

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 17, 1968

REGULAR HEARING

IN THE MATTER OF:)

)
The hearing called by the Oil)
Conservation Commission on its)
own motion to consider the)
amendment of Order No. R-3221,)
the Commission's Salt Water)
Disposal Order, to permit the)
exemption of certain presently)
existing and future pools in)
Eddy and Lea Counties, New Mexico,)
from certain requirements of said)
order.)

Case No. 3806

BEFORE: Honorable David Cargo
Mr. A. L. Porter
Mr. Guyton B. Hays

TRANSCRIPT OF HEARING

MR. PORTER: We will take up next Case 3806.

MR. HATCH: Case 3806. In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the amendment of Order No. R-3221, the Commission's Salt Water Disposal Order, to permit the exemption of certain presently existing and future pools in Eddy and Lea Counties, New Mexico, from certain requirements of said order.

If the Commission please, George Hatch appearing on behalf of the Commission and its staff and I will have one witness.

MR. PORTER: Does anyone else desire to make an appearance in Case 3806?

MR. WHITE: David White; Pan American would like to make a statement.

MR. PORTER: No testimony?

MR. WHITE: No, sir.

MR. PORTER: Anyone else desire to make an appearance and present testimony? Mr. Gray.

MR. GRAY: Ralph Gray. I represent William A. and Edward R. Hudson and Windfohr Oil Company, and I would like to make a statement.

MR. PORTER: When the testimony is concluded you would like to make a statement?

MR. GRAY: I don't want to present any testimony,

just make a statement.

(Witness sworn.)

R. L. STAMETS

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HATCH:

Q Would you state your name and position for the record?

A R. L. Stamets, geologist with the New Mexico Oil Conservation Commission in the Artesia District Office.

Q Mr. Stamets, in your position as geologist, District Number II, do you undertake studies and make recommendations concerning the disposal practices in District II?

A Yes, sir, I do.

Q Are you familiar with the purpose of Case 3806?

A Yes, sir.

Q Would you briefly state for the Commission the background and purpose of this case?

A On April 19, 1967, the Commission met at Hobbs, New Mexico to consider issuance of an order prohibiting the disposal of oil field brines in surface pits in Lea, Chaves, Roosevelt and Eddy Counties. At that hearing it was determined

that large amounts of water produced in conjunction with the production of oil or gas, or both, was being disposed of on the surface of the ground by means of unlined disposal pits, and that this produced water contained high concentrations of chlorides.

It was further determined that fresh water supplies as designated by the State Engineer exist in substantially all areas where there is surface pit disposal and in substantially all the area encompassed by Lea, Eddy, Chaves and Roosevelt Counties.

As a result of the hearing the Commission issued Order No. R-3221 which prohibits the disposal of water produced in conjunction with the production of oil or gas, or both, on the surface of the ground, or in any pit, pond, lake, depression, draw, streambed, or arroyo, or in any watercourse, or in any other place or in any manner which will constitute a hazard to any fresh water supplies.

The effective date of Order R-3221 was different for different areas and for secondary and primary production. The effective date for the area here in question is January 1, 1969.

Then later, on May 15, 1968, Case Number 3758 was heard by the Commission here in Santa Fe. In this case the

operator, William A. and Edward R. Hudson, sought an exception to Order Number 3 of Commission Order R-3221 for their leases in the Dos Hermanos Yates Seven Rivers Pool. What they sought exception to was the no-pit provisions of this order. The findings in Case 3758 were that substantial amounts of oilfield brines were being produced and disposed of in unlined pits in the pool. However, that in relation to the disposal of unregulated potash brines in the immediate and mediate area, the volumes of water and concentrations of chlorides was small. Further, it was found that as the oilfield pits and potash tailings ponds overlies the same general surface and subsurface drainage system, the enforcement of Order 3 of Order No. R-3221 would not appreciably reduce the hazard to fresh water and would be an unnecessary expense upon the operator. Order R-3424 approved the applicant's request.

As a result of the evidence presented in Case 3758, it was determined that the Commission staff should check into the general situation in the potash mining area to see if other pools in that area warranted a similar exception. As a consequence of the investigation, this hearing has been called.

Q Will you describe in particular the area that you have studied and that is under consideration here today, and would you point it out on the map?

(Whereupon, Exhibit No.
1 was marked for
identification.)

A Yes, sir. The area is essentially, well, it is exactly the same as described in the docket for this case and it is shown on what I have labeled Exhibit No. 1 in this case, which is a map of the potash mining area. Here the area under consideration is outlined by a dark green line. Also on this map are shown the oil and gas pools in various colors; the highways, the windmills, lakes, the location of the potash refineries and tailings ponds and the general outline of Clayton Basin and Nash Draw. Clayton Basin and Nash Draw are broad depressions in eastern Eddy County which are caused by the slumping of the surface beds over an area where the salt has been mined by ground water. Ground water flowing through this area from north to south has dissolved the salt which underlies the surface and is carrying that salt down to the Pecos River through springs near Malaga and the surface is kind of slumped over where the salt has been eroded.

This area includes portions of Lea and Eddy Counties. The Lea-Eddy County line runs between Ranges 31 and 32 East, actually only the West Half of Township 20, 32 is under consideration in this case.

Q Now, the areas outlined in green there on your

map, why did you pick those particular boundaries?

A Well, after a field study of the area we tried to include all of that portion of Clayton Basin and Nash Draw because that's where the majority of the potash mines are and that represents the drainage system in this area. Water drains from the margins of these basins toward the center and from the centers of the basins toward the river. However, there are no permanent streams in this area. Water does not flow past this salt lake. There is a ditch which goes between the Pecos River and Nash Draw and there is no permanent stream across this ditch.

Q Where did you get the information that you have put on the map concerning the windmills?

A The base map itself was drawn with the use of U.S. Coast and Geodetic Survey topo sheets. The outlines of Clayton Basin and Nash Draw were taken from these same topo sheets. The windmills were spotted using a county highway map and also spotted from my own field observations. There were a few windmills not shown on the county highway map and I have put these on as I saw them. I did find that quite a few of the wells spotted on the highway map were still there. Some of them apparently have been abandoned.

Q Are those maps that you use in performing your

duties, did you find them accurate?

A Yes, sir.

Q What oil and gas pools that may be in the area might be affected by an order dealing with this particular area?

(Whereupon, Exhibit
No. 2 was marked
for identification.)

A If you will refer to Exhibit Number 2, this is a list of producing oil and gas pools inside the defined area. I would like to name these off, if I may. The oil pools are the Barber-Yates, East Benson-Yates, Big Eddy-Delaware, Big Eddy-Strawn, Cabin Lake-Strawn, Dos Hermanos-Yates-Seven Rivers, North Hackberry-Yates-Seven Rivers, Halfway-Yates, PCA-Yates, Parallel-Delaware, Red Hills-Yates, Remuda-Wolfcamp.

The gas pools are the Dos Hermanos-Morrow gas, Golden Lane-Strawn gas and Los Mendanos-Atoka gas.

This Exhibit Number 2 shows the number of wells in each pool, producing wells, the barrels of oil production, the barrels of water production, the water production converted to barrels of water per day, parts per million chlorides where we have samples on the produced water, and the dates that the pools were created or discovered.

If you'll notice on the map there are a few pools

which I did not show. These pools are plugged and abandoned such as the Benson-Yates, the West Lusk-Strawn, the Maroon Cliffs-Tansil-Delaware, so on. In every case the pools have either been plugged and abandoned or notice of intention to abandon has been filed.

Q Are there pools shown on that map that are not on your list?

A There are pools outside the area which are not shown on this list and which I have not mentioned. I merely have shown those so as to complete the map of the area.

Q Are most of those pools within the Nash Draw and Clayton Basin depressions?

A Yes, they are. Either that or they lie more or less between potash mines at two extremes.

I would like to point out that only a portion of the North Hackberry-Yates-Seven Rivers Pool is shown. Just that portion which lies in and immediately at the edge of Clayton Basin. The reason I have done this is in Section 28 of 19, 31 is one of the few wells sampled which has fairly good water in the area, and further, these wells in the eastern portion of this pool, part not included, report very little water production, and from my observations on the ground this seems to be correct. So I have not included those.

Q Does your Exhibit 2 show the total volume of water produced by those pools?

A I feel that this is pretty good representation.

Q What is that total volume?

A The total volume on a barrel per day basis is 15,985 barrels.

Q Does that exhibit also show the range of the chloride content?

A Yes, sir, it does. There are not samples shown for each pool, however, I believe that the samples shown are representative of pools completed in the same formation. You can see here how close the Barber-Yates Pool and the Dos Hermanos-Yates-Seven Rivers Pool are. So I believe these samples probably could be expanded to cover the entire area.

Q What is the range?

A They range from about 16,000 parts per million to a high of 186,000 parts per million in the Parallel-Delaware. I believe this is actually a little bit high. I took this sample from the pit and so it's probably evaporated water and concentrated to salt. Delaware usually runs to about 110,000 parts per million.

(Whereupon, Exhibits 3, 4 and 5 were marked for identification.)

Q Will you describe to the Commission what this

area is like, starting with the potash mines in the area?

A You mean would I like to go into this discussion of Exhibits 3, 4 and 5 at this time?

Q Yes.

A I would like to refer, then, to Exhibits 3, 4 and 5 and describe the exhibits briefly and then show you on the map what they mean. Exhibit 3 is a copy of a report by Mr. E. C. Barry of the Roswell Office of the State Engineer. This report shows the potash mines then in operation, the source of their water supply and the volumes of water to the tailings pond, parts per million chlorides in the tailings water.

Exhibit Number 4 is a similar report prepared by the United States Bureau of Mines and published in 1965, some two years prior to Exhibit Number 3. This report is much more detailed and it is presented here because it shows not only the volumes to the tailings pond but the tailings ponds' sizes and an estimate of seepage from these tailings ponds into the ground.

Exhibit Number 5 is a tabulation of the data from Exhibits 2, 3 and 4 and for convenience I have converted all figures on this Exhibit Number 5 to barrels of water per day. Exhibit Number 5 is a list of the potash mines. First, we have U. S. Borax, which is the oldest mine in the area listed.

There are two locations. They have one in 18, 23, 29 and another in 12, 21, 29. Both of these operations have been closed down at the present time. They may be started back later by a different company but I'm not sure about that. There are figures here shown for the Bureau of Mines data and the State Engineer data. I feel that the State Engineer's data being some two years later probably represents more closely the actual volumes of water being disposed of.

MR. PORTER: At this point, Mr. Stamets, where these mines have been abandoned are there still mounds of salt left on the site?

THE WITNESS: Yes, sir.

MR. HAYS: They're not pumping any water now?

THE WITNESS: No, they are not.

A This particular operation had very little seepage of water because they went into a natural salt lake here. Their seepage was something like 6.8 percent for the two mines. The second mine is Ideal Basic Industries, Inc., which is the old PCA mine. That is located in Section 4 of 20, 30, and its tailings pond area is located.

I would like to point out that these tailings ponds are, as I show them on the map, are probably considerably larger than the actual water that you'll find standing there

at any one time, but I am sure that rains in the area fill these things up occasionally, so you find salt encrustations over a good sized area. It's not too reliable standing out on a hill sketching this thing in on a topo map. You can make mistakes. This is the general area of each one --

MR. HAYS: How do you measure seepage?

THE WITNESS: In Exhibit Number 4 the seepage is estimated by the Bureau of Mines, and what he has done there, he uses a figure of evaporation, five gallons per minute per acre, if I'm not mistaken, and what he does is take the acreage in each one of these ponds, estimate the number of barrels or the number of gallons of water which will evaporate. He takes the number of barrels or gallons which go in and takes the difference as the seepage into the ground. I checked one or two of these using his figures and I agreed with him in each case.

MR. HAYS: How big are these lakes?

THE WITNESS: I would have to refer back to Exhibit 5 to give you an acreage figure.

MR. HAYS: You have seen them, give me a guess, or are you afraid to?

THE WITNESS: That's a little hard; well, PCA here on my map, I would say it covers about a section and a half,

probably there's a half a section of water standing when I was there. They vary quite a bit.

MR. HAYS: When were you there?

THE WITNESS: Within the last two months. I could give you the exact date if you need it.

MR. HAYS: No, it isn't necessary.

A Moving on then to International Mineral and Chemical Company, that is located here in the lower part of Nash Draw in 12, 22, 29. It has one of the largest tailings piles and ponds. I feel that the size of this pond is due to its location in the central part of Nash Draw. In all likelihood there's a great deal of rain water funnels into this lake and makes it quite big. It runs on here for two or three miles.

The water standing in this lake is located in the southernmost portion of the area.

The Duval Sulphur and Potash Company is located in 35, 20, 30 and it has a small tailings pond which extends out to the west. Southwest Potash Corporation is located in 9 of 19, 30 in the northern part of this area and its tailings pond is shown.

National Potash Company is located outside of the limits of either Clayton Basin or Nash Draw. It is located in Lea County in 18, 20, 32, actually located in the edge of a

very large natural sink. I feel sure that this sink connects with Nash Draw, that being the lowest point in the area, and in all likelihood water runs from this sink into this low area.

Then the last potash mine to be developed in the area is Kermac Potash Company, located in 4, 21, 31. They're a pretty new company but they also have a very large pit. I believe they have more water in their pit than anybody else.

Going back, the parts per million chloride taken from the State Engineer's reports, the U. S. Borax, an in-plant sample now, I presume that he picked up a sample somewhere inside the plant area and not in this tailings pond area. The in-plant sample there was 131,000 parts per million.

Ideal Basic or PCA, 10,050 parts per million. Now, this is the low. International Minerals, the parts per million were 11,220. Duval Sulphur, 90,200. Southwest, 188,200. National, 14,680; and Kermac, sample that he took from their tailings pond, 178,800. I'm not sure why some of these are so low. I feel that they should be higher and I'm certain that the water in these ponds is essentially saturated.

We've stopped here at PCA and seen some water coming off of this big mound they have got out there and it's just solid with salt. The water itself is kind of a red. You can just practically see the salt crystals in it as it's flowing.

The comparison of the volumes of potash brine against the volumes of oilfield brine are shown on the bottom portion of this exhibit.

Q (By Mr. Hatch) What exhibit is that?

A That is Exhibit Number 5. The oilfield brines represent about five percent of the total disposal in the area which I have outlined here.

Q Did you ever give the total potash brine disposal?

A The total potash brine disposal as shown in the State Engineer's report represents 301,548 barrels of water per day. The closing of the U. S. Borax Chemical Company mills and the cutback in production in some others may have cut this as much as one-third. However, it's possible that some of these others may have had some increase since that time. It's still a substantial quantity and represents about five percent, or the oilfield brines represent about five percent of the total, potash mines about ninety-five percent.

One thing I failed to mention earlier, National Potash Company has a rather limited size pit and I understand when it rains they have to pump some of their water over here into this natural lake Laguna Plata; however, the volume would represent no more than about 3,000 barrels a day if you average it out over a year, and that is about one percent of what the potash mines dispose of, so it's not a significant

figure now. I was hesitant to take this area in for that small volume and I'm not certain what the drainage is from this lake. When you move just a little bit east from here the drainage is toward depressions to the east, and I feel --

MR. PORTER: Away from the potash area?

THE WITNESS: Away from the potash area, so I haven't included this at this time.

Q What's the water situation in this area?

A Well, to discuss the fresh, and I put brackets around fresh water because a lot of it isn't, I would like to use Exhibits 6, 7 and 8.

(Whereupon, Exhibits 6, 7
and 8 were marked for
identification.)

A Exhibit 6 is a tabulation of water samples which were taken in this area over quite a long period of time. The samples were taken in the area in 1948 and 1950 and in 1968. The samples as shown on Exhibit 6, marked U.S.G.S., were reported in the Ground Water Report Number 3 "Geology and Ground Water Resources of Eddy County, New Mexico" by G. E. Hendrickson and R. S. Jones in 1952. The samples marked OCC were collected by myself and tested by John Runyon of our Hobbs Office in 1968.

If you look on this exhibit, there are several

samples bracketed by red lines. I believe these samples to be from the same well and each one of these shows a deterioration in the quality of the water from that well. The sample shown as being in Unit letter "I" of 16, 20, 30 looks like it's haywire somewhere. The sulphates and chlorides appear to be reversed in one of these samples. However, we double checked our sample and it is correct, the analysis, so I am not too sure who went wrong where, but in any event, the total dissolved solids is up in this sample and indicates a deterioration in the quality of the water.

Exhibit Number 7 is a two-part exhibit; the first page is a letter from the Lea County Health Department to our Hobbs Office which outlines the recommended standards for potable water as adopted by the Public Health Service in 1946.

If you'll refer to this exhibit, especially the section in parts per million chlorides, parts per million sulphates and total dissolved solids, it can be seen that just about all of the water sampled even twenty years ago was not fit for human consumption.

Then the second part of Exhibit Number 7 consists of a cover letter from Dr. Smith at the New Mexico State University, and an excerpt from a pamphlet entitled "The Effect of Saline and Alkaline Waters on Domestic Animals". I am

informed that this is the definitive work on this subject and that anybody who says anything goes back to this work for support.

Essentially what this says, there are ten parts to it, is that cattle can maintain themselves on waters which contain up to 1.5 percent salts, which is equivalent to 15,000 parts per million. It also says that they can't do this if they are suckling young, so for cows with calves it would be somewhat less than this.

I also presume that by maintenance they mean that they are not going to improve a whole lot. They're just going to be out there. Very little of the water sampled --

MR. HAYS: What about sheep?

THE WITNESS: Sheep can get along with a little bit worse water.

MR. PORTER: Does it indicate in here that cattle would kind of have to grow up with this kind of water situation, that they couldn't be transferred from one pasture to another and go to this concentration?

THE WITNESS: That's right, they have to be kind of brought up with this.

GOVERNOR CARGO: But it is debilitating while they are adjusting to it?

THE WITNESS: Right, it is. And some of them don't adjust.

MR. HAYS: Can you testify as an expert in that field?

THE WITNESS: No, sir, I'm afraid not. I have to rely on the State University.

MR. PORTER: By the way, I notice this letter is addressed to Mr. Lee Clemmons, can you tell us who that is?

THE WITNESS: I'm not sure who Lee Clemmons is. I am afraid he may be Les Clemmons. They may not recognize him over there for all I know.

MR. PORTER: I thought we had some new Commission personnel that I did not know about.

A I might point out the map here, there's some twenty-three windmills located on this map and I personally know about fourteen or fifteen of those which are being used either for domestic purposes or for stock water. I believe this well right here is being used for domestic purposes. That's the only one that I know definitely is.

There are numerous intermittent lakes in this whole area. Every time it rains they'll fill up with water and I've seen cattle using a lake right in here on my first trip out there and the next trip about a week later it was completely

dry, so they come and go.

Also this little lake right here, I took a sample of water from it and I really didn't need to because it smelled just like being out on the Gulf Coast; when I got the sample back it was one hundred seventy some thousand parts per million chloride. So not all of these lakes in this area can be used, all of this seems to be pretty bad.

MR. HAYS: The lakes, are they about the highest you have ever seen them?

THE WITNESS: I haven't been back by since this last rain. I did all of my field work before that time.

GOVERNOR CARGO: They had four and a half inches last week.

Q (By Mr. Hatch) There is water in the area and being used for domestic purposes and for stock purposes?

A Right, and I believe in Exhibit 5 it shows that PCA is using, or at the time of that report was using about nineteen hundred gallons per minute of low quality water from wells in the plant area to supplement the water they pipe in from the Caprock. I believe the water is coming from the Rustler.

Q Do you know of any other industrial use for water in that area?

A No, I don't, and neither is there any irrigation. As far as I know the only other use is for stock water. I would

like to point out that the reservoirs in there are shown on Exhibit Number 8. Exhibit Number 8 is a map, a copy of a map from this Ground Water Report Number 3 which I have previously mentioned. The map is entitled "Wells and Springs and Availability of Ground Water in Eddy County, New Mexico".

I have taken a red marker and marked off the area which we're considering here. If you refer, then, to the left-hand column of this map, it breaks the county down into five areas. We're in Area Number 5. If you'll look over here in Area 5 you can see that the area we're considering in this hearing is divided up into 5-b and 5-c. 5-b is described as stock water generally obtainable at depths less than 250 feet in Rustler formation, generally impotable and locally unfit for livestock. 5-c is stock and domestic supplies available at less than 300 feet in Triassic redbeds, generally fair but locally impotable. I agree with that. I have reviewed well logs and scout tickets for wells in this area and they find water just about everywhere but the lack of development would lead me to believe that this is correct in its description of the ground waters.

Q Would you briefly summarize for the Commission what you have found and what you have testified?

A Yes, sir. I find that there are several oil and

gas pools in the defined area which produce varying volumes of water. These volumes ranging from zero to 7500 barrels of water per day total 15,978 barrels of water per day. This can be compared with the reported potash brine disposal of 301,548 barrels of water per day.

I find that the oilfield brine disposal pits and potash tailings ponds overlie the same surface and subsurface drainage system and in my opinion the enforcement of Order 3 of Order R-3221 would not appreciably reduce the hazard to fresh water and would be an unnecessary expense upon the operators in this area.

Q You have testified that Exhibits 1, 2, 5 and 6 were prepared by you?

A Yes, sir.

Q And that Exhibits 3, 4, 7 and 8 are various papers and reports prepared by other agencies and persons and used by you in performing your duties?

A Yes, sir.

MR. HATCH: I would like to move the introduction of Exhibits 1 through 8.

MR. PORTER: Any objection to the admission of these exhibits? Any questions concerning them? The exhibits will be admitted to the record.

(Whereupon, Exhibits 1 through 8 were offered and admitted in evidence.)

MR. PORTER: Does anyone have a question of Mr. Stamets? Mr. Lovelace.

CROSS EXAMINATION

BY MR. LOVELACE:

Q You testified that the U.S.G.S. estimated five gallons per minute per acre evaporation in trying to determine the amount of the rate of seepage out of those ponds?

A Yes, sir.

Q Is that an average annual figure or was that an observation taken at the time of measurements?

A That is an average annual figure and is not necessarily applicable to each pond in the area.

MR. LOVELACE: Thank you.

MR. PORTER: Does anyone else have a question?
The witness may be excused.

(Witness excused.)

MR. PORTER: Does anyone else desire to present testimony in the case? If not, we will hear any statements that anybody has concerning this case. Mr. Gray.

MR. GRAY: I represent William A. and Edward R. Hudson and the Windfohr Oil Company. We would just like to

support the Commission's proposal to set up this area as advertised as an exception to the no-pit order. We would further like to commend the Commission on initiating this hearing on their own motion rather than have each individual operator to have to appear separately at separate hearings. We think the industry should be appreciative of this action.

MR. PORTER: Thank you, Mr. Gray. Mr. White.

MR. WHITE: David White on behalf of Pan American. Pan American has supported this Commission in their efforts to eliminate pit disposal where it is felt that it is a contamination hazard. In the case of this hearing we again concur with the Commission and feel that this is a just cause for an exception to the no-pit order. We feel that it would be an unreasonable expense on the part of oil and gas producers in this area to dispose of produced water in a manner other than which other industries are required to dispose of it.

We also feel, based on the evidence presented, that the pollution hazard presented by the oil and gas industry in this area is very minor, if any at all. For those reasons we support the Commission in this hearing and request that this area be approved for an exception to the no-pit order.

MR. PORTER: Thank you. Anyone else have a comment to make concerning this case? The Commission will take the case under advisement. Before calling the next case we will have a very short recess.

I N D E X

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Witness my Hand and Seal this 3rd day of August, 1968.


NOTARY PUBLIC

My Commission Expires:

June 19, 1971.