

Approved 3-17-87
Date

MINUTES OF THE SENATE COMMITTEE ON ECONOMIC DEVELOPMENT

The meeting was called to order by Senator Wint Winter, Jr. at
Chairperson

12:45 ~~a.m.~~/p.m. on March 10, 1987 in room 123-S of the Capitol.

All members were present except: Senator Burke - Excused
Senator Hayden - Excused
Senator Karr - Excused
Senator F. Kerr - Excused

Committee staff present:

Arden Ensley, Revisor of Statutes
Lynne Holt, Legislative Research Department
Ramon Powers, Legislative Research Department
Mary Allen, Secretary to the Committee

Conferees appearing before the committee:

Dr. Anthony Redwood, Institute for Public Policy and Business Research
Don Green, University of Kansas
G. Paul Willhite, University of Kansas
Donald Schnacke, Kansas Independent Oil and Gas Association

The meeting was called to order at 12:45 p.m. by the Chairman, Senator Wint Winter, Jr..

Senate Bill 176 - An Act creating the small contractors and small businesses' revolving loan fund.

The Chairman told the Committee that Senator Eugene Anderson, sponsor of SB 176, has requested that the subject of the bill be studied by an Interim Committee.

Senator D. Kerr moved that the subject matter of SB 176 be recommended to the Legislative Coordinating Council for Interim study. Senator Daniels seconded the motion. The motion carried.

Chairman Winter called on Dr. Anthony Redwood, Institute for Public Policy and Business Research, to brief the Committee on the Tertiary Oil Recovery Project (TORP). Dr. Redwood spoke of a summary of recommendations of the Kansas Economic Development Study and called the attention of the Committee to lists of those recommendations that have not seen legislative task force or legislative commission action. (Attachment I) He stated that he particularly wants to focus on the recommendation dealing with the research program on enhanced oil recovery and increasing the transfer of new technology to independent oil well operators (Recommendation No. 2) and the recommendation which deals with the impact of regulations and rule making on businesses and economic development (Recommendation No. 50). He spoke of other recommendations and said that No. 14 concerns the state's commitment to public education in Kansas, and in particular higher education. This is an endorsement in principle of the importance of this dimension to future economic development. Dr. Redwood suggested that the following recommendations be referred to the Interim Committee on Economic Development:
No. 34 - Provide low or no-interest loans to local governments and nonprofit organizations to facilitate the establishment of incubators. No. 39 - Establish a state community development block grant program. A state program could introduce greater flexibility into helping local communities with economic development because it would be less restricted and structured than the federal program. No. 47 - Review the state's budgeting procedure to determine how the state can expand its investment in public infrastructure to support economic development.

Senator Daniels moved that Recommendations No. 34, 39 and 47 as shown in Attachment I be recommended for Interim study. Senator Vidricksen seconded the motion. The motion carried.

Dr. Redwood discussed the Tertiary Oil Recovery Project (TORP) which has operated at the University of Kansas. He observed that oil and gas is a traditional "sector" in Kansas and that it constitutes about five or six percent of the state's output. He noted that the Kansas oil industry is an industry of small producers and that it does not have its own

CONTINUATION SHEET

MINUTES OF THE SENATE COMMITTEE ON ECONOMIC DEVELOPMENT

room 123-S, Statehouse, at 12:45 ~~a.m.~~/p.m. on March 10, 1987.

generation of its own technology.

Dr. Redwood said that the state funds TORP at K.U.. He noted that the focus of that project is to develop advanced technology for the recovery of oil in Kansas given the nature of the oil industry in the state. The key need, he said, is how to get the technology field tested and get it accessible to the industry. He called on Professor Don Green, Co-Director of TORP, to brief the Committee on the project.

Professor Green provided members of the Committee with copies of an "Overview of the Tertiary Oil Recovery Project". (Attachment II) He said that TORP was started in 1974. He discussed the project's basic objectives and gave recommendations on how TORP might extend or expand its services to the industry and the state. The first objective, he said, is to evaluate the potential for tertiary oil recovery. He observed that tertiary oil recovery means advanced technology beyond traditional water flooding. In the initial evaluation it was determined that in Kansas at least as much as one billion barrels and perhaps as much as three billion barrels of additional oil might eventually be recovered if advanced technology is applied. He said that the major thrust of TORP is the second objective, to conduct research and development work on various technologies to recover more oil. In this regard, they are doing such things as injecting polymers into reservoirs to try to improve waterflood efficiency. Small operators in Kansas can apply this process, he said. TORP has researched other processes such as the use of detergent type chemicals or the use of carbon dioxide to get additional oil recovery.

Professor Green said that the third objective of TORP is dissemination of information about tertiary oil recovery out to the Kansas oil industry. TORP has done this various ways such as through publications and conferences. He noted that the fourth objective is to interact directly with the Kansas oil industry to try to get the technology to them, to have it used and to test the technology in the field. In 1983, TORP was able to hire a field engineer to work with the oil operators for field testing of enhanced oil recovery processes. TORP has directly participated in fourteen field tests in the state. He noted that all of the tests which have been completed have been in the eastern part of the state. He observed that TORP's tests of the gelled polymer technology have shown that the process has merit for improving oil recovery from conventional waterfloods. He told the Committee that TORP has seen a greater demand on its resources over the past year than in previous ones. He pointed out that the drop in oil prices has brought forth a greater demand on its resources because people are concerned about improving efficiency and increasing oil recovery.

Professor Green said that TORP could increase its support of the industry by expanding its field activity. He noted that in addition to the full time field engineer, TORP has a second professional person on its staff who is assigned to work on field projects on a part-time basis. TORP would like to expand its field activity through the use of additional field engineers. He said that TORP is recommending, as a minimum, that one additional field engineering position be added to the project and that the budget be increased to support this position. He observed that if a position were added, activities in the central and western part of the state would be expanded significantly.

Senator Feleciano observed that the proposed budget for an additional field engineer would be for approximately \$64,000.00. He asked if TORP had approached the oil industry to see if it would be willing to pay for this engineer. Professor Green said that TORP had not approached the industry for this. Chairman Winter called on Don Schnacke, Kansas Independent Oil and Gas Association (KIOGA), to comment on this subject. Mr. Schnacke said that TORP's budget is in the \$300,000.00 to \$400,000.00 range. Although the industry does supply some money through grants and things of that type, he noted that it does not pay for TORP. He observed that the independent oil men of Kansas produce a product and sell it on the open market but they do not really have a research and development wing of their organization. He pointed out that millions of dollars are spent at K-State on agricultural research and he observed that TORP is a very small research program, is one which is important to the oil industry, and is one which should be supported.

Dr. Redwood observed that it is his impression that support for the oil industry, in many respects, is much less than support for agriculture or aviation in Kansas.

Professor Green said that the TORP budget for FY 1987 for tertiary oil recovery was about \$400,000.00 from the state. He pointed out that they have additional funding from

CONTINUATION SHEET

MINUTES OF THE SENATE COMMITTEE ON ECONOMIC DEVELOPMENT,
room 123-S, Statehouse, at 12:45 ~~a.m.~~/p.m. on March 10, 1987

the Department of Energy, approximately \$150,000.00, they have grants and some industrial support, which amounts to \$20,000.00 to \$30,000.00 per year.

The Chairman introduced Professor G. Paul Willhite, Co-Director of TORP. Professor Willhite said that it is important to remember that one of the reasons that the project was started was because K.U. saw a need in the state and the need was the independent oil industry. TORP is an example of how the University can interact with an important industry to develop technology to improve the economic well being of that industry. TORP is asking to be allowed to extend its efforts to other important producing parts of the state.

Senator D. Kerr moved that the minutes of the March 3, 1987, and March 5, 1987, meetings of the Committee be approved. Senator Vidricksen seconded the motion. The motion carried.

The meeting was adjourned by the Chairman at 1:35 p.m..

March 10, 1987

GUEST LISTNAMEREPRESENTING

CHARLIE KRINGER

KV

Don Green

KY

Paul Willhite

KY

Don Schnacke

KIOGA

Walter Durr

EKOGA

Tommy Redwood

KW

SUMMARY OF OTHER RECOMMENDATIONS OF *THE KANSAS ECONOMIC DEVELOPMENT*
STUDY TO BE ACTED UPON

The following recommendations have not seen legislative, task force nor legislative commission action:

2. Expand the research program on enhanced oil recovery and increase the transfer of new technology to independent oil well operators.

14. Endorse strongly a continuation and expansion of the state's commitment to all levels of public education in Kansas. Public education in general and higher education in particular are crucial elements for the future progress of Kansas.

34. Provide low or no-interest matching loans to local governments and nonprofit organizations to facilitate the establishment of incubators.

35. Establish a revolving loan pool for infrastructure development available for use by communities to promote economic development.

39. A state community development block grant program should be established and targeted to economic development.

42. Continue and expand the state's commitment to a high quality of life in Kansas communities by encouraging the arts. Funding for the arts should be increased to the mean per capita level of the fifty states.

47. Review the state's budgeting procedures to determine how the state can expand its investment in public infrastructure to support economic development, particularly highways, airports, water resource development, recreation and wildlife improvements, and state agency facilities.

50. The impact of regulations on state economic development should be added to the criteria that regulatory bodies must use in carrying out their regulatory responsibilities, and, where they exist, be given greater emphasis. Existing and proposed regulations should be reviewed by Kansas Inc. to insure that they are not unnecessarily impeding economic development.

Senate Committee on Economic Development
3-10-87
Attachment I

The following recommendations are being acted upon by departmental agencies. Written progress reports from each agency responsible should be submitted to the appropriate House or Senate Committee for their review in the 1987 Legislative Session:

19. Sponsor a program of financial symposia on capital formation. (Kansas Advanced Technology Commission)
29. Kansas Department of Economic Development should implement a marketing program aimed at targeted industries. (Department of Commerce)
30. Kansas should initiate a national promotion campaign aimed at improving the image of Kansas among business leaders with responsibility to make business location decisions. (Department of Commerce)
32. Establish an overall travel and tourism strategy for the state. A funding increase is necessary for:
 1. research on travel and tourism,
 2. marketing of Kansas attractions in and out of the state, and
 3. development of state parks or other major attractions. (Department of Commerce)
33. Upgrade the Kansas Department of Economic Development data and information systems necessary for economic development. (Department of Commerce)
38. Federal Community Development Block Grants should be used to the fullest extent possible for economic development projects. (Department of Commerce)
40. Expand the "Certified Cities" program. (Department of Commerce)
44. The major policy goal of the state Job Training Partnership Act Program (JTPA) should be to promote economic development. (Department of Human Resources)
48. The allocation of state highway funds should, to the fullest extent possible, be linked to economic development. Priority should be given to projects that promote economic growth in the state. (Department of Transportation)
49. Conduct feasibility studies to examine the need for major highways in southeast and southwest Kansas. (Department of Transportation and the Kansas Turnpike Authority)

3/9/87

OVERVIEW OF THE TERTIARY OIL RECOVERY PROJECT

University of Kansas

Don W. Green and G. Paul Willhite, Co-Directors

OBJECTIVES

The Tertiary Oil Recovery Project (TORP) was originally proposed by the University of Kansas as a mechanism by which expertise existing in the areas of petroleum engineering and geology at the University could be brought to bear directly on the problems relating to the declining oil reserve in Kansas. The Project was established for this purpose by the Kansas Legislature at the request of the Governor in 1974 and as a direct response to the developing energy crisis which was heightened by the Arab embargo of late 1973.

The specific objectives established for TORP were the following:

1. Evaluate the potential of tertiary oil recovery processes in Kansas.
2. Conduct research and development work on tertiary oil recovery processes which are applicable in the State.
3. Disseminate information about the technology to the Kansas oil industry.
4. Interact with representatives of the oil industry and provide technical assistance on selected field tests.
5. Educate students in the technology of tertiary oil recovery.

PROJECT ACTIVITIES AND ACCOMPLISHMENTS

Activities and accomplishments related to the five specific objectives are described in the following paragraphs.

1. Evaluation of the potential of tertiary oil recovery processes in Kansas.

A statewide assessment was made of the amount of oil which will remain in Kansas reservoirs after exhaustion of primary and secondary production. A classification of this resource by major geologic formation type was also made. The study was released as the first publication of TORP. Briefly, the conclusion was that about one-third of the original 15 billion barrels of oil in place in Kansas will be recovered by conventional technology. As much as one to three billion barrels of the remaining 10 billion barrels should eventually be recovered through application of tertiary techniques of the type being investigated.

Several detailed geologic studies of specific Kansas reservoirs have been completed. Early work focused on sandstone reservoirs of the type found in eastern Kansas. The later investigations have centered on carbonate-type reservoirs such as found in central Kansas. In this work, geologic factors are being related to the engineering parameters which affect tertiary oil recovery

so that improved estimates might be made of recovery potentials. As a part of the assessment of the potential of tertiary oil recovery, several economic studies have been conducted which focus on Kansas reservoirs.

2. Conducting of research and development work on applicable tertiary oil recovery processes.

This activity has been the major emphasis of TORP to date in that most of the personnel effort and project funds have been focused on research and development work. Research areas investigated, in order of priority, are the following:

- a. Application of polymers and gelled polymers to improve waterflood efficiency in reservoirs throughout the State.
- b. Use of surfactant/polymer systems to recover oil that is trapped and not recoverable by conventional waterflooding in the sandstone reservoirs of eastern Kansas.
- c. Application of the in situ combustion process to recover heavy oil such as exists in many reservoirs in southeastern Kansas.
- d. Application of carbon dioxide to recover trapped oil in the large carbonate reservoirs such as exist in central and western Kansas.

The Project has made progress in all of the areas investigated and a large number of technical papers and reports have been published. The most significant progress has occurred in investigations of the use of polymers to improve waterflood efficiency. As described in item 4 below, TORP is actively involved in the field testing of this process in the State. TORP is perhaps the leading research center in the country for work related to gelled polymer technology.

3. Dissemination of information about oil recovery technology.

Within this activity the objective has been twofold. One purpose has been to disseminate information about tertiary oil recovery technology to the Kansas oil industry. This information should convey the state of the art as it applies to Kansas oil operators and should not be highly technical or research-oriented in its nature. The second objective has been to publish research results in the technical literature.

As part of the first objective, six Tertiary Oil Recovery Conferences have been sponsored by TORP. These have been held in Wichita every two years beginning in 1975. The seventh conference is scheduled for March 11, 12, 1987 in Wichita. An average of 180-190 persons has attended each conference. TORP is also initiating a series of workshops on waterflooding which will be held in different parts of the state. The first of these is scheduled for April 14, 1987 in Great Bend.

To meet the second objective of this activity, a number of papers and reports have been written. A list of these and copies are available upon request.

4. Interaction with the Kansas oil industry.

An Oil Recovery Advisory Board was established at the beginning of the project. This board has been active throughout the program and has offered

guidance in such areas as development of the oil recovery conferences, planning of the research program, and implementation of field tests of oil recovery processes.

Since 1983, the project has had an active program of field testing of enhanced oil recovery processes. In that year a full-time field engineering position was added to the project. Monies for the position were provided by an internal reallocation of funds. Emphasis in the field activity has been on testing the gelled polymer technology which is aimed at improvement of water-flood efficiency. TORP has been directly involved in fourteen tests of this technology since 1983. Field tests to date have been conducted in eastern Kansas because the reservoirs are relatively shallow and testing is less expensive. However, an objective is to move testing of gelled polymers into the central and western parts of the state and an initial test will be conducted this spring in a reservoir south of Great Bend. A state map indicating the locations of completed and active tests is included as Figure 1.

Our tests of the gelled polymer technology have shown that the process has merit for improving oil recovery from conventional waterfloods. The most successful test was conducted on the Cook Lease in Elk County. A plot showing the very positive effect of using gelled polymers on this lease is attached as Figure 2. Results of all testing are made available to the Kansas industry.

5. Education of students in the technology of tertiary oil recovery.

Between ten and fifteen graduate students are associated with TORP each year under present operating and budget policies. There is also some participation of undergraduates in research activities and approximately four undergraduates have participated in research during each academic year. The project work is being related to the general graduate and undergraduate programs in chemical and petroleum engineering and geology. A new course in Enhanced Oil Recovery Techniques was first offered in the spring semester of 1977. The course is taught every third semester and is open to graduate students and seniors in engineering.

POTENTIAL EXPANSION OF FIELD RELATED ACTIVITIES

As indicated, an initial objective of TORP was the establishment of a field liaison program. The plan was to work with operators in Kansas to assist in the implementation of new oil recovery technology. In particular, it was envisioned that, as TORP conducted research on new or improved oil recovery techniques, at the appropriate time these techniques would need to be field tested. Such field tests would require direct cooperation with Kansas oil operators. Further, it was realized that there was a need for technical assistance for operators who were implementing such advanced technology, whether or not that technology was developed in the TORP laboratory. Thus, TORP was established in part to serve as a research/technical facility to operators who otherwise would not have access to the latest technological developments. The role of TORP was seen as one involving advanced technology and, as such, would not be in competition with standard consulting which has been available to the industry. Information developed through the Project was to be shared openly with the entire petroleum industry in the State.

Work in the early years of TORP focused on the development of a laboratory and on research related to new or improved oil recovery methods. Direct work

related to the field was a smaller part of the overall effort. However, by the early 1980's, the Project had developed a research program and a base of technological expertise such that it was appropriate to implement direct field related activities. The field liaison program took a major step forward in 1983 with the hiring of a field engineer. That person was given direct responsibility for working with oil operators. A second professional person on the TORP staff was also assigned to work on field projects on a part-time basis.

TORP field personnel have several responsibilities. These include:

1. Designing and implementing field pilot tests involving new technology. This requires the identification of operators who are willing to participate in pilot tests and a close cooperative effort with those operators. TORP personnel often work at well sites, supervising the conducting of field tests.
2. Providing advice and recommendations to specific operators who are in the process of implementing new technology. This often requires that TORP personnel visit the oil field sites.
3. Disseminating general information about new technology to Kansas operators.
4. Monitoring of performance of field projects which involve new technology. This activity requires that TORP personnel visit the sites of a number of field projects across the State.

Project personnel have been quite active in conducting these responsibilities. For the years 1983-1986 inclusive, TORP personnel were involved in 14 field tests of gelled polymer technology, and 20 field tests using chemical tracers as a diagnostic method of determining the efficiency of waterflooding. A total of 57 visits were made to field sites or field offices in the State during 1986, i.e., about five per month. Distance traveled in Kansas during 1986 was approximately 24,000 miles.

Even though the industry has been suffering poor economic conditions, there has been a very large demand on the time and services of TORP staff. In fact, much of the recent demand has arisen because of the economic condition. Operators are searching for ways of improving operating efficiency and increasing oil recovery in order to meet the economic crisis.

The requests for our services exceed our ability to respond. We think that it would be beneficial for the petroleum industry to increase the service level in the field liaison part of the project. As a minimum we recommend that one additional field engineering position be added to the project and that the budget be increased to support this position. A recommended budget for such a position is attached. If a position were added, activities in the central and western part of the state would be expanded significantly. Thus, there would be a need for a vehicle and an office which would be located in central Kansas.

BUDGET

Field Position

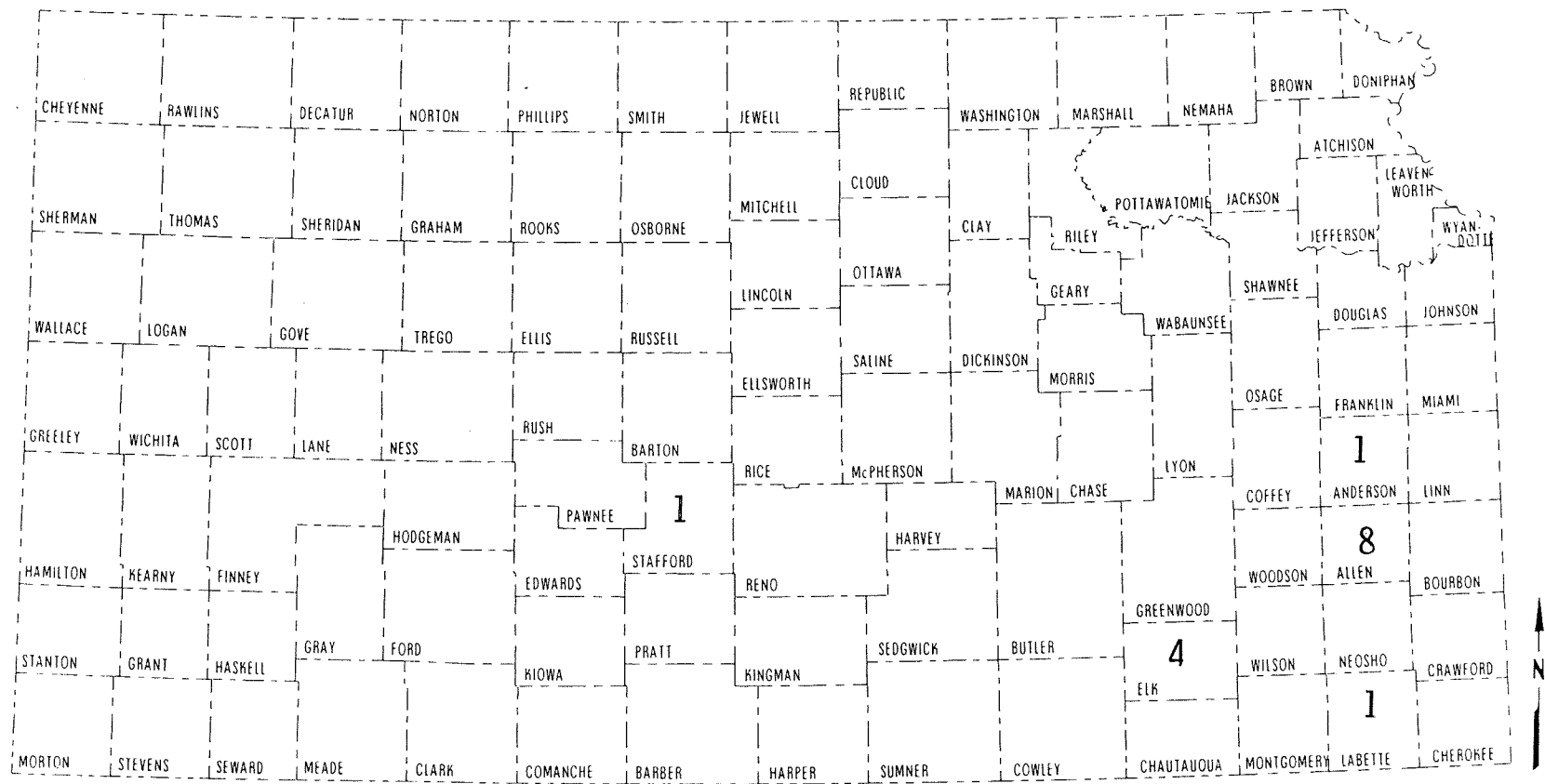
Tertiary Oil Recovery Project

Annual Expense

Field Engineer	\$33,000
Employee Fringe Benefits	6,600
Travel	7,000
Office Rental	2,500
Laboratory Supplies and Expense	<u>10,000</u>
Total	\$59,100

One Time Expense

Four Wheel Drive Vehicle	\$15,000
--------------------------	----------



state base map: Kansas Geological Survey, 1986

Scale 1:3,000,000

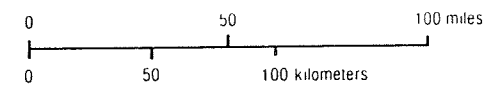


FIGURE 1. FIELD TESTS - GELLED POLYMER TREATMENTS

