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COUNTY CLERK
REBECCA BUSTAMANTE
SANTA FE COUNTY NEW MEXICO

SANTA FE COUNTY

BOARD OF COUNTY COMMISSIONERS

SPECIAL MEETING

May 27, 2004

Michael Anaya, Vice Chairman
Paul Duran
Jack Sullivan
Harry Montoya
Paul Campos, Chairman [Absent]

SFC CLERK RECORDED 07/02/2004

SANTA FE BOARD OF COUNTY COMMISSIONERS

COMMISSION CHAMBER COUNTY ADMINISTRATION BUILDING

Special Meeting
May 27, 2004 – 12:00 p.m.

Notice of Special Meeting

Notice is hereby given that the Board of County Commission of Santa Fe County, Santa Fe, New Mexico, will hold a Special Meeting on Thursday, May 27, 2004, at 12:00 p.m. in the Commission Chambers at the County Administration Building, 102 Grant Avenue, Santa Fe, New Mexico.

I. Call to Order
II. Roll Call
III. Approval of Agenda
IV. Discussion of Aquifer Storage and Recharge and options derived from the Arizona Water / Wastewater Facility Tour.
V. Adjournment

The County of Santa Fe makes every practical effort to assure that it's meetings and programs are accessible to the physically challenged. Physically challenged individuals should contact Santa Fe County in advance to discuss any special needs (e.g., interpreters for the hearing impaired for the sight impaired).

SANTA FE COUNTY

SPECIAL MEETING

BOARD OF COUNTY COMMISSIONERS

May 27, 2004

This regular meeting of the Santa Fe Board of County Commissioners was called to order at approximately 12:20 p.m. by Vice Chairman Mike Anaya, in the Santa Fe County Commission Chambers, Santa Fe, New Mexico.

Following the Pledge of Allegiance, roll was called by County Clerk Rebecca Bustamante and indicated the presence of a quorum as follows:

Members Present:
Commissioner Mike Anaya, Vice Chair
Commissioner Jack Sullivan
Commissioner Paul Duran
Commissioner Harry Montoya

Members Absent:
Commissioner Paul Campos, Chairman

III. Approval of the Agenda

COMMISSIONER DURAN: Move for approval, Mr. Chair.
COMMISSIONER ANAYA: Is there a second?
COMMISSIONER MONTOYA: Second.

The motion to approve the agenda as published passed by unanimous [4-0] voice vote.

IV. Discussion of Aquifer Storage and Recharge and Options Derived from the Arizona Water/Wastewater Facility Tour

COMMISSIONER ANAYA: I'm going to turn it over to Commissioner Duran.
COMMISSIONER DURAN: Thank you, Mr. Chair, and thank you, Commissioners for taking time out today to come and talk and discuss this aquifer storage and

recharge technology that we've been trying to get a handle on for a number of years. Although a lot of staff ended up going with us, I think the two critical people here, actually the three critical people, are Dr. Wust, Diane, and Doug Sayre since the work with the Utility Department. I think in my mind, they're going to be the ones that are going to be advising us as to how this technology can be adapted and brought into our community to help us manage our communities water resource.

So basically what I asked is for everyone that went on that trip to meet today and to exchange their ideas, offer their insights into what they saw and just kind of have a roundtable discussion on how each one of us think we might be able to bring this technology into our community. So I guess with that, I'll start off first by saying that it seemed to me that the way that they use this aquifer storage recharge technology in the Scottsdale area of the Phoenix area is different than I think how we might be able to use it here, because they have water that comes in from the Colorado River and they actually extract most of their water from the aquifer.

So I'm not sure how it's going to work here exactly, but it seems to me that the only way that we can actually deal with the recharge and the aquifer injection element or aspect of this is by getting the City to participate with us at some level and create a facility like the one that we saw, the first one that we saw. If you recall, that cost something like $4 million and they decided to build a new facility rather than try and retrofit an old one. And weren't they injecting the aquifer at that facility?

DIANE QUARLES: Not at that one.

COMMISSIONER DURAN: Was it –

MS. QUARLES: The Water Campus.

COMMISSIONER DURAN: So honestly, all I know is that I truly believe that there has to be a way of bringing this technology to our community and I'm hopeful that the professionals and experts that we have available to us can guide us in that effort.

COMMISSIONER ANAYA: Thank you, Commissioner Duran. Any other Commissioners want to talk about what they saw or how they feel? Okay then we'll go ahead and go into the presentation, Diane and Steve. Are we having a slide show?

MS. QUARLES: Commissioner, if you'd like. I actually videotaped while we were there and we're going to run the video stream. What I'm going to do is give you an introduction into each clip and then we'll bring it up for a little bit. Some of it kind of rattles on and runs on but we want to give you a feel for what it all looks like.

The first piece you are going to see –

COMMISSIONER DURAN: This is the second facility that we saw, right?

MS. QUARLES: That's correct. That was the Water Campus. And I'm going to start from the very beginning of the trip. Where we are here, this was actually our first stop and this is the very leading edge technology wastewater treatment plant that Commissioner Duran was referring to as being a $4 million project. Just to give you a little overview of what you're going to see, they were actually very limited on the amount of land they had to build the plant, and because land costs are so high in the Scottsdale area – what you're getting ready to

see is we're going to walk through the building and the entire treatment system is actually underneath us. So the treatment system is actually built underground and the building sits on top of it. So there's very little smell, very little noise. You don't even really think you're at a treatment center. I'm going to run this clip because he's going to describe how the project came to be and how it was built.

COMMISSIONER DURAN: Now, Diane, at this facility, what they're doing is accepting sewage, right?

MS. QUARLES: That's correct. And then they are actually retailing the effluent then to what they call the reuse sites, mostly the golf courses. And one of the purposes for locating the plant where the did it, it's very strategically located close to the reuse places so that they don't have long distances that they have to pump it too. There were other issues too with the City of Goodyear. They sort of broke off and did this wastewater treatment plant separate from the larger project they were doing, but he gets into some of that when I play the stream.

[Video clip plays]

[Engineer Speaking on Tape]: They are in the middle of designing an expansion to that facility and came across the design-build-operate approach that provided for the facility and looked at kind of the cost economics of it and found out that maybe they could build a treatment plant closer to the reuse areas, capture all the sewage that they would have just pumped down to the city and lost resources and revenue from effluent sales, reclaim it here and pump it and reuse it here locally. So they entered into an agreement for a design-build which delivered this plant in approximately 18 months from the time we started design to the time it was operational. When it went on line about a year and a half ago, two years ago it was treating 800,000 gallons a day. I think the average flow now is up to right around 2 million, a little higher than that, 4 million gallons. It has an average capacity of 4 million gallons a day, a peak day's capacity of 8 million gallons a day and a peak hour capacity of about 11 mgd. It treats to Class A+ water quality standards which are similar in respect to California Title 22 unrestricted reuse requirements, which means that it has to have a BOD, a TSS and a total nitrogen requirement of less than 10 milligrams per liter on the effluent. The fecal coliform concentration has to be undetected in four of seven running samples, so in seven days you have to have four samples that come back with none detected, and not to exceed any one sample 25 fecal coliform. Those are the standards for A+ water.

COMMISSIONER DURAN: And you meet that?

[Engineer Speaking on Tape]: Yes, actually, the plant runs at about 2 or 3 mg. BOD runs just about less than 5. TSS runs down to one or two and total nitrogen between one and two mg/l. So we use a UV disinfection system that you'll see, filtration We have a hybrid sequencing batch reactor process here which I know from New Mexico, it's a very popular process, SBRs are. So this is a hybrid SBR in which is has an anoxic prereactor system for dedicated denitrification, as well as the sequencing batch reactors for our main process treatment. We are able to achieve substantially lower nitrogen levels that you would see in the standard SBR with this hybrid system in a smaller footprint.

[End of video.]

MS. QUARLES: I'm going to go ahead and skip ahead. He goes on for quite a while. You can tell he's an engineer and loves his work.

COMMISSIONER DURAN: Excuse me. So how can this kind of a facility be of a benefit to our community. I know that they use the water that they recycle here for their golf courses and we probably wouldn't be using - we might be using some for the city's golf courses, but in the event that the City doesn't participate with us, how would the County use or justify the expense of having a facility like this?

MS. QUARLES: I think that, and again, I would defer to Steve to give me his two cents, but from what I saw, what made this particular plant so interesting was one, it was done on a very short time frame. What would have been an $11 million project, because of the design-build, because they built the structure on top of it, they used very little land and it actually came in at $4 million. So this was an excellent example of how to get very high quality effluent that could be injected, and they had brought that up at some point. You could use this type of facility as a companion for effluent injection because it meets the water quality standards.

So this particular plant was really kind of a proto-type of the type of system that could be built here as a wastewater model.

COMMISSIONER DURAN: So the end product would be purified in such a form that it could be injected into the aquifer.

MS. QUARLES: That's correct. In fact, I'll have a stream here in a minute where it actually shows one of the engineers letting the water run through his hands and I'm getting a picture of the water. It's so clear that it looks like it's at drinking water level. He was even saying that at some point in the future probably meet water quality standards for full reuse back into the drinking water system.

STEPHEN WUST (County Hydrologist): If I may, Diane, Commissioners, there's a couple of significant things in this plant that could be applied here. One is that - and Commissioner Duran mentioned earlier about what happens if the City won't cooperate. Well, they ran into the same situation with the City of Goodyear, a question over upgrading an existing plant, and there were some issues, I think financial and political and just technological in trying to upgrade an old plant, and they went off and built their own. And they ended up with a better plant at a cheaper cost. So that's a feasibility that can be applied.

The other thing that I notice here is they actually use their treated effluent for a number of things, injection being only one of them. And I'll say right up front, I had a discussion with the Environment Department actually yesterday, someone I know there, and in essence, if we were going to inject anything it will have to be treated to drinking water standards. There's no other question about that. But their two plants here, they do injection, they recycle the water and they add it to some of their infiltration. And there are different treatment options for those things. So what I was looking at is this showed me there's a range of possibilities that you can do with that water.

Right now, if we look at areas in the county that are on septic tanks, that's just water that doesn't do anything, really, except let grass grow that the leach fields. So if there was a

regional wastewater treatment plant, we would have the option of doing several things with that water. For example, the City of Tucson, and I visited a subdivision in Tucson on a different trip, they actually, from their wastewater treatment plant, recycle the water to homes, like the La Pradera Subdivision has proposed to do here that they just obtained a permit. They have a set of piping to all the homes and all the outdoor water use for those homes runs through a separate meter. They pay for it, but at a different rate, and it's used for all outdoor water use, so no aquifer water is used for outdoor use. And that's for entire subdivisions.

The other thing, again, infiltration, which does help recharge the aquifer could be utilized. The treatment is less severe, mainly for biological things. But the disadvantage in this state is with injection, the way our state laws are, we don't get credit for the volume of water we put into the ground, unlike they do in Arizona. We get some percentage of that. So as an example, because I've been looking at areas where we could apply these things, sort of put it into perspective. If for example, we built a wastewater treatment facility like this downhill in the Galisteo Basin from Eldorado and Cañoncito and places like that, and pumped everything in, of course we'd have an infrastructure cost, but the effluent could go right down Galisteo Creek. The advantage of that is that's probably the number one way that the aquifer gets recharged down by Cerrillos and Madrid and places like that. So we would be creating a recharge potential for the Galisteo watershed and the aquifers therein without having to built and put the cost of treatment and things for an injection program.

There's a lot of water again, I don't know how many homes are out there now, 2500, that are on septic tanks and not of that water is being utilized for anything at the moment. Again, you could do a secondary piping system if you wanted to recycle it back to all those homes and take them all off outdoor water use from the fresh water and maintain your aquifer which we know has some problems there in the Eldorado area, just by cutting the use drastically.

So they state a lot of things there, but the big thing I think to remember is they use several different technologies to treat the water but they use them for several purposes also.

COMMISSIONER ANAYA: Thanks, Steve.

DOUG SAYRE (Acting Utilities Director): This could be injected? This is the one in Scottsdale, is that correct?

MS. QUARLES: We're on the edge of Goodyear and - actually I think we may be actually in the City of Goodyear here. We're on the edge of several jurisdictions but this is not the Scottsdale one.

DR. WUST: It all looks like one mass of urban development. I couldn't keep track.

MR. SAYRE: Are they injecting or are they providing to golf courses?

MS. QUARLES: This is not an injection system. This is - what was significant and I think Steve just went over it, what was really significant about this particular one, one that was funded by a private entity, in private partnership with the City of Goodyear, but it's an excellent model for a low-cost, very high-end wastewater treatment system that produces high-grade water quality effluent.

COMMISSIONER ANAYA: Commissioner Sullivan.

COMMISSIONER SULLIVAN: I just wanted to kind of clarify the question that Doug asked because they're not injecting 10-10-10 water into the aquifer, are they? He said this was a 10-10-10 plant. They couldn't inject that, could they?

MR. SAYRE: That's the question, because my understanding with the aquifer in the area is that you have three different levels. They allow some of this water to go into the aquifer, but do they allow any formal water use downstream from this plant? I don't think they do. They allow you to use it for irrigation purposes, take it out somewhere downstream because of the way the aquifer works.

COMMISSIONER SULLIVAN: I think we've got two levels of plants that we ultimately will be looking at, or two options. One is recycling water for surface use, like Steve is suggesting here where we can use it for gardens, we can use it for that type of thing, but a 10-10-10 plant which is 10 mg/l of nitrogen and TSS is what he said at the beginning, total suspended solids, that's a level on a good day, a lagoon can get that, one of the aerated lagoons in New Mexico can produce that level of effluent. On a good day. Not on a bad day. Not in the winter. But that will give you – that is not drinkable water. That's water you can use for irrigating alfalfa and grasses like that. As I think you mentioned, if you're going to the next step, which is injection then you've got to have – and when I was there a couple years ago I saw the plant – I saw this one too, the water park where they had the injection. And there, of course, you've got to get into your filters and your UV sterilization and all of those issues.

DR. WUST: That's correct, Commissioner, in fact we'll have some pictures of that second one. And I asked that specific question about the injection and the treatment options when we had a discussion near the end of the trip from their legal counsel who was talking about the differences in laws. And in essence they said, Well, they could. It means adding a treatment facility. So it would be, you would have to add another step, as you mentioned. But it could have been done at this plant. They would just have added a treatment option to bring it to drinking water standards, which will be required, again in my discussion with the Environment Department no matter where we inject it, even if there's separate water-bearing zones like they had there in Arizona, it wouldn't matter. The approach of the Environment Department here is if you're going to inject it, you're going to have it to drinking water standard.

But any surface water source for drinking water does most of that treatment anyway. It would probably be fairly similar to what the City does with their Santa Fe River water or the City of Las Vegas does with their watershed water. So the treatment ability is there. Probably the hardest thing would be the public perception end of things, that we're injecting wastewater into the aquifer and then we're going to have these people drink it, which is the very reason the City of Tucson does not recycle their water and treat it to drinking water standards and just send it back to people to drink, which they could do, actually, but they won't, because they can't get that public perception of things.

COMMISSIONER SULLIVAN: I think they're both good options to consider. I just want to be sure that we understand that you can't build a $4 million treatment plant and get injectable water, because you've got a lot more steps than this plant has. You've got the reverse

osmosis, you've got the UV sterilization, which adds plenty of cost to this plant.

DR. WUST: In fact I would add one interesting item that they don't inject at that second plant that you'll see, a bit. I'm not sure it's on the video. They do not inject all that water. And somebody had asked them, how do you decide? And they said, well, if we could sell it all to golf courses we would never have injection. They only inject it to try and find a way to get rid of it and get some credit for it. Otherwise it all would have gone off to the golf courses, but they can't sell that much.

CHAIRMAN CAMPOS: Gerald.

MR. GONZALEZ: I'm glad you mentioned the term golf courses because there is a significant block of potable water that comes in to the system that is being consumed for golf course use and that's the golf course up in Las Campanas. And if we were able to replace that water with sewage water, clean to the point where it can be used in their system, there's the potential of a trade for gaining additional potable water for the system in exchange for cleaned effluent. That's one possible use. There are also potential parks and so on up in that neighborhood that could create green spaces using recycled effluent.

The other thought that I had was that I just wanted to remind folks that even though Las Campanas and the City settled their portion of the dispute, Las Campanas still is not staying within the water budget that they agreed with the County that they would. So there is some potential for sitting across the table with them and trying to negotiate in exchange for their increasing the allotment or the budget of water that they agreed to but are exceeding presently, some agreement that they would, down the road, take effluent to replace the potable water and make that potable water available to the County.

COMMISSIONER MONTOYA: Mr. Chair.

COMMISSIONER ANAYA: Go ahead.

COMMISSIONER MONTOYA: Stephen, what are we looking at in terms of the additional I guess, filtering. Because they are doing some UV sterilization as I understood it in this plant, but I guess not to the extent. Is there another step of sterilization?

DR. WUST: I'm getting waved at by Diane. Is that on the DVD?

MS. QUARLES: I should have it all on the video, so what we might want to do at this point is actually walk through the plant on the video and I can tell you the different parts, including the UV clarifier.

COMMISSIONER MONTOYA: I guess my question is, how much more would it cost?

COMMISSIONER DURAN: Right. Could you find out and get back to us?

DR. WUST: Sure. It would also require probably some more filtration, like pressure sands or things like that. We can work up a cost.

COMMISSIONER MONTOYA: Okay.

MS. QUARLES: The other thing too is when we get to the water campus, the R.O. system, reverse osmosis is where they're bringing it up to a standard so that they can do the injection at the water campus and I may have that on film as well. And that was a very sophisticated system. In fact when we get to that point, he's holding one of the R.O. containers,

the key components of the plant when we get to the second one.

COMMISSIONER ANAYA: How long is your presentation?

MS. QUARLES: What I'm going to do is just skip, and I'll walk you through it so we'll get through it quickly.

COMMISSIONER DURAN: Mr. Chair, I just have one comment. Gerald, could you - not right now, but could you later on get back to us and give us an update on the process of acquiring control of Las Campanas wastewater system. I think we pay like a dollar for it, then we take it over. I'm not sure, but could you find out, then also let us know after you've met with staff the advantage of taking that over or the disadvantages of taking it over?

MR. GONZALEZ: Okay. Be glad to do that.

MR. SAYRE: I have a question. It's my understanding the agreement says that we get to take over Las Campanas water system. I don't know that it says wastewater system.

COMMISSIONER DURAN: Oh, it's the water system.

MR. SAYRE: If we could, could we look into that? Because I don't remember discussion about the wastewater system. It was all that their wastewater system would come on board and they would start using it to furnish effluent to the golf course. But because they didn't have enough effluent, that's why they contracted with the City of Santa Fe to supplement the amount. But we can look at that agreement.

COMMISSIONER DURAN: Yes, could you? Because I remember that we had the right to take over the wastewater system.

MR. SAYRE: We can get back to you.

COMMISSIONER DURAN: Yes, let me know.

MS. QUARLES: I'm just going to narrate as we go through this and I'll skip. The first room that we go into is the electrical back-up system. They actually have two completely independent electrical systems so that if they were to lose power in one of the systems the other one would be able to keep the system on line. So it's all charted and computed through a computer system to keep the electrical flow balanced. And I'm going to try to skip through this.

We've actually moved outside and we're actually standing on top. The primary treatment is below us. The chimneys that you see in the background is for the air quality discharge. You'll see them right there. There's a chimney. That's where the discharge of the odors are emitted and I would say that it's almost completely odorless and they're actually quite proud of it. This is what the campus looks like and you wouldn't know that you're standing in a wastewater treatment plant.

This is actually the primary treatment chambers. This is where they are actually separating the effluent from the solids. There are catch basins in the back. You can see them; they look like garbage cans. And again, everything, the churning system and everything is actually below us and again there's absolutely no odor whatsoever.

This is really the one opportunity we had to see what was below. This was after the solids had been separated out. In the primary treatment center they have some of the open chambers but none of the operating system itself is within the sealed chambers. They can get to

anything mechanical at any time they need to.

DR. WUST: I believe this is the one where the building was built over a number of the facilities.

MS. QUARLES: That's correct.

DR. WUST: That's how they kept the footprint very small.

MS. QUARLES: Everything is underneath us at that point and I think we're right before it goes into the clarifiers. I actually got a shot of it. This is after it's been treated, before it goes into the UV system for the tertiary treatment. We're going to see them testing the water here in a second. Here they actually have the chamber open. This is really the only opportunity to have to see what's actually going on underneath here. They do four tests a day of the water quality and they're actually taking a sample in front of us. We think they might have planned that. You can see how clear the water is even before it goes into the clarifiers.

COMMISSIONER ANAYA: It's going to get treated one more time?

MS. QUARLES: Yes, it will be treated one more time and we'll go back into that and see. This is the clarifiers right here. This is where they do the UV treatment. You can see filtered effluent right there. And there's a bucket, and I don't know if I got a picture of it, where he actually turns on the faucet and lets us actually view the water as it's coming out.

DR. WUST: A nice thing about those UV devices, which are getting used more and more in drinking water systems because of chlorine byproducts, they worry about disinfectant byproducts, these are all automated. The biggest thing with UV is they tend to gunk up. As it kills the little bugs they can create a film on the light and anything that the light can't hit doesn't die of course. But these have automatic cleaners in them so the maintenance is, in terms of personnel hours is fairly low on these because they're automated and they have a pretty good life time.

MS. QUARLES: They were also real proud of the fact that they don't have to use chemicals for treatment. It's all bioengineered. It's clarification and tertiary treatment so again that's part of the reason there's no smell, no odor. They do treat the air itself before it's released, but that would be the only chemical they use and again, instead of chlorine they're using the UV system.

DR. WUST: I believe they said that the air cleaner they're using now, they could have done even better on that. They could reduce their chemical use by quite a bit. But they got in just a little ahead of that technology.

MS. QUARLES: We were daring him at this point to drink it but he wouldn't go there.

Now we're moving to the next site. This is the water campus that we were referring to where they are doing an injection system. I actually made copies of a lot of the material that we have so included in that is the water campus. [Exhibits 1-3] It's a brochure that shows you how the system works. I'll go through this quickly. I don't have as much footage. You really don't know you're at a wastewater treatment plant. I guess that's why they call it a water campus.

COMMISSIONER SULLIVAN: This is the one that has the little barrel cactuses out front next to the pumps?

MS. QUARLES: Yes. And that's the effluent right there.

COMMISSIONER SULLIVAN: The pumps look like the cactuses. I'd hate to be the pump maintenance people with those cactuses around.

DR. WUST: One of the things that demonstrates, they talked to us about it, by building the campus like that, and they encourage people to come and learn about the wastewater system and what they're doing, so it really helps with this whole public perception thing. There's a sewage plant there. Folks can come. School kids can come. They use it for educational and they make it very nice, so it's a pleasant atmosphere. So there's a very good component of community relations that went along with this construction.

MS. QUARLES: We're actually moving into the lecture room here, the educational center. This particular gentleman was very interesting and very amusing. He and Commissioner Duran had some interesting exchanges. He actually runs the treatment plant. He was very familiar with the R.O. system. He's actually holding one of the R.O. canisters and the cross section of it. I'm going to play a little bit of the sound just so you can here what he has to say and this will be the end of the tape.

[Video resumes.]

DON HENDERSON: My name is Don Henderson. I'm an operator here at the water campus. This is the City of Scottsdale's wastewater treatment reclamation plant. This has a design flow 12 million gallons a day. We are going to expand pretty soon another 4 million gallons some time after the new year. It's a conventional activated sludge plant. Most of the wastewater that's treated is actually pumped from the south to a higher elevation, so it's pumped up to here. Is everybody familiar here with wastewater treatment here or no? Do I have to go through the process of it?

Are you primarily interested in the advanced water treatment part then? Do we want to go through the wastewater part? In the advanced wastewater treatment the micofiltration, we have the conventional activated sludge process. We run three, four million gallon trains on the facility. The water comes in our screening facility, goes into our primary sedimentation basins. We have three aeration basins, three secondary basins. We have six filters, each ready for two million gallons a day. We chlorinate.

Now here, we have two four million gallon reservoirs up here. I'm not sure of the size of this reservoir. This is raw canal water. We have a pump station in here in the middle of the tube, the idea being our effluent goes to – right now it's 16 or 17 golf courses. So in the summer we pump out our reservoir and actually they demand more than we can treat here so we have raw canal water that goes up to what we call Res. A, what you see up there. That augments our treatment capacity.

COMMISSIONER DURAN: Is the water that you treat here basically for outside use?

MR. HENDERSON: What do you mean by that?

COMMISSIONER DURAN: It's for golf course use?

MR. HENDERSON: It's for golf course use, then in the winter time when the golf courses aren't taking it we're injecting it into the ground.

COMMISSIONER DURAN: Into the ground. Okay.

MR. HENDERSON: So we use that during the summer, like I said, they take more than that. In the winter time they shut down their turn-outs and we're left with all that water. We have 26 injection wells on site, 26 or 27. They're located along Pima Road, just outside the perimeter of the fence of the building. I think there's three monitoring wells on site. Three monitoring wells on site and there's one directly south of here and then south of the city. I don't know where they're at.

During the winter, when the water is in the reservoir and the golf courses aren't demanding the water – when they are demanding it, that water just comes out of the conventional treatment of the reservoir to them.

[End of video]

MS. QUARLES: At that point I think I ran out of video. So that's really the end of what I filmed.

DR. WUST: Their injected water, they said they have not seem results of two miles away yet, down-gradient. That it hasn't had an effect on the aquifer at about that distance. In about five or seven years. Of course they're not injecting year 'round but it is a slow response. What they're doing is they've put in some monitor wells and they're looking for a change in the water table to look for a response in the injection.

MR. SAYRE: How deep are the injection wells? A hundred feet? Several hundred feet?

MS. QUARLES: It's about 180 feet I think. And there were actually some examples in here that were taken for the presentation. There were two types of injection systems. One we looked at and the other was referred to. This is the vadose zone and to give you a cross section. That was being used at the water campus which is a shallow injection system that allows water to filter down through the system both laterally and longitudinally. That's why it was taking seven years before the started to see the effect.

DR. WUST: Just so you know, the vadose zone is that area below the ground surface but above the water table. So it's unsaturated soil. So anything put in there, in essence it's kind of like putting it onto the ground and letting it infiltrate in. It's basically an infiltration type recharge because it's gone through an unsaturated zone. The other type of well would be where they're injecting along the water table and they're in the saturated zone. So they're injecting directing into the aquifer water.

MS. QUARLES: And the cost difference between them, these were about I think $150,000 to $250,000 was what he was saying and then when you got to the deep well injection systems that were much more sophisticated, they were actually closer to half a million.

COMMISSIONER DURAN: Mr. Chair.

COMMISSIONER ANAYA: Commissioner.

COMMISSIONER DURAN: Mr. Wust, so injecting water into the vadose zone, or wherever they inject into the vadose zone, would you see that there's some filtration that takes place as it moves its way into the aquifer?

DR. WUST: Yes, indeed. One of the biggest one, in essence it kind of acts like

the leach field of a septic tank system except this is how you remove nitrate and leach fields don't do that. The biggest thing is biological. It's moving through the vadose zone. Generally all the bugs end up dying, either do to the change of oxidizing reduction areas or through their interaction with the sand filter. So in essence it's a sand filter but one of the biggest differences is the biological component and that's one reason it doesn't have to be as sophisticated here.

COMMISSIONER DURAN: When you inject it into the vadose zone does it percolate horizontally, vertically, or is there some horizontal movement?

DR. WUST: It does both and it would demand on the way the porosity is and the permeability and whether it changes. It will go in what the most permeable direction is. And in the vadose zone generally that's both vertical and horizontal. It's pretty, what we call isotropic, the same in all directions. Unless it's like a shale or something and then it tends to be primarily horizontal because it can't go vertically.

The other thing I wanted to mention though, the reason they inject this in wells into the vadose zone, I said it is like just infiltration, but the difference is water that hits the surface of the ground, 80 to 90 percent of that water may never make it past the plant roots. It all gets taken up by plants. Or just straight evaporation. And so by putting it in these shallow – actually 180 feet is still pretty shallow. You get below that root zone, below that evaporation zone, so all that water gets to actually infiltrate.

COMMISSIONER DURAN: I have a couple more questions. At this last place that we just saw on the film, they indicated that in the winter time when there's not a demand for it they inject it. So are they injecting it for the purposes of storing it? Or are they injecting it for the purposes of recharge? And depending on what they're doing, what would we want to do here? Would we want to recharge or would there be some reason why we would want to store it?

MS. QUARLES: Commissioner, and you may remember as well, what I saw is there were really two primary purposes. One was they were storing it for the purpose of being able to take it out during peak demand months to be able to water the golf courses, reuse the effluent. So they were using it for storage. They were also using it as part of meeting the requirements under state law. What we would call return flow credit. They had another term for it. Depending on how you inject and what you inject, there was either a 50 percent exchange, you got 50 percent credit back for what you injected, or in some cases, you got 100 percent back. And I think some of that may have been whether you were doing deep well injection or the shallow well injection. So what I saw was they were using it for two purposes.

COMMISSIONER DURAN: So if they inject it for storage purposes, how quickly does that water travel? Does it stay there for months? Does it travel at a fast rate of speed?

DR. WUST: That would be very dependent upon the hydrology of the aquifer there and I don't know what it is there. Around northern New Mexico we have areas that range from water that moves hardly at all, and it sounded to me that the Phoenix area was that type because they kept saying the basin was, what? 250 miles wide or something and pretty flat. So the movement there is really, really slow. We're talking tens to hundreds of years for it to go

anywhere.

COMMISSIONER DURAN: So at some point in time you would be able to advise us as to whether or not injecting it here would be, for recharge purposes would be advantageous over injecting it for storage purposes. Because of the geology.

DR. WUST: Well, it's the geology, but also the way the our state looks at what you can take back compared to Arizona. As Diane mentioned, in Arizona, in essence if you do direct injection into the aquifer, you can get credit and you can take out 100 percent of the volume that you put in because they consider that, whatever volume of water you put in, even if it move then more water is taking its place so you should get credit for everything you put in.

In New Mexico the approach, and I'll say upfront that the State Engineer really hasn't made many decisions on aquifer storage and recovery yet so things could change. But the general approach in New Mexico is that you're supposed to be getting credit for the water you put in the ground, and if that goes in somewhere and it moves, even though other water has taken its place, you don't get that volume, you've sort of lost some of it. So rarely, if ever will the State Engineer, my understanding is will the State Engineer allow credit for 100 percent of the water you put into the ground. You'll get some lesser percent. That will change and that's where the advice on the hydrology and the geology comes in that if it's slow moving you'll get more, because it hasn't gone anywhere. If it's a high gradient area, and actually the Pojoaque Valley would be a higher gradient area, it's going to move quickly and you'll probably get less credit for it what you can recover.

And I'd like to clarify one thing on treatment. You had asked about treatment and infiltration wells versus the direct injection wells. Again, from my discussion, the way the Environment Department is viewing this, they're going to pretty much say, if you inject it through a well, we don't care if it's direct injection or infiltration in the vadose zone, we're going to probably require drinking water standards. They're not going to change the treatment standard that they're going to require. Unlike Arizona, it sounds like they do have slightly different treatment standards for their different wells.

COMMISSIONER ANAYA: Okay. So this meeting was clearly for information purposes only? Or do we want to direct staff to go do anything or come up with new ideas or what are we doing here?

COMMISSIONER DURAN: Mr. Chair, my thought was to keep the ball rolling on this. Just because last time we went it just kind of faded away. We never followed up on it and as time goes on it becomes evident that we need to keep moving towards that kind of technology. So I thought we'd just sit down, revisit the trip that we made and then, I'm going to be talking to Steve and everyone else to see what kind of progress they've made. I still have a bunch of questions. So as these questions come up or as you have questions, let's just keep on asking questions. And then at some point, maybe in a month or 45 days, 60 days, revisit the issue one more time. Just keep on kicking it around.

COMMISSIONER ANAYA: So I see in the long run that eventually we would be, or the City would probably be doing this, or we'd probably piggy-back on with them, or we would use it in the Eldorado area, possibly to assist them over there, a wastewater treatment

system, injection system, send it down the river, possibly doing it up in Harry's district. And maybe even in the Edgewood area. Is that what we're trying to get at eventually?

COMMISSIONER DURAN: Mr. Chair, I think what you're going to find almost sooner than anyone is Rancho Viejo coming forward with a request for you to consider allowing them to maybe be the test case for this kind of technology. Because they have everything in place and they have a pretty active community in a centralized wastewater system. I don't know for sure but I think that they would probably be the first ones to come forward. I was happy to hear that you'd even gone beyond that and thought about how the Eldorado area might benefit from it. How you might be able to put it into the Galisteo River at a certain level that would be acceptable to everyone and maybe get some return flow credits from that. I don't know. It's bigger than I can even imagine.

COMMISSIONER ANAYA: So let's say for example, if somebody wants to come in and put in a wastewater treatment system, are we going to require them to go the extra step to making sure some day that we will be doing this injection or reuse. I know we're reusing some, but are we going to start looking ahead just in case those people are coming forward and making sure that they're doing those steps?

DR. WUST: Mr. Chair, I would say that one of the things, again, I took away from this is we have that opportunity and it would change, depending on the area. So we don't have to view it as all one or the other but I think certainly, always viewing any wastewater system, ask the question, What do we do with the effluent and what's the best way to use the effluent? I would add to the examples given though that we are looking at, and Leonard Quintana is here, our operator from the Utilities Department, upgrading the Valle Vista system and possibly hooking into and upgrading from the state pen system. During that upgrade you could consider an injection well that would help La Cienega, for example and you don't have to build an entire new plant for that but as we upgrade we can ask those very questions.

So I would say all of those are correct and it would kind of depend on the area and the growth in that area and the hydrology of the area, what would be the best option. But certainly, I would recommend that we always look at that kind of thing at every single place now. I would also say that based on the La Pradera experience and Rancho Viejo experience, I would say the developers are going to be pushing that because that reduces their per-household water use so they can get more houses for the same allotment of water.

COMMISSIONER ANAYA: How are we in terms of that wastewater treatment at the pen? I know it's not ours but we're operating it. Are we going to take it over eventually, and if we do, can we implement this technology first as Santa Fe County?

MR. SAYRE: Maybe I can address that, Commissioner. Regarding the pen wastewater plant, we extended our contract for five years, so I think it's good until 2008. We have discussed with the state pen about extending it for a longer period of time, and I think we probably should approach that. The County Manager and I had discussions about entering into some discussions with the Corrections Department about not only use of the wastewater system, but also use of the water system out there so that we can conjunctively manage both of those systems to the benefit of the entire area.

In answer to the pen, yes, we could look at upgrading that and we've been considering taking over the Valle Vista wastewater over there to the pen and consolidating the wastewater treatment. The concern is about the return flow credits that we get from the State Engineer and we had to address that with the State Engineer's Office regarding the Valle Vista plant, because they get a considerable amount of return flow credit currently at the Valle Vista plant. We wanted to make sure that we didn't lose that by consolidating efforts. So hopefully, I've answered that question.

The second question I wanted to tell you, in doing these contracts that we've done in the past, specifically with State Lands, we've maintained that we have use of the wastewater from their system if we provided water to them. And so we still keep the jurisdiction on how we're going to use the wastewater regarding those specific areas. So we have a right to tell them if we're going to take it or if we're only going to use it in some fashion.

MS. QUARLES: I just want to concur Steve. My thoughts, after we saw this was probably the state pen wastewater treatment plant would be the first good prototype to try injection systems if it were upgraded and brought up to the type of standards. One thing I wanted to clarify about Arizona, at the very end we went through a sort of differences in law thing with an attorney, and clearly, back in the 80s they created these laws to capture Colorado River water, called CAP water, to bring it to Arizona, to bring it to Phoenix and to put it underground. It captures the water before it moves to California. So the whole system of aquifer storage and recharge were created under the premise of capturing CAP water and sticking it underground.

They have very sophisticated laws on how you can put the water in, how you can take it out. It doesn't have to be in the same place. And when we got to the New Mexico law what was clear is we're missing a kind of sophisticated legal system and implementation. You know exactly where you are at all points in Arizona. You know exactly what it's going to cost, what you put it in, how much you've got to model. So one thing we definitely need to push is some legislative reform in making it clear what kind of return flow we would get, where we'd put it. And I know that the Environmental Department and the State Engineer are working on that in the enabling legislation but we could definitely be a party in making those laws read the way we need them to read.

COMMISSIONER ANAYA: Commissioner Montoya.

COMMISSIONER MONTOYA: Mr. Chair, I think one of the other things that this Board needs to certainly discuss is how do we want to move forward. Certainly we need to amend some legislation or enact different legislation to allow us maybe to do some of these things. And then secondly and probably more importantly is what are we going to do in terms of how are we going to fund these projects. Are we going to look at private/public partnerships? Are we just going to float bonds and fund it completely that way? I think those are critical questions that we need to look at because the one thing that certainly impressed me was it probably was more of a private contribution than it was a public/private partnership that funded these facilities. And certainly –

COMMISSIONER ANAYA: Private?

COMMISSIONER MONTOYA: Yes. And we had the discussion the other day about developers and are they going to pick up the cost for infrastructure and the cost it's going to have in that particular area where they're developing. I think there's the same type of situation in terms of do we want to have these types of facilities in place so that people can tie into. There's a lot of questions we need to look at policy wise in terms of the direction that we're going to head in.. I just want to throw that on the table and see maybe what some of the thoughts are from some of the other Commissioners.

COMMISSIONER ANAYA: Today Lisa came into the office and told me that the governor I believe has $10 million. And maybe Gerald, maybe you want to go after that money in maybe a pilot project with the state at our facility down there and see if we could start looking at something that the County could be a leader in.

COMMISSIONER DURAN: What's the money for?

MR. SAYRE: You bring up a good point about this $10 million. We've had conversations with the Office of the State Engineer of late and specifically Jack Frost. And one of the projects that we'd like to look at right now is called the Yates well. The Yates well is in the middle of the Peters property but it goes down 4,000 feet. Preliminarily, we've looked at that and we see that there's different aquifer zone possibilities that could be looked at as far as production. And there's a very good aquifer zone down on 2300 feet to 3000 feet. The state would like to join forces with us where we go in and actually physical log this well, then produce out of it and look at the quality of the water and see what kind of quality there is in the deep zone. There is a possibility, if this water proceeds westward it could have an outlet in the Rio Grande and give us an idea that this well could be used as far as possible transfer in Rio Grande rights, if it's got a direct connection with the Rio Grande.

So that's one project that the state has approached us on about getting some state funding and then both the State Engineer and ourselves putting some money into this project. And I have a proposal from the State Engineer's Office to go forward on this one, because it is June 11th that we have to have the applications in. But this sounds like a very good getting out of a box situation to look at what's going on in Santa Fe County, both shallow and deep in a possible zone. And I wanted to bring that up with you. Would you want to consider this project as a possibility. Not that we couldn't consider some other ones.

COMMISSIONER ANAYA: So you're saying that we could possibly use this money, go after this money that they're talking about. Gerald, did you want to comment on that?

MR. GONZALEZ: Well, I think Lisa has the basic information but apparently the governor does have the $10 million that's available for collaborative projects involving water. I know we've also talked about the possibility of using it in connection with the New Mexico regional water system effort that's ongoing as well. But I think that we need to think creatively and put as many irons in the fire to get as much of that money as we can.

COMMISSIONER ANAYA: Commissioner Duran.

COMMISSIONER DURAN: Is that $10 million for Santa Fe County or for the state?

MR. GONZALEZ: Statewide and if I recall correctly, in includes wastewater projects as well as water. Is that correct?

LISA ROYBAL (Constituent Services): Basically, they're looking for several short-term pilot projects. Like say, 6 to 18 months. So they want quick turn-around time with deliverables that will advance New Mexico's efforts to conserve, acquire, recycle and distribute water sufficiently. The idea must be new and innovative and based on good science and economics. The scope can be $5k to multi-millions of dollars. Project must be at testing or deployment stage. No pure R & D. Projects to be evaluated by a technical advisory group, and projects must dovetail with the state water plan. And avenues to streamline and acquire matching funds will factor in the award process. [Exhibit 4]

So they have this technical advisory group that will be evaluating all the letters of interest submitted. Then that deadline is June 11 at 5 p.m.

COMMISSIONER SULLIVAN: Is that wastewater, Lisa, or just water?

MS. ROYBAL: Water and wastewater.

COMMISSIONER SULLIVAN: Here is says water. Does it say wastewater somewhere?

MS. ROYBAL: In speaking with other individuals they are talking about wastewater.

COMMISSIONER DURAN: Mr. Chair, we don't have a lot of time. So how are we going to decide which projects we want to go after? And when do we want to do that?

COMMISSIONER ANAYA: Whether we want to go search for water or do wastewater?

COMMISSIONER DURAN: Well, either one. Maybe we should submit three or four and then let whichever one rises to the top of the pile.

DR. WUST: Mr. Chair, if I could, on that point, the June 11th deadline, all you need is like a two-page summary of the project and then they vet them. If you get through the first filter they ask for a more detailed thing. So I think the idea of putting in multiple projects is worth the time and effort.

COMMISSIONER ANAYA: So if we did that one and we did the well, the 2500 feet to 3000. Are we looking at the water to see where it is, where it goes, what are we doing there?

MR. SAYRE: Mr. Chair, we'd be looking at one, testing it to see what the capabilities are of the aquifer. We would be geophysically evaluating by logging it, the aquifer, then we would be doing quality water sampling from various areas.

COMMISSIONER ANAYA: So are we asking for a test well, to test?

MR. SAYRE: The well is already there. The well is there. We just need to go back in the hole, drill it out and go down and do various I guess evaluation tests on this existing well to give us information about the aquifer.

COMMISSIONER ANAYA: So is that what we're going to ask the money for, to do that?

MR. SAYRE: It's pretty sophisticated. We're probably talking about

somewhere around $400,000.

COMMISSIONER ANAYA: So can you get a two-page thing for that and a two-page thing for that? And was there any other thing you wanted to look at.

COMMISSIONER DURAN: Just two pages of our requests. What I'm thinking of is there something you could put together that would allow us to submit the Hagerman well to see if the water is pure enough that you can directly tie it in to the – it doesn't need much filtration. So I'm wondering if there's some way – if we could think about how that Hagerman well might play into this, with the idea that the water coming from that would go to the community of La Cienega rather than have it go to areas outside of that community. Because in the past, every time we've talked about the Hagerman well, the La Cienega people have come up in arms because they feel that it might impair their aquifer. And if we could use this water that comes out of that to actually provide them with potable water that might help us address the impairment issues that are going to come up when and if we ever talk about how we might be able to use that well.

MR. SAYRE: Commissioner, my understanding is that we don't even have to provide them potable water. They just want water provided to a ditch that they could utilize in their ditch system. Perhaps we could look at just pumping that well and diverting some water to them of x-amount. But I think the City's also considering providing effluent to them. And we might want to have a discussion with the City. Because the state is going to come down and say you have offsetting requirements in the La Cienega area due to the Buckman well pumpage. And there was a meeting held about a month ago down in La Cienega to discuss this with those people about what's going to be the requirement. I think we probably, I think we can address this situation if we want to. I suggest we contact the State Engineer's Office to see where they are and probably the City to see what they're proposing possibly to do. Because that was going to be a requirement basically on the City as far as use of the Buckman wells.

COMMISSIONER ANAYA: Any other comments.

COMMISSIONER DURAN: We've got a lot to do. We've got to get it done in the next seven months.

COMMISSIONER ANAYA: Okay. Gerald.

MR. GONZALEZ: Mr. Chair, if it's okay with the Commission, I will continue the internal staff discussions and if anything else emerges that may be worth submitting a proposal on. If there's no objection, I'd also like to do that, in addition to what we've discussed here if something else comes up.

COMMISSIONER ANAYA: A proposal for what?

MR. GONZALEZ: To tap the $10 million. And one thing that we haven't mentioned is the northern New Mexico regional, I'm assuming, Commissioner Montoya, that you want us to also put in a proposal for that.

COMMISSIONER MONTOYA: If they could be considered somewhere in there, certainly. Absolutely. Because I think that's at least a cohesing group.

COMMISSIONER DURAN: What about the Raney collector?

COMMISSIONER MONTOYA: As things started coming up that one came to

mind as well.

COMMISSIONER ANAYA: What's that?

COMMISSIONER MONTOYA: The Raney collector wells.

COMMISSIONER DURAN: The collector out there at San Ildefonso that the City and County fund. We got the money from – I don't know where we got the money but we got the money from somewhere. And San Ildefonso agreed to throw the land in, right? As a pilot project for this infiltration system. And so what's happened in the last three or four years, San Ildefonso has taken the position that they would like to buy the City and the County out of that and do it on their own so that they can be a bulk provider of water to our community. But I don't know. If they don't have any money maybe we could work with them on enhancing that system or doing something where from a regional point of view the water from that pilot project could be used in some capacity for the benefit of Santa Fe County. But the Pueblo is a little tough to deal with on those issues.

MR. SAYRE: We've been approached by Ed Gonzales to talk about utilization of that. Ed Gonzales is an engineer that basically works for San Ildefonso. My understanding is San Ildefonso was looking at could it possibly utilized for this entity, San Ildefonso, the City and the County. But because of the Aamodt they've kind of drawn back to see what was going to happen on that Aamodt case because that's supposed to be the utilization, that type of system is supposed to be the utilization for water supply for the entire Pojoaque Valley.

COMMISSIONER DURAN: Well, we're there for another 30 years in that lawsuit.

MR. SAYRE: Right. Well, I hope not. Not according to the judge today. The judge indicated that everybody needs to get together and come to some agreement or else the court is going to make a settlement agreement that probably nobody will like. And they have until March 2005 to get things done. I think it's March 31st. Is that right, Gerald? Gerald was there and we can probably say – maybe John would like to add comments to this because he was the County representative at the meeting.

JOHN UTTON: Actually, it was a lot tamer and civil in there than one might expect, although Commissioner Montoya was out on the sidewalk with the picketers because the courtroom got too full. But I think there was a very clear message sent by all the parties and by the judge that I think that the status quo is not going to continue and it's not necessarily the settlement that people should be worried about, it's the litigation. And Judge Vazquez made it clear that prior rights have the first access to the water and people should really try and get involved in the settlement process and see if they can come to an amicable resolution.

So there were two representatives appointed from the objectors to continue the negotiation process. So they'll start attending in June. If I could just offer one other observation on the aquifer storage issue, something we might keep in mind and that is the issue of storage, particularly as we go to a surface diversion system. When you go to a surface diversion you put yourself in the position of relying on the vagaries of the surface hydrograph. And the City of Santa Fe has storage in the Abiqui reservoir that I think they have under subcontract with the City of Albuquerque. They have storage in two reservoirs in the canyon. They have wellfields

in the basin.

So they have a lot of back up protection in terms of not just relying on what happens to be flowing by the diversion structure. And I think we need to think about that aspect too. One way would be to try and get storage in Abiqui and store some of our water there. Now, they're storing a lot of San Juan/Chama. Probably most of our water rights are going to end up being non-San Juan/Chama native rights and it may be more difficult to store those up in Abiqui or other reservoirs and of course we're not going to be able to store them in reservoirs up the canyon. So what that means is we're going to have to look to the groundwater. The New Mexico Act which is not as sophisticated as the Arizona. The Aquifer Storage and Recovery Act, the ASR has that recovery component so you can use the aquifer as your lake or your reservoir. So when we talk about conjunctive management and conjunctive use of the surface rights, one thing we should try and keep in mind is what we just as the County may want to do is when we have high flows or excess flows available to us coming down the Rio Grande, we might want to grab those at that diversion structure, put them in our bank account so that when those flows go down we would then have that bank account available to us.

So that's another component in addition to the treated effluent aspect that I think we should consider so that we could have a conjunctive management resource between the river and the Santa Fe aquifer.

COMMISSIONER ANAYA: Okay. Thank you. Thanks for the presentation. Commissioner, thanks for getting the meeting together.

ADJOURNMENT

Vice Chairman Anaya declared this meeting adjourned at approximately 1:30 p.m.

Approved by:

Board of County Commissioners
Mike Anaya, Vice Chairman

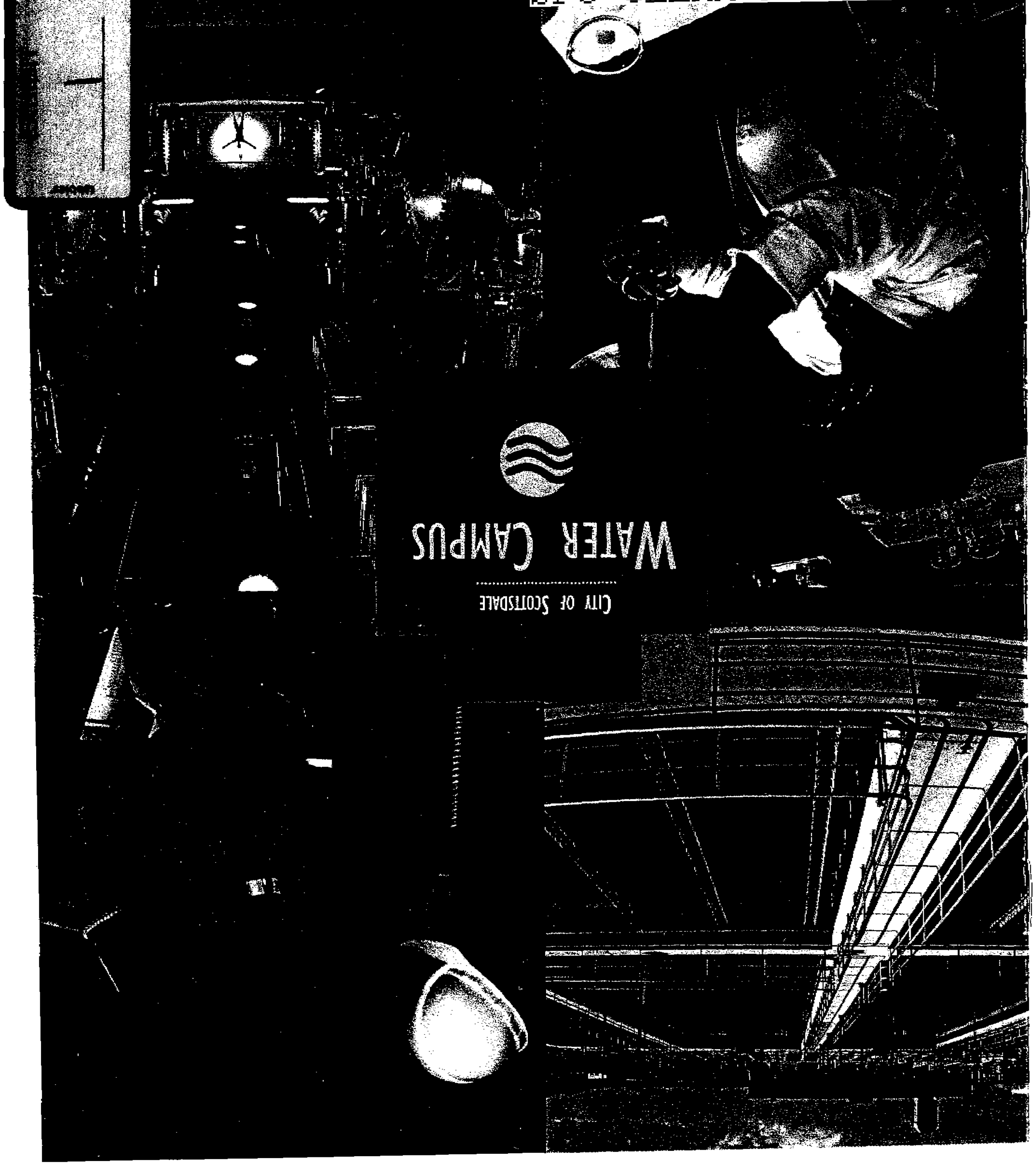
Respectfully submitted:

Karen Parrell, Commission Reporter

ATTEST TO:

REBECCA BUSTAMANTE
SANTA FE COUNTY CLERK

SFC CLERK RECORDED 07/02/2004

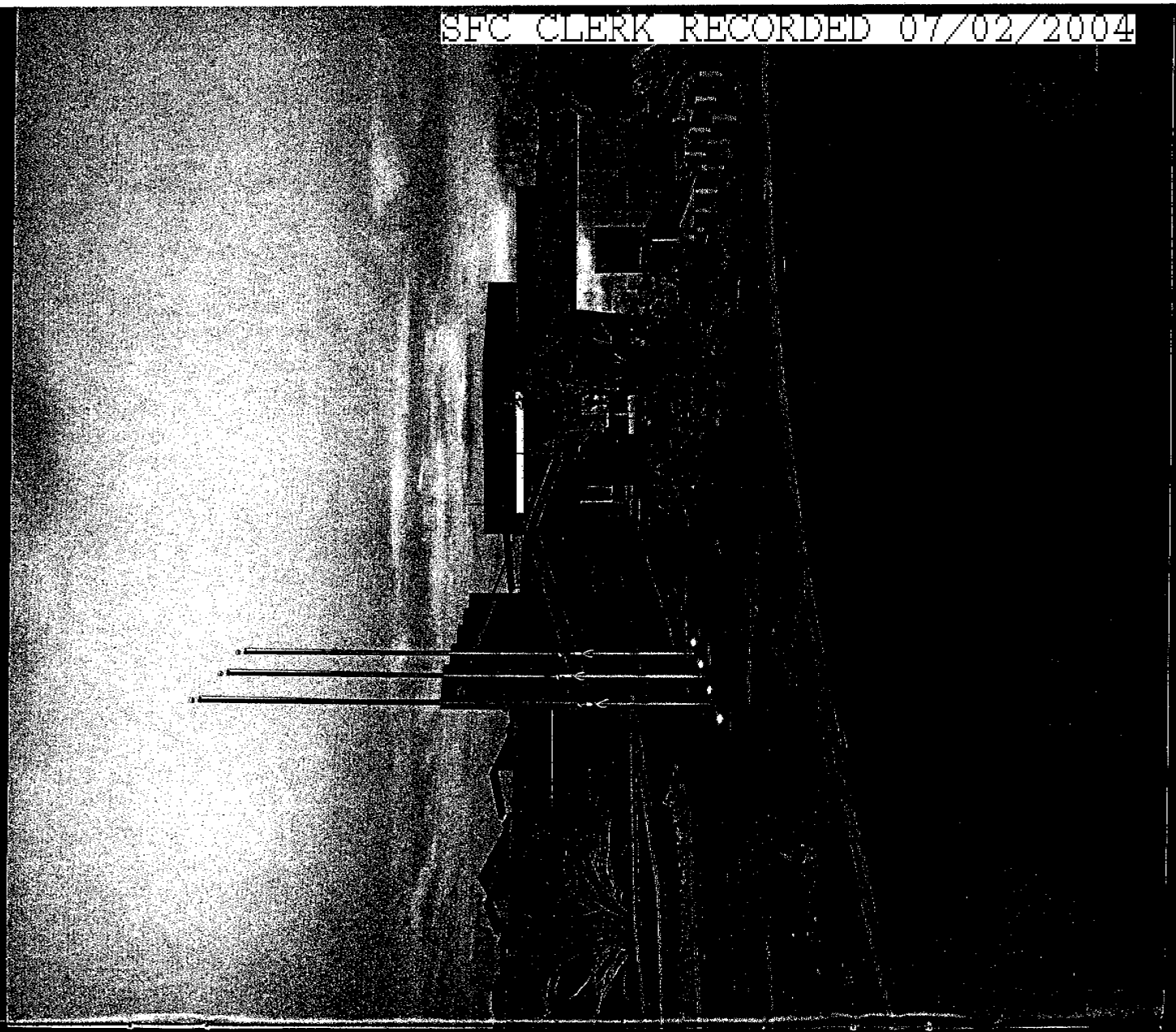


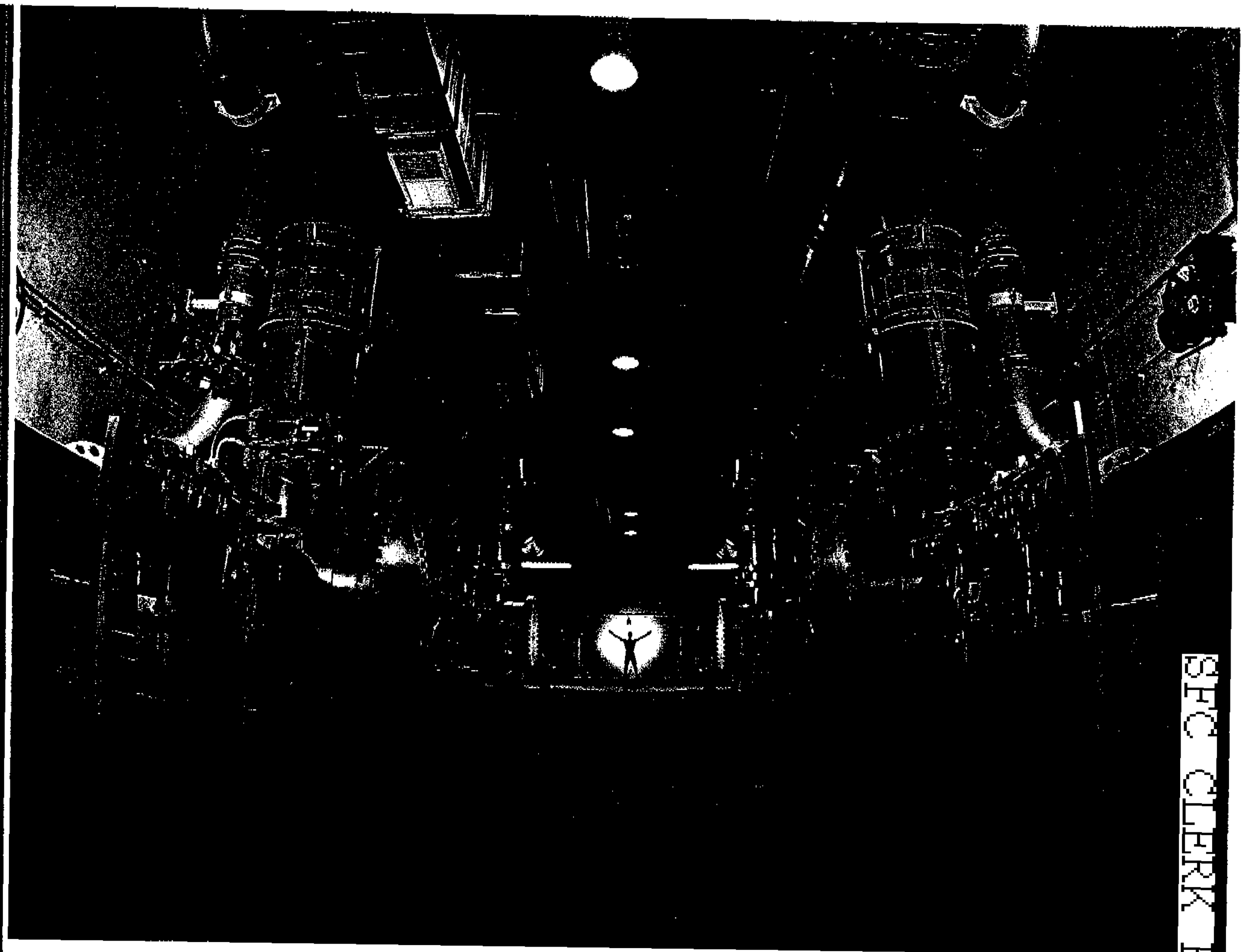
Overview

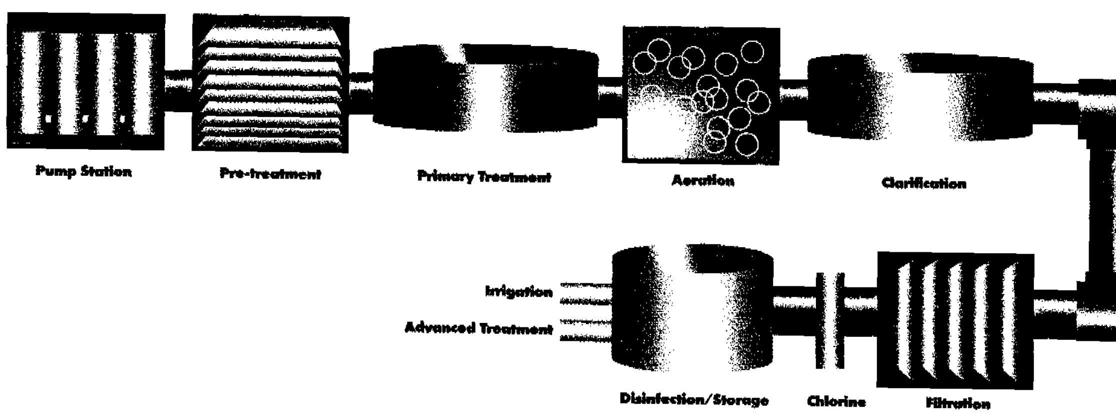
The Scottsdale Water Campus is a world class, state- of- the -art water treatment facility, which benefits Scottsdale citizens in numerous ways. Here, wastewater is reclaimed for use on parks, medians and golf courses. Excess reclaimed water receives advanced treatment and is used to recharge or replenish our ground water resources. Scottsdale's Central Arizona Project (CAP) water allotment is also treated on site to provide quality drinking water for our citizens. The Scottsdale water campus also houses a complete, state- of- the- art water quality laboratory, designed and equipped to perform a full range inorganic, organic, and microbiological analysis.

The reclamation plant capacity is 12 million gallons per day (MGD), and the advanced water treatment portion of the facility can process 10 MGD. Expansion of the water reclamation and advanced waste treatment facility will occur as the city approaches build out. The ultimate design capacity of the water reclamation plant will be 24 MGD and 22 MGD for the advanced water treatment facility. The CAP water treatment plant can treat and deliver 50 MGD.

Scottsdale's Water Campus Administratio Building







Filter building piping and controls

WATER RECLAMATION

Water reclamation defines a process in which raw wastewater is converted to a product suitable for use in irrigation, such as in parks or golf courses. It is a five-step process:

Step one Pre Treatment
Rocks, rags, paper and other large solid material are removed from the process flow.

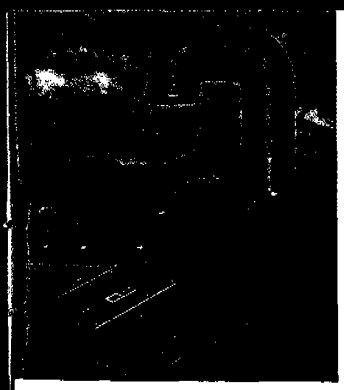
Step two Primary Treatment
Substances that readily settle or float are separated from the water being treated.

Step three Secondary Treatment
Secondary treatment consists of two steps; Activated Sludge Treatment, and secondary clarification. Activated Sludge defines a biological wastewater treatment process that speeds the decomposition of wastes by the addition of activated sludge and air, followed by agitation in large basins under precisely controlled conditions. Secondary clarification follows, allowing solids remaining from the activated sludge process to settle out, leaving a clear or clarified product.

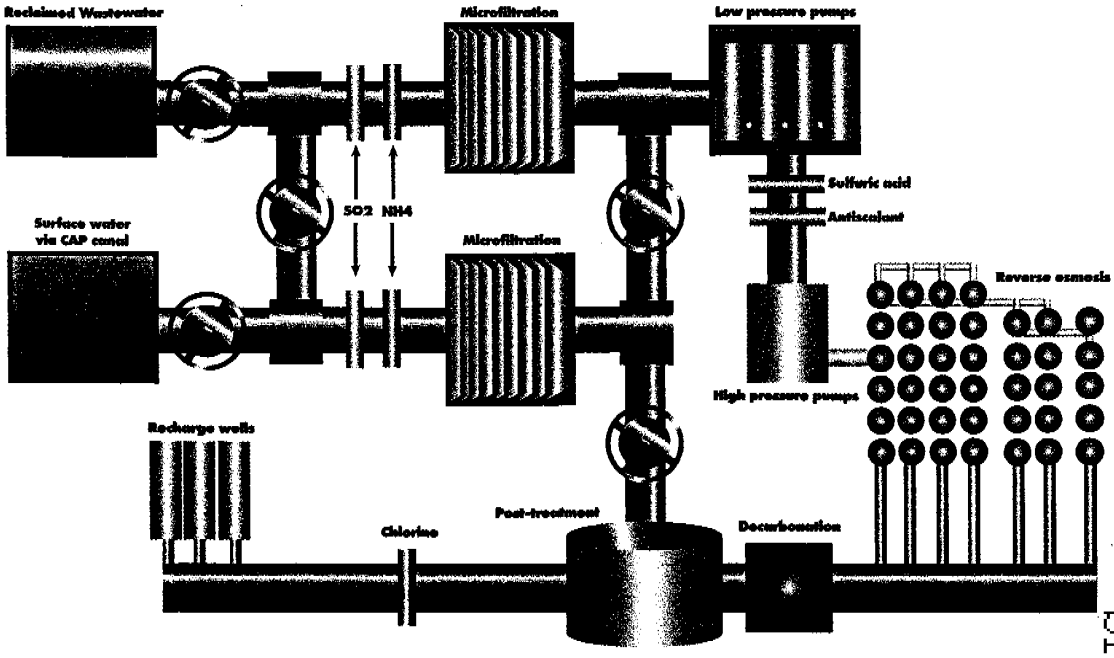
Step four Filtration
Clarified water is filtered through anthracite coal to remove very fine particulate matter that was not removed in the previous treatment processes.

Step five Disinfection
The final step is disinfection with chlorine. Any bacteria, viruses or other harmful microorganisms that remain after all previous treatment steps are rendered inactive by this process. At this point the treated water is distributed to the reclaimed water distribution system, or transferred to the advanced water treatment plant for further processing.

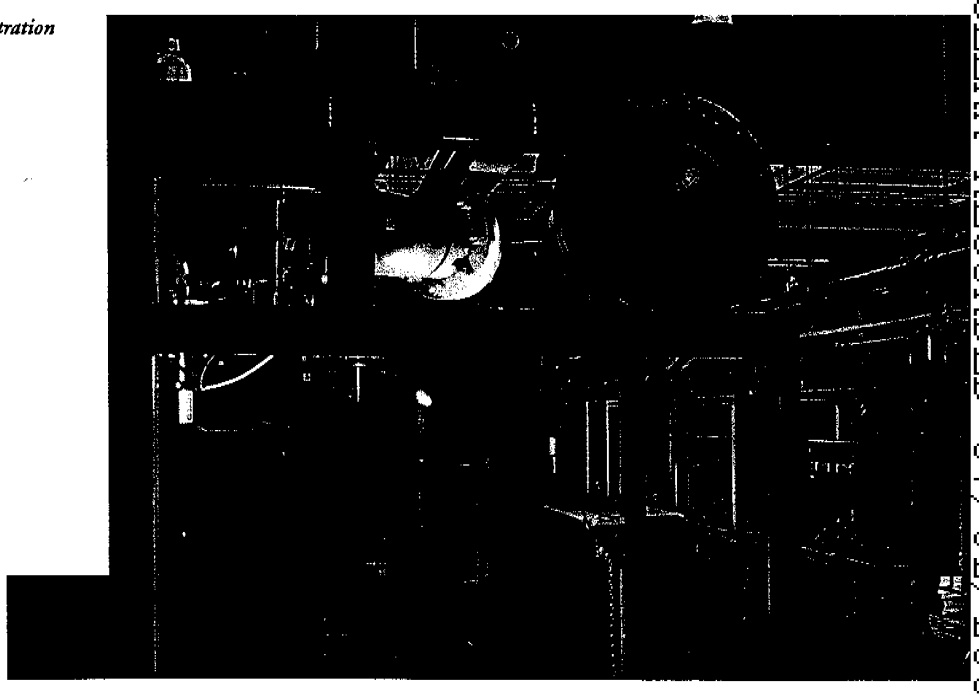
Control room computers



Secondary clairifiers covered for odor control



Microfiltration



ADVANCED WATER TREATMENT

Advanced wastewater treatment at the Water Camps is a two step process capable of treating filtered secondary effluent to a level that meets or is better than federal drinking water standards.

Step one Microfiltration

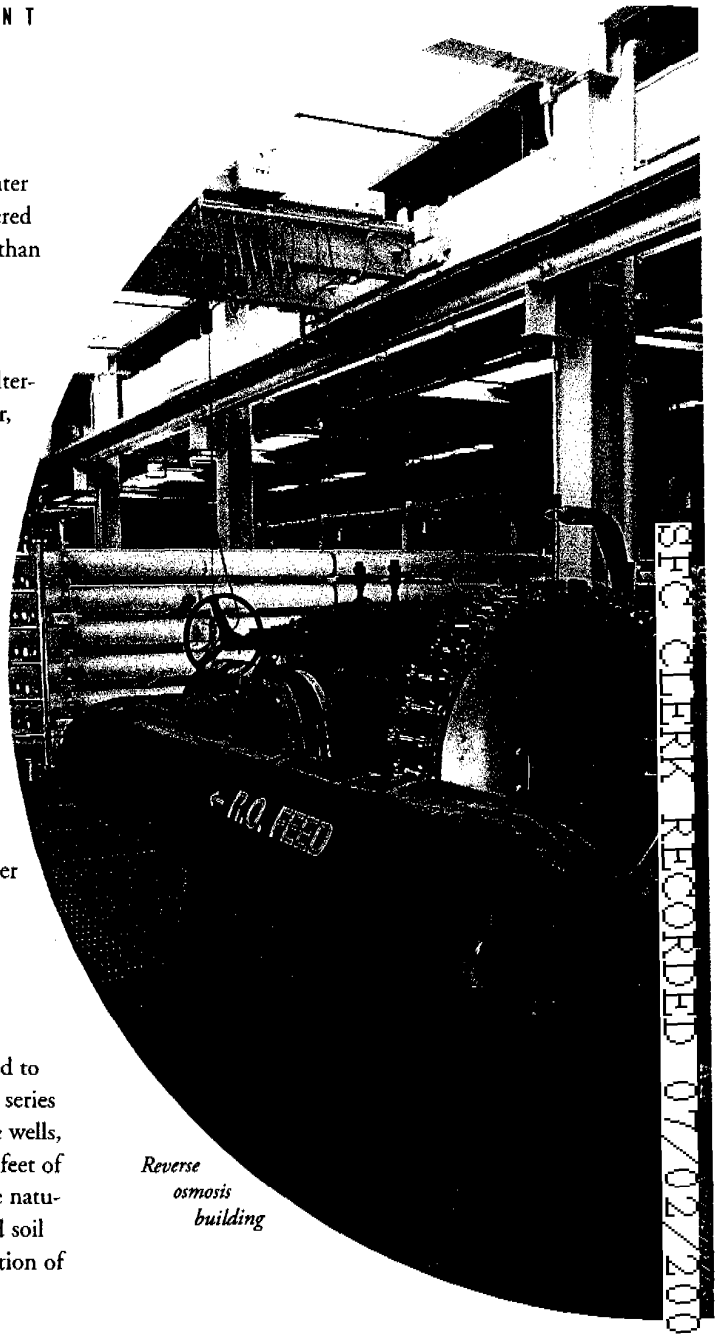
Microfiltration is a membrane process capable of filtering out particles as small as 0.2 microns in diameter, including viruses, protozoa and bacteria. The primary purpose of the microfiltration process is to provide pre-treatment to the reverse osmosis process that follows.

Step two Reverse Osmosis

Reverse osmosis (R.O.) is a membrane process which uses water pressure to reverse the normal osmotic flow of water through a membrane. The R.O. membranes at the Water Campus are capable of filtering out virtually all of the unwanted organic, inorganic and microbiological substances that remain after the micro filtration process. R.O. treated water from this process will meet or be better than all federal standards, and will be used to complete the final step in the treatment train, which is recharge.

Recharge

Water produced from the R. O. process will be used to recharge ground water supplies, by injection into a series of dry wells. R.O. water will be injected into these wells, and the water will flow through an additional 500 feet of soil, known as the vadose zone, before reaching the natural water table. The combination of membrane and soil treatment will ensure that there will be no degradation of the ground water.



Reverse osmosis building

CENTRAL ARIZONA PROJECT (CAP) WATER TREATMENT PLANT

The CAP Water Treatment Plant treats Colorado River water, supplied by the Central Arizona Project, to drinking water standards and distributes that water to Scottsdale citizens.

To begin the process of delivering drinking water to Scottsdale's citizens, water is first pumped approximately 2.5 miles from the CAP canal to the water treatment plant located on the Water Campus grounds. There, a six step process converts raw CAP water to drinking water.

Step one Pre Treatment
Chlorine is added and, depending on water conditions, powdered activated carbon and potassium permanganate are used to control manganese and taste and odor compounds.

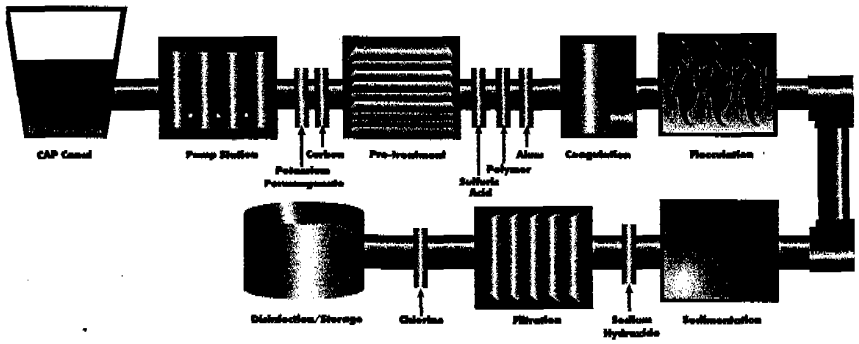
Step two Coagulation
A coagulant, Aluminum Sulfate, is added to the raw water to neutralize, or coagulate, small particles such as bacteria, algae and suspended materials.

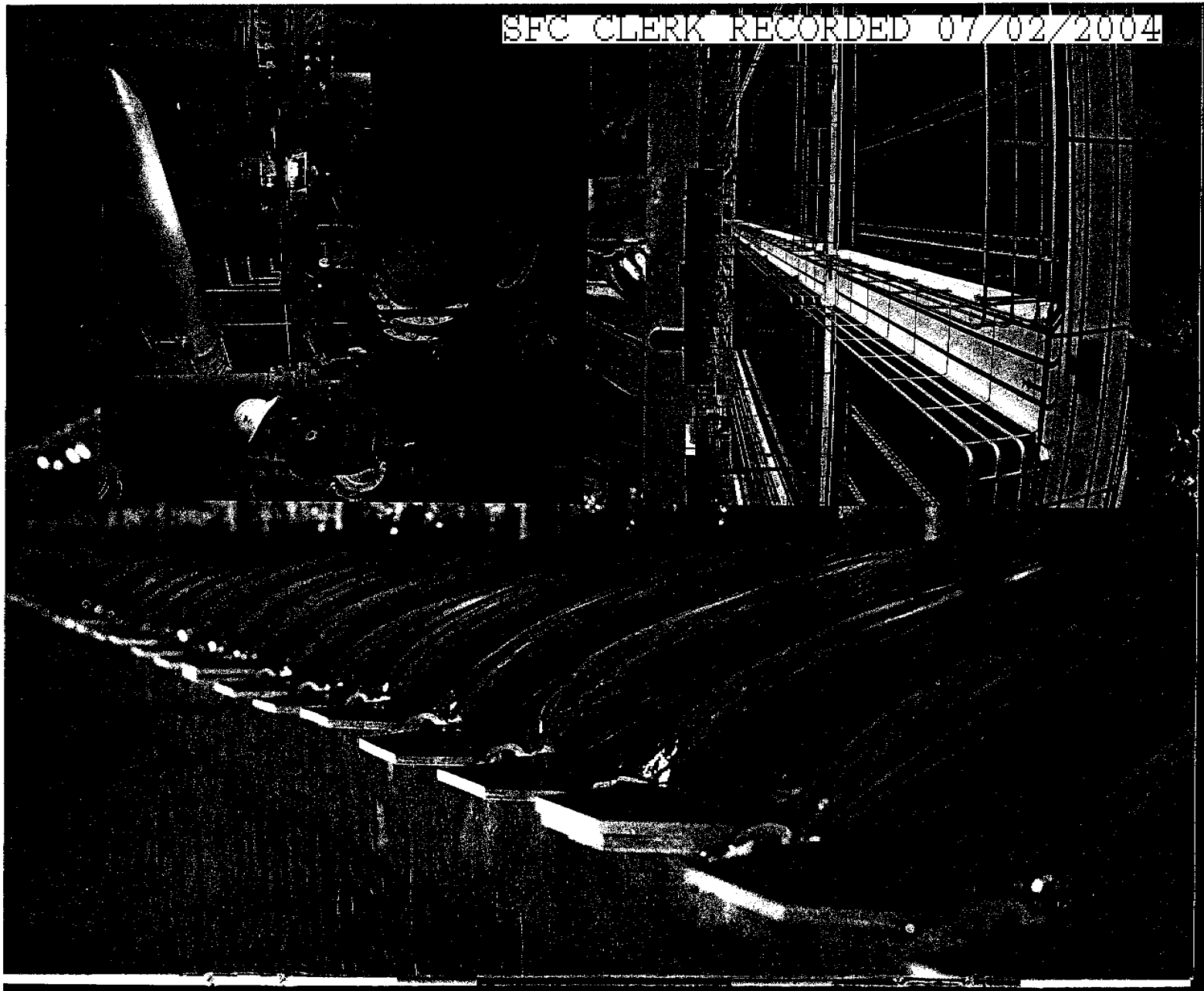
Step three Flocculation
Polymers are added to ensure that the coagulated particles will aggregate to form larger and heavier particles. Large mixers called flocculators are used to aid this process, and their design and speed of operation must be precisely controlled. The Scottsdale CAP plant uses a three stage flocculation process.

Step four Sedimentation
The aggregated particles, called floc, are removed from the water by settling in large rectangular basins. The settled material collects in the bottom of the basins as sludge and is removed for drying and disposal.

Step five Filtration
Very small particles that remain in the product steam are removed by filtering through anthracite coal and fine sand. Particles as small as 0.2 micron can be removed by this process.

Step six Disinfection
The final step is disinfection with chlorine. Any bacteria, viruses or other harmful microorganisms that remain after all previous treatment steps, are rendered inactive by this process. At this point, water carrying a slight chlorine residual is distributed to water customers.

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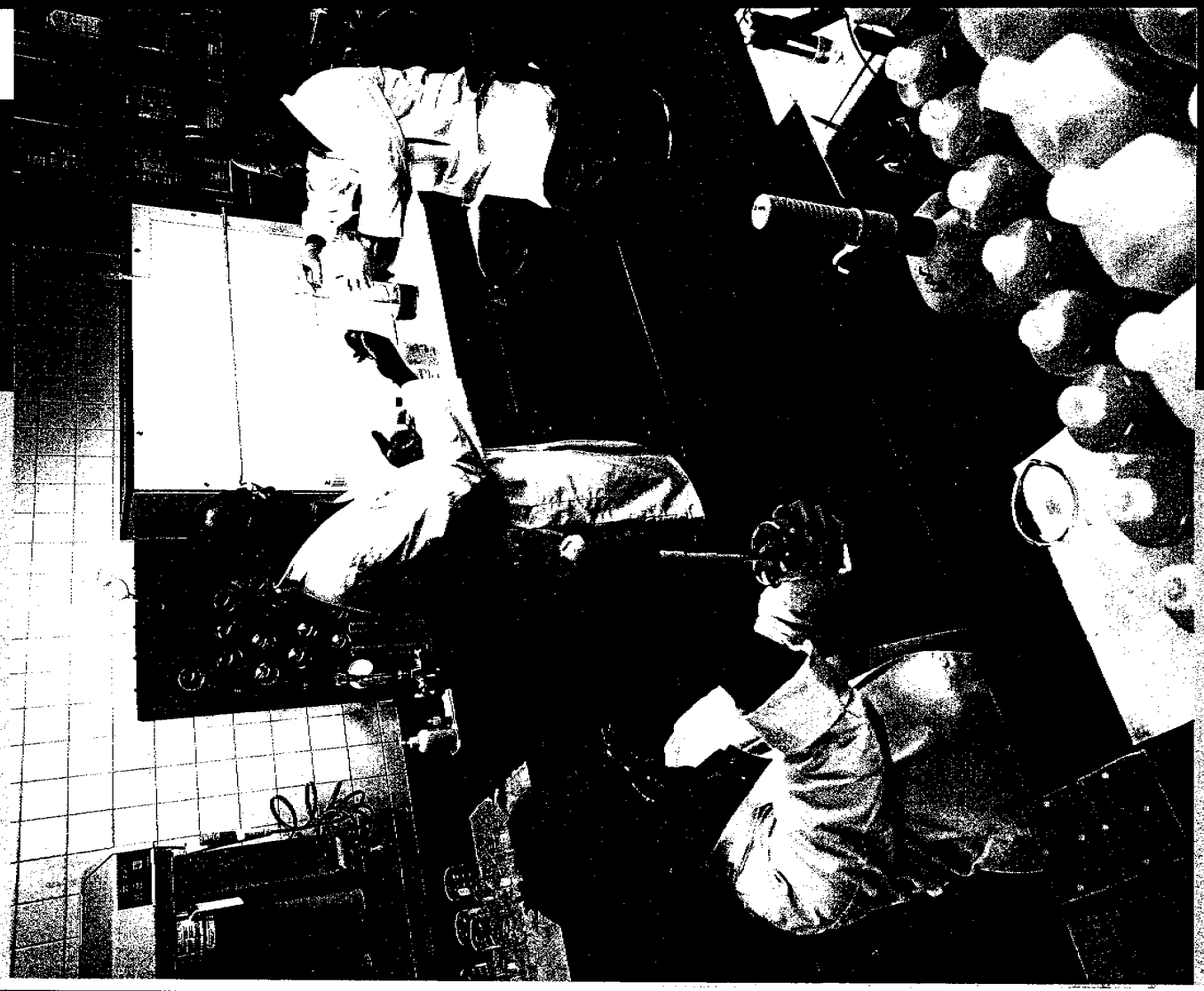


Testing la

WATER QUALITY LABORATORY

The Water Quality Laboratory, in the Water Campus administration building, is a state of the art facility. Highly experienced chemists and microbiologist have been hired to operate very sophisticated analytical equipment and methodologies. The laboratory is licensed by the State of Arizona and complies with all EPA regulations.

The laboratory was established to analyze the numerous samples required for compliance with the Safe Drinking Water Act (SDWA), Aquifer Protection Program (APP) and the Clean Water Act (CWA). This facility was built to enable the city to gain control of the quality of the data being generated to comply with these regulations. City of Scottsdale water is the sole focus of the laboratory.

Within the laboratory exists the following four areas of analysis:

Inorganic Chemistry

The use of Ion Chromatography and Total Organic Carbon (TOC) instrumentation along with classical wet chemistry methods, provide for the analysis of many substances such as nitrate, fluoride, chlorine and TOC in drinking water. The laboratory also analyzes for many wastewater parameters such as solids, oxygen demand and phosphorus.

Organic Chemistry

The laboratory will be using gas chromatography with mass selective detectors to analyze water for volatile organics. This analysis will detect such substances as disinfection by-products, solvents and gasoline by-products.

Microbiology

Samples are analyzed daily in this area for bacteria such as fecal and total coliform. Analysis for such parasites as giardia and cryptosporidium will also be performed in the near future.

Metals

Due to our location in the arid southwest, analysis for metals is crucial for ensuring safe drinking water. The metals lab is capable of testing metals and some non-metals from Arsenic to Zirconium, however only key elements are regulated substances under the SDWA, APP and CWA. This lab analyzes for metals like arsenic, lead and copper. Determination of these metals is done using multiple analytical techniques such as GFAAS (Graphite Furnace Atomic Absorption Spectroscopy) and ICP-AES (Inductively Coupled Plasma-Atomic Emission Spectrometry).

The City of Scottsdale is proud of the capabilities of our Water Quality Laboratory. We will now have the ability to analyze our water more frequently, get faster results with high quality data. The information obtained at the lab can then be used by our Water Quality and Treatment staff to deliver the best possible water to the citizens of Scottsdale.

The City of Scottsdale Water Resources Department is very proud of this facility. We welcome public participation and input. Tours and other educational opportunities for residents and students will be encouraged. For further information on any aspect of the facility please call (480) 312-8732 . The Scottsdale Water Campus is located at 8787 E Hualapai Drive.

CITY OF SCOTTSDALE

EXHIBIT 2

WETLANDS OF AVONDALE

AVONDALE, ARIZONA

PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

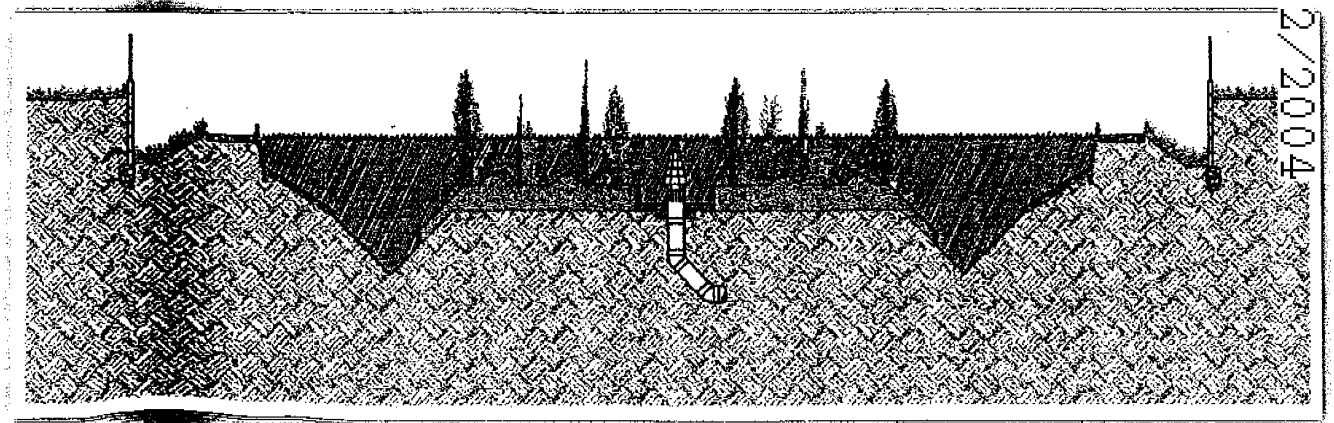
WATER RESOURCES SYSTEM

WETLANDS OF AVONDALE

The City of Avondale in western Phoenix presented a challenge to PACE in 1995 to incorporate a wetland treatment system for the city's allotted surface-water supply into a beautiful park-like setting for a residential community to provide recreational and aesthetic features and enhance wildlife development.

Lead by Johan Perslow, P.E., and Mark Krebs, P.E., the Wetlands of Avondale project included the planning, desi and construction of a unique multi-use constructed wetlands system for the treatment of Salt River Project (S canal water contaminated with agricultural runoff. The treated water was necessary for groundwater recharg and ultimately, municipal consumption. Dr. Alex Horne, professor of Ecological Engineering at the University California, Berkeley, was consulted to design the biological treatment islands within each wetland to provide removal of nutrients (i.e. nitrate) and other contaminants. In addition, the system design incorporated an eco system to provide for aquatic plants and organisms, as well as numerous species of fish and birds including la species such as crane and herron.

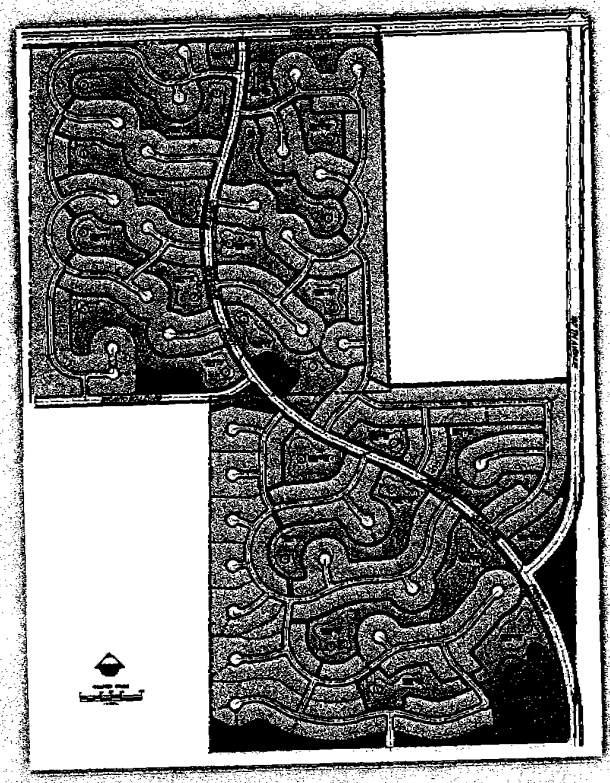
This PACE designed and Pacific Aquascape constructed project has successfully processed and recharged ove 30,000 acre feet of canal water contaminated with agricultural runoff to comply with drinking water standarc for groundwater recharge since August, 1999, when it became fully operational. This feat was accomplished



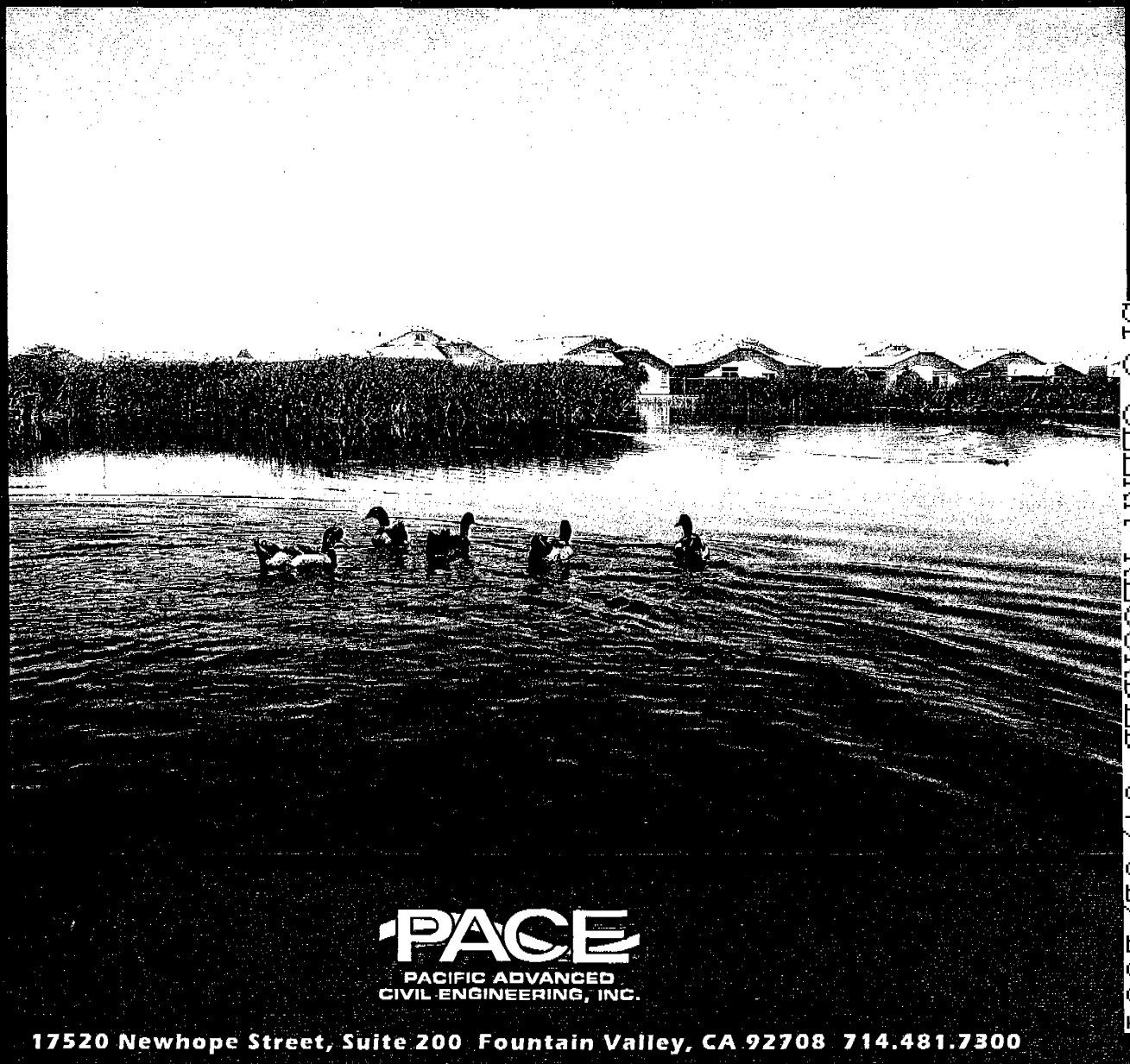
Wetland Treatment Schematic

through a spectacular series of 14 gravity-flow interactive wetland lagoons. Approximately 30 acres of the total submerged area consists of vegetated wetland islands conducive to biological, chemical, and physical treatment and polishing of water. The system has a treatment capacity of 13.5 MGD.

The landmark 88-acre lagoon system not only provides water treatment, but also creates a recreational amenity for local residents via walking and biking paths, and a waterfront-view residential community for over 800 homes. Thus, this successful project not only facilitates a water reclamation system, but also provides a visual amenity, wildlife habitat, and recreational feature to the local community.



The wetland design and functionality was presented at numerous state and national conferences, and the project



SFC CLERK RECORDED 07/02/2004

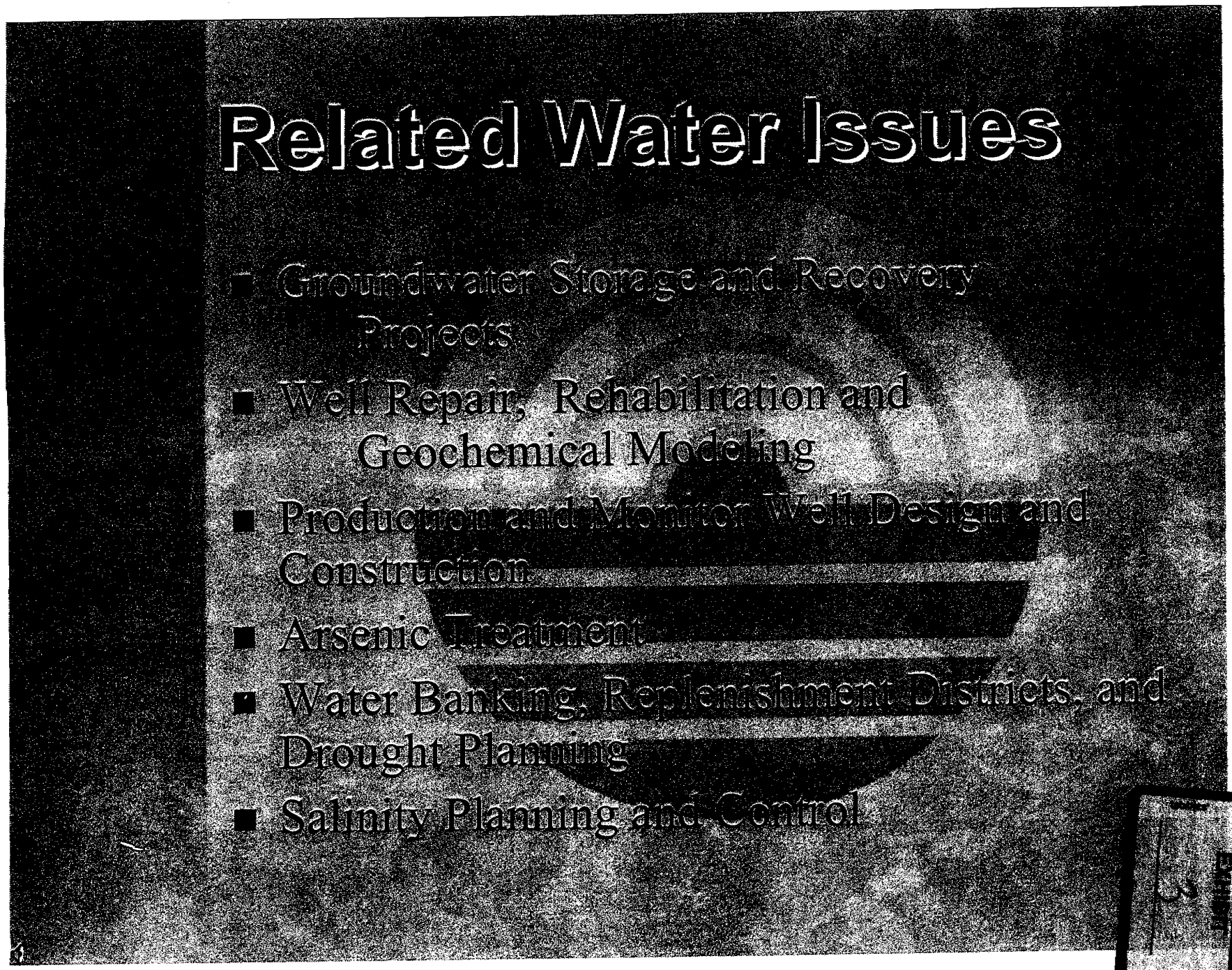
PACE

PACIFIC ADVANCED
CIVIL ENGINEERING, INC.

17520 Newhope Street, Suite 200 Fountain Valley, CA 92708 714.481.7300

WATER TREATMENT

SYSTEM



Artificial Groundwater Recharge Projects

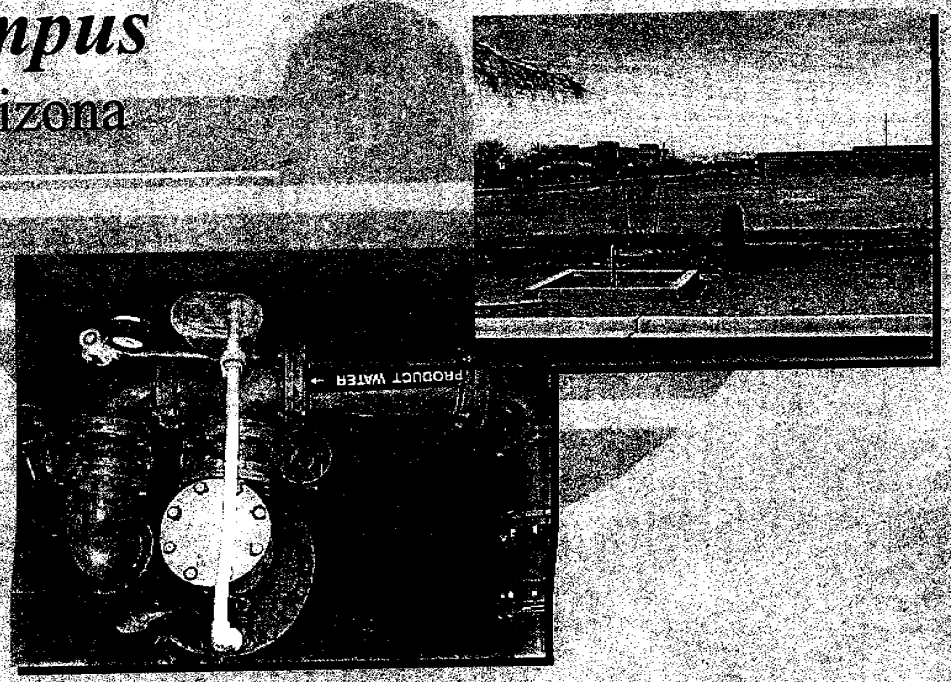
- ✓ The City of Scottsdale Water Campus Facility
- ✓ Fountain Hills Sanitary District Aquifer Storage and Recovery Project
- ✓ Vidler Water Company's Basin Recharge Facility

Vadose Zone Recharge Wells

City of Scottsdale

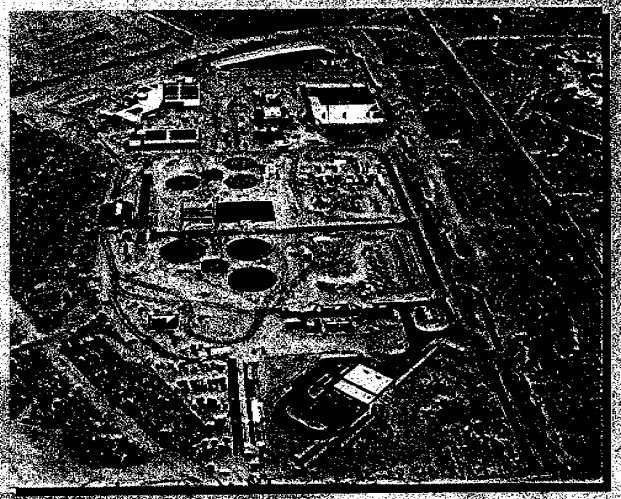
Water Campus

Scottsdale, Arizona



Water Campus Facility

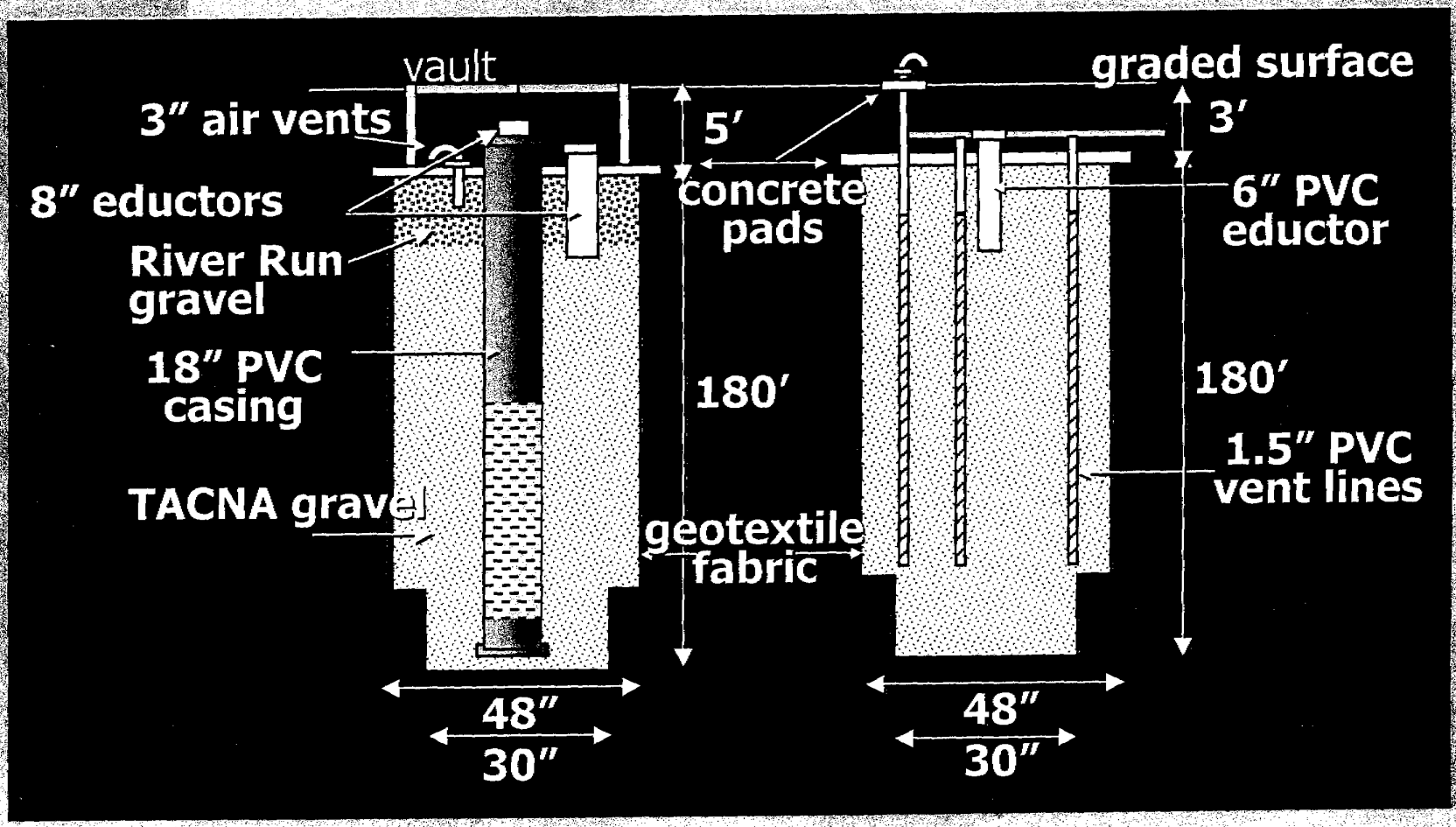
- Advanced Water Treatment (AWT) plant
- Regional wastewater reclamation plant
- The ultimate treatment capacity for the Water Campus will be 24 mgd



- Recharge and recovery system consisting of:
  - 27 Standard Vadose Zone Recharge Wells
  - 28 Emergency Vadose Zone Recharge Wells

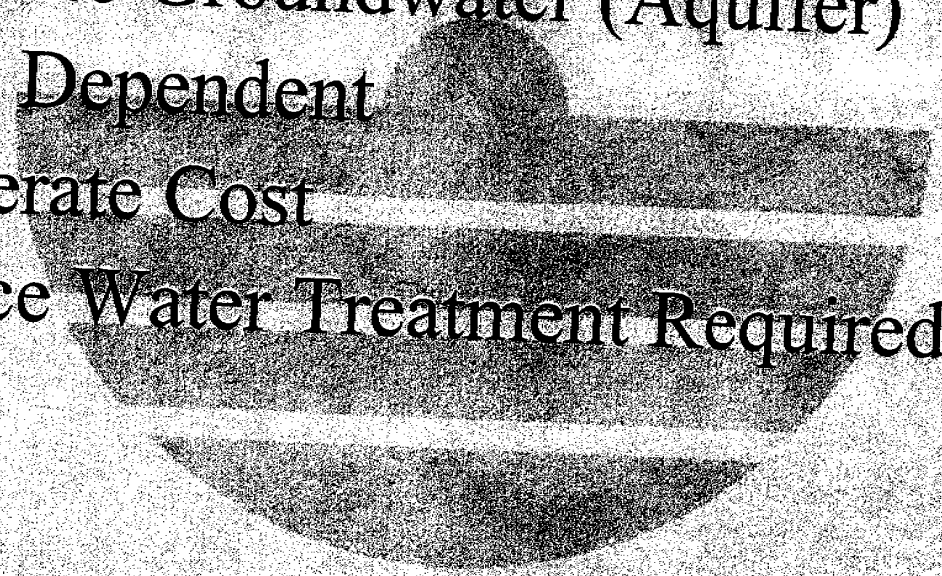
COS Water Campus Facility

Vadose Zone Recharge Well Designs



Vadose Zone Recharge Wells

- Limited Land Availability (Cost/acre)
- Aesthetically Pleasing
- Depth to Groundwater (Aquifer)
- Soils Dependent
- Moderate Cost
- Source Water Treatment Required

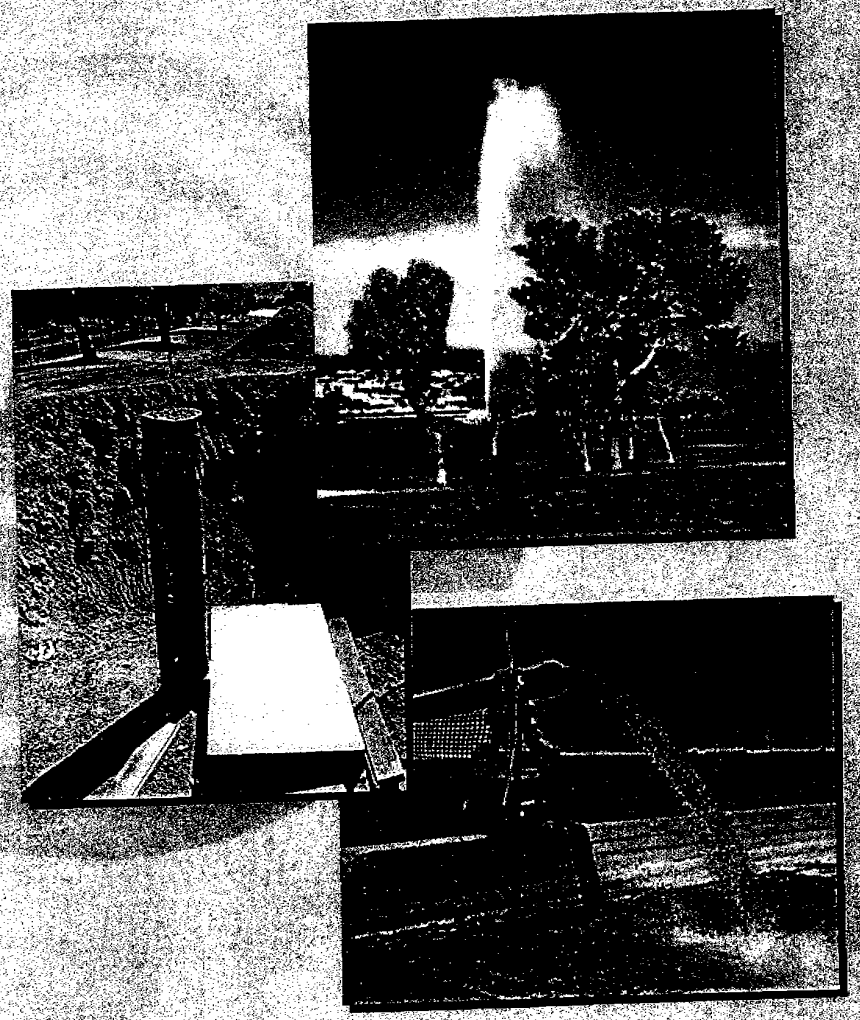


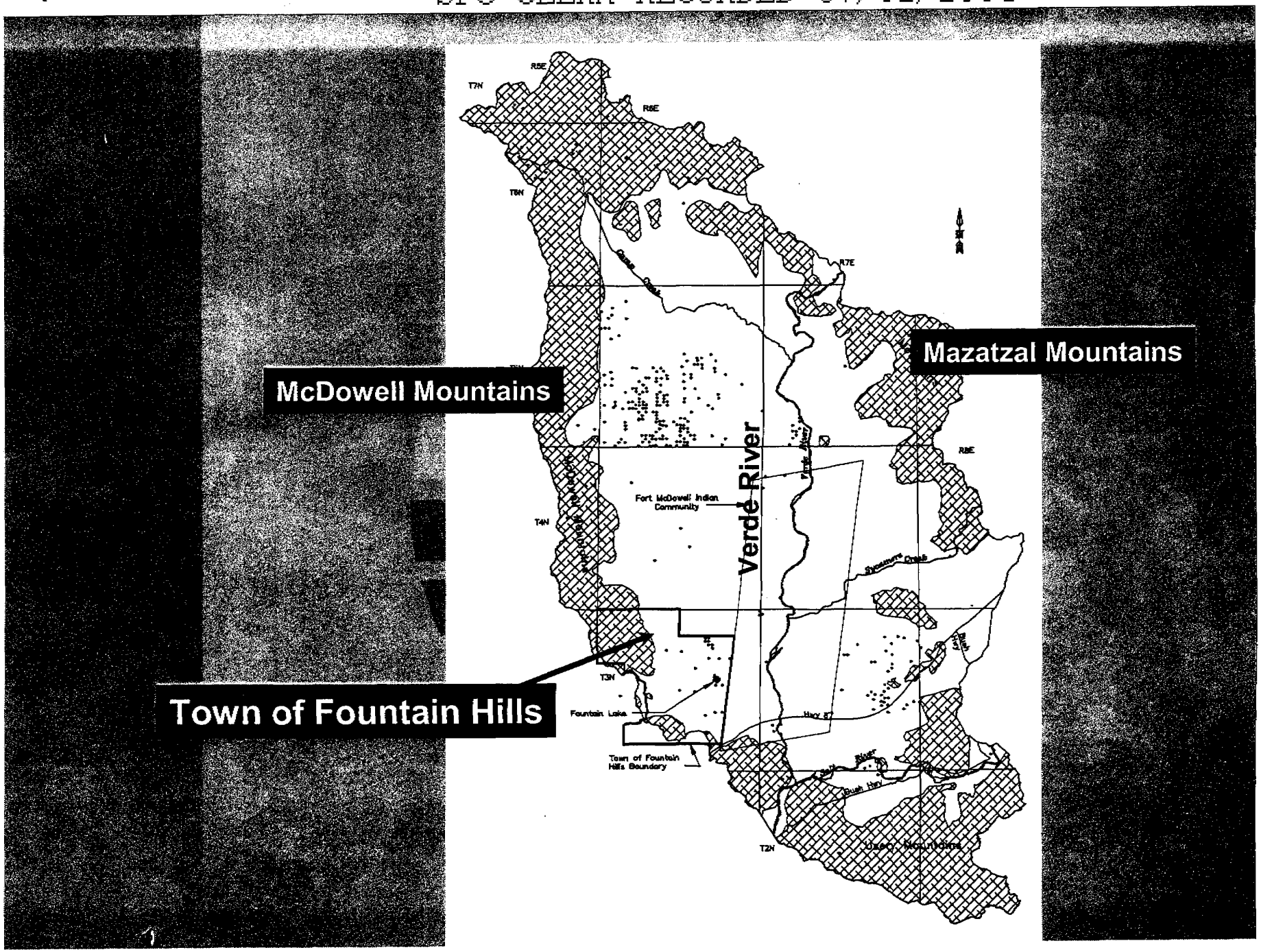
Aquifer Storage and Recovery Wells

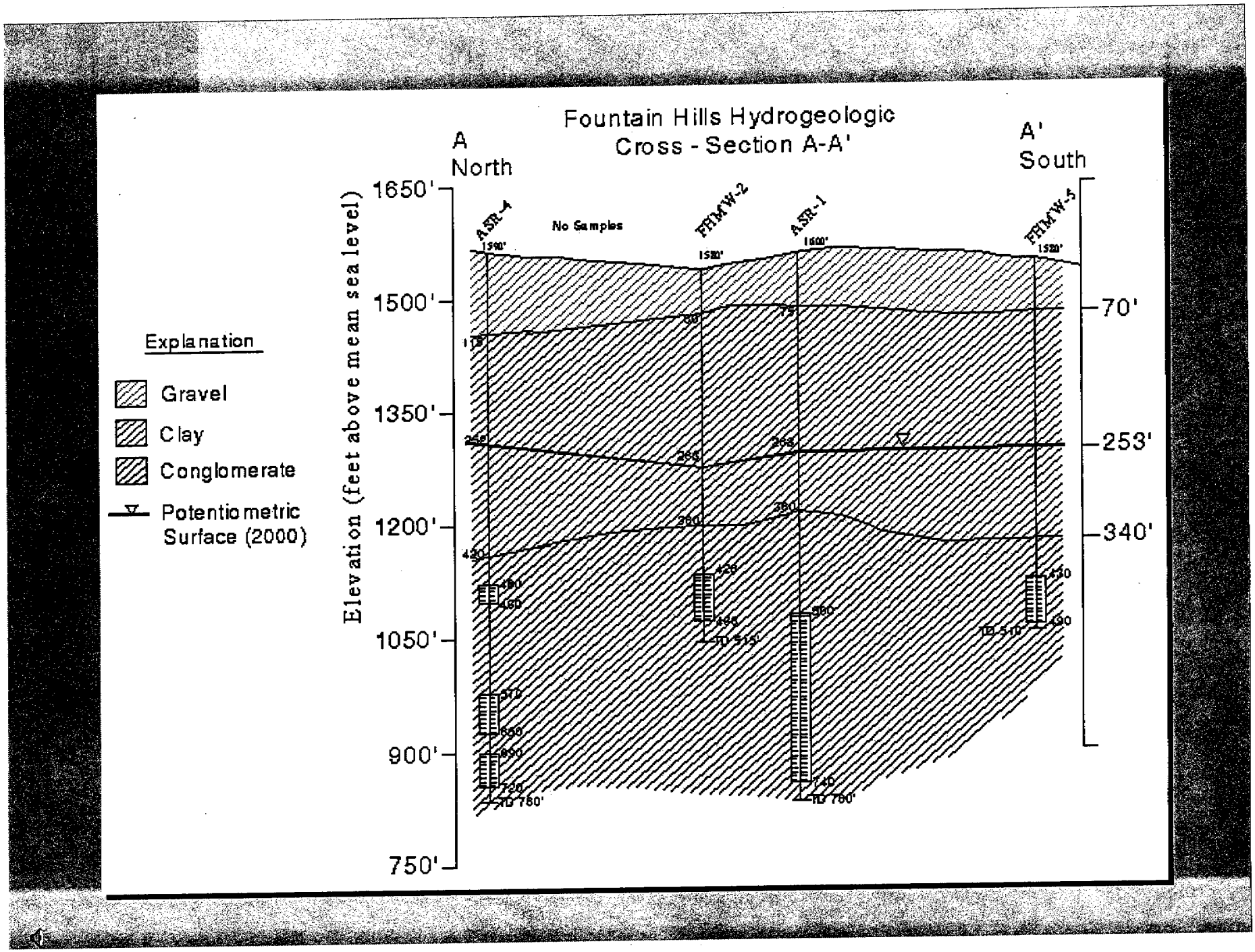
Fountain Hills Sanitary District

Aquifer Storage and Recovery Project

Fountain Hills, Arizona







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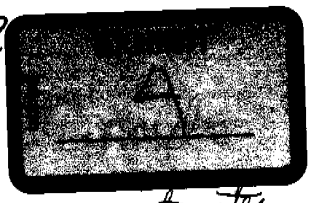

wastewater issues $10 Million

GOVERNOR RICHARDSON'S WATER INNOVATION FUND

c/o 409 St. Michael's Drive
Santa Fe, NM 87505
(505) 984-1454

MEMORANDUM

TO: Interested Parties
FROM: New Mexico Department of Finance and Administration
DATE: May 21, 2004
SUBJECT: Governor's Water Innovation Fund - Solicitation for Letters of Interest

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The New Mexico Department of Finance and Administration (DFA) is now soliciting letters of interest for financial assistance for Governor Richardson's Water Innovation Fund. Financial assistance shall be recommended for projects that fit within the following project concepts and guidelines.

- Looking to fund several short-term (6-18 months for deliverable results) pilot projects that will advance NM's efforts to conserve, acquire, recycle, & distribute water efficiently;
- Idea must be new & innovative, & based on good science & economics;
- Scope can be $50k to multi-millions of dollars;
- Projects must be at testing or deployment stage. No pure R&D;
- Projects to be evaluated by a Technical Advisory Group;
- Projects must dovetail with State Water Plan; and
- Avenues to streamline & acquire matching funds will factor in award process.

The projects to be considered by the Technical Advisory Group are as follows:

1. Finding solutions for communities in crisis;
2. Coordinated planning for regional answers;
3. Developing more water resources;
4. Creating innovative water conservation techniques;
5. Streamlining rates, barriers & bureaucracy;
6. Integrating small-scale appropriate technology;
7. Importing successful innovations from other states;

The letter of interest must be addressed to the New Mexico Department of Finance and Administration and received no later than June 11, 2004 at 5:00 pm (MST). The project summary in the letter of interest shall be no longer than two pages (single sided) and at a minimum shall include the following information for consideration by DFA.

1. Name of Entity
2. Primary Contact Person
3. Type of Entity (i.e. Municipality, County, SWCD, Private Organization, etc.)
4. Address; Phone #; Fax Number; and E-mail address
5. Project Summary (Describe your project and explain how it will advance NM's efforts to conserve, acquire, recycle and distribute water efficiently)
6. Explain how your idea or project is new, innovative and if it is ready for testing or deployment stage.
7. Describe any urgent need that precipitates the need for this project. Describe the project goals and expected long and short term benefits. (i.e. Economic, Environmental, Increase in water quality and quantity etc.)
8. Amount needed to fund the project (Identify if the project could be phased and at what amount)
9. Identify any Private, Federal, State or local funds that have been leveraged and secured for this project.

Please submit all letters of interest in an electronic format to:

Department of Finance and Administration
c/o New Mexico Finance Authority
409 St. Michaels Drive
Santa Fe, NM 87505
1-877-275-6632 – Toll Free
(505)-984-1454
(505) 984-0002 – Fax
agonzales@nmfa.net