INTERVIEW OF MIKE ONNEN

October 4, 2013

MR. STARR: Well, let's get going, Mike. This is an interview with Mike Onnen, manager of the Little Blue Natural Resources District. The interview is being conducted for the Natural Resources District's oral history interview project. The interviewer is Gayle Starr. The interview is being conducted on October 4, 2013, at Mr. Onnen's office in Davenport, Nebraska.

So, with that, Mike, I'd like to have you just, first of all, give us a little resumé of what you've done with your life and how you ended up here and so forth.

MR. ONNEN: Okay. Well, I graduated from the University in 1975 with a degree in Wildlife Management Natural Resources with a wildlife option. I worked for two years in Lincoln. I'd been kind of interviewing for jobs in the NRD field. I interviewed, as a matter of fact, by candlelight with the previous manager of the Upper Big Blue NRD -- I can't think of his name right off-hand.

MR. STARR: Floyd Marsh (phonetic).

MR. ONNEN: Yeah, Floyd Marsh, and interviewed by candlelight because they'd had a blizzard and the lights went out, and he said, “Well, just come out and we'll interview anyway,” but I didn't get that job. I also tried, I think, a position in South Platte NRD. But I worked in Lincoln for two years at a tree service in the meantime and, in 1977, we were doing timber improvement in Table Rock,

Nebraska during the winter and got a call to come in for an interview with Little Blue. So that led me here and I was hired in March. I started March 7th of 1997 -- '77, excuse me, here with the Little Blue NRD and my title was operations supervisor at the time. I worked with Dave Mazour (phonetic), the manager, and Ted Sobata (phonetic) was the assistant, and Nelda Sander (phonetic) was our secretary, and that was all we had here for staff at the time. And my duties primarily were the tree planting, wildlife programs, conservation cost share, which they just started the soil and water conservation program in the Game and Parks wildlife habitat improvement programs. Those were a couple of my main duties.

MR. STARR: Sounds like you were obviously directed to NRDs but what wetted your interest in working for an NRD?

MR. ONNEN: Well, you know, I guess, I grew up on a farm near Gilead, in between Hebron and Fairbury. My dad was a conservation farmer from the word go. I remember him getting the conservation award back in 1965 for a farm photo award back then and remember the photo hanging on the wall at home. It just always impressed me because it was an area of some rolling terrain that had a lot of water-ways and terraces and small ponds on it, and tree plantings as wind breaks and everything, just really impressed me. Plus, I

had a 4-H project when I was a kid that I got involved in wildlife management and things like that, and I got a real interest in just conservation in general through our 4-H program and through what Dad had taught me. I guess I always thought I probably would work for Game and Parks Commission, that's why I went through the University with a wildlife option, but seemed like a lot of my class members had their foot in the door with some of the jobs that were available for summer work there and I ended up coming back to Hebron to work in the Soil Conservation Office there as a watershed inspector building flood control dams down in the Hubbell, Nebraska area, and that kind of got me started, I guess, with the soil conservation and the conservation end of it here.

MR. STARR: So when you got here, was it about what you expected or was it entirely different than what you were --

MR. ONNEN: Well, it was pretty much what I expected but the Little Blue had some really interesting things going on in the late '70s. That was at the time that the Cather (phonetic) land project was on the table and Dave Mazour was intricately involved in trying to get a water right to construct the Cather land project. And about that same time they had just -- the State had modeled the groundwater in this part of the State, the Big Blue and

Little Blue Basin. They did a model for us and made some projections that our area was going to be -- a lot of those areas would be dryland by 2050 based on the trend lines that were occurring in water tables. So in the late '70s, the Little Blue NRD went to work and had developed some rules for regulating groundwater through our groundwater control area. They established a control area in 1979 with a plan to be in groundwater allocation by 1982, a pretty aggressive plan. So when I got here, those were the things that were taking up the time at the board meetings. And I remember sitting in the room right next to us here, and board meetings would last til 12:30, one o'clock in the morning quite often. And at those times, we didn't have any regulations about smoking at the board meetings and we had a lot of smokers on the board and there was oftentimes that the smoke was so heavy in there with those guys puffing them, their cigarettes, you couldn't hardly see from one end of the room to the other. But they had a lot of business they were conducting back then and those were some of the things -- the early things I remember from our board meetings.

MR. STARR: So what were the arguments for and against the -- moving ahead with some groundwater controls or regulations for controls?

MR. ONNEN: Well, I think, at that time, most of

the concern was, it was moving so fast. And, of course, people, they always question the models, “How can that be that we could be dry?” It just seemed like there was so much water here. So when we started metering wells, there was opposition to metering. I think a lot of the same arguments we hear today, they're always afraid that the State will tax them. If it's something that can be taxed, it would be taxed, and they felt like they were already being taxed on their irrigated ground, but those were some of the arguments we heard. Otherwise, I think it was just that people felt like even though the state law said that the water was the public's, I think a lot of people felt like, “I bought the land, it's my land -- my water underneath the land,” and so they really didn't think the NRD should be regulating on that basis. Those were probably two of the most common arguments we heard.

Of course, we got into the time, 1982, when we intended to go to allocation and we just -- we were having trouble getting everything metered in time and in 1980, '81, and '82 we had some wetter years and it kind of looked like maybe things were not -- the trend line changed a little bit so they backed off and said, “Well, let's wait until 1985.” And, at that time, when that came, the trend line looked better yet and so people suggested, “Well, the models were wrong. There's no reason we should be regulated and let's

back away from this."

MR. STARR: So did this NRD require meters at that time or was is just a voluntary --

MR. ONNEN: We did. We never did get all of the meters fully in place. I think we had about 4500 wells at the time and probably got close to 3500 of them metered so we were getting close. Today we still have close to 16-, 1700 of those meters still in the field and those people are still reporting in the voluntary program, so we've got about 110,000, 112,000 acres annually that are still reporting their water consumption to us. And we're starting to meter again. We're requiring meters on some of the newer wells that are put in and offering cost share so we're getting -- we probably have close to 2500, maybe 3000 wells out there that are metered again. I'm sure there's still meters in the (indiscernible) sheds and the quonsets them guys took off after the mid-80s and said, "Well, we'll wait until we need them."

MR. STARR: Your district is certainly not the most heavily irrigated NRD in the state but, still, you're in the heart of a lot of irrigation.

MR. ONNEN: Yes.

MR. STARR: How have the attitudes about these issues changed over the years that you've been here since '77 until today, which is over 30 years? Has the attitude

changed a lot?

MR. ONNEN: I think amongst many of the people, it has. Early on there were still people that thought regulation was a good thing, don't get me wrong. There were people out there. They tended to be those that were a little bit more meek about their opinions, they were not willing to share them, where the people that were opposed tend to be the folks that are vocal and come out to fight the issues. And I think that's still prevalent today. We talked at our last board meeting about the need again to require flow meters and we had several folks here that said, “We fought this 30 years ago and we're going to fight it again because we don't think the issues have changed.” But I think the recognition with most of the people is that the state has changed. The value of water has changed. The need to conserve, especially in this day and age with technology, what it is. Most people say that, you know, even with an allocation, we think there's a way we can manage and should be able to manage. It's not like running water down the furrows that they did 30 years ago. So I don't think the fears are as great out there, but there's still that segment of the population that don't want it to be regulated. I think they still fear the tax on the meter.

MR. STARR: Sure. So when did you become the manager? When Dave Mazour left?

MR. ONNEN: Yeah, Dave left in March -- I think March 1st of 1985 and I was hired as manager just prior to that, so March of '85 is when I became manager.

MR. STARR: So what changed for you then?

MR. ONNEN: One of the first things was the Cather land project because there were a lot of issues there. There was a lot of difficulty. We had gotten the Osterman (phonetic) case overturned, of course, and we still had that battle with the environmental world about a water right for the project. And as I remember, one of the first couple meetings that I was manager, our board had changed significantly, too. I should mention that. We had a group of people that were opposed to the irrigation regulations that had formed a group, Little Blue Observers was their name. They still exist. They had raised money from voluntary donations to fight our regulations in the district and to use those monies to get their people elected to the board of directors so they had a say in this. And it was in 1985 that they probably got control of the board, so not only were they fighting the irrigation issues, but they also were pretty frugal with tax money and didn't want to pursue the Cather land project. So those first couple months, that was one of the issues. They backed away from that. They said they felt that they should just turn that back over to the Cather land reclamation district and let them fight

their own battle rather than the NRD doing it for them, so that transition was made, the transfer was made, but I think the State ultimately said, “We didn't have the authority to transfer the permit and pull back on projects,” so it didn't go any place. Those were -- that was probably one of the first issues that I faced that was really difficult because I knew there was opportunities there, but you could see with the board it was not going to go anywhere.

MR. STARR: I think you already answered, obviously, my first question. My next question was going to be what was the biggest challenge when you became manager --

MR. ONNEN: That was it.

MR. STARR: -- but that was it.

MR. ONNEN: We had just started the big Sandy Creek watershed project, too. That started in the early '80s. Dave Mazour led the efforts to get two of the largest dams in our district constructed, one on the (Indiscernible) Research Center and one over here by Bruning. They were done in 1982 for the (indiscernible) project in '84 for the Bruning dam. And then we kind of ran into this buzz saw about spending money again and so they -- the board shut off the additional projects at that time. We did a little bit of research on a site here by Edgar, which would have encompassed part of a gravel pit, putting water in there. And we had done some groundwater and surfacewater sampling

both to determine if there'd be any impacts. Surfacewater sampling showed there could be some atrazine and alachlor problems and so the board kind of shied away from that because we would have been putting water directly into the aquifer, into that gravel pit, so --

MR. STARR: Sure.

MR. ONNEN: -- that kind of -- that was one of the other major projects we had going that kind of fell by the wayside at that time.

MR. STARR: How has the board, as currently constituted, has there been a progression of their attitude in the adaption of technology over the years? Has that change occurred or not?

MR. ONNEN: To some degree. We've had some board members that have come on board, some actually that wanted -- that were opposed to groundwater regulations, for one. They got on the board and actually, I think, became pretty well educated on things, learned a little bit about the technology and were pretty good proponents for changing technology and improving irrigation practices. Of course, we didn't change attitudes of everybody that got on the board, but I think, overall, the board has become fairly progressive about looking at the technology and the technology that's available and trying to support those.

MR. STARR: You mentioned the Little Blue

Observers and their effort to get people on the board to control what happens. Did some of those people that came on the board with those type of positions as they served on the board, did their view change any or were they pretty stalwart opponents?

MR. ONNEN: Some changed and some probably did not. I know we had a few of them that were on for a short time and I think they learned that the district wasn't this big monster out there. We had some responsibilities (indiscernible) we really needed to meet. Some of those folks didn't stay on the board very long after they discovered that because they knew there was some battles there yet. We still have a couple members on the board that I think still fit that mold is the Little Blue Observers (indiscernible) as watchdogs, so to speak.

MR. STARR: That change of attitudes on the part of the directors that come on the board, statewide that's been a very common thing. When they get on the board, they say, “Ah ha, there's a lot here I didn't know and now that I know, I look at things a little differently.”

MR. ONNEN: I think that's the way with all of us though. It's easy to oppose things on the surface until you get in a little bit deeper.

MR. STARR: Sure. So you've had a lot of contests for board positions, people running against each other and

so forth?

MR. ONNEN: We did in those early years. Here, more recently, it's been almost difficult to find people to fill some of the slots. Just about every election now we've had almost one -- and a couple years we had two different slots to fill because we didn't have any filings for those positions. And there have been very few candidacies where we've had more than one name on the ballot the last few years. So I don't know if that's good or bad. I'd like to think that we have more people interested in that but I know people are busy and looking for another job isn't always one of their objectives.

MR. STARR: And there's getting to be a lot fewer farmers out there.

MR. ONNEN: Yeah.

MR. STARR: And generally we're talking about farmers on many of these boards. Well, you do have Hastings that provides some board members.

MR. ONNEN: Yeah.

MR. STARR: How did the process over the years of having to change your election districts to fit the criteria and the state law eventually to one-to-one and so forth? Was that a big thing for your board?

MR. ONNEN: See, state law only requires no more than three-to-one at this point. Initially, I guess, the

first process wasn't really too bad. We came out with a pretty good map and I think we ended up just slightly under three-to-one, it was like 2.92-to-one. Right now I think we're around 2.56-to-one. Right after the 2000 election we were around 2.16-to-one. So there's still a concern out here that if we went one-to-one, Hastings, with two-fifths of the population, you would have two-fifths of the directors --

MR. STARR: Sure.

MR. ONNEN: -- and I think that's -- maybe that's a good thing or maybe not. We've had some really good directors from the City of Hastings that have come with a pretty open mind. More of them have an ag background, too, or have just retired from the farm so it's not like they have just strictly an urban mentality. I think our distribution of the board has been pretty good. I always like to see a few more females on the board. We've had probably half-dozen over the years but they tend to stay on the board very long.

MR. STARR: Yeah. That's been a -- I don't know if you'd call it a problem, but that's been the situation statewide, it's not nothing unique to your district. But one of the things that has happened in some of the districts with much bigger urban populations like Lincoln and Omaha, is that the urban people have been stronger supporters of

things like cost sharing on conservation practices and things of that nature than some of the rural folks, which has been kind of -- you wouldn't think it would happen, but it did. It has happened.

MR. ONNEN: I think they take their position seriously and they understand the 12 responsibilities of the NRDs and they see their objective as a director of trying to fulfill those obligations.

MR. STARR: There's been, at least in some districts and maybe in yours, too, that they saw the responsibilities as the more narrower focus that SWCDs had, not the 12 you're talking about, all of the recreation, wildlife, water quality, et cetera, that SWCDs didn't worry about because it wasn't their job.

MR. ONNEN: Yeah. One other project I should mention, maybe, that was one of the early projects we were involved in that I think even today is just an outstanding project for our district because we talk about most of the district having pretty decent groundwater, but there's that part down in the southeast that does not, and our first rural water system was developed and kicked off in 1976. We expanded that in '78 and again in '79 with a small addition. And I took over the water projects in probably 1980, that's when I was moved from the operations supervisor to assistant manager around 1980 and took over that project. But since

that time, we've added another rural water project that actually extends down into Kansas. We've got about 70 customers down there so we're serving close to 400 rural connections now. It's just been a boom for that area because I know a lot of folks -- well, my folks were on that project. I grew up in an area that didn't have water. We could see some center pivots out our kitchen window a couple miles away, but we were on the edge of that aquifer and we couldn't take a shower and water the cattle at the same time. So it's been a really good project, a very positive thing for our district constituents in that area.

MR. STARR: So did both of your projects get water from Fairbury or do they --

MR. ONNEN: Yes, we buy all of the water from the City of Fairbury.

MR. STARR: And that's working well for you?

MR. ONNEN: For the most part. We are, right now, not taking any more sign-ups on the project because Fairbury is kind of bumping their capacity. Last year was a big test. 2012 was the first time that we couldn't actually fill our water towers because we couldn't get enough water fast enough to serve people. We had to impose some water sanctions or conservation measures and that helped, but it kind of scared the City a little bit because of their capacity. We're using about -- they've got 1200

gallon-a-minute capacity and we're using about 200 gallon-a-minute right now. We had gone to them last winter and asked if there was a chance of bumping that to 300 gallon-a-minute and they said, “No, we can't do that” because of their peak demand. So we're kind of hoping maybe they'll expand their well system, either that or we may end up having to look for well sites on our own.

MR. STARR: Some of the rural water projects have had a little bit of a problem with there being fewer farmsteads out there and people dropping off because of discontinued operations.

MR. ONNEN: We're seeing some of that, too. Ours has -- I don't remember -- I can't give you numbers of how many we've lost, but I think we've had about as many additions as we've had losses, primarily in that area south of Fairbury where it's just a really attractive area to live, out in the hills, but they don't have any water down there at all.

MR. STARR: Well, generally, south of the Little Blue River there's not a lot of groundwater, generally.

MR. ONNEN: Generally, the area around Ruskin, Deschler, and back toward Hebron, they've got a triangle down there that's got some pretty good water yet, and then we've got that area from Chester to Fairbury (indiscernible) aquifer that is irrigated.

MR. STARR: So you mentioned when you first started there were four employees. How has your staff expanded and why?

MR. ONNEN: Well, about the time we were looking at going into groundwater allocations and Dave Mazour was still here, he recognized we were going to need people on staff to manage that, so we hired an additional two technicians on board then, and I think the staff grew -- we probably had -- I'd have to think about the number, two, four, six -- there were probably nine employees at that time here in this office and we reduced that back to eight after the groundwater controls didn't actually take place, and we're back up to nine now with at least a temporary fellow. We may have -- he may -- he's employed on a grant so his grant runs out here in a year so -- but we're still talking now about metering again and so we probably will have to have that person if we go to the metering. So it's been fairly consistent. It grew quickly in the early '80s with groundwater control thoughts and the Big Sandy project underway and things like that.

MR. STARR: Where do you stand on your budget in terms of your mill levy? Are you up toward the limit or are you down?

MR. ONNEN: No, we're not. We've actually been fairly consistent between two and three cents. I think this

year we're around 2.9. We've been hanging right around the 2.9 -- and we went just a little over three here a couple years ago when Little Sandy was being constructed, but we've been hanging right around that middle section. Right now we've got a little over a $3,000,000 budget.

MR. STARR: So do you have any areas that you're considering, any types of allocations, moratoriums, or any of those types of vehicles?

MR. ONNEN: We have actually got a moratorium for wells and acres on that little paleovalley from Chester to Fairbury. It's an area that showed -- well, with all the groundwater monitoring we've done over the years, we've got normally about 300 to 320 wells we monitor spring and fall, and we've also got a system now, a dedicated monitoring network, of about 48 wells. But we were seeing some pretty consistent declines in that area and recognizing it was a small aquifer, we put that moratorium on in 2005. The rest of the district -- as I mentioned earlier, we had the control area. In 1992, we had hit a level that we were ready to go back into allocations and, again, the folks came out of the wood to fight the groundwater allocations and found a glitch in our monitoring network based on the rules we had in place at the time that (indiscernible) monitoring is invalid so we had to back up on that and ended up having a public hearing. Mike Jess (phonetic) said, “Well, it's

obvious that you guys aren't interested in using these rules anyway so you can just do away with your controller," and so the board did. And they had to start over, then, with our groundwater management plan in the mid-90s and develop a plan with some triggers, which, in my opinion, are far too lenient this time, especially -- you know, it's been almost 18 years since then. We really need to take another look at our triggers.

MR. STARR: What type of triggers do you have in place?

MR. ONNEN: Well, they're based on -- our groundwater plan initially was broken into -- the district was broken into sub areas, somewhat unhydrologic conditions, but somewhat trying to keep those areas similar in size so they weren't too big to manage. There wasn't a lot of science behind that bunch of sub areas. But, for example, the board decided, at that time, that they felt 10 percent of the aquifer was an acceptable decline and after that they would be willing to allocate. Well, if you look at Adams County, they still -- they had 150-foot average of aquifer, which meant that they could drop 15 feet before you'd be in an allocation program. Fillmore County was not quite that deep, probably 130 feet, so you're looking at an area that could have 13 foot of decline. And we know the maps we've seen for the last 35 years have shown the Big Blue and the

Little Blue being in one of those areas where we've had declines that have gone from 20 to almost 30 feet in a few isolated places. So looking at these kind of declines on top of those just, in my mind, seemed to be just really too much.

MR. STARR: What did 2012 do? Was there a big blip there or was it not much?

MR. ONNEN: We had probably -- our groundwater level, if you look district-wide, reached the same point that it was in 1992. We're not below that, I mean, we're essentially the same. But a lot of the wells that we monitored had taken -- they were lower than their 92 levels. The average looked about the same, but some of the wells were actually lower than they were in '92. So if you look at the graphs, we're really not a whole lot different, point from point, from 1982 to 2013 district-wide on the chart.

MR. STARR: A 30-year period.

MR. ONNEN: A 30-year period. So, you know, I guess from a farmer's perspective, they'd say, “See, we didn't really need those allocations.” But I think the political climate regarding water and the urgency of maintaining -- because we have continued to add acres. The efficiency has gotten better with the option of center pivots and some of the newer techniques, but we have added acres. And I think from the most recent statistics I put

together about a year ago, it looks like we have around 650,000 irrigated acres in the district. That's probably not as accurate as it should be, but a lot of folks aren't involved in the federal farm program and so they don't have things registered with the FSA office and we don't have certified acres in our district other than that area that's certified in unit 8 near Fairbury.

MR. STARR: So what is -- you mentioned the technology that has happened, center pivots being obviously the big one, but there's all kinds of other technologies that have allowed farmers to be more efficient by moisture blocks, drop nozzles --

MR. ONNEN: ET gauges.

MR. STARR: Yeah, precision application.

MR. ONNEN: Right.

MR. STARR: Has that been a big factor? Do people keep track and say, “Well, I only used 10 inches this year,” or, “I used 15,” or whatever? Is that -- and in particular, have farmers become more technologically savvy, older folks like me that retire, that don't adapt to technology quite as well? Has that been a big change for you?

MR. ONNEN: Well, I think it has. Most of the farmers now-a-days, at least the more progressive farmers, they've got GPS on their tractors and their combines. They've got everything that is -- a lot of fellows are

gritting their fields now for fertilizer applications, for chemical and pesticide applications, and they do that for even spot treatment of weeds and things. So I think there's a lot of that out there, which is a little bit puzzling why everything else that they use in the field they monitor to the “T” but they don't want to put a flow meter on the well. That's one of those things that always kind of puzzles me.

MR. STARR: Yeah.

MR. ONNEN: But I think they have adapted -- or adopted a lot of those practices, a lot of center pivots with drop nozzles. They've changed nozzles to be for low pressure systems. We've had two or three quarter-sections that have gone in the last year that are drip-taped and more people talking about that, especially when you think about -- I was just thinking this morning about Edgar. For example, they had two storms this year, tornadoes and -- from two different directions, and hail that had gone through, and a lot of center pivots were turned over. One time I heard one of the dealers said he had 85 pivots on the ground and then the next storm came through and there were more that were on the ground. So the drip-tape does seem like it would have a little protection and you wouldn't lose that possibility of irrigating during the year if you needed it.

MR. STARR: That's awful expensive.

MR. ONNEN: But it's more expensive.

MR. STARR: And it limits you somewhat, too, in terms of how you operate and so forth.

MR. ONNEN: We've done a lot to promote the ET gauges and the watermark sensors, and some people have used them very religiously, some have been pretty skeptical the first year or two. We've had a couple of cases where they didn't quite work as well as they should have, either they dried out or something and the guy was -- got false information and put too much faith in them and his yield was hurt. So those are all growing pains, I think, with technology.

MR. STARR: Sure.

MR. ONNEN: I continue to think there's a lot of these tools out there that look at the evapotranspiration of a plant and also even the -- some of the gauges now that can take chlorophyl samples to get you a sense for how the plant is responding to drought conditions. So I think a lot of that stuff is coming and, like I say, the more progressive farmers, I think they're right in the thick of that technology.

MR. STARR: What do you see as the biggest challenge for this NRD going forward in the next few years? What do you see as --

MR. ONNEN: Well, the groundwater issue will be

still a challenge, although I think there are more and more people on board with those kind of management techniques. It's getting more difficult to build structures and dams for flood control. We've recognized that primarily from the permitting standpoint, from the design standpoint, and for the cost of land. We just proposed a structure here north of Davenport last -- it was one in the Big Sandy master plan that, because it is in an area that was located right over one of the pockets of the deepest decline in our district, we felt like maybe now was the time to pursue that and take a look at it. Ran into a real buzzsaw with landowner opposition, especially since land prices have kind of gone through the roof and crop prices were high, people just were not willing to part with that land. And we even saw it in the Little Sandy project between the time we started and there were some delays for permits, delays from the cultural resources issue that came up. The cost rose significantly there in land cost primarily -- and also construction costs, but land prices especially because that's -- we were in that time when things were jumping. So those are things the board has to evaluate, I think, if we're going to move ahead with flood control projects like that. We are doing -- just kicked off a basin-wide -- and this will take in even that portion of the Tri-basin NRD. It'll be a basin-wide water quality and quality planning process.

MR. STARR: Groundwater quality?

MR. ONNEN: Yes, that we'll be looking at. The plan we have in place now for trying to manage our nitrates and our water quality issues and how that ties with our groundwater quantity concerns because two years ago we did a hydrogeologic investigation for the whole district. We road-mapped everything based on the newer information that's available, pulled all the data together and put together this hydrogeologic study, which has some great, great tools, and we're trying to get a handle now on how does that surfacewater and nitrates and things like that play into what we're trying to do, and then kind of create a road map for the future. So some of the questions we've got right now, we hope to answer through this management planning we're doing. We've used the study that was completed to start evaluating some of these new developments that are taking place in marginal parts of our district. We've got areas that there's not a problem poking a well down and getting water anywhere, but we've got folks now that are trying to tie multiple wells together just to farm some of these marginal tracts coming out. So we've used that study and some work done by the NRCS to develop a new irrigation suitability score for those soils, and so any soil that comes -- any application for a permit now that comes in, in those areas, where either marginal water exists or highly

(indiscernible) lands exist, we run them through a ranking and scoring process, and we've applied conditions to those permits if we've granted the permits. We have not denied any permits yet, but I think the board is getting to think there's probably a score where, if it falls below that score, we should be maybe thinking about denying those permits either from a soil loss perspective or from a groundwater management perspective. So those are issues we're talking about right now.

MR. STARR: Do you have many nitrate problems in your district?

MR. ONNEN: They're springing up all over. We've -- matter of fact, this summer we collected close to 2500 samples between what the NRD collected and the samples we asked the farmers to bring in for us from irrigation wells. We've got, right now, about 270,000, 280,000 acres of our district that we do have in special water quality areas where we require the farmers to do some special management activities, but our monitoring is showing us that probably three-fourths of the district ought to be in some of those areas because nitrates are rising. And the other concern that we just started thinking about is, we don't have that many really good water areas left in the district and we've still got communities that are having nitrate problems, saying, “Where can we go for water?” We're

beginning to think we probably ought to just throw the entire district into a monitoring -- into a management program, require operator training, some fertilizing management on the entire district with the hope of continuing to protect the areas that still have good quality water for our future needs. The one thing that I think reflects what's happening with the nitrates is if we look at the municipal well samples that they've taken for years because that's where we see the long-term trends. We were just looking at Hasting's water supply. We've been working extensively with wellhead protection in the city of Hastings because they've got, you know, our largest population center, but also one of our most critical areas of the district for water. And their nitrates have gone from -- when they first started monitoring around 1.1, 1.5, somewhere in that category before a lot of fertilizer applications. In the early '90s, they were averaging around four, and today they're pushing about 8.5 and they've had several wells go offline because of high nitrates. So they're actually looking at a project now to pump and treat some of the water and inject it upstream of Hastings in the line of their wells so, as it moves towards the wells, they're pulling some of the good water back out of the aquifer. So they're using the aquifer as a storage vessel, pumping some of the really high nitrates off from the top

layer of the aquifer to try to irrigate with it and use it that way. So some innovative things that they're trying to do and I think we've probably got six -- at least six cities or villages in our district right now that are struggling with nitrates at the maximum contaminate level.

MR. STARR: How about -- have you had any areas where domestic wells, that were not drilled very deep at the time they were put in, have gone dry or have reduced capacity because of nearby irrigation wells -- or apparently because of nearby wells? Has that been a problem for you?

MR. ONNEN: We've heard a few instances. I think there are some out there that they probably don't report it, they just get a well driller. We've had a couple well drillers who have said, though, that they've replaced some wells for people this summer in the Bladen and Blue Hill area, another area that's kind of a problem spot we've been watching. In 2012, we only had two farmers that reported loss of water from a well, but we know that some of the wells are, like you say, fairly shallow and so they kind of expected that's probably just what they needed to do. And now we require that any wells that are put in for domestic purposes (indiscernible) just consider taking them deep.

MR. STARR: Going back to the nitrate issue, is most or maybe all of it tied to fertilizer or do you have any evidence otherwise?

MR. ONNEN: We've done some isotope analysis for samples and most all are showing just agronomic fertilizer. We still have people in the Bruning area that believe that water -- and Bruning was one of the first sub areas we created because of high nitrates and they actually put a municipal well down near Belvidere in a good part of the aquifer because they were right at 10 parts per million, so they've been in one of the first management areas. But they've also said there was an awful lot of livestock that was produced in that area and so we're trying to get a little bit better sampling there and doing some of this isotope sampling to see --

MR. STARR: One big feedlot east of town.

MR. ONNEN: Yeah. Even Hastings, there was that concern because they've got the Juniata feed yards out in their wellhead protection area right smack in the center of that, but most all of the isotope sampling (indiscernible) has indicated it's agronomic, not livestock (indiscernible).

MR. STARR: Well, Mike, I've come to about the end of my questions. Is there anything else that you think of that I -- that we haven't thought of, that we ought to make a record of?

MR. ONNEN: Well, you know, when we're talking about staff changes in the office, one of the things we did in the late '80s was hire somebody for information

education. And I look back and I think, you know, those were -- we still do quite a bit of that type of work, working with farmers and things, maybe more one-on-one, but there's a component of the education in the NRD world for these kids to understand conservation and natural resources and the environment, and we've really got a good program set up for a lot of training for our youngsters to understand those things, I think. We just conducted our water jamboree here two weeks ago, or last week I guess it was, and had close to 600, 700 kid that came out to Liberty Cove to experience different stations of water environments, soils, tree planting, and things like that. I think that's all really important.

MR. STARR: When you -- back in 1985 when you took over the job as the manager 28 years ago, I guess, did you envision that the NRD would be where it is today, or that -- a lot of surprises or just a natural evolution?

MR. ONNEN: It's kind of a natural evolution. I guess I'm not surprised with where we are today, probably the thing that frightens me more than anything is this nitrogen -- nitrate problem and the other issue that Hastings is facing is uranium. We just talked to some folks from the University two weeks ago that believe there is some connection between nitrate pollution and uranium release in the sediments in this area. And if that's true, then we

could be facing another significant issue in the near future because the nitrate -- between the nitrate and pulling water out of the aquifer and oxygenate it before it -- percolates back, those two components, it seems like we're changing the soil chemistry. And one of the professors at the University believes that change in soil chemistry is releasing some of those otherwise bound-up uranium components in the soil.

MR. STARR: That's a new one on me. I didn't even know there was uranium.

MR. ONNEN: Yeah, they've got some really hot issues right north of Hastings that they're going to have to be dealing with real soon.

MR. STARR: Out of that lake?

MR. ONNEN: It's just north of Lake Hastings, yeah.

MR. STARR: That's interesting.

MR. ONNEN: But I think it is an evolution. Things continue to change. I guess I'm one of those people who loves to build projects. When I do things like the Little Sandy project, I love to see those projects come together. It's neat to be able to envision them and see what they might be for the area. But I guess my long-term projection is, it's going to be more difficult to get structures primarily because of land values and the politics in getting those built. We're going to have to focus more

on things like the no-till and conservation on the land, getting the water to fall -- to stay where it falls. And I think the NRCS (indiscernible) -- they've just recently come out with their emphasis on soil health. I've preached soil health for 30 years. I've often thought that if we did a better job of managing the residue, building organic matter, using cover crops, rotation of crops, we'd have better soil health and we'd be infiltrating a lot of this rain that we have yet to build both our soil and our aquifers. And I think that's kind of where the future needs to be, where we need to be moving toward.

MR. STARR: Well, I thank you very much, Mike. I appreciate you taking the time and I appreciate the information you've provided. Thank you very much.

MR. ONNEN: It's been enjoyable. Thank you, Gayle.

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