BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 17, 1977

COMMISSION HEARING

IN THE MATTER OF:	)	
Applications of La Rue and Muncy, Harvey E. Yates, H & S Oil Company, Gene Snow and Marbob Energy Corporation for exception to Order No. R-3221, Eddy County, New Mexico.	)	CASES (De Novo) 5719 5720 5721 5722 5723

BEFORE: Joe D. Ramey, Director
Emery C. Arnold, Member
Phil R. Lucero, Member

Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

EXHIBIT INDEX

MR. RAMEY: The hearing will come to order. We will call the first case on the docket.

MS. TESCHENDORF: Do you want us to call them all, sir?

MR. LOSEE: Yes.

MS. TESCHENDORF: We will consolidate Cases 5719, 5720, 5721, 5722 and 5723 for purposes of testimony and these are the applications of La Rue and Muncy, Harvey E. Yates, H & S Oil Company, Gene Snow and Marbob Energy Corporation for an exception to Order No. R-3221, Eddy County, New Mexico.

MR. RAMEY: I'll ask for appearances.

MR. LOSEE: A. J. Losee appearing on behalf of the applicants. I have one witness, Mr. Ed Kinney.

MR. RAMEY: Would you swear the witness?

(THEREUPON, the witness was duly sworn.)

MR. LOSEE: I would like to apologize for our tardiness in appearance this morning and hope in view of the brevity of our presentation that it will be forgiven.

I'm not sure that counsel for the Commission did move but I would like to move to consolidate these cases for purposes of hearing and have the record so show.

MR. RAMEY: That will be fine, Mr. Losee, to consolidate.

EDWARD E. KINNEY

called as a witness, having been first duly sworn, was

examined and testified as follows:

DIRECT EXAMINATION

BY MR. LOSEE:

Q. Would you state your name, residence and occupation?

A. Edward E. Kinney, I reside in Artesia, New Mexico, I'm a consultant in oil and water matters in Artesia.

Q. Have you previously testified before this Commission and had your qualifications accepted as a geologist and an expert in water matters?

A. I have previously testified before this Commission with regards to oil matters, not as to water matters in particular.

Q. Would you give the Commission some of your -- first your educational background in connection with water matters?

A. I studied ground water under Tollman at Stanford University and I have worked on the City of Carlsbad water case a couple of years ago and I have appeared in several cases before the State Engineer as an expert witness in water matters.

MR. LOSEE: Are Mr. Kinney's qualifications acceptable?

MR. RAMEY: Yes, we will consider him qualified.

Q. (Mr. Losee continuing.) Would you state the purpose of this application in these four cases or applications?

A. The purpose of these applications is to seek variance to the regulations to permit the disposition of or disposal of

produced oil field waters into unlined earthen pits.

Q. How many wells, Mr. Kinney, are involved?

A. Twelve wells, to the best of my recollection.

Q. How many pits?

A. Seven pits.

Q. Now, you are aware that this is a De Novo proceeding and the prior orders of the Commission in these cases denied the applications, are you not?

A. Yes, sir.

Q. Would you briefly explain the findings in those orders?

A. In the previous hearings fresh water was determined to be in the vicinity of the pits. It was also determined that surface drainage was away from the fresh water but no determination or no evidence was given as to subsurface draining, underground water movement and for that reason the application was denied.

Q. Okay, would you please refer to what has been marked as Applicants' Exhibit One and explain what is portrayed by this exhibit?

A. Applicants' Exhibit One is two maps of the USGS topographic series, one labeled Oil City, the other Clayton Basin, that have been joined together to form one map covering the area adjacent to the leases held by the various parties in these cases.

Q. What does the yellow area indicate?

A. The yellow area is a coloring between the thirty-five hundred and thirty-five ten contour, surface contour on these maps for the purpose of showing the surface structure of the area, to show the Loco Hills Ridge, the Nimenim Ridge and the valleys in between.

Q. Okay, now, the brown is also --

A. The brown is also for the same purpose, it is the contour interval between thirty-four fifty and thirty-four sixty to give a little more depth to the outline of the geography.

Q. Okay, now, where does the Loco Hills Ridge run with respect to these wells which are the subject of this application?

A. The Loco Hills Ridge starts in Section 5 of Township 19 South, Range 29 East -- wait a minute, it's 30 East, excuse me -- and proceeds north by northeast right through the center of the H & S property, the La Rue and Muncy property.

Most of the leases lie to the west of this ridge, with just the two, the H & S and the La Rue and Muncy lying on top of the ridge.

Q. What are the red dots, what does that signify?

A. The red dots are the locations of the disposal pits presently on the leases.

Q. Now, with respect to those pits that lie west of the Loco Hills Ridge, where will they drain if they overflow?

A. If they overflow they will drain southerly and then somewhat southwesterly down into the area in Section 18 of Township 19 South, Range 30 East.

Q. In other words, southerly from the leases?

A. Southerly from the leases, yes, sir. The leases are in Sections 32 and 33 and the drainage will be to the south until you hit Section 8 and then kind of southwesterly into Section 18.

Q. Okay, now, I notice one of the pits is on top of the ridge, where will it drain?

A. Essentially it is a flat area there and there is not much likelihood of any directional drainage. Let me say this in regard to the previous question that in the event of a hard rain, none of these pits are likely to overflow for the simple reason that each is located in a structural depression that is high enough to contain the water but lower than some of these contours that appear here. There is four or five feet of embankment, just natural depressions in the blow sand.

Q. Okay, now, Mr. Kinney, you were telling me what would happen to the water on top of the ridge?

A. The water on the top of the ridge, it will just sink down into the sands. It's too flat there, I don't think that it will flow either way but if it did, part of it might go to the southeast and part might go to the southwest but essentially it would just sink right into the top of the

ridge there.

Q. All right, now, one of the pits is located on the east side of that?

A. Okay, that pit that is located on the east side of the Loco Hills Ridge will drain to the southeast into the the little depression that shows at the bottom of Section 34 and then if there is any excess it would tend to flow on down south toward the Amax Potash mine.

Q. Okay, now, is that opinion supported by the topography shown on this map?

A. Yes, sir, by the contours.

Q. Okay, now, you talked about the water sinking into the blow sand, at least with respect to the pit up on the ridge, what will happen to that water when it sinks into the blow sand?

A. The water that will sink into the blow sand or the dune sand will percolate downward until it comes to the top of the Redbed section, which is in some cases a few feet to a maximum of a very few tens of feet of blow sand there and then it will be discharged back into the atmosphere through evaporation and transpiration.

Q. Okay, will the residue form any caliche-like --

A. The solids contained in the water as it percolates downward will be precipitated as the waters evaporate and it will form a caliche-like hardened layer consisting of the

salts that were in the water.

Q. And that's going to occur, really, just a few feet below the surface?

A. Just a few feet below the surface and if any place, it will be right on top of the very fine-grained Dockum.

Q. Now, let me ask you from this map, would you point out the location of the only fresh water within three miles?

A. The fresh water on this map is located over where the arrow shows in Section 26 of the southeast quarter of Section 26. It says water well on the map and right at the end of it is a black dot representing a house, a ranch house at the Walters camp of the Snider Ranch and the water well is located right by the ranch house.

Q. Okay, now, would there be any surface drainage from these pits in the direction of that water well?

A. No, sir, there will not be any. The brown contours in there show too many high ridges and the contours can -- the geographic structure will cause the water to flow south or southwest or southeast but not north.

Q. Okay, now, I notice this is called Walters Lake up there in a northeasterly direction, is that actually a lake?

A. Walters Lake and the little blue dot in the southeast corner of Section 22, a little blue dot in Section 26, all of these are intermittent lakes, dry lakes. After a heavy rain the water will stand for a short time but not permanently.

Q. Okay, now, I notice right up opposite that Walters Lake is a purple area by which you have written Duval. What is located there?

A. That's the north mine shaft and waste dump of the Duval Postash Company. Their main operation is further south on the Carlsbad Highway.

Q. Now, they have put the waste on the top of the ground, haven't they?

A. Yes, sir.

Q. And you've got some pictures of it, have you not?

A. Yes, sir.

Q. Okay, now, south of the leases is another purple area which you have written Amax by the side of, what is located there?

A. That is the mill mine entrance and disposal pits, waste dumps of the Amax Potash Corporation.

Q. Okay, now, how big is that waste dump?

A. Well, the whole waste area there covers forty to eighty acres, waste dump and water disposal area around the Amax mine.

Q. Are they discharging water into that pit there?

A. Yes, the underflow from their mill. The waste is salt brine being discharged into a pit outside there.

MR. RAMEY: Excuse me, Mr. Losee, is that in Section 10 that you are talking about?

MR. LOSEE: Yes, sir.

A. Yes, all that purple area there. That purple area there is put on by the USGS, it's not mine.

Q. (Mr. Losee continuing.) Now, is that waste water that they are putting in that pit more briney than the water produced in these oil wells?

A. Yes, sir, it's super saturated salt water.

Q. And what in relation to the volume?

A. The volume is many times greater, I don't know what their volume is but it will be many times greater than these wells produce.

Q. Okay, let me ask you to refer to what has been marked as Exhibit Two, being an envelope?

(THEREUPON, a discussion was held off the record.)

Q. (Mr. Losee continuing.) Now, Mr. Kinney, this is a series of pictures taken in that area, is it not?

A. Yes, sir.

Q. Are these in numerical order?

A. Yes, sir.

Q. Okay, if you will explain what area is shown by each picture and I will pass it up to the Commission.

A. All right, picture number two is a picture of the Snow Elk Lease on the northwest of the southwest of Section 32 and it shows the disposal pit which is a shallow depression in

the blow sand on the lease.

Picture three is a view from another angle of the same disposal pit on the Snow Lease.

Q. That lease is the most westerly lease?

A. The most westerly lease of the group.

Well, they're not in numerical order, excuse me. Picture number one is the Heyco pit in blow sand about nineteen eighty from the north and east of Section 32, 18 South, 30 East and it shows on this Exibit Number One as a dot in the center of the Heyco green lease there.

Picture number four is the northeast corner of the Heyco disposal pit in the center of their lease and shows the northeast corner, which would be right in the center of the picture, it shows the hummocky nature where the pits are located so that in the event of rainfall, excess rainfall, there isn't any way that it would get onto general drainage.

Picture number five is the Heyco disposal pit about sixty north and thirteen hundred east, Section 32, 18 South, 30 East. The pit is located in a depression, natural depression, in the terrain and will not flood into the main stream of the draw.

Picture number six is a picture of the Marbob disposal pit about twenty-three ten from the north and nine ninety from the west of Section 28, Township 18 South and Range 30 East in a low spot in the blow sand and it is in the center of the

picture with a small amount of caliche showing at the top, again in a structural depression.

Picture number seven is another view of the Marbob disposal pit and the pit is dug down into caliche and there is caliche around it and presumably in the bottom.

Picture number eight is Duval's waste dump at the north mine shaft in Section 22, Township 18 South, Range 30 East. The white appearing on the dump is the salt efflorescence. The Walters Lake as shown on the map in Exhibit One lies in the valley to the east or to the right of the dump in this picture.

Picture number nine is the La Rue and Muncy disposal pit on the top of the Loco Hills mesa, sixteen fifty from the north and twenty-three ten from the west of Section 33, Township 18 South, Range 30 East. The pit is dug into caliche.

Picture number ten is the H & S Oil Company disposal pit about three thirty north and sixteen fifty west in Section 33, Township 18 South, Range 30 East. The pit is located in blow sand in an area swale.

Picture number eleven is the La Rue and Muncy disposal pit on the east side of the Loco Hills Ridge about sixteen fifty from the north and east of Section 33, Township 18 South, Range 30 East. The pit is located entirely in blow sand.

Picture number twelve is the area south and east of

the La Rue and Muncy east disposal pit, sixteen fifty north and east of Section 33 and the area is in a local swale, the flood waters will not reach the main valley.

Q. Mr. Kinney, you took those pictures yourself, did you not?

A. Yes, sir.

Q. And what general purpose are the pictures offered for?

A. The pictures are offered to show the exact nature of the rock in which the pits are located and also to depict as best pictures can the swales in which the pits are located.

MR. LOSEE: At this time, if the Commission please, we move to introduce the testimony and the exhibits in the original hearing before the Examiner in this case and particularly with respect to the pictures showing the Amax dump right to the south and east of these wells and also for the purpose of showing the water analysis from that pit and from these wells.

(THEREUPON, a discussion was held off the record.)

MR. RAMEY: That will be satisfactory, Mr. Losee, we will incorporate the record into this hearing.

Q. (Mr. Losee continuing.) Will you refer to what has been marked as Exhibit Three, Mr. Kinney, and explain what is shown by this exhibit?

A. Exhibit Three is a map prepared by Hendricks and Jones for geology and groundwater resources of Eddy County, Groundwater Report Number Three published by the New Mexico Bureau of Mines and Mineral Resources. It's called The General Direction of Movement of Groundwater in Eddy County, New Mexico.

This map shows the subject leases from which disposal water is desired to be produced and in the same colors, two shades of blue, red, green and orange in Township 18 South, Range 30 East and the arrows on this map show the direction of groundwater movement. The arrows all point south in this area and show that the drainage will be to the south, possibly a little to the southwest and no drainage will go from the leases towards those lakes to the northeast.

Q. Do you have anything else to offer with respect to this exhibit?

A. No, sir.

Q. Please refer to what has been marked as Exhibit Number Four and explain what is shown on this exhibit?

A. Exhibit Four is a map prepared by me showing the top of the Rustler in Township 18 South, Range 30 East.

The top of the Rustler or top of the anhydrite as is particularly referred to as TA, is shown in all wells with vertical lettering. Also shown on this are known fresh waters from cable tool wells which are shown in numbers with a slant and a line drawn under the number.

The solid contour line on the map is the surface geography showing the Loco Hills Ridge on the left side and the Nimenim Ridge on the right side and the valley lying in between.

The dotted contour, there are just two contours, one at plus thirty-one hundred, the other at plus thirty-one fifty on the top of the Rustler or the top of the anhydrite, taken from electric logs in the area.

This shows a considerable reentrant right in Sections 27 and 28 over the whole to the west. We are dealing in this area with near the wedge edge of the Salada formation near the outcrop edge of the Rustler formation and we have local subsidence occurring you will note in Section 28 at the north half. We have one elevation on the top of the anhydrite at plus thirty-one seventy-nine and one to the west of it at plus thirty-one ten with a regional dip being to the southeast in this whole area. That is an anomaly you also find down in the stippled area on Marbob where the top of the anhydrite is plus thirty-one twenty-four. These do not jibe with the higher elevations to the south and east, showing that we already have a certain amount of local subsidence due to solution of the Salada formation underlying the Rustler.

We also have instances shown further to the northwest where there is a non-uniformity of dip to the southeast.

Q. What effect does that have on the flow of water under-

ground?

A. Well, if there were any fractures being developed from the natural subsidence it would create some flows of water but there are none, there are no flows of water so that the natural subsidence hasn't affected the area in any way.

Q. All right, now, the cable tool holes that you mentioned that found some fresh water, what horizon did they find the water in? It wasn't fresh water was it?

A. Some of it, yes. The water in the wells, there are five wells, two in Section 15 and two in Section 22 and one in Section 23, that all found some water that was fresher than the underlying Rustler water. It is from the Dockum group and it is sufficiently fresh that it can be used for livestock.

Q. Okay, now, is there any possibility of surface drainage from these wells up in that direction?

A. No, sir.

Q. What about subsurface?

A. No, sir, the dip is in the opposite direction.

Q. Now, as a matter of fact, Mr. Kinney, isn't it true that that large mine deposit of Duval's lies in between those wells, those fresh water, and the leases that are in question here?

A. Yes, sir. One other fresh water well exists in Section 26 in the southeast quarter at the point where the data says plus thirty-two ten. The circle indicates the

approximate position of the water well where the full blue circle or the dark blue circle to the right of that would indicate the position of the intermittent fresh water lake at the Walters camp of the Snider Ranch.

Q. Okay. Now, you've also got Walters Lake shown on this, again is that a --

A. Walters Lake, the one I have shown on the map is the Walters Lake that is shown on the USGS topo sheet submitted as Exhibit Number One, in the position that they show it.

Q. Is that a lake?

A. It's an intermittent lake, a case where water impounds during flood seasons only.

Q. It's not a permanent lake?

A. It's not a permanent lake, no, sir.

Q. Is there any drainage from surface or subsurface from the subject leases and pits towards Walters Lake?

A. No, sir, the drainage is all to the south in this area and there will be no drainage from these leases to this Walters Lake nor to the Walters camp of the Snider Ranch.

Q. All right, now, you have mentioned the Dockum group, would you describe that group to the Commission, please?

A. The Dockum group is a Triassic deposition overlying the Permian formations in this area, overlying the Permian Rustler formation. Starting at the bottom up it consists of three hundred and fifty feet of red sandy shale with a few

fine-grained sandstones, then two hundred to three hundred feet of gray and red sandstone with lenses of red shale and conglomerate and a bit of conglomerate at the top. Then three hundred feet or more of red shale with thin intermittent sandstones, all are covered by dune sands in this area and the actual outcrops are not readily seen.

Q. What does the red shale carry?

A. The red shale in this group are very fine grained with a high colloidal content which impedes water movement.

Q. What about, is there a physical barrier formed by this Dockum group?

A. These fine-grained shales, sandstones, mudstones, whichever word a person prefers to use, are known as an aquiclude, a-q-u-i-c-l-u-d-e. An aquiclude is a formation that holds the water but will not transmit sufficient water to support a seep or fill a well and these beds are strict aquicludes.

Q. And so what you are saying is that the water if it gets in these Dockum group beds won't transmit itself subsurface?

A. The shale beds are full of original water depositions, what is residual after compaction and fresh water will not or any other water will not move through it in any quantity, not even enough to sustain a seep.

With one exception. Now, there is one exception. There are a few little lenses in this group of slightly

cleaner sandstone confined within the group, within the Dockum group and some of these fine grained, slightly cleaner sandstones carry a little water but they are not very extensive.

Q. Well, let me ask you this question, Mr. Kinney. This Walters water well is actually a fresh water well, is it not, in Section 26?

A. Yes, sir.

Q. Would you explain from what zone it is producing and how the water got there?

A. The Walters camp water well of the Snider Ranch is two hundred and thirty feet deep with the casing set at two hundred and twenty feet and according to testimony of the agent for the Snider Ranch in Case Number 4710 the water level stood at a hundred and ninety feet. If the water level stands at a hundred and ninety feet and no water was encountered until they got down to two hundred and twenty feet and there is no showing that they had any before that point, then we have confined water, not water table water but confined water and it has to be in a lense surrounded by a confining bed which is the Dockum group. The lense has to be recharged somewhere up dip to provide a pressure to raise the water above the limits of the aquifer itself.

Q. And so you are saying that this well is charged or recharged from water to the northwest?

A. Probably to the northwest, possibly to the north

itself but most likely to the northwest, most likely in the area of Walters Lake or further on to the northwest where the dip would bring this particular sand lense closer to the surface and where the Dockum group would be thin enough, the shales over the area would be thin enough to permit the ingress of water.

Q. And as I understand your justification for concluding that it's a confined water is that the water is actually in the well at a higher level than it was encountered in drilling?

A. That's right.

Q. Now, one other thing so that as you go from the surface down in this area you have, correct me if I'm wrong, the blow sand first and then the Dockum group?

A. Yes, sir.

Q. And then you go into the Rustler?

A. Yes, sir.

Q. Does the Rustler have fresh water?

A. No, sir, the Rustler carries considerable water in two zones. The basal zone of the Rustler carries the water, in many places quite an abundant amount of water, heavily saturated in sodium chloride, plain salt. The middle member of the Rustler formation carries water in a lot of the areas, in the area of the mines, and it is saturated with a calcium sulphate or gypsum water. Neither one are fresh waters or potable waters.

Q. So, as I understand your testimony, Mr. Kinney, it is that in this area the only fresh water that has been found is in a confined area in the Dockum group?

A. Correct. There are a few waters there that will meet the fresh water test.

Q But as a rule the Dockum group because of the nature of its rocks will not transmit water horizontally.

A. The group as a whole will not transport any water, only the few limited lenses.

Q And below that is the Rustler which has no fresh water?

A. No fresh water.

Q Okay. Now, Mr. Kinney, to the south are Southwest Potash or Amax's refinery, has there been any subsidence evidenced on the surface by virture of that mining operation?

A. Yes, sir, there has been subsidence over the mining areas where they have pulled the pillars and allowed the ground to settle.

Q. Now, that's to the south of these subject leases?

A. South of the subject leases, near the Amax mine.

Q. Okay, describe those cracks or fractures, if you would, please?

A. In general in the subsidence areas there is no cracking, the big broad area settles just slowly and makes a concave area at the top. However, on a few edges where the

subsidence ends or commences, whichever word you care to use, you do get a fracture that comes to the surface and at the surface is the only place we see any openness inasmuch as the shales with their high colloidal content are a type of formation that heals instantly and does not have any material in it to sustain open spaces in the formation along the fracture, except at the very top, a few feet from the surface down where the overburden has been insufficient to cause it to immediately heal. It will heal in time but it is a very limited amount of open fracture.

Q. So you are saying that when this subsidence occurs that outside of at the very surface, it immediately heals?

A. Yes.

Q. By that, it cements?

A. It seals itself, it just never opens up, the formation just stays tight together along the fracture.

Q. Okay. Is there any possibility in your opinion of water from these pits getting in those cracks and going towards the northeast towards this Walters Lake well?

A. In my opinion there is no possibility of water moving down these fracture zones, either towards the Walters well or any other place along those fracture zones.

Q. Because they have healed?

A. Because it is right in the same type of formation and the fact of the fracture is not enough to change the nature

of the rock or to provide open spaces for water to percolate.

Q. Now, that subsidence has been caused when the Southwest Potash moves out of an area they have mined?

A. Moved out of an area and allowed the land to settle, yes, sir.

Q. Has Southwest Potash had any problems with water in the mined out area?

A. No, the Southwest Potash, or Amax, has allowed their area to subside and then reentered the subsided area and is mining a bed over the original bed and are not troubled with water, they are in there mining and they are drawing their ore underneath the Rustler which carries many times more water than the Dockum group would ever.

Q. And so what you're saying is that after subsidence has occurred they go back in and mine above it?

A. That's right.

Q. And yet they are below the Rustler, this sand that is full of high chloride non-potable water?

A. Yes, sir.

Q. And they still haven't had any problem?

A. They haven't had any problems.

Q. Now, you earlier mentioned their forty to eighty acre pit, tailing pit or brine pit, have they had any evidence of migration of salt from that pit?

A. They have had no evidence that they know of to date

of any migration to water wells surrounding those pits.

Q. Now, you visited with the --

A. I visited with the Chief Engineer, the Chief Mining Engineer of Amax Potash in regard to their mining operations and their problems, if any.

Q. Okay. Mr. Kinney, in your opinion will produced water in the seven pits shown on your exhibits and the subject of this application, will that produced water percolate -- well, first let me ask you, will it run along the surface towards the water well in Section 26 or towards the northwest or northeast towards those water wells?

A. No, sir.

Q. Okay, what about it percolating subsurface, will it?

A. No, sir, it will not percolate to the northeast, it will settle into the dune sand and then be discharged again by evaporation and transpiration to the surface.

Q. And in your opinion there is no probability that that water from, the produced water from these pits would enter the aquifer or the confined area that is charging this Walters well?

A. No. The recharge has to be done north or northwest from that position.

Q. Were Exhibits One through Four prepared by you or under your direction?

A. Yes, sir.

Q. Including the pictures which you took?

A. Yes, sir.

MR. LOSEE: We move to introduce Exhibits One through Four.

MR. RAMEY: They will be admitted.

(THEREUPON, Applicants' Exhibits One through Four were admitted into evidence.)

MR. LOSEE: That's all of the direct, Mr. Ramey.

MR. RAMEY: Any questions of the witness? Mr. Stamets?

CROSS EXAMINATION

BY MR. STAMETS:

Q. What volumes of water are being produced by those wells at the present time?

A. I cannot answer that exactly, I did not make any measurements myself. I note that the oil wells are discharging volumes of a barrel or two a day, up to volumes perhaps in the fifty to sixty barrel range. I asked that the operators file proper reports with the Commission.

MR. STAMETS: Mr. Losee, you I believe, asked that the record in the Examiner's Hearing be included in this case and I believe there is testimony in there concerning water volumes, concerning the waterflood which lies to the south of these wells and the potential for an increase in the volume of water produced by these wells resulting by such waterflood

activity.

MR. LOSEE: The answer is, yes, Mr. Stamets. I don't think the waterflood is to the south there, it's right in between. The waterflood is in between the two leases.

A. In between the Marbob and the Heyco.

MR. STAMETS: In the general vicinity anyhow?

MR. LOSEE: Yes.

Q. (Mr. Stamets continuing.) I did observe from the pictures here, the Heyco pit six sixty from the north line and thirteen hundred feet from the east line of Section 32, 18, 30, and it would appear from this picture that the pit is about to run over?

A. That was the way it appeared at the time, however, right to the south, it's a little bit hard to see in a two dimensional picture, if it did run over it couldn't go but a few feet because that swale is cut off by a ridge that comes in from the right-hand side. However, the water seems to be disappearing into the blow sand.

Q. Even if the pit did run over the dike we see here it still couldn't drain any significant distance?

A. No.

Q. Your testimony relative to the Walters camp well is that the source of that water lies some distance north or northwest of Section 26 and that the natural drainage, both surface and subsurface, would be such that there would be no

way that this disposed water could enter the formations and get to this well?

A. Yes, sir.

Q. Mr. Kinney, are you aware of the general exception to Order R-3221 that exists in the area of these potash mines?

A. Well, I'm aware that they are allowed to dispose of their brine waters on the surface. I'm not familiar with the exact wording.

Q. You are not familiar with the geographical extent of that exception?

A. No.

Q. I believe the Commission's records probably will reflect that that lies just immediately to the south of these --

A. I think that's right.

Q. If that line had been drawn a couple of miles to the north you probably wouldn't even be in here today?

A. If it had been drawn as far as that Duval's north pit I wouldn't have been here certainly.

MR. STAMETS: That's all of the questions I have.

CROSS EXAMINATION

BY MR. RAMEY:

Q. Mr. Kinney, you mentioned something about water wells around the Amax pit?

A. Yes.

Q. There are some fresh water wells?

A. No, they are not fresh water wells, they are water wells that they get out of the area to use, they are primarily Rustler water wells that they are using to sluice their tailings with.

MR. RAMEY: Okay. One thing I would point out, Mr. Losee, it seems like there are a lot of pits in these pictures that don't have fencing around them or adequate fencing. It is something that probably should be done and there is one pit in particular that had very steep sides, if livestock or wildlife got in there, I'm sure that --

MR. LOSEE: Mr. Ramey, I'll be sure and advise my clients with respect to fencing pits.

MR. RAMEY: I will advise my district office also.

Q. (Mr. Ramey continuing.) But as far as you have been able to determine, Mr. Kinney, there is no fresh water in the area of these leases with the exception of what has been marked on Exhibit Four?

A. That's right.

Q. And you have no record of any to the south?

A. No, sir.

Q. Where the drainage is from these pits?

A. No, sir. I went through the cable tool records and found no evidence.

Q. Were most of these wells drilled with cable tools?

A. About half and half I would say.

Q. But some of these on the applicants' leases were drilled with cable tools?

A. Oh, yes, and around them.

MR. RAMEY: Any other questions? Mr. Arnold?

CROSS EXAMINATION

BY MR. ARNOLD:

Q. Mr. Kinney, Exhibit Three shows the direction of groundwater flow over the area, I wonder if you knew the procedure whereby they determined this?

A. The procedure?

Q. Yes, how they determined this.

A. The procedure is determined by the elevation at which water is in the various wells or areas. Water always flows at right angles down the steepest portion of the contour, so you draw your contours or take your elevations of water where it is found.

Q. They contoured the water sand first?

A. Well, they would have to contour not only -- all this map shows is the elevation of water in everyone of these wells. For instance, up there in 17 South, 29 East, it's at thirty-four seventy. Down in 18, 29, its at thirty-two seventy and over in 18, 28 it's thirty-four twenty-five and from that they have worked out -- somebody had to draw some

contours and determined the general direction of the contours and water always flows down the steepest dip.

Then on the surface, on the surface part, they had to use geography as shown on the topographic maps.

MR. ARNOLD: Thank you.

MR. RAMEY: Are there any other questions? The witness may be excused.

(THEREUPON, the witness was excused.)

MR. RAMEY: Do you have anything further, Mr. Losee?

MR. LOSEE: No, Mr. Ramey.

MR. RAMEY: Okay, the Commission will take the cases under advisement and the hearing is adjourned.

(THEREUPON, the hearing was adjourned.)

REPORTER'S CERTIFICATE

I, SIDNEY F. MORRISH, a Certified Shorthand Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings to the best of my knowledge, skill and ability.

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