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Appropriations Committee
February 25, 2015

[AGENCY 57]

SENATOR MELLO: Are there any other testifiers today on Agency 18, the Department of Agriculture? Seeing none, that will end today's public hearing on Agency 18, the Department of Agriculture, and take us to our next hearing on Agency 57, the Nebraska Oil and Gas Commission. Good afternoon. [AGENCY 18 AGENCY 57]

BILL SYDOW: (Exhibit 1) Good afternoon, Mr. Chairman. For the record, my name is Bill Sydow, B-i-l-l S-y-d-o-w. I serve as the director of the Nebraska Oil and Gas Conservation Commission, and I appear today in support of the appropriations bill for our agency. We...you have given us basically what we asked for and, in fact, a little bit more, so we are very happy with that. I would ask for a couple of modifications to the budget, specifically on the federal appropriations. We would ask that the appropriation for FY '16 be reduced to \$80,000--it's currently at about \$91,000, as I recollect--and reduce that to \$79,000 in 2017. And the reason for that is that U.S. EPA continually cuts our funding for our Underground Injection Control Program and so we need to cut that in the budget. But at the same time, I would like those exact cuts added back to our cash fund so that it won't change the appropriation. It just changes the split as we replace those federal dollars. We've never done this in our agency, but I would ask from this committee to recommend the reappropriation of any unexpended cash funds or unencumbered funds at the end of the budget year. And so Senator Kuehn asked about that. I don't have a number but it would be about \$150,000 perhaps. And I think we can use that in the next biennium to help plug and abandon some wells that we have responsibility for. My handout, as I've given you today, I just would like to tell the committee a little bit about things we've accomplished in the last several years. Maybe before going to the handouts I'll just say that we've made some significant upgrades to our on-line data in our...on our Web site. We host our Web site in Sidney, Nebraska. When we first started that was ten years ago. Most of the 10,000 hits a month were our own, as we tested it. We actually went over a million hits per month in the spring of 2014, so people are noticing. We also began a scanning project which we wrote about

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in the budget recommendation, but we have a scanning project going of historical well files that are curated and maintained by the geological survey of our Conservation and Survey Division here in Lincoln. And those scanned logs, ultimately we're doing this to help at least two natural resources districts, our South Platte and North Platte NRDs, as they do some shallow geologic mapping, to help them model their ground water. So we have about 8,500 logs that we scanned out of perhaps over 12,000. We continue to work on that. We spanned a two-year process changing our rules and regulations and adding some new regulations. Those were approved in June of 2013 and approved by the Governor in 2014, in June, after a review. We also developed a new inspection module for our field inspectors. It uses a pad device, just much probably like Mr. Ibach was talking about, but it's electronic for our in-field inspectors. Maybe just refer to the handouts very quickly: The first page of that is obviously a map of Nebraska showing the counties that we have drilled wells in or that are under our jurisdiction. Those are shown in the black number in each county, and that represents probably 3,000 wells. We continue to drill...permit and then the industry would drill wells, so we permitted 231 wells in 2014. That was up about 50 wells from the previous year. And we actually drilled 170. The red value to the right of the county names in most cases were the numbers of wells that actually were "spudded" by the industry. And where we had discoveries, those counties are shown it with a green dot. There are three counties with the red dots: Cheyenne, Kimball, and Sioux County. Wells were drilled there last year but were not started in a completion process until 2015. And it's possible we have discoveries in each of those counties. So that's our activity level. The second page that we have prepared is stacked on top of one another, two graphs. One is an historic production curve for the state of Nebraska since 1990. The green curve is oil production in barrels per month, and the red is natural gas production. Out in our time frame, 2014, you'll see that our oil production has increased really dramatically due to drilling successes by the industry. Our gas production has fallen off and has stairstepped twice. Gas production in 2012, we had quite a few wells where I live became uneconomic with lower gas prices. And then the really steep curve happened in the end of 2013 when a major, at the time, gas transmission line that comes through the southern Panhandle,

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enters Colorado, and comes back into southwest Nebraska was converted from gas back to oil production. So we have probably 150 wells that are basically stranded right now and have no market. But that's a history there. I put a curve there for you on average oil prices in the Denver-Julesburg Basin. That's posted prices by Shell Trading. And you can see it's always up and down, but we've entered into another down cycle. And so from June of...actually, June of 2014, our oil price was a little over \$90 a barrel and it averaged a bit more than \$34 a barrel in this last January, last month. So we're cash funded. We need to forecast not only prices but production and sales from the gas and oil, and so sometimes that gets to be a challenge. But that's our history that we've gone into. Of the wells that we drilled, I have just the last page I wanted to bring to you. It's a composite of a brand new field that was found by a Wichita-based, family-owned company, BEREXCO. It's called the Burntwood Canyon Field. It's in the very southwest corner of Hitchcock County, was a three-dimensional seismic prospect that BEREXCO drilled. The various maps that you can see are from our Web site just showing status, but this field is unique right now in Nebraska in that it straddles two state lines. So about half the field is in Nebraska, half the field was in Kansas. It was a competitive reservoir in that whoever had maybe perhaps the most straws got the most oil. And that field peaked at about 10,000 barrels a day--5,000 in Nebraska, 5,000 in Kansas--and it's dropping off. And so some day it will be unitized and water flooded, I hope. And that will be a challenge for Nebraska and Kansas to see how well we get along on that issue, but hopefully we do and we can get some more oil out of the ground. So I could tell you some more things but probably my five minutes, we didn't start the timer, Mr. Chairman, but. [AGENCY 57]

SENATOR MELLO: You have as much time...directors have as much time as they need to speak, Director Sydow. So by all means, if you have anything you'd like to add, continue. [AGENCY 57]

BILL SYDOW: Well, just a little bit. Our activity levels for operators drilling wells is actually...it's always driven by economics and so we have about five drilling rigs working

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in Nebraska. They're all in southwest Nebraska, in Dundy County, Hitchcock County. And probably one rig just came from Senator Kuehn's district. I would say for discoveries, we had 12 field discoveries this last year. That's pretty good. That's about a 15 percent success rate. Development wells were actually successful about 72 percent of the time. And in Senator Kuehn's district we have really the first really commercial production. We have two wells and two field discoveries in Franklin County, so we're glad about that. That's driven by 3-D seismic as well, and an independent company, private company from Wichita is driving that. Our activity in the Panhandle, we didn't have a lot. It was driven by 3-D as well. One company using 3-D seismic actually drilled about 17 dry holes in a row and then had a discovery in Morrill County. The significant wells that have been drilled are in my county, Cheyenne County, a horizontal drilled by Devon Energy. They're just completing that. There was a horizontal, it was a discovery well, maybe perhaps not economic, in Kimball County. And then we have two wells that are being completed by a brand new start-up company in Denver called Hawkwood Energy in southern Sioux County. Those are all Paleozoic wells that they penetrate rocks that are older than the Cretaceous. And that's...if we have significant potential, at least in the Panhandle, that's the intervals that we could experience some success. It would be good for Nebraska. So that's it. [AGENCY 57]

SENATOR MELLO: All right. Thank you for your testimony, Director. Are there any questions from the committee? Senator Haar. [AGENCY 57]

SENATOR HAAR: Yeah. I have a series of questions and it has to do with the announcement of, you know, bringing in water to inject waste water. So I'll just go ahead with that. Will you be required to do permits, any kind of permits, or who will be required to do permitting in that process? [AGENCY 57]

BILL SYDOW: Okay. Thank you for asking. [AGENCY 57]

SENATOR HAAR: Sure. [AGENCY 57]

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BILL SYDOW: ...because my life has be a little miserable for the last 30 days or so. And in fact, I am prepared for some handouts if you would like for that issue. [AGENCY 57]

SENATOR MELLO: By all means. [AGENCY 57]

SENATOR HAAR: Yeah, I would. [AGENCY 57]

BILL SYDOW: (Exhibits 2 and 3) This one didn't take probably a lot of great thought to get ready for. But back to your question, Senator Haar, our agency permits these Class II injection wells and we are the sole authority to do that for wells that deal with oil and gas well produced fluids. So that's, if you will, the simple side of that. We could hand this out. I'll just tell you, we have a program. It's an environmental program and it's the one we get our grant for from EPA every year. It's called the Underground Injection Control Program. And we received delegation of primacy from U.S. EPA in 1983. So we've operated that federal program under the Safe Drinking Water Act for over 30 years, and prior to that our commission always did permit injection wells in water floods. And so it turned out that in 1960, the very first order I could put my hands on, dealt with an injection well. It was for an enhanced oil recovery well. But we do...we are the permitting authority for that. [AGENCY 57]

SENATOR HAAR: Uh-huh. Uh-huh. So in some of these I'm maybe going to be a little too simple, but why would a company spend all this time and effort and money and all that distance to come to Nebraska when the, you know, the fracking is being done in Colorado and Wyoming? [AGENCY 57]

BILL SYDOW: And Wyoming. A great question. The problem is, a good problem for Colorado and Wyoming, they're drilling a lot of wells. Like where we drilled 170, they've drilled several thousand this year. They're having great success and so they are having the requirement to dispose of their produced fluid, the formation waters and then the

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stimulation fluids. They are so successful, they have not been able to catch up on their disposal well permitting, which is also permitted through their oil and gas conservation commission. So both...and that's in both states, they're behind. One of the...and that's, anyway, that's a big issue. If they could get more wells permitted then we probably would not have had this application, to be honest. But there's not enough capacity and people are, at least when we had \$100 oil, were desirous of transporting that. So I know of water that was taken from Weld County that went basically to Laramie, or past Laramie to a town called Wamsutter in the middle of the Red Desert. It's probably a 400-mile round trip just to haul 100 barrels of water over there to dispose of it. So it's an economic incentive to help keep their...or get their oil production ramped up. That's the consideration and they're willing to spend the money, apparently, to truck this water. I would say that this is not unusual, and I'll show you, but we have about only four or five commercial disposal wells in the state of Nebraska. They can take water from across state lines, some of them have. We actually have water on a daily basis that goes to Kansas in Red Willow County, so that goes to Kansas. We have hauled water from around Sidney and Potter to Colorado injection wells, as well as Wyoming injection wells, when there was a need, before there was a disposal well. And we have actually had two stimulations recently in 2013, Senator Haar, in Sioux County where we did not, as a state, have an authorized injection well. That water from Nebraska was hauled to Wyoming for disposal. So it goes across border, and we have a shared oil and gas basin, the Denver Basin, in four states. So I hope all my talking answered that portion of your question. [AGENCY 57]

SENATOR HAAR: Uh-huh. Yeah. So what is involved in the permitting of an injection well like this? [AGENCY 57]

BILL SYDOW: Okay. An injection well, to have any injection well, it requires an application. [AGENCY 57]

SENATOR HAAR: Okay. [AGENCY 57]

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BILL SYDOW: We actually...we don't prescribe the format but on our Web site we have a sample format. [AGENCY 57]

SENATOR HAAR: Who does? Is that feds who do that? [AGENCY 57]

BILL SYDOW: No. That's state of Nebraska. [AGENCY 57]

SENATOR HAAR: Okay. [AGENCY 57]

BILL SYDOW: As far as the format? [AGENCY 57]

SENATOR HAAR: Yeah. Yeah. [AGENCY 57]

BILL SYDOW: No, it could be styled by an attorney. Usually attorneys prepare it because it is a legal document. It's the foundation of the file. And so they would basically ask for an order to be allowed to have this enhanced oil recovery injection well or a salt water disposal well. They have to specify on salt water disposal, do they want commercial or do they...is it private. Most of...we have around 130 wells in our salt water disposal inventory right now; 119 are active and most of them are private. And by private, this would be the case: If you were the operator, Senator Haar, and you had ten leases of one well and you had a disposal well, you could bring all of your water to your well and dispose of it, but you could not let any other operator bring their water there and you couldn't...you can't charge them. So this commercial designation is for a charge. The permitting process itself is...a lot is on our shoulders. We will actually vet wells with operators to tell them is this a good candidate or not, because it does have to meet certain requirements for casing integrity, and that's how it was drilled, completed, or constructed is the term used nowadays. So it has to meet certain requirements. We're going to require that any water in a well like this, less than 3,000 parts per million, will have at least three layers of protection from the inside of that well bore to the

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outside. Normally, that's going to be accomplished by the surface casing with its cement sheath; then the production casing or intermediate casing, and this is all steel casing; and then we will require a concentric string of tubing that could be two and a half inches, two and three-eighths, two and seven-eighths or larger if the other casing would accept it; would be in that well with a device on the bottom that's called a packer. And that packer seals any fluids from coming up and getting back into the annular area of the tubing and casing. So that's going to be a requirement. Another requirement is that no water, we don't care where it comes from, an oil field or the quality of the water, no water would be able to be injected into any reservoir that has water less than 10,000 parts per million unless there was an aquifer exemption. State of Nebraska does have aquifer exemption on what we call the D&J Sands in western Nebraska. We produce a lot of water that's under 10,000 parts per million, which would be at EPA headquarter's office the cutoff. They'd say that's drinking water. It's really not but it could be cleaned up, whether you want reverse osmosis or do another method. So that's the cutoff. If it's more than that or if...I'll say without the aquifer exemption, you can't inject into that. And so a part of this particular application we've never had any injection under our jurisdiction in those two zones, which are in the Triassic, Jurassic and Triassic rocks. And so we required them to spend some money, probably cost \$50,000, but they had to get us a water analysis, of which when that was obtained we had our own people so we got a duplicate. And we send our water lab...actually to a lab in McCook, Nebraska. But they have to prove that. Maybe...and I'll ask Senator Haar, would you like on this handout, I could just tell you a little bit about this. [AGENCY 57]

SENATOR HAAR: Okay. [AGENCY 57]

BILL SYDOW: First, injection wells in Nebraska is not a new thing at all, and we've had injection into oil and gas reservoirs since the early 1950s. And so this first map shows those counties where we currently have injection of waters into oil reservoirs, that's with the green triangles; or just for disposal, that's with the light blue triangles. We currently have 19 counties in Nebraska that have oil and gas production, and we have disposal

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operations going on in all of them except for two: Franklin County, because we only have two wells and hopefully we needed another well in there; and Sioux County. But all the other counties that have oil and gas production we have those kind of wells. I have shown on this particular form the grand total: 630 injection wells in our inventory that we're responsible for to maintain and inspect and see that they are adequate. Have some estimated fluid volumes there as well. In the oil and gas business all over the United States, you're really in the water business and you skim a little bit of oil off. And so we produced almost 59 million barrels of water last year. We reinjected 30 million into our water floods for enhanced oil recovery. And our salt water disposal wells, we reinjected 24 million barrels. So we handle a lot of fluid. And in fact, down at the bottom we're a little bit more than that on oil. Some reports have come in and they are altered. But we basically lift 21 barrels of water out of the ground for every barrel of oil, so you have a lot of produced fluids. And that's the distribution that we have. The next page of this handout, the two colored well bore diagrams are taken off our Web site. So our Web site, if it's...if you don't get blocked by your software, you can look at the well bore diagrams. On the far right is a well bore diagram that I actually did for a disposal well for this horizontal discovery in Kimball County, and it was drilled fairly deep, 7,400 feet. Our disposal zone is in the Lyons sand, which occurs at Lyons, Colorado, in outcrop. And this well was equipped with tubing and packer, and this is a private salt water disposal well. But before this well could be used, it had to be permitted. And we will have a witnessed test of the annulus between the tubing and the casing. That well has to hold 300 psi for 30 minutes. And so, Senator Hilkemann, you were asking about scales. Ours, there isn't any variance. It either passes or it fails. And if it doesn't hold the pressure, they're not going to be allowed to inject into that. On the left-hand side, on this particular well, it's the Heidemann 1, it is a commercial salt water disposal well in southern Kimball County. Right now most of the water that gets injected into that comes from Wyoming. It was the second horizontal well that we ever drilled in Nebraska. It was unsuccessful and so it was converted to disposal. We have tubing string in this with the packer set inside of a 7-inch casing that went horizontal. And the 7-inch casing, the cement was brought back several thousand feet above that TD. That's the way that well

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is. Our well that has caused all the furor, the actual well bore diagram is right below that. It's also a horizontal well drilled in 1998 by Burlington Resources. It was a well that made, initial, about 24 barrels a day and 200 barrels of water. That was uneconomic for them, but they sold the well. And if we had had a disposal well in Sioux County, this well probably would have been producing. But we have no place to go with the water so we've maintained it. The operator has maintained it in the inactive status by providing fluid levels to us every year. A different thing about this well, the 7-inch casing has the...there are slash marks on the exterior of it that go all the way back to the surface. This well, and we didn't ask Burlington to do this, they wanted to do it. They cemented that casing string from the surface all the way back, 7,000 feet or so. They pumped 2,200 sacks and circulated cement; had excess 100-and-some-odd sacks to surface. So this well right now, the way it sits without anything, has four layers of protection of our groundwater resources in this well. And just a little bit about it, and I won't be hard and fast on this, but the...our agency is about protecting groundwater wherever it is. We don't care what it's called. Actually, the Ogallala does not occur very much, just in a small part of Sioux County, so our primary reservoirs here are the White River group. There's...Senator Stinner knows this. There's a Gering formation... [AGENCY 57]

SENATOR STINNER: Gering, yeah. [AGENCY 57]

BILL SYDOW: ...that's in there, the Arika Reformation, and actually the Chadron. All those are, except for the Chadron, which is shown in orange, but even the Chadron has two layers of protection and it's not very well developed there and that's about 1,000 feet from the surface. So at the surface is...are tertiary rocks. But these are typical well bore diagrams for our agency. We have been accused, Senator Mello, that we wouldn't live anyplace where this is not (sic) done in our backyard, and so here's a map off our Web site. Sidney is shown in yellow for the city limits, not the jurisdiction of the city but the city limits. In the light blue areas, those are wellhead protection areas for our potable drinking water in the area up the Lodgepole Creek and in the valley there and north of town. If you just look around to the south, you'll see some blue triangles that can come

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around and you could proceed clockwise around. We have shown water flood units on there. They're in pink. One got kind of crossed over when you put the blue on it. But those are water disposal wells within a few miles of Sidney. The closest one is just to the northeast of Sidney. In Section 28 there's a two-well D Sand field and that injection well is disposing into the J Sand. So this is basically in our backyard. It's our water and we live here and we want to take care of it. We have the red-colored wells to the north. That's the Huntsman gas storage field. Those injection wells are operated now by Tallgrass under the Federal Energy Regulatory Commission. Those inject or produce methane back during the times of year when they could put it in or take it out in the winter. We actually have three disposal wells that are up there for Tallgrass that dispose of, into the Lakota or the J Sand. So we have gas injection going on and, of course, it goes through our aquifer, the Ogallala or the Brule. Thought this would be of interest, this is really in town. Kimball, Nebraska, is 38 miles to the west of us and in the 1950s they discovered an oil field under Kimball. Kimball was already there, so they ended up drilling oil and gas wells on vacant lots, next to houses. It was unitized. There were over 60 wells drilled here. That field made 7 million barrels of oil. Our records, we produced 19 million barrels of water out of it and reinjected all of that water, plus another 6 million barrels that came into those two wells that I have arrows on, that came...they were effectively commercial enhanced oil recovery wells. But they brought outside water into Kimball, unloaded it, and injected it all safely. And you can see the activity. But again, this program is about preventing the contamination of anybody's drinking water, so there's in your backyard. The next series I have, this is a water disposal well that is just northeast of Potter, Nebraska. And I don't know if it's in Potter's wellhead protection area. I think it's going to be downstream. This is...I'll say it's brand new. There may never be one that looks quite like it again. Devon Energy was the person who funded this, but there are eight stock tanks there. They're steel. They will each hold 400 barrels of water. They've put a dike that is made of that corrugated steel. And then on the inside, it's like a big bathtub, there's a rubber mat. And so we can't tell them you have to use a dike of steel or dirt, but we want on a disposal well, especially like this, it's nice to have that dike around it. And the proposed well in Sioux County, that will be a

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requirement, actually agreed to by the landowner, because I advised him, if you will, on this is what I would ask for. And so it will have a dike and it will have a rubber liner so that if you spilled anything it will be in that bathtub. You can vacuum it up or evaporate it. The truck, this is actually unloading, so this is coming back, this water right here, this is a Z&S Construction truck. That's a 100-barrel tank, so each of those tanks would hold four truckloads. And then the wellhead that's shown there, normally it wouldn't be a wellhead like this but this was a deep well. And it's...the flow line coming from the tank battery over to the wellhead has been wrapped up and insulated because the waters are fresh enough they won't freeze. So they wrapped that up. This particular well is a Lyons well. It was a straight hole that went into the Paleozoic. They cored it. We used it as a microseismic well during fracture stimulation job on the offset, and this well, it actually has taken 6,000 barrels of water a day on a vacuum, no surface pressure at all. So that's that well. Water chemistry has certainly come into effect and so I'm not going to go over all this but I have given you a detailed composition of seawater. This was actually from New Zealand. The major composition of seawater, besides water, is sodium, chloride, magnesium, some sulphur compounds, sulfates, potassium, calcium, and bromine, and those metals or nonmetals that are right there make up about 30,000 parts per million. It's about 29,000 I think if you add that up. So the next following couple of pages are actual analyses of injected water that would be injected into a disposal well. This was part of an application that our commission processed probably in 1993. It was actually a contentious one. But you can see that the...it's summarized down at the bottom. It's TDS, total dissolved solids. One is 32,000; one is 29,000 parts per million. That's for like seawater, and well it should be because all these rocks were deposited in a marine environment. Sometimes you have elevated salts because of solution of the bedded salts that could have come up and got in the reservoir. Most of our western Nebraska water, though, can be fresher than 10,000, fresher than seawater because of meteoric waters that have come into the reservoirs. And so the water quality actually increases. The last page of that, of the analyses there, is actually a water analysis for drinking water from a potable house well. And if...and we will require this on every application. They have to tell us this is what we have an idea that we're going to inject,

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so they would give us the injectate and we will ask for a well, preferably within half a mile legal area around that well, that we want a water analysis of a stock well because that will set the baseline for the future, that we are going to know what the chemistry was before we started any injection. That's always a requirement that those types of data will be in. I did put some information in here about the structure of Nebraska because there has been articles in the newspapers about deep well injection causing earthquakes, and so this is just a brief geologic overview. But that page that's entitled "Revised Structural Features of Nebraska" was prepared by Dr. Marv Carlson several years ago, and Marv is here today. But we think of Nebraska as flat or rolling hills, but you get in the subsurface and we had a lot of activity that buried mountain ranges that have been eroded, basins that have been filled in. And so out in the Panhandle we have the Denver-Julesburg Basin is there, but we have an Alliance Basin. It's a subbasin that goes up into Sioux County. We have bedded salts at 6,000-7,000 feet that are free in the Permian and so this is like the Permian Basin in west Texas. We've got highs: the Chadron Dome, the North Platte Arch, Cambridge Arch coming down through Red Willow County. And then over in eastern Nebraska, where it's high-risk living, if you will, some major features. There's the Nemaha Uplift. That's a major structural feature in North America. It runs from central Oklahoma, all the way across Kansas, up into our southeast Nebraska. And we also have...it's called the Eastern Nebraska High, but this is a part of the Midcontinent Rift in North America that I think was a melt and a sag, but it came out of the ground 35,000 feet one time and got eroded off. And hence, Lancaster County is underneath that. So those are some features that affect many things. The next map is a map that Dr. Carlson prepared using oil and gas wells, and the log information that is required. So we require that one log be obtained on every oil or gas well drilled in our state for all kind of purposes. But all...you have all the squiggly lines, but those represent topography. And so there's a bull's-eye up in the northwest there in Sheridan County, where I grew up, going into Dawes County. It's called the Chadron Arch and that's a feature that came up, I think, probably at 4,000-4,500 feet at one time and all the rocks were eroded off the top of it. Most of the known faults that we've got, we don't have a lot of known faults but we do in southeastern, eastern

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Nebraska. They're shown on the dashed lines. So that's...I like this map. I want to give it to you for a good reference map. The next visual we have is a structural cross-section that actually goes through Senator Stinner's county that he represents, Scotts Bluff County. But it goes from what's called the Harville Uplift and the front range of the Rockies in Wyoming, Goschen County, Wyoming, and it goes across the northern portion of Scotts Bluff, Morrill, and into Garden County. So just a couple things. The rocks at the edge of the basin, when the mountains came out of the ground, were tilted up, exposing those rocks to atmosphere. Whatever oil and gas was there had leaked out. And it began to be pressure depleted but it was also refilled, if you will, with meteoric waters that came out from snowmelt or streams. And so as we have this still ongoing, it's recharging and it has a hydrostatic head that affects Nebraska geology so that in the...where I've shown the green and blue dots in the Dakota Group, that's...we've produced 350 million barrels of oil in the Panhandle from the Dakota. We have not only production but we have water disposal and water injection going on. But this Dakota Group comes together, it comes all the way across Nebraska and basically comes to the surface right here in Lincoln. And I've never walked it but I've driven past it, so we have Salt Creek. And Salt Creek emanates from saltwater springs out of the Dakota, and we can blame it on Wyoming because they keep putting that water in there and it's pushing it out to the east. But that's actual fact. The hydrodynamics work that way. The zones that...in this application in Sioux County are the Sundance and Spearfish, and so I've just got one dot in there in the central part of Scotts Bluff County, at that location there, 6,000 feet below the ground level. We don't have, on a technical sense, the Ogallala was eroded off but we have our aquifers and that would be about the...there's in fact, Spotted Tail Creek. Across the road is...from this injection well is the Spotted Tail Creek oil field. There's one well in that, but that's where it's located. But that's a nice picture I think to remember about our D-J Basin in Nebraska. And our deeper production is down, of course, toward the bottom. Those are the rocks that are prospected for the future. The threat of earthquakes, I've got just a couple more here. These were taken from a publication in Nebraska called "Earthquakes in Nebraska" that Ray Burchett put together a number of years ago. His ending date was 1989. And so

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this is an evaluation of...or this particular one, seismic risks in the United States. Where we have most of our oil and gas production is a seismic risk of one, which would be minor damage if we had any earthquakes. Zone 2 is that area that follows the Nemaha Uplift that comes across Kansas and into Nebraska. And at the southern end of that, this is now where we are experiencing these earthquake swarms east...west of Oklahoma City, swarms that actually--I saw a presentation--happened in 1950 and '51, and they moved north into southern Kansas. So I'm not going to say that it's going to go across Kansas, but if we had any earthquake activity, that's the area. We included...there are just two more pages out of Ray's article. We have earthquakes that were measured and estimated on a modified Mercalli scale, and I don't pretend to know about the intensity of that, but since 1886 through 1989. They're all over, as you can see, in a geographic sense. The grouping of wells in Red Willow County down there, the structural feature that is there is the Cambridge Arch. It may not be the culmination or the highest part of the Cambridge Arch, but that's a big buried feature. And so we've had injection going since 1950. We've had fracture stimulation since probably...or into the 1950s. And of all our oil- and gas-producing counties, there are the Red Willow County, actually, you know had...we had some earthquake activity in 1979, but our other counties have no recorded earthquake activity other than Scotts Bluff County in 1937. So I personally...I believe there's a couple wells that I'm aware of, one in Ohio, one in Arkansas, where injection caused some earthquakes. The one, the well that I'm told caused the entire Safe Drinking Water Act was an injection well operated by the Department of, I'm going to say, Energy. It was in Denver, Colorado, at a Rocky Mountain arsenal. They manufactured nuclear bombs there and they had waste water they needed to get rid of. And they drilled a deep well with injection above the fracture pressure, but with injection into the Precambrian rocks, which have no storage. They have no porosity. So it's like just fracturing...worse than concrete, and then you have to go above the fracture pressure to even get the water in and keep it in. They caused earthquakes and that might have been the well that kicked off Safe Drinking Water Act that now every injection well came under since, and in our program as well. I'll cease and desist on that. [AGENCY 57]

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SENATOR HAAR: So right now, as we know, in Sioux County, for example, the county board and so on have held hearings. Does it matter at all what these local counties and cities come up with, you know, when it comes to your permitting? [AGENCY 57]

BILL SYDOW: I'll just...I'll jump in on that one, Senator Haar. [AGENCY 57]

SENATOR HAAR: Yeah. [AGENCY 57]

BILL SYDOW: I want to be sensitive on this answer. But I'll just say that our commission is quasi-judicial. It's like a court of law. And in our commission, the way we design it, my commissioners will sit in the front like judges. We'll have the applicant, must be represented by an attorney. They will bring expert witnesses that will be sworn to oath upon penalty of perjury. And they will testify as to exhibits, technical exhibits that they've got. If there's any opposition, the opposition in a legal sense are those owners within a half a mile around that well. Those are the legal people who could bring evidence, be represented by an attorney, and otherwise be there to ask questions of witnesses, to cross-examine. So in a legal sense, those are the parties: the applicant and anyone involved in that half-a-mile circle. And we would go as long as...at that. Now we've never had--I've been 20 years--we've never had anything quite like this. We always invite people to come and, you know, maybe we've had, the most people, a dozen. I don't know what it would be like here, but we...and I won't run the meeting. My commissioners will. [AGENCY 57]

SENATOR HAAR: Uh-huh. Uh-huh. [AGENCY 57]

BILL SYDOW: I believe that they might have time for several comments from the outside. We've received letters from the Scotts Bluff County Commissioners and I've spoken with one of their commissioners. So...and, actually, we've received a lot more letters than just one. But they'll at least, you know, we'll have some kind of record as to

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the response. But it's very linear. Like a lawsuit, it's very linear. They have to put out their evidence. It can be rebutted. It can have people speak their mind on that half a mile. But the decision will be made upon the evidence and the testimony that happens during that hearing. [AGENCY 57]

SENATOR HAAR: And really just within a half-mile of the well. [AGENCY 57]

BILL SYDOW: Yes. And the half a mile is in our rules and, in fact, I went back, I won't give you a copy, but this first order was R5 or R6. It was 1960 and our commission started in October 29 of 1959. So this was the second hearing probably they ever had in terms of a public hearing, but there were six injection wells authorized. And they were...and the notice area in 1950 or 1960 was half a mile. It's always been that way for 55 years. [AGENCY 57]

SENATOR HAAR: But that's a matter of your rule, is that correct? I mean that's your rule; it's not a federal regulation or anything. [AGENCY 57]

BILL SYDOW: No, it's not. Well, I don't think it's a federal regulation. There is a federal regulation that everybody within half a mile, the legally interested parties, have to be notified by return receipt request. [AGENCY 57]

SENATOR HAAR: Uh-huh. Uh-huh. [AGENCY 57]

BILL SYDOW: And so that is always done and that will be Exhibit A to the applicant's case, here are all the people. In fact, state of Nebraska is a respondent in this, if you will, because of the state highway. This is right off the highway, so Road Department owns minerals underneath the highway. So for what we do, Senator Haar, it will be very linear. It will be based upon the evidence and what's proven. Our decisions are always followed up with a legal order that's binding. It's a legally binding instrument. And if any party doesn't like it, then they're free to appeal, starting at district court, Court of

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Appeals, go all the way to the Supreme Court. But our record that we have, the evidentiary record which will include the transcript, just like will be prepared for this hearing; all the exhibits are stamped, marked number one or A or however it goes. That will be the evidentiary record that will go to any Appeals Court. [AGENCY 57]

SENATOR HAAR: Uh-huh. So basically, anybody outside...right now, anybody outside that half-mile radius, you'll listen to them but it really doesn't matter. [AGENCY 57]

BILL SYDOW: Yes, sir. [AGENCY 57]

SENATOR HAAR: I mean that's the reality of it. [AGENCY 57]

BILL SYDOW: Yes. And we want to be sensitive. And so I met Senator Stinner for the first time yesterday. I have given several presentations on oil and gas in Scottsbluff in the past, and they were pretty well attended. And I have put out offers to anybody now, whether they want it or whether they don't want it, but I would certainly attend a meeting and give a presentation that would probably include some of which I just did there. [AGENCY 57]

SENATOR HAAR: Some of the maps, yeah. [AGENCY 57]

BILL SYDOW: I can only educate and I, you know, I would hope to convince but that's really not my job. But I would like that opportunity. I have not received any offers but, from the other side, if you will, but Senator Stinner can maybe get us an audience up there. And so we'd be happy to do that. [AGENCY 57]

SENATOR HAAR: So is there any scenario in which, let's say, there's a spillage or the company that's doing this goes under? I mean there have been some questions about their finances. Road surfaces or in the future if there's some new evidence that really this fracking is causing earth tremors and so on, is there any responsibility that the state

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of Nebraska has? [AGENCY 57]

BILL SYDOW: Oh yeah, the...at least a responsibility. Let's say we will have...this well will have a witnessed inspection of the 300 pounds. That will be the requirement for a well like this every year. We have the ability to go anywhere we want to go anytime through our statutes in the 57-900 series for inspections. They have to report to us every month about this well, how much water went into it and what were the average pressures on this week or pressure during every week. [AGENCY 57]

SENATOR HAAR: Yeah. But could anybody come back at the state of Nebraska, let's say, that if the company fails or the rules proved not to be sufficient? [AGENCY 57]

BILL SYDOW: Okay. If the company failed, and personally I'll say I've never had a company fail on me, the state of Nebraska, the Nebraska Oil and Gas Conservation Commission would be responsible to plug and abandon the well. And a part of that would be taking the tank battery apart, which we've done before. The environmental damage that would be there, my personal opinion, is incredibly low, and the reason is that this is not a pipeline where you could have an undetected leak go for a while. This is all...would all be trucked in, if it's approved. There's a known input or coming in, a known volume, because they'll keep track of all these trucks, who they are, where they came from. They'll unload and then this will be metered in. And as well, it will be a visual inspection all the time because there's no buried tanks here. This is all on the surface so you would see a leak. [AGENCY 57]

SENATOR HAAR: Yeah. But what about roads, for example? [AGENCY 57]

BILL SYDOW: Roads are...I have nothing to do with it. The...okay, and this particular well is right off State Highway 29. It's north of Mitchell. So either you're coming in from the south on that highway or you're coming from the north from Harrison. There are very few county roads in Sioux County that you can travel across the county. I don't think it

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would come by gravel roads. It would be really state or federal highways. So if water was coming from Colorado, it would probably come up Highway 77, which is two-lane from the state line or actually clear down in Weld County to Kimball, but then it goes to four-lane. That was part of the big expansion that was done several years ago. It's four-lane and, really, it's an international highway. That's what that thing is ultimately going to be from Mexico to Canada. [AGENCY 57]

SENATOR HAAR: Sure. [AGENCY 57]

BILL SYDOW: But once you get into the Scottsbluff area, you have to go over towards Mitchell and there might be some county roads. In fact, I know there's a county road because we've hauled oil field stuff on that county road even this year up to Hawkwood's. Or I say "we." We haven't but the industry has. [AGENCY 57]

SENATOR HAAR: Yeah. [AGENCY 57]

BILL SYDOW: So there's a county road there. And then you'd have to go through the east side of Gering and Scottsbluff...or the west side of Gering and Scottsbluff. But we don't have any say on that. [AGENCY 57]

SENATOR HAAR: Okay. Okay. Well, I'm, you know, I'm getting all these questions, too, so I'm sorry to take all this time. But that's it for now from me. [AGENCY 57]

SENATOR MELLO: That's fine. [AGENCY 57]

BILL SYDOW: If we had had any oil and gas production for any length of time in Sioux County and more in Scotts Bluff County, I don't even think we'd be talking about it because it would have become a normal occurrence of life, but it's not that way. [AGENCY 57]

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SENATOR HAAR: Uh-huh. Well, appreciate that. Thank you. [AGENCY 57]

BILL SYDOW: Thank you, Senator Haar. [AGENCY 57]

SENATOR MELLO: Any other questions from the committee? Seeing none, thank you, Director Sydow. [AGENCY 57]

BILL SYDOW: Thank you. And I just...I'm going to leave a bunch of these for you later and I'll count out 12. This is an EPA publication, 1994, about these Class II injection wells that deal with salt...with the oil field water. I won't be real greedy, but that ought to be it, Julia. Thank you very much, committee. Thank you for your time, too, for a budget, because I know that's very time-consuming, so. [AGENCY 57]