1996; the Oil Conservation Division file for Case No. 11168 filed by Oxy in 1994, including Order R-4680-A which contained an authorization for a maximum surfacing injection pressure for MLMU injection wells of 1,800 psi, and the transcript of the hearing in that case; OCD file documents related to the application of Getty Oil Company in 1980 in Case 6987 for statutory unitization for the MLMU; and documents pertaining to the financial performance of the MLMU. I have also prepared and reviewed graphs and analyses related to surface injection pressures, injection volumes, and fluid (oil and water) recovery related to MLMU injection well patterns, including those in close proximity to the Myers "B" Federal No. 30 well.

3. I am familiar with the rules and regulations of the New Mexico Oil Conservation Division which apply to operators of waterflood units in New Mexico, including those regulations which would apply to the MLMU.

4. On the basis of my work in the industry and professional experience, I am also familiar with the custom and practice in the oil and gas industry as it relates to non-consent provisions in unit agreements and unit operating agreements, and the manner and method by which unit operators collect the share of expenses for working interest owners who have elected to go non-consent and become a carried interest.

5. In the oil and gas industry the right to be a "non-consent party" and a carried interest refers to the circumstance where a party to a joint operating agreement for a pooling or unitization agreement does not agree to participate in the drilling, reworking or plugging back of a well or other expenditure. The term "carried interest" has a well-defined and generally accepted meaning within the oil and gas industry. When a working interest owner has the right to go non-consent and become carried, that working interest owner relinquishes his interest temporarily to the operator or other interest owners while his or her share of expense is being recovered and has no personal obligation for operating costs.

6. One of the necessary elements of a working interest owner's status as a carried interest is that he or she is not subject to actions for collection of the unpaid expense by lawsuit or other legal remedies. If the working interest owner who elected to go non-consent and become a carried interest could be sued by the operator or other

working interest owners who were paying for unit operations, the right to go non-consent would become meaningless. In all my experience, the unit operator or other working interest owners are limited in recovery of the carried owner's unit expense solely from the non-consenting party's share of production from that unit.

7. For many years, the New Mexico OCD has regulated surface injection pressures for waterflood units in Lea County. The general rule prohibits surface injection pressure in excess of 0.2 psi per foot of depth absent a showing by step-rate testing or some other evidence by the operator that a higher injection pressure would not fracture the injection zone and cause injected water to escape to other formations or onto the surface. In the MLMU, given the depth of the Lower Seven Rivers and Queen Formations, the 0.2 psi per foot of depth translates to a surface injection pressure of approximately 700 psi. Administrative Order WFX No. 460, issued May 11, 1978, authorizes a surface injection pressure of 900 psi for the MLMU.

8. Having reviewed the transcript and exhibits in Oxy's case in support of its Application in Case No. 11168, I saw no evidence whatsoever submitted by Oxy during that proceeding which would support a maximum surface injection pressure of 1,800 psi or any other elevated pressure for the injection wells in the MLMU which were proposed to be part of the 1994 Redevelopment Program.

9. Based on my professional experience, it is my opinion that a surface injection pressure of 1,800 psi in the MLMU is in excess of the pressure that will fracture the authorized injection formation and cause injected water to escape from the target zone to other formations.

10. Based on my preliminary review of documents and files, it is my opinion that there is evidence of water out of zone as a result of MLMU injection practices. This opinion is based on my preliminary analysis of MLMU surface injection pressures, injection volumes and fluid recoveries, and Hartman's experience in drilling the Myers "B" Federal No. 30 well, in which he encountered large quantities of water in the Yates Formation. Water is not naturally occurring in the Yates Formation in this area.

11. Before I can finalize all my opinions on this issue, I would need to review numerous documents maintained and generated by Oxy as the MLMU operator (or by Oxy's predecessors-in-interest), including but not limited to documents relating to unit operations; well files for various production and injection wells; pressure analyses, spreadsheets, graphs, maps of the waterflood area; fall-off tests including historical and test data; graphs depicting wells, injection data, cumulative injection volumes, average water pressure measurements, injection-withdrawal ratios, pressure data reports, step-rate tests; reports, analyses, worksheets, preliminary reports, final reports, and supporting data prepared or generated by outside consultants or the MLMU operator or its personnel regarding the past or projected performance of the MLMU; and other documents regarding MLMU injection practices.

FURTHER AFFIANT SAYETH NOT.

Craig W. Van Kirk

CRAIG W. VAN KIRK

SUBSCRIBED AND SWORN TO BEFORE ME this ___ day of June, 1997.

Notary Public

My Commission Expires:

RESUME

CRAIG W. VAN KIRK is a practicing petroleum engineer and a professor of Petroleum Engineering at the Colorado School of Mines. He holds advanced degrees in Petroleum Engineering, including the Doctorate. Prior to his present position at CSM, he spent over eleven years in the industry in the areas of reservoir engineering and simulation, supplemental oil recovery, and reservoir characterization. He is involved in several areas of research, has published articles and monographs on reservoir engineering and related topics, and is active in several professional organizations.

EDUCATION:

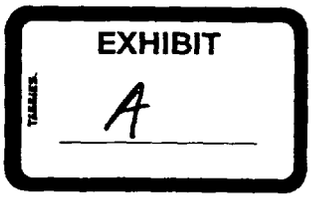
Ph.D. Petroleum Engineering, Colorado School of Mines, Golden Colorado, June, 1972. Specialized in reservoir engineering and simulation. Minor in mathematics. Thesis: "Effect of Pressure-Dependent Variables in Gas-Well Numerical Simulation and Gas-Well Test Analysis". Constructed numerical finite-difference simulator.

M.S. Petroleum Engineering, University of Southern California, Los Angeles, California, June, 1969; Emphasis in reservoir engineering. Thesis: "Effects of the Water-Oil Viscosity Ratio on the Relative Permeability to Oil".

B.S. Petroleum Engineering, University of Southern California, Los Angeles, California, February, 1968.

WORK EXPERIENCE:

1980-Present	Department Head of Petroleum Engineering. Teaches and conducts research on reservoir engineering, simulation, management, improved oil recovery, and how to conduct reservoir studies.
1978-Present	Professor, Colorado School of Mines, Golden, Colorado.
1977-1978	Manager, Calgary Branch Office, and Member of Board of Directors, Scientific Software Corporation of Canada, Ltd. Manager of Reservoir Studies.



Work Experience (continued)

1974-1978 Manager of Reservoir Engineering, Scientific Software Corporation, Denver, Colorado. Managed a staff of engineers and geologists conducting reservoir engineering and simulation studies worldwide. Responsibilities included major project coordination and scheduling, ensuring technical quality of all work, preparation and presentation of final reports, and presentations to private companies, government agencies and national corporations. Taught regularly scheduled courses in reservoir engineering and simulation in Denver and throughout the rest of the United States and internationally. In 1977, became the Manager of the Calgary Branch Office and served on the Board of Directors of Scientific Software of Canada, Ltd. Responsible for the profit and loss of professional consulting services in the oil and gas industry. Heavily involved in training new employees and clients and in teaching short courses in reservoir engineering and simulation.

1969-1974 Reservoir Engineer, Shell Oil Company, Denver, Colorado. Involved with reservoir engineering and simulation, economic analysis, well log and total formation evaluation, drilling operations, workover and stimulation operations, and exploration geology. Studied oil and gas reservoirs throughout the Rocky Mountain states, as well as designing, supervising and analyzing well tests. Evaluated potential for waterfloods, infill drilling, and field development.

1967-1969 Production Engineer, Humble Oil and Refining Company, Long Beach, California.
Gained experience in offshore platform operations including directional drilling, artificial lift, compressor design, and production handling facilities. Conducted economic studies for well workovers, surface facilities, and expansion for waterfloods.

Summers 1965&1966 Test Engineer Assistant and Gas Plant Trainee, Continental Oil Company, Casper, Wyoming (1966).
Roustabout/Roughneck/Engineer's Assistant, Continental Oil Company, Ventura, California (1965).

Dr. Van Kirk has written numerous reports of a confidential nature for the United States Government, private industry, and national oil companies throughout the world. These studies have included every oil and gas producing continent on earth, numerous geologic basins onshore and offshore, and all types of reservoir rocks and fluids.

A small sample of the many countries Dr. Van Kirk has worked with on field studies include Russia, China, Bolivia, Saudi Arabia, and the Solomon Islands. The types of field studies conducted include black oil and volatile oil recovery optimization giving consideration to multiple scenarios of supplemental recovery, well spacing, and completion practices.

Numerous studies have focused on producing gas fields and gas storage facilities, including the largest gas storage field in the world. These gas-oriented studies addressed individual well deliverability, capacity, and the effects of curtailment. Frequently the studies have incorporated the simulation of surface facilities (e.g., compressors), wellbores, and the reservoir into one comprehensive computer model.

SHORT COURSES AND TRAINING:

Throughout the past twenty years Dr. Van Kirk has conducted numerous short courses for private industry and government agencies throughout the world. This training has covered subjects such as reservoir development and management, optimization of recovery and economics, simulation, well testing, waterflooding and gas injection, multi-disciplinary teamwork, and many others.

INVITED SPEAKER:

Dr. Van Kirk has enjoyed being an invited speaker for SPE events, private companies, and government agencies throughout the world. The subjects have included education, research, practical application of technology, and organizational structures. Some of the locations are western Europe, Russia, Middle East countries, Latin America, Canada, and Asia.

AWARDS/HONORS:

National Society of Petroleum Engineers Board of Directors, June 1989. Term of four years to October 1993.

Who's Who in Engineering in America.

Professional Societies:

Society of Petroleum Engineers of AIME

1988: Nominated for Director at Large for 1989-93

1987-1989: Technical Editor of JPT
National ad hoc committee member on Petroleum Engineering Education

1985-1986: Chair, SPE National Education and Professionalism Committee. Responsible for organizing and running SPE Annual Technical Conference in October 1986, session on Education and Professionalism in Petroleum Engineering.

Registered Professional Engineer in the State of Colorado
National Society of Professional Engineers
Colorado Society of Professional Engineers

RESEARCH:

Areas of research activities include: **Reservoir Simulation** (Development of simulators for research, teaching, training, general application and special topics; methods for simulating geologic depositional structures; improvement of history matching methodology; techniques for handling dispersion and diffusion); **Reservoir Behavior** (Migration of fluids in porous media; depositional environments and geological influences on flow behavior; reservoir characterization, tied closely to geological conditions; reservoir and field development for optimizing recovery); **Supplemental Recovery** (Enhanced oil recovery and waterflooding and gas injection).