OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

COPY

December 20, 1946

Honorable J. O. Seth
Attorney at Law
Santa Fe, New Mexico

Dear Judge Seth:

Re: Case 90 - Waiting on cement time - Notice of Publication

Enclosed please find Notice of Publication of hearing upon your petition in the above-captioned case, which case, along with four others pending and described in said notice, is set for 10:00 o'clock A. M., January 10, 1947.

Very truly yours,

Chief Clerk and Legal Adviser

Encl
CBL:mem

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

COPY

December 20, 1946

Santa Fe New Mexican
Santa Fe, New Mexico

Hobbs Daily News-Sun
Hobbs, New Mexico

Gentlemen:

Re: Cases Nos. 90, 91, 92, 93 and 94 - Notice of Publication.

Please publish the enclosed notice once, immediately. Please proof-read the notice carefully, and send a copy of the paper carrying such notice.

UPON COMPLETION OF THE PUBLICATION, PLEASE SEND PUBLISHER'S AFFIDAVIT.

For payment please submit statement in duplicate, accompanied by voucher executed in duplicate. The necessary blanks are enclosed.

Very truly yours,

Chief Clerk and Legal Adviser

CBL:mem
Encl

L CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

COPY

December 21, 1946

Mr. Glenn Staley
Proration Office
Hobbs, New Mexico

Dear Glenn:

Re: Cases 90-91-92-93-94 -- All set for hearing January 10, 1947.

Enclosed please find copy of the petitions in each of the above-captioned cases. Inasmuch as operators may desire to know the details of each petition, which, of course, cannot be set out in the brief abstracted notices of publication for hearing, which notices have been sent you heretofore.

Very truly yours,

Chief Clerk and Legal Adviser

Encl
CBL:mem

SETH AND MONTGOMERY
ATTORNEYS AND COUNSELORS AT LAW
111 SAN FRANCISCO ST
SANTA FE, NEW MEXICO

J. O. SETH
A. K. MONTGOMERY
OLIVER SETH

December 12, 1946.

Oil Conservation Commission
Santa Fe, New Mexico

Gentlemen:

I enclose in duplicate a Petition of the Stanolind Oil and Gas Company for a hearing on the matter of waiting time on cement. I hope the Petition is in proper form.

This is a matter which you have already agreed to set down for hearing on January 10th next.

Very truly yours,

JOS:CB
Encls.

SETH AND MONTGOMERY
ATTORNEYS AND COUNSELORS AT LAW
111 SAN FRANCISCO ST.
SANTA FE, NEW MEXICO

J. O. SETH
A. K. MONTGOMERY
OLIVER SETH

January 14, 1947

Oil Conservation Commission
Santa Fe, New Mexico

Gentlemen:

At the hearing on the 10th, in Case No. 90, Stanolind Oil and Gas Company was given permission to incorporate in the record a report on certain wells in Texas of Anderson-Prichard.

This information came in subsequent to the hearing, and it is enclosed herewith.

Very truly yours,

JOS:AW
Enc.1

ANDERSON-PRICHARD OIL CORPORATION

PRODUCERS REFINERS

OKLAHOMA CITY 2, OKLA.

Hobbs, New Mexico
January 8, 1947

Mr. Ralph Gray
Stanolind Oil & Gas Company
% La Fonda Hotel
Santa Fe, New Mexico

Dear Ralph:

Your office notified us to mail this report to you in care of the La Fonda Hotel, Santa Fe, New Mexico.

Yours very truly,

ANDERSON-PRICHARD OIL CORP.

By: L. H. Foster
L. H. Foster

LHF/igb
enc

ANDERSON-PRICHARD OIL CORPORATION
West Texas - New Mexico Division
Hobbs, New Mexico

WAITING ON CEMENT TIME

From January 1, 1946 to January 1, 1947 there were fourteen wells drilled in various pools in this division with the "Waiting on Cement Time" shown by accompanying report:

A recording pressure gauge was put in service on the 8-5/8 inch OD casing well No. 6, McCrea Lease, Fullerton Pool, Andrews County, Texas. The plug was pumped to the float, a recording pressure gauge was installed, initial pressure of 225# p.s.i. was recorded, and at the end of a 7 hour period the pressure had increased to 750# p.s.i. and at the end of a 12 hour period had decreased to 625# p.s.i. Pressure was released at this time and drilling was resumed at the end of 24 hours.

There has been no indication of cement failure in any of these fourteen wells. Nine of these wells were drilled in the Welch Pool, Dawson County, Texas. All of these wells are on the pump and have a low fluid level, if there had been any indication of cement failure, it could be easily detected in these wells.

Also attached is a report on the Parcell No. 1, Drinkard Area, Lea County, New Mexico by Mr. Travis Moore of Stanolind Oil & Gas Company, Hobbs, New Mexico.

ANDERSON PRICHARD OIL CORPORATION

By: L. H. Foster
L. H. Foster

LHF/igb
att-2

ANDERSON-PRICHARD OIL CORPORATION
West Texas - New Mexico Division
Hobbs, New Mexico

WAITING ON CEMENT TIME

	WELL	AMT. CASING	AMT. CEMENT SACKS	UNDER PRESS. HRS.	DRLG. PLUG HRS.
FULLERTON Andrews County, Texas	McCrea #6	125' - 13-3/8	150	12	24
	"	3995' - 8-5/8	600	12	24
	"	6849' - 5-1/2	300	12	40
	McCrea #7	124' - 13-3/8	150	12	24
	"	3929' - 9	500	12	40
	"	6844' - 5-1/2	300	12	40
DRINKARD Lea County, N. Mexico	Parcell #1	See attached report.			
WELCH POOL Dawson County, Texas	Webb #2	309' - 13-3/8	145	12	24
	"	4908' - 5-1/2	200	12	24
	Webb #3	314' - 13-3/8	155	12	24
	"	4903' - 5-1/2	200	12	24
	Webb #4	311' - 10-3/4	140	20	30
	"	4846' - 5-1/2	200	19	59
	O'Brian #1	305' - 10-3/8	150	12	24
	"	4868' - 5-1/2	200	12	24
	O'Brien #2	301' - 10-3/4	150	12	24
	"	4870' - 5-1/2	200	12	24
	O'Brian #3	310' - 10-3/4	150	12	24
	"	4888' - 5-1/2	200	12	24
	O'Brian #4	289' - 10-3/4	150	12	24
	"	4878' - 5-1/2	200	12	24
	O'Brien #5	298' - 10-3/4	155	12	24
	"	4905' - 5-1/2	200	12	28
	O'Brian #6	302' - 9-5/8	150	12	24
		4904' - 5-1/2	200	12	30
WILDCAT Cottle County, Texas	Lynch #1	1742' - 9-5/8	500	12	30½

WAITING ON CEMENT T.

	WELL	AMT. CASING	AMT. CEMENT SACKS	UNDER PRESS. HRS.	DRLG. PLUG HRS.
LEVELLAND POOL					
Hockley County, Texas	Hash #1	303' - 9-5/8	150	16	24
	"	4771' - 5-1/2	200	16	24
	Hash #2	303' - 9-5/8	150	16	24
	"	4776' - 5-1/2	200	16	24

Hobbs Area

Minor Engineering Report No. 9
January 18, 1946

MINIMUM WAITING ON CEMENT TIME

Anderson-Prichard Parcell #1

Drinkard Field

On January 15, 1946, 3003' of 9-5/8" OD 36# H-40 casing was run in the above well and cemented with 1130 sacks bulk common cement. Pertinent data follows:

Total Depth: 3007'
Date T.D. Reached: 1-14-46
Depth Casing Set: 3003'
Depth to Float: 2968'
Amount and Kind Cement: 1130 sacks bulk common
Average Weight of Cement Slurry: 15#/gallon
Type of Drilling Mud: Salt-saturated Zeogel
Time First Cement Mixed: 4:30 A.M. 1-15-46
Last Cement Mixed: 5:05 A.M. 1-15-46
Plug Pumped Down to 2918' at 5:35 A.M.
Maximum Pressure to Pump Plug: 550 p.s.i.
Final Pressure: 550 p.s.i.

A C-1500 p.s.i. pressure recorder was put into service approximately 25 minutes after plug was spotted, and recorded a pressure of 240 p.s.i. initial pressure. No pressure build-up was obtained, and the pressure had decreased to zero within 4 hours. There were apparently no leaks in any of the surface connections. The valves were opened on the Halliburton head at 2:30 P.M., 1-15-46, and there was no pressure on the head, even though fluid was standing in the head. The plug and 23' of cement above the float collar was drilled at 9:50 P.M. or approximately 17.5 hours after cementing. A total time of 27 minutes was required to drill the plug and 23' of cement, using a pump pressure of 700 p.s.i., and 18000# of weight on the bit. The cement drilled firm to hard.

A core barrel was the run, and 11' of cement was cored from 2942'-53' at 12:45 A.M., 1-16-46, or 20.25 hours after first cement was mixed. A recovery of 2' of cored cement was obtained, and was at the surface 22.5 hours after first cement was mixed. The cement core, the largest piece being approximately 6" in length, was inspected by Mr. Frank Stahl of the U.S.G.S., Mr. L. H. Foster of Anderson-Prichard, and Mr. Travis Moore of Stanolind. The cement had definitely reached final set, and possessed all the characteristics of a well-set cement sample. The samples could be cut with a knife, and had an estimated hardness of 2.5 on Moh's scale. The cement cored at the rate of 1'/minute with a pump pressure of 100-150 p.s.i.

This is the first time that cement has been cored in this area, and is conclusive proof that cement can be drilled safely at least after a waiting period of 22.5 hours. Since no pressure build-up was obtained the actual minimum waiting time could not be determined, but the time allowed was definitely ample.

The only logical reason advanced for not obtaining a pressure buildup as the cement set up is that there was sufficient movement of the plug downward inside the casing to relieve any pressure created by the expending drilling fluid. This is thought to be brought about by a faster rate of dehydration of cement outside the casing as compared to that inside the casing. The cement outside the casing sets up while that inside the casing is still a highly viscous fluid, thus allowing a small amount of cement inside the casing to pass the casing shoe and enter the formation. In turn, the plug moves downward a sufficient amount to relieve any pressure built up during dehydration of the cement, and no pressure is built up at the surface. This analysis is borne out by the fact that no pressure build-up has been recorded at the surface on either of the cement jobs tested in this area where the plug was not pumped down to the float. On two other cement jobs tested by Anderson-Prichard, and one job tested by Stanolind where the plug was pumped to the float, a pressure build-up was obtained in each case.

It would seem that the surest way to obtain a pressure build-up would be to bump the float collar with plug and obtain a seal which would prevent any further displacement down the pipe.

By: William Travis Moore

BEFORE THE

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

"Notice of Publication
State of New Mexico
Oil Conservation Commission

"The Oil Conservation Commission, as provided by law, hereby gives notice of the following hearings to be held at Santa Fe, New Mexico, at 10:00 o'clock A.M., January 10, 1947:

"Case No. 90

In the matter of the application of Stanolind Oil Company for modification of the rules and regulations of the Commission with respect to the periods prescribed for waiting on cement in connection with the cementing of casing.

"Case No. 91

In the matter of the application of Gulf Oil Corporation for the promulgation of an Order revising Rule 15, General Order No. 4 'Oil Tanks and Fire Walls'.

"Given under the seal of said Commission at Santa Fe, New Mexico, on December 20, 1946.

OIL CONSERVATION COMMISSION

By: /s/ R. R. Spurrier, Secretary

S E A L".

Said meeting convened at the appointed hour, on the 10th day of January, 1947, in the Coronado room of the La Fonda Hotel, Santa Fe, New Mexico, with the Commission sitting as follows:

Hon. T. J. Mabry, Governor, Chairman
Hon. John E. Miles, State Land Commissioner, Member
Hon. R. R. Spurrier, Secretary, Oil Conservation Commission, Member
Hon. Carl Livingston, Chief Clerk & Legal Adviser, Oil Conservation Commission

R E G I S T E R

NAME	COMPANY	ADDRESS
Glenn Staley	Lea County Operators	Hobbs, New Mexico
W. R. Bollinger	Shell Oil Co., Inc.	Hobbs, New Mexico
H. D. Murray	The Texas Company	Midland, Texas
A. E. Willig	The Texas Company	Ft. Worth, Texas
P. H. Bohart	Gulf Oil Corporation	Tulsa, Oklahoma
Paul C. Evans	Gulf Oil Corporation	Hobbs, New Mexico
Eugene Husford	Gulf Refining Company	Mt. Pleasant, Mich.
H. C. Otis	Otis Pressure Control	Dallas, Texas
H. C. Laird	Otis Engineering Corporation	Dallas, Texas
G. H. Gray	Repollo Oil Company	Midland, Texas
Lloyd Holsapple	Repollo Oil Company	Ft. Worth, Texas
W. N. Little	Tide Water Association Oil Co.	Midland, Texas
Robert L. Bates	N. M. Bureau of Mines & Natural Resources	Socorro, New Mexico

REGISTER (cont'd)

NAME	COMPANY	ADDRESS
William B. Macey	Oil Conservation Commission	Artesia, New Mexico
E. J. Gallagher	Gulf Oil Corporation	Hobbs, New Mexico
John M. Kelly	Independent	Roswell, New Mexico
Foster Morrell	U. S. Geological Survey	Roswell, New Mexico
Vernon B. Bottoms	Superior Oil Company	Midland, Texas
R. S. Christie	Amerado Petroleum Corporation	Ft. Worth, Texas
H. L. Johnston	Continental Oil Company	Midland, Texas
S. V. McCollum	Continental Oil Company	Midland, Texas
N. R. Lamb	State Bureau of Mines & Mineral Resources	Artesia, New Mexico
D. R. McKeithan	Phillips Petroleum Company	Bartlesville, Okla.
Lloyd L. Gray	Gulf Oil Corporation	Tulsa, Oklahoma
S. A. Sanderson	Gulf Oil Corporation	Tulsa, Oklahoma
J. D. Atwood	Gulf Oil Corporation	Roswell, New Mexico
Charles C. Rodd	Gulf Oil Corporation	Tulsa, Oklahoma
Ralph L. Gray	Stanolind Oil Company	Hobbs, New Mexico
J. E. Wooten	Stanolind Oil & Gas Company	Ft. Worth, Texas
R. Floyd Farris	Stanolind Oil & Gas Company	Tulsa, Oklahoma
Roy O. Yarbrough	Oil Conservation Commission	Hobbs, New Mexico
J. W. House	Humble Oil Company	Midland, Texas
W. E. Hubbard	Humble Oil Company	Houston, Texas
R. S. Dewey	Humble Oil Company	Midland, Texas
George Berlin	Skelly Oil Company	Tulsa, Oklahoma
George W. Selinger	Skelly Oil Company	Tulsa, Oklahoma
J. N. Dunlavey	Skelly Oil Company	Hobbs, New Mexico
E. O. Anderson	New Mexico Bureau of Mines	Hobbs, New Mexico
Lewis Finch Jr.	Stanolind Oil & Gas Company	Ft. Worth, Texas
J. O. Seth (Attorney)	Stanolind Oil & Gas Company	Santa Fe, New Mexico

DIRECT EXAMINATION

JUDGE SETH:

My name is J. O. Seth, I represent the Petitioner in this case. It is simply a request to reduce the waiting on cement time in Order 52, to the hours shown in the petition. We would like to introduce in evidence the showing by laboratory tests and actual field tests, the hours requested in the Petition will be ample to protect the strata.

I don't know how much Governor Mabry knows about oil well drilling - - -

EXAMINATION OF MR. LEWIS FINCH, JR.

(After being duly sworn, Mr. Finch testified as follows)

JUDGE SETH:

Please state your name.

MR. FINCH:

Lewis Finch Jr.

JUDGE SETH:

Give us a brief idea of your training and experience.

MR. FINCH:

I am a petroleum engineer, have a B.S. degree from the Oklahoma A. & M.

JUDGE SETH:

What practical experience have you had?

MR. FINCH:

Three years actual experience in the oil fields of Lea County, also had charge of development in Southeastern New Mexico for Stanolind Oil Company for an additional three years.

JUDGE SETH:

What is the present regulation No. 52, as to the time for cement to set?

MR. FINCH:

The present regulation on the surfact pipe is that the cement shall stand for 36 hours before drilling progresses; 48 hours on intermediate casing,on the oil strain 48 hours before drilling progresses.

JUDGE SETH:

Will you state for Governor Mabry's benefit what is meant by cementing the casing?

GOVERNOR MABRY:

I understand that.

JUDGE SETH:

Would you state the Order terms apply outside Lea County?

MR. FINCH:

Order 52, I believe, is limited to Lea County.

JUDGE SETH:

Any general order applicable outside Lea County?

MR. FINCH:

Not - so far as I know.

JUDGE SETH:

Now, have you a draft for the purpose of getting before the Commission some idea of the rule the Stanolind would like to have put into effect?

MR. FINCH:

Yes, Sir, I do.

JUDGE SETH:

We would like to present this to the Commission as Exhibit A, in this case.

State briefly what effect that has on the present rule.

MR. FINCH:

The rule we are proposing will reduce the time for drilling & the cement on the surface drain from the present prescribed hours of 36, to 24. We are also proposing that the surface casing shorten the time for cement for 16 hours before releasing the pressure. With respect to the intermediate strain, we are proposing shortening the time to 24 hours before releasing pressure, and not less than 30 hours before testing pipe and cement, and drilling progresses.

Mr. Finch (Cont'd)

Reduce from 48 to 30 hours, on the production strain. On the production strain we are proposing that it shall stand cemented 24 hours before releasing pressure, and less than 30 hours before drilling progresses, reducing from 48 to 30 hours.

JUDGE SETH:

Have there been any previous hearings held before this Commission covering this same matter?

MR. FINCH:

Yes, there has been.

JUDGE SETH:

Do you know when that was held?

MR. FINCH:

In October of 1936.

JUDGE SETH:

As a result of that hearing was the rating on cement time reduced to the present rule?

MR. FINCH:

Yes, sir.

COMMISSIONER MILES:

Reduced to the present ruling?

JUDGE SETH:

Yes.

We would like to offer in evidence Case No. 4, held October 14, 1936. Considerable testimony was taken at that time. I suppose there is a copy of that hearing in the Commission's file, we have one here if you have not.

MR. SPURRIER:

Yes, sir.

MR. LIVINGSTON:

The record is filed in the case.

JUDGE SETH:

What is the practice of adjoining states in this regard?

MR. FINCH:

In Texas the practice has been recently revised to conform with the proposal we are presenting here.

JUDGE SETH:

Do you know about Oklahoma?

MR. FINCH:

I don't believe Oklahoma has any specific rules.

JUDGE SETH:

In your opinion, Mr. Finch, would this reduced waiting time result in considerable saving in the cost of drilling a well?

MR. FINCH:

Yes, sir, I believe it would.

JUDGE SETH:

How much would it reduce and in what manner?

MR. FINCH:

We would have a saving of 12 hours on the surface pipe, 18 hours on the intermediate, and 18 hours on the oil string; which would be a total of 48 hours - two days.

JUDGE SETH:

You mean by that, in paying of the drilling crew?

MR. FINCH:

Yes, sir.

JUDGE SETH:

They sit around waiting while the cement is setting?

MR. FINCH:

That's often the case.

JUDGE SETH:

What would that amount to?

MR. FINCH:

Some $500 or up.

JUDGE SETH:

What is your opinion as to the adoption of these shorter hours, will it result in any injury to the oil string?

MR. FINCH:

No, sir.

JUDGE SETH:

In you opinion, could these suggested hours of waiting time be safely adopted by this Commission?

MR. FINCH:

That is right, these are minimum hours we are proposing.

JUDGE SETH:

Anything further?

MR. FINCH:

There is one thing further, which I might explain. With respect to the

MR. FINCH (cont'd)

proposal we have made for holding the casing cemented for a certain number of hours before releasing the pressure, we have included in this proposed order here an explanation of the term releasing pressure - by that we mean any step or operation which would relieve any pressure at the base of or outside of the casing string being cemented.

JUDGE SETH:

That may hold pressure by pumping or plugging?

MR. FINCH:

By proper equipment.

JUDGE SETH:

If the pressure is removed too soon, what would be the effect?

MR. FINCH:

Could result in some back flow of cement.

JUDGE SETH:

In other words, you mwan if it is removed while the cement is still in liquid form, it might flow back up?

MR. FINCH:

That is right.

COMMISSIONER MILES:

The longer it is set, the more apt it would be to be in place?

MR. FINCH:

We have another witness that will give some data on the actual setting time of cement to show the time we are proposing here is quite adequate to allow the cement to set up.

JUDGE SETH:

Governor, the rules of evidence don't apply in these hearings.

GOVERNOR MABRY:

You want to get the truth there and not cover it up?

JUDGE SETH:

To get at it quickly is the main thing.

GOVERNOR MABRY:

Cement doesn't set in 24 hours very good.
Don't require the degree of setting for this it would in other circumstances. I guess somebody else will testify about that.

TESTIMONY OF MR. R. FLOYD FERRIS:

(After being duly sworn, Mr. Ferris testified as follows)

JUDGE SETH:

What is your name?

MR. FERRIS:

R. Floyd Ferris.

JUDGE SETH:

Your profession?

MR. FERRIS:

I am research engineer for the Stanolind Oil and Gas Company.

JUDGE SETH:

State briefly your training.

MR. FERRIS:

Have a Bachelor Degree in Petroleum Engineering from the University of Oklahoma. Started to work for the Company about 12 years ago, served two years as engineer in field work, after which I was removed to the Research Department in Tulsa. During the past 9 or 10 years I spent most of my time on well composition problems, particularly having to do with the cementing phase of well composition problems.

JUDGE SETH:

Does Stanolind maintain a production laboratory in Tulsa?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

You have conducted tests on the question before the Commission, have you not?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

Did you put your findings at that time in the form of paper?

MR. FERRIS:

Yes, sir. In October 1945.

JUDGE SETH:

Have you a copy of that article? I believe you wrote about methods for determining the waiting on cement time. - "Method for Determining Minimum Waiting-on-cement Time".

MR. FERRIS:

Yes, sir.

JUDGE SETH:

We would like to introduce this pamphlet as Exhibit #2 in this case.

Have you conducted many tests on this problem?

MR. FERRIS:

We have conducted a number of tests on this problem. The behaviour of

cement, not only in the fluid state - and as they set. They are in the paper you refer to.

JUDGE SETH:

You have made a summary of that paper, I wish you would read it to the Commission.

MR. FERRIS:

"Stanolind Oil and Gas Company has made an extensive study of chemical and physical properties of cements over the past several years in an effort to secure a better understanding of the performance of cement in wells. The chemical make-up of cements is a complex subject; however, the physical properties and physical behavior of cement are easy to comprehend.

"For example, when water is added to dry cement the slurry thus formed will remain fluid for a period of time, then it will gradually stiffen, set, and gain strength. If the cement slurry is agitated or pumped for just a short time after it is formed, thick gels or false body systems will develop in the slurry, giving it the appearance of a partially set cement. This behavior is sometimes called false set. The cement in this state is a semi-plastic and actually possesses some bonding strength. However, a slight vibration or movement of the cement before the initial set occurs will cause the cement to revert back to a fluid state. After cement takes a final set it assumes the properties of a solid and cannot again be reduced to the fluid state. After it becomes a solid it resists distortion by the amount of its strength in shear. When a force or pressure is applied to it which is greater than the shearing strength of the cement, it simply breaks, cracks or crumbles. Therefore, since the period between the initial set and the final set marks the transition from a fluid state to a solid state, if it can be proved that cement in a well at the time of its final set possesses sufficient strength and rigidity to support the pipe opposite it, to exclude undesirable fluids or gases, and to withstand the shock of drilling, then the time to the development of that physical state in cement would be the absolute minimum WOC time.

"It was reasoning along such lines that prompted the Stanolind Oil and Gas Company to conduct tests in both the laboratory and in the field for a more scientific answer to WOC time problems. The paper entitled "Method for Determining Minimum Waiting-on-Cement Time" presented before the A.I.M.E. in October, 1945, reported the results of some of that work. One of the first efforts in that connection was a study of the bonding strength of cement in the annulus between 5½ inch and 9-5/8-inch casing at early ages or short WOC times.

"This work showed that when the cement reached the final set, i.e. when the irreversible transition from a fluid to a solid was completed, the cement had a bonding strength of 4,550 pounds per linear foot of cement in the annulus. From these data it can be calculated that each linear foot of cement in an annulus at the time of the final set should support 267 feet of 5-1/2-inch 17-pound casing. Since most engineers regard a safety factor of 267 to 1 insofar as support of pipe in the hole is concerned, it appeared obvious that any WOC time spent beyond the time required for the cement to take its final set (approximately 8 p.s.i. tensile strength) would be time wasted.

"Following this development, attention was turned to the thought of conducting field tests to verify the laboratory's suggestion that the minimum safe WOC time is the time of the final set (8 p.s.i. tensile strength). Before field tests could be conducted, however, means had to be devised for accurately determining when the final set of cement will occur in a well. This problem was easily and conveniently solved by utilizing the well established fact that cement slurries liberate heat more rapidly during the setting process, i. e. during the fluid-state-to-solid-state transition period, than at any time before or afterward. Laboratory tests established the fact that all the cements tested would attain the final set (8 p.s.i. tensile strength) by or before a period corresponding to 1.5 times the time to the point of maximum heat development in cement. Field tests were then conducted to prove that the heat of hydration of cement slurries in any well will heat drilling fluid on the inside of the casing to the extent that, when the casing is shut in, the pressure at the surface will increase and reach a maximum almost simultaneously with maximum heat development of the cement in the well. The field tests not only proved this thought but also proved that cement may be drilled any time after it reaches the final set or 8 p.s.i. tensile strength.

"Relating the strength development of cements to the heat of hydration during the setting processes was one of the most important developments of this work, since it provided for the first time a means of determining the rate at which cements actually set in wells. The heat generated by cement during the setting processes has been known for years and has been used in connection with temperature surveys to locate the top of cement, but to my knowledge this is the first time it has been employed in the more broad sense.

"This method for determining minumum WOC time has been used in a number of fields in a routine manner for approximately a year. To my knowledge there has been no case of failure attributable to drilling of the plug too early.

"While there are several advantages in using a formula for determining minimum WOC time, i.e., 1-1/2 times the time to the maximum shut-in casing pressure, it has the disadvantage that leaky casinghead connections or other leaks may prevent the normal pressure build-up on the casing. When this occurs on a Stanolind well, an alternate method for determining minimum WOC time is applied which is based on the limit of pumpability of cement slurries at the high pressures and temperatures in simulation of those which exist in the average well at any depth. However, since information of the latter type is not now available to all operators, it is believed that the minimum WOC time should be based on a flat-time, at least for the present time.

"Therefore, studies were made of the setting times of many of the types of cements used in cementing surfact pipe, intermediate strings, and oil strings to determine what fixed minimum time might be applied to each type of casing cement job.

"The following times were recommended:

	Under Pressure Hrs.	Drilling Plug Hrs.
Surface Pipe	16	24
Intermediate	24	30
Oil String	24	30

"Under pressure in this case has reference to the pressure on the cement - not necessarily the pressure on the casing at the surface.

"These times are generally somewhat greater than those which would be obtained by the pressure build-up method.

"The Texas Railroad Commission has adopted these WOC time practices for several fields and it has operated almost a year without difficulty.

JUDGE SETH:

You have made a summary - Mr. Ferris I believe your method of determining the setting time is based on the theory that cement when setting generates heat?

MR. FERRIS:

That is right.

JUDGE SETH:

And this heat is generated through the pipe into the fluid in the well, and builds up pressure in the well if there is no leak?

MR. FERRIS:

That is right.

JUDGE SETH:

Your experiments in the laboratory show the high point of the build-up of the pressure is about the time the cement sets?

MR. FERRIS:

It is between the initial set and the final set.

JUDGE SETH:

Your experiments show that 1½ that length of time it took to build the highest pressure would give a safe margin?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

If the build up of the pressure in the casing was 8 hours, your formula end of it would increase the waiting to 12 hours?

MR. FERRIS:

That is right.

JUDGE SETH:

You are satisfied from your laboratory experiments that is a safe margin of safety?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

On page 12 of your printed paper, there are listed 10 wells in Texas, and one in Oklahoma, one in Wyoming - those figures shown there are actual field tests are they not?

MR. FERRIS:

That is right.

JUDGE SETH:

In each instance showing your formula,was there any difficulty encountered?

MR. FERRIS:

The only difficulty was not being able to drill the cement out as early as we would like, to prove the method.

JUDGE SETH:

You did not get to as rapidly as you would like to have?

MR. FERRIS:

In a number of cases we came very close to it. In one case it was between 12 and 13 hours. For all practical purposes we would check it.

JUDGE SETH:

In addition to these 10 wells, have you had experience with other wells?

MR. FERRIS:

We have run a number of tests, which I believe another witness will describe, and I have just seen reports come through company channels, on the routine cement jobs that are being presumed in other areas where no regulations apply.

JUDGE SETH:

It has been adopted at this time?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

Oklahoma has never had any regulation on the subject?

MR. FERRIS:

Not to my knowledge.

JUDGE SETH:

Nor Wyoming?

MR. FERRIS:

Not to my knowledge.

JUDGE SETH:

Louisiana?

MR. FERRIS:

I am not too certain.

JUDGE SETH:

In addition to these wells, the tests have been made in many other wells, have they not?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

Do you recommend,from your experience in the laboratory, from the tests made in the field - will you recommend to the Commission that these hours experienced, and set out in the Petition, be adopted?

MR. FERRIS:

I would.

JUDGE SETH:

Anything further you want to add?

MR. FERRIS:

I don't believe so.

COMMISSIONER MILES:

What would be the result of the damage done if it wasn't in there - not properly set, did not have the time to form as it should?

MR. FERRIS:

Another cement job would be required, but our past experience has been that once cement has set it is fixed in form. After it hardens and goes into that solid state, it attains that strength necessary to support the pipe and enable us to go ahead and drill without waiting 72 hours-or a week would not make the cement serve any different purpose. There will continue to be cement failures that can be brought about for a number of reasons. But waiting will not make mud turn over to cement and set, for that reason we believe once it attains that minimum strength, the strength it attains after that by the hardness is of no particular advantage.

JUDGE SETH:

If it is a failure no particular harm is done, just another cement job to do?

MR. FERRIS:

That is all.

JUDGE SETH:

If they drill too soon it does not injure the field does it?

MR. FERRIS:

No, sir.

COMMISSIONER MILES:

Would not have any effect on the well?

MR. FERRIS:

No, sir. Frequently cement plugs are drilled at 72 hours and find soft cement under the wooden plug. Mud scraped off the side of the casing and gets into the cement.

JUDGE SETH:

That is all, I believe.

COMMISSIONER MILES:

What is the difference between WOC time and flat time?

MR. FERRIS:

By flat time we have a fixed period. By this formula it would be variable time. At the shallow it would take a longer time because of the lower temperature and pressure. This pressure would occur later,as you go down to higher pressures and higher temperatures we would have a variable time with depth.

JUDGE SETH:

The time you give, is in your judgment, safe on all types of cement?

MR. FERRIS:

Yes, sir. It might appear to one studying these data a little conflicting, but the discussion in the paper and what we propose - The paper we discussed the deeper the well the faster the cement will set, due to the higher pressure and temperature.

JUDGE SETH:

The time begins to run from the time they begin pumping cement in the well?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

How long does it take an operation of that kind?

MR. FERRIS:

The actual time is rarely over 30 minutes and the job is usually completed within an hour.

JUDGE SETH:

They put the cement in by a plug on top of it and begin pumping mud or water of top of that?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

That operation with the plug down to the bottom of the casing is over in less than an hour?

MR. FERRIS:

Yes, sir.

MR. LIVINGSTON:

It will be well to explain what is meant by maintaining the pressure - set a specific pressure in pounds for all wells - will that pressure vary for different wells?

MR. FERRIS:

It will vary with the height of cement which is backed up on the outside. Ten pounds of mud on the inside, and 16 pounds of mud on the inside, the higher you raise it the greater will be the pressure to pump the mud down. The pressure we recommend holding is that pressure necessary to keep the balance. We want to be sure nothing will be released which will allow those ~~[illegible]~~ forces to come back before the cement sets - until it has attained its final set.

JUDGE SETH:

Any other questions.

EXAMINATION OF MR. RALPH L. GRAY

(After being duly sworn, Mr. Gray testified as follows)

JUDGE SETH:

State your name.

MR. GRAY:

Ralph L. Gray.

JUDGE SETH:

Where do you live?

MR. GRAY:

Hobbs.

JUDGE SETH:

By whom are you employed?

MR. GRAY:

Stanolind Oil and Gas Company.

JUDGE SETH:

Give a brief statement of your training and experience.

MR. GRAY:

I have a degree - Bachelor of Science from New Mexico School of Mines, also of Petroleum Engineering in the same school.

GOVERNOR MABRY:

I would like to be excused at this time, since I have a lot of work waiting in my office.

(Continuation of examination of Mr. Gray)

JUDGE SETH:

What practical experience have you had?

MR. GRAY:

I have been employed by the Stanolind Oil and Gas Company for approximately $7\frac{1}{2}$ hears, $3\frac{1}{2}$ of which have been spent in Lea County, New Mexico; and approximately 4 years in Texas and Oklahoma performing engineering duties.

JUDGE SETH:

Have you conducted, or have there been conducted under your supervision, some tests in connection with this matter of waiting time on the cement?

MR. GRAY:

Yes, sir. We have conducted tests on a total of 5 wells - 4 wells belonging to outside operators and one well for Stanolind.

JUDGE SETH:

The test on this Stanolind well - will you state what well that was?

MR. GRAY:

The test was made on Stanolind's State-S, Well #2, in the Drinkard pool.

JUDGE SETH:

Have you the data to show the result of that test?

MR. GRAY:

Yes, sir. At this well 7-5/8" casing was cemented at a depth of 2986 feet, using 500 sacks of standard Portland cement. After the casing was cemented, a record pressure gauge was connected to the casing head so as to continuously record the pressure within the pipe. We have a curve we would like to introduce, showing the pressure from the time the first sack of cement was mixed until the maximum pressure was obtained.

JUDGE SETH:

We would like to introduce this curve as Exhibit C - showing the building up of the pressure.

MR. GRAY: That is right.

JUDGE SETH:

The bottom shows the time and the left-hand side shows the pounds?

MR. GRAY:

Yes, sir.

JUDGE SETH:

We offer that in evidence.
What time would the pressure build up to those highest points?

MR. GRAY:

The maximum pressure build-up was obtained in approximately 8 hours after the first sack of cement was run.

JUDGE SETH:

You had a permit from the Commission to make these tests, did you not?

MR. GRAY:

That is right. Under the conditions the test was run, the waiting

time was less than the regulation called for, and we got special approval to continue the experiment.

JUDGE SETH:

The build up of the pressure 8 hours after the first running of the cement?

MR. GRAY:

Yes, sir.

JUDGE SETH:

When did you begin to core?

MR. GRAY:

Fourteen hours, 45 minutes after the first sack of cement was pumped.

JUDGE SETH:

Was the core obtained?

MR. GRAY:

A core was obtained and a recovery at the surface was made 18 hours after the well was cemented. We have as evidence a specimen of that core.

JUDGE SETH:

Were the same marks cut on the outside that were there when the core was taken?

MR. GRAY:

The only change in the form is a little scraping on the side that was done in order to test the hardness of the cement.

JUDGE SETH:

What was the condition of that core when it was taken?

MR. GRAY:

The quality of the cement was good, it drilled the same and the strength was sufficient to support the weight of the drilling pipe.

JUDGE SETH:

Did the drilling operations proceed?

MR. GRAY:

After recovery of the core, a conventional bit was run back into the well and drilling operations were continued.

JUDGE SETH:

Was any trouble encountered by starting the drilling earlier than the present regulations before then?

MR. GRAY:

No difficulty encountered at all.

JUDGE SETH:

In your opinion, was that cement set to the extent that the drilling could safely proceed at that time?

MR. GRAY:

Yes. I think the significant thing about this core is that we were able to recover such a large piece at all - undoubtedly, the cement had taken form, otherwise, it would not have been possible to have cored and recovered such a large piece if it had not set.

JUDGE SETH:

You speak of other wells - on which tests were made, were they other Company wells?

MR. GRAY:

Yes - we assisted in making tests on the Rowan Drilling Company well B-15, #2, also the Allison B-9, #3, and as a matter of fact, two tests were made on Allison B9-#2.

JUDGE SETH:

Can you get result os those tests?

MR. GRAY:

On the Ellenburger 15, #2, 7" casing cemented at a depth of 5,350 feet with 500 sacks of cement.

JUDGE SETH:

That oil string?

MR. GRAY:

Yes, sir, the oil string. The maximum pressure was recorded 8 hours after the well was cemented.

JUDGE SETH:

Have you one - another on the Rowan Drilling Company?

MR. GRAY:

A test made on the Allison B9, #3, in which 5½" oil string was cemented at a depth of 8,189 feet with 1,450 sacks of cement. On this testing a maximum pressure was recorded 8 hours after cementing.

JUDGE SETH:

Also is a test on the Anderson-Pritchard well?

MR. GRAY:

That is right - It is made on the Anderson-Pritchard #1, in which the intermediate string 9-5/8" casing cemented at a depth of 3,003 feet with 1,150 sacks of cement. On this test it was not possible to record pressure build up, due to some mechanical difficulties, and that might have to do somewhat to our lack of experience at that time in conducting these tests - By a drilling of the core, drilling of the cement plug 17⅓ hours after cementing in this well and a core was also obtained.

JUDGE SETH:

Was there any trouble encountered?

MR. GRAY:

No, sir, not at all. The drilling carried out in a normal manner.

JUDGE SETH:

Anderson-Pritchard have made the test on several wells in Texas have they not?

MR. GRAY:

That is right. We have been advised by Anderson-Pritchard that cement plugs have been drilled out at a total of 14 hours in Texas, at approximately 24 hours after cementing and in no case was there any failure in cementing or casing - -

JUDGE SETH:

Are they supposed to have sent you the reports on those wells?

MR. GRAY:

It was their intention to present this information in the form of a tabulation, and it is enroute. I am sorry it did not arrive in time to present it at this time.

JUDGE SETH:

We ask permission to file it with the Commission when it comes in.

There is another well, one of the Continental wells? -

MR. GRAY:

That is right.

JUDGE SETH:

Is Mr. McCollum of the Continental here?

MR. GRAY:

I believe Mr. McCollum is here.

JUDGE SETH:

Have you anything further to add, any data you wanted to present on this subject?

MR. GRAY:

I believe not.

JUDGE SETH:

We understand Mr. McCollum had data he wanted to present on this subject.

COMMISSIONER MILES:

Other than the economical standpoint, what other advantage is there gained by earlier drilling and not waiting so long?

MR. GRAY:

I cannot think of any other advantage at the moment. I think it is a matter of economics.

COMMISSIONER MILES:

The drilling crew keeps on the payroll during this waiting period, does it?

MR. GRAY:

In nearly all cases that is the practice.

EXAMINATION OF MR. S. V. McCOLLUM

(After being duly sworn, Mr. McCollum testified as follows)

JUDGE SETH:

State your name.

MR. McCOLLUM:

S. V. McCollum.

JUDGE SETH:

Give a brief history of your experience and qualifications.

MR. McCOLLUM:

I received a B.S. degree from Texas Tech in 1940. Since that time have been employed by the Continental Oil Company as Petroleum Engineer. During the last three years have been in charge of engineering work in West Texas and New Mexico area.

JUDGE SETH:

Will you go ahead and give the well and tests on it?

MR. McCOLLUM:

Our test was continued in a similar manner of the one on the Lockard A-35- Well numbdf 3 Drinkard test was only intermediate string, 9-5/8" set at 2,575 feet with 500 sacks. Recording pressure gage was connected to the well head after the cement had been pumped down. Two cores were taken, one after approximately 19 hours. This core we recovered at this time was in small pieces, were fairly well set up but were still where could be considered green. The second core was taken approximately 36 hours after the plug had been pumped down and an excellent core recovered from it. The pieces vary from 4" to 8" in length. These cores, you could not scratch them with the fingers, could make marks with a brass key.

JUDGE SETH:

In your judgment were they set safely to go ahead and drill?

MR. McCOLLUM:

Yes, sir. The length of time it took for maximum build up was 9½ hours.

JUDGE SETH:

When you drilled you had no trouble?

MR. McCOLLUM:

No, sir.

JUDGE SETH:

In your opinion,was this period recommended by the Stanolind - would it be regarded as safe to go ahead?

MR. McCOLLUM:

I think so, sir.

JUDGE SETH:

We would like to put Mr. Ferris back on your question, Governor Miles.

(Mr. Ferris returned to give further testimony)

JUDGE SETH:

Mr. Ferris, you heard Governor Miles' question to Mr. Gray as to the advantages of shortening this time?

MR. FERRIS:

Yes, sir.

JUDGE SETH:

What advantages other than the saving of cost would it be?

MR. FERRIS:

There are no other advantages other than that the operator will be able to get the well on production some two days earlier than he would otherwise. That quite often is a decided advantage. Another thing, when cement is green, when it has not attained a high degree of hardness or brittleness, it will withstand shock without suffering fracture or damage more readily than will a cement that is extremely brittle - to make an analysis, you can take a hammer and crack clay, whereas if your window payne is of plastic material, it will stand considerable force without cracking. There is quite a belief now that it is quite important in taking advantage of that in certain types of completion problems. Not only from the standpoint of setting of cement, but also some consideration is now being given to prevent the same thing at early ages exactly for the same reason.

MR. LIVINGSTON:

Will all cement as ordinarily used in the petroleum industry, set in the same manner as determined by these experiments, or is there any particular standard of quality of cement necessary?

MR. FERRIS:

No, sir. The methods, or proposal, which we make, will apply to all ordinary cements on the market today that we know of. All classes of cements we have used - Standard Portland or regular. construction cements - slow setting cements. All generate heat and all of them set and react to the high temperatures of pressure in a similar manner.

MR. SPURRIER:

Would you care to define the extreme limits you were speaking of, green then finally becomes brittle. What is the interval of time between when you feel it is safe to begin drilling and the time when the cement becomes brittle?

MR. FERRIS:

I should like to call upon some of the tests we ran in connection with the casing which was backed up by cement set. The same as we have in oil well - set those tests up to study the behaviour or the reaction of the cement to this choke or force brought by the bulleting. In those tests we set up a series of apparatus which consisted of 5" casing set in an 8" hole, then filled with cement, surrounding that we had concrete, a hard formation. at 10 to 15 pounds we found the blast would not crack or shatter the cement, but in the green cement we found we would have holes blown in the cement 2½ to 3 inches in diameter. We found when the cement attains a certain strength of around 150 pounds - tensile strength, then the hole made by the bullet would be the same size - the bullet would gradually become smaller and smaller and after around 300 pounds cracks and shattering would set in. I believe that interval of greenness of cement or plasticity - that physical set would allow it to absorb the shock with the condition which exists after the time of its final set - or to between 150 pounds and 300 pounds, it would begin to border on that degree of hardness where shattering and breaking might set in.

MR. SPURRIER:

Lets convert that to the time in hours - from 8 pounds to 150 pounds.

MR. FERRIS:

To convert that to hours I would have to know the type of cement, the weight, the temperatures and pressures - just for rough figures temperatures and pressures should normally be encountered on the surface pipe, I would say we would have 150 pounds tensile strength perhaps in the neighborhood of 48 hours. Those are just off-hand figures, it would be in that region I think. Again it would depend on the type of cement. When you go down to 8,000 feet, 160 degrees temperature, 5,000 pounds of pressure, that condition which for a time might be dropped to 12 hours.

JUDGE SETH:

Anyone one else care to be heard?

MR. FOSTER MORRELL:

I thought it would be of interest to the users and operators to know that the Geological Survey has under consideration an order with respect to federal lands, involving waiting on cement time. We have had for some time, based largely on these experiments. The Federal regulation is 72 hours for all strings. For many years the requirement along that line, based largely on early development, in Eddy County - so many failures occurred that we found 72 hours would take care of practically every job. Our interest in cement and assurance of cementing is due primarily to the shallow formations found in the Eddy County area. The order has been applied to Lea County. We don't know yet when it might be extended to Lea County. The recognized progress made in the cementing, and the experiments, we have had a number of operators want to reduce the 72 hours - we have no argument with the laboratory tests and they appear to be well substantiated facts - we do feel sometimes the practical operation in the field does not meet the standards or perfection of the laboratory tests, and naturally, a new order has to be an over all order and would take care of the operator who is least prepared to conduct a satisfactory cementing job as those that are best prepared. In that connection, last Spring we started witnessing some of these

tests presented to the Commission. Our witnessing was during the early stages, and out of the first dozen less than one-half obtained set - results which were comparable to the laboratory tests, primarily due to mechanical failures which does not necessarily disprove the test would not set.

In June of last year the matter was circularized among 19 major companies operating in Lea County, and I have letters that were received by Rowan Drilling Company with respect to reducing this time on federal land, and the agreement of the majority was for a waiting of cement time of 24 hours on conducting string and 48 hours on intermediate string and production string - The Shell, Mid - Continental, Anderson-Pritchard, Phillips, Skelly, Magnolia, Rowan, Tidewater Association, Continental Oil Company, Sinclair-Prairie, Amerado Petroleum Corporation, Texas-Pacific Coal Oil Company; Stanolind presented practically the same proposition they have petitioned to the Commission.- Humble Oil Company, Gulf Oil Company; Texas Company agreed to the same waiting on cement time but increased their release in pressure time.

These have agreed to that time does not necessarily bind them they do not agree to the lesser time under your petition. I think that qualifications should be studied in all fairness. We intend to keep 72 hours as a general requirement on federal land on cement time to cover base cementing jobs, but where a case of cement of circulation, we are agreeable to reduce the waiting to 24 hours, on surface casing and 48 hours intermediate, and production strings with the condition that additional cement requirements be made that the surface casing be cemented by circulation to the surfact or re-filled from the surface if necessary, and that sufficient amount of cement be used on intermediate production strings. As a minimum on volume, we figure 150 feet of the calculated volume necessary or after a calibre survey is run, 110 feet of calculated volume may be used - giving credit for the expense and additional information obtained, a minimum requirement would be the base of the firm recognizing the fact that it is not always practical. After further consideration of reducing this time, we are including a provision requiring a survey be made determining the height of cement behind the pipe. That information is very desirable, not only from the determination from the amount of cement, but also to prevent corrosion of pipe which has become a large factor in the older producing wells in Lea County, and pressure test shall be made. I merely wish to present this as information so the operators might be informed.

JUDGE SETH:

Anyone else who would care to be heard at this time?

MR. D. R. McKEITHAN - Phillips Petroleum Company

I would like to go on record as being in favor of Stanolind's proposal in change of cementing time on various casing strings.

MR. VERNON BOTTOMS - Superior Oil Company

The Superior Oil Company favors the Stanolind's proposal.

MR. GEORGE GRAY - Repollo Oil Company

The Repollo Oil Company favors reduction in cementing time. No objection to minimum requirements and no objection to the proposed order.

MR. FOSTER MORRELL - U. S. Geological Survey

Our order makes no reference to pressure release time. I don't

that could possibly be eliminated. Another thought is that the laboratory tests make no reference to the use of water. We do know the quality of water has a lot to do with the setting time of cement. We had a variance in water used by operators in Lea County, the major companies will generally assure satisfactory water. Some of the other areas might not be able to rely on the petition.

MR. W. E. HUBBARD - Humble Oil Company

The Humble Oil Company is in favor of the proposed reduction of cementing time.

MR. SPURRIER:

Then, Gentlemen, I assume the Commission is expected to promulgate a suitable order with the facts and opinions which we have in the record now. I might add the Commission will not approve or disapprove the recommendations and the case will be taken under advisement, and a suitable order promulgated.

This concludes Case No. 90.

MR. ATWOOD:

The Gulf proposal, I think, can be disposed of in a very few minutes.

CASE NO. 91

MR. ATWOOD:

This applies to modification of existing oil wells relative to fire walls.

TESTIMONY OF MR. LLOYD L. GRAY:

(After being duly sworn, Mr. Gray testified as follows)

MR. ATWOOD:

State your name.

MR. GRAY:

Lloyd L. Gray.

MR. ATWOOD:

Where do you reside?

MR. GRAY:

Tulsa, Oklahoma

MR. ATWOOD:

You are employed by the Gulf Oil Company?

MR. GRAY:

Correct.

MR. ATWOOD:

What position?

MR. GRAY:

Chief production engineer.

MR. ATWOOD:

How long have you had that position?

MR. GRAY:

Approximately 19 years.

MR. ATWOOD:

Mr. Gray, will you state to the Commission what you have to offer with reference to this petition?

MR. GRAY:

At the present time, it is a requirement that storage tanks be enclosed in fire wall capacity 1/3 greater that the storage tanks. I was present when they had the discussion and hearings with reference to the matter. As I recall, they did not give this particular matter a great deal of consideration. In other words, at that time it was practical in other states to have fire walls - practical in other states at the time the statute was enacted creating the Oil Conservation Commission. The requirement in other states, I believe, was more or less outmoded at the time it was adopted. Original tank ladders did not have tops on them, did not have vent lines so that the hazard at this time is nowhere near the hazard involved at the time those ordinances promulgated in other states. Our proposal is that the order requiring fire walls be rescinded except for the tank where batteries are within 500 feet of inhabited dwellings or highways, or 1,000 feet of schools or churches. Any public building where a substantial number of people work or gather.

We have been operating for between 11 and 12 years since the order was promulgated and we have a record of only one fire in that time - that has to do with Gulf only, and I believe at this time we have about 380 walls in Lea County. I believe it is an unnecessary investment. Our records indicate the investment in fire walls cost $150 per two tank battery, will increase $50 per tank in the battery. A compilation of our cost of maintaining fire walls shows direct operating charges against the business amounts to $50 per tank per year. In addition, there is sometimes spent by the Pumper or other employees whose time are not charged directly; the overall cost of maintaining fire walls probably exceeds $50 per year. We feel elimination of tank battery will not cause undue hazard.

MR. SPURRIER:

This is an economical consideration entirely?

MR. GRAY:

It has an economical phase to it, but in our operations in Lea County there is not a great deal of damage that would occur. This is a requirement only on leak storage tanks, I believe, so far as any damage occurring from wrecks there is no greater, probably less leaks that occur in pipe lines from lead lines or pipe lines. We don't want to propose any that would be dangerous.

MR. SPURRIER:

Does not occur to you much in Lea County - you do confine this to Lea County?

MR. GRAY:

So far as we are concerned we would confine it to Lea County.

MR. ATWOOD:

No chance for any escape into streams in Lea County is it?

MR. GRAY:

No, I don't believe so.

MR. ATWOOD:

One other question, in other states do they have this?

MR. GRAY:

In Michigan, I believe that is considered up there.

MR. ATWOOD:

Would the Commission like anyone to ask Mr. Gray any questions?

(No questions)

Do you have any factual data to submit?

MR. GRAY:

We have made a compilation of construction cost and brought it down in terms of two-tank batteries - might be of interest to the Commission.

TESTIMONY OF MR. McKeithan.

(After being duly sworn, Mr. McKeithan testified as follows)

I have prepared some notes somewhat along the line of Mr. Gray's testimony, except they probably go into more detail. Stress some of the phases other than the fixing and the unnecessary expense. Don't think it is necessary to go through the first part, but would like to mention some of the disadvantages other than economical disadvantage.

1. My company has come definitely to the conclusion that fire walls in a great many cases, over large areas, particularly such as in most of the New Mexico fields, are a definite disadvantage for the reason they prevent proper drainage conditions around the tank battery, which result in exterior corrosion of tank bottoms.

2. They provide a trap for wind-blown trash and weeds.

3. They form a collecting basin for spilled oil and poisonus gases.

4. They are a definite hindrance to "good housekeeping" in that normal maintenance and repair work around the tank battery is made more difficult.

5. They necessitate stairways over the wall, thus creating an additional safety hazard to employees.

COMMISSIONER MILES:

Lets go back to number 4 - a definite hindrance to "good housekeeping" - why?

MR. McKEITHAN:

Because it is much more difficult to get in around the tanks

when you have this wall of considerable height surrounding the battery and the stairways, whereas if your ground is level around the tank battery, it is very simple to maintain and take care of your installations.

COMMISSIONER MILES:

The wall does not interfere with maintaining your tank does it?

MR. McKEITHAN:

No, sir. They run extremely far away - they are way in the very rear proximity of the installation itself. I think a regulation in New Mexico calls for an enclosure large enough to hold 1-1/3 times the calculated volume of the tanks.

These additional provisions, we are very much interested and in favor of removing that part of the general rule which makes it mandatory in all cases to construct fire walls around tank batteries. In Kansas and Oklahoma we got along very nicely without that requirement. In many cases in such a large percentage where it is necessary and desirable to have protection around the tank battery. In that case it is up to the operator for their own protection.

We should like to endorse and urge the Commission to adopt the recommended change as proposed by the Applicant.

MR. VERNON POTTONS -

Is it intended by rescinding this order you will not have to maintain the present fire walls?

MR. GRAY:

That was our intention.

MR. FOSTER MORRELL:

If favorable consideration is given by the Commission of this application, I would like to suggest the consideration of stating that this order be accepted within the areas of established municipalities, and that the 1,000 foot rule applies to schools and churches, and be also extended to state or federal parks, fish refuges.

MR. ATWOOD:

I don't think there are any reclamation withdrawals in Lea County.

MR. GRAY:

So far as we are concerned, the proposal suggested by Mr. Morrell will be satisfactory.

MR. McKEITHAN:

It is satisfactory with us too.

MR. SPURRIER:

Anyone else like to be heard?

(No Response)

If not, we will conclude testimony on this case.

PLEASE REGISTER

HEARING JAN. 10, 1947

Name	Company	Address
Glenn Staley	Lea Co. Operator	Hobbs
W. R. Bollinger	Shell Oil Co Inc	Hobbs
H.D. Murray	The Texas Co.	Midland.
A.E. Willig	The Texas Co	Ft. Worth
R.H. Bohart	Gulf Oil Corp	Tulsa
[illegible]	" "	Hobbs
Eugene [illegible]	Gulf Refg Co	Mt Pleasant, Mich
H.C. Otis	Otis Pressure Control	Dallas
H.C. LAIRD	OTIS ENGR. CORP.	DALLAS, TEXAS
G.H. GRAY	Repollo Oil Co.	Midland, Texas
Lloyd [illegible]	"	Fort Worth
W.N. Little	Tide Water Assoc. Oil Co	Midland, Texas
Robert L. Bates	N.M. Bureau of Mines & Min. Res.	Socorro, N.M.
William B. Macey	Oil Conservation Comm.	Artesia, N.M.
E.J. Gallagher	Gulf Oil Corp.	Hobbs, New Mexico
John M. Kelly	Independent	Roswell N.M.
Foster Morrell	U.S. Geological Survey	Roswell, N.M.
Vernon B. Bottoms	The Superior Oil Co.	Midland, Texas
R.S. Christie	Amerada Petr. Corp.	Ft. Worth, Texas
H.L. JOHNSTON	CONTINENTAL OIL CO.	MIDLAND TEXAS
S V McCollum	Continental Oil Co	Midland Tex
N.R. Lamb	State Bureau Mines & M.R.	Artesia N.M.
D.R. McKeithan	Phillips Pet. Co.	Bartlesville Okla.
[illegible] Gray	Gulf Oil Corp	Tulsa Okla
~~[illegible]~~		
J.D. Atwood	"	Roswell N.M.
Chas. C. Rodd		Tulsa Okla
Ralph L. Gray	Stanolind	Hobbs, N. Mex.
C. E. Wootton	Stanolind Oil & Gas Co	Fort Worth, Texas
R. Floyd Farris	Stanolind Oil & Gas Co	Tulsa Okla
Roy G. Yarbrough	OCC	Hobbs
J.C. House	Humble Oil	Midland Texas
W.E. Hubbard	do	Houston Tex
R.S. Dewey	do	Midland Texas
George [illegible]	Skelly Oil Co	Tulsa Okla
George W. Selinger	Skelly Oil Co.	Tulsa Okla
J.N. Dunlavey	Skelly Oil Co	Hobbs, N. Mexico
[illegible] Anderson	N.M. Bureau of Mines	
Lewis Finch Jr	Stanolind Oil & Gas Co.	Ft. Worth, Texas
J.O. Seth	"	Santa Fe, N.M.