

TRANSCRIPT OF JUNE 25, 2008

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PRESENTER #1

**KEN SEASHOLES, SENIOR POLICY ANALYST,
CENTRAL ARIZONA PROJECT (CAP):
HISTORICAL/HYDROLOGIC OVERVIEW OF
TUCSON ACTIVE MANAGEMENT AREA (AMA)**

MR. SEASHOLES: That's going to require me to turn my head a fair amount. But, yes, the last time I spoke to the Committee was the first meeting and I had a different job then. The purpose of this presentation is to provide a broad overview of the water resources and the management framework for the region, and there's a ton of ground to cover, so we're going to divvy it up among four folks.

I'm Ken Seasholes, and I'm a Policy Analyst with the Central Arizona Project, and I'm going to be followed by Jeff Tannler, who's the Acting Tucson Area Director for the Arizona Department of Water Resources - over there. He's going to be followed by Cliff Neal, who's the Manager of the Central Arizona Groundwater Replenishment District - sitting next to him. And then, finally, finishing up, is going to be Laura Grignano, who's a Water Resource Specialist with the Tucson Active Management Area.

The statistics we're going to be citing are for the Tucson AMA as a whole. Jeff's going to give some background on the role of the AMA a bit later in the presentation. But, I'm going to begin just with some - some orientation and some background.

The AMA is largely defined by groundwater basins, basin boundaries, including the entire Metro Tucson area, and it extends to Picacho Peak in the north, Kitt Peak to the west,

Mexico and Elephant Head Road to the south, and then the ridge line of the mountains, bringing us to the east; slightly larger than the State of Delaware, the area contains a million people, and a diverse water-user group.

A little bit on the water resources. As you're all aware, there are no large-scale reservoirs, like SRP has to serve the Phoenix Metro area, and our major river systems are ephemeral, which is to say they flow only in response to direct precipitation events; they're dry much of the year. There are, however, some notable exceptions to that, including some localized perennial and (inaudible; static) stream reaches that are fed from sources directly into the mountains. While these are not a major component of the water supply for human uses, those flows sustain important aquatic and riparian habitat; a number of these also - also have high aesthetic and recreational value, obviously.

There is also perennial flow in the Santa Cruz River downstream of the two major regional wastewater treatment plants at Roger Road and Ina Road here that flow - of the Santa Cruz that way; and that stretch also has ecological value, and increasingly the supply itself, of course, has economic value and has been contentious as - as a consequence. And, of course, there's the Central Arizona Project, CAP water, as Larry Dozier explained last meeting is also, indeed, a perennial supply, and then there's groundwater which, for most of this region's modern history, was the sole source of water supply.

As the mountains around us have eroded over the eons, broad basins have created from a mixture of salt - excuse me - silt, sand, gravel and rubble. It's the tiny spaces between those materials that have gradually filled with water, and most of that water has resided in place for thousands of years.

So, when we talk about groundwater in the Active Management Area, we're typically talking about these regional groundwater systems, which is comprised of these very large, loosely interconnected alluvial aquifers. In some places, they extend down thousands of feet, though they generally thin out as you get closer to the mountains. The total amount of groundwater in storage is staggering; it's enormous; an estimated 60 million acre-feet just down to the first 1,200 feet.

Now, some of that groundwater does actually slowly move following the general - same general path as the surface water, but the flow rates are on the order of feet-per-year, so most of it actually just stays in place.

The accessibility of the water varies across the AMA, with depths to groundwater ranging from less than 50 feet to over 600 feet, but current depths to groundwater are typically

in the two to 400-foot range below land surface. This means that groundwater can be pumped relatively economically in much of the AMA, and it has.

The end of the second World War and the advent of the turbine pump led to a sustained increase in groundwater pumping; mostly for agriculture; that reached a peak in the 1970s; and, by that time, groundwater overdraft in central Arizona, as a whole, was viewed as an increasing threat to the economy of the entire State. When overdraft is sustained, water levels drop, riparian areas are damaged, costs increase, quality declines, and the land can subside, sinking as the water is removed from those deep layers of sand, silt and gravel; it can also lead to fishing, in which the land literally cracks open. So, while we are fortunate to have a large and highly-productive aquifer system, there can be severe consequences to sustained overdraft.

Moreover, also in the late-1970s, competition among groundwater users was creating conflict. The outcome of lawsuits between the mines and agriculture in Green Valley was threatening the ability of other users, including the City of Tucson, to use and move groundwater as they saw fit. And, finally, at this same time frame, funding for the Central Arizona Project was imperiled. This perfect storm of events could have been ruinous; it could've come out really poorly; but, instead, it resulted in the 1980 Groundwater Management Act, and Jeff is going to take a look at that.

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<p style="text-align: center;">PRESENTER #2 JEFF TANNER, ACTING AREA DIRECTOR ADWR, TUCSON AMA: STATEWIDE PROVISIONS OF GROUNDWATER MANAGEMENT ACT</p>

MR. TANNER: So, Ken has described the circumstances that led up to the creation of the Groundwater Code. Let's look - take a look at the language now within the Code. In it's Declaration of Policy, the Arizona Legislature concluded quite clearly that over-reliance on groundwater in the most urbanized areas of the State was threatening to place Arizona's economic future in danger.

In response, they enacted a sweeping set of regulations in a management framework that were, indeed, comprehensive. Taken together, the two statements make the overall intent clear: Arizona would manage its water resources

and, in particular, would do so, so that it could continue to grow.

The Groundwater Management Act did a number of things: It created the Arizona Department of Water Resources; it ensured the completion of the Central Arizona Project; and it established Active Management Areas, or AMAs, with a system of water rights, provision for well-impact rules, a strict limit on expansion of agricultural irrigation, mandatory conservation requirements for all sectors, compulsory water use reporting, and long-range water management goals. The goal for the Tucson AMA is Safe-Yield, which is a balance between pumpage and recharge, with a target date of 2025.

While the Groundwater Management Act is rightfully praised as a progressive piece of legislation, it was also a compromise that had to balance protection of the groundwater with the investments of existing users, and the desire for economic growth.

One of the tools that was used was the establishment of groundwater rights. The system of water rights and permits that are set forth in the Groundwater Code forms the foundation of water management framework. In a nutshell, you can see that there are different types of water rights issued for different water uses. Grandfathered rights, which are the first three types listed here, are based on historical use of groundwater in the years immediately before the groundwater was ad- - the Groundwater Code was adopted in 1980.

There are some limited opportunities for rights to be converted from one type of water use to another. So-called Type I rights allow for the conversion from agricultural use to municipal or industrial. The City of Tucson has some large Type I rights that are associated with farms they bought in Avra Valley years ago and, actually, Tucson Water has had all of these types of water rights listed here at one time or another.

Service Area Rights, the last one here, are issued to municipal water providers, including both public and private water companies. Municipal provide - providers can grow over time, but their growth, generally, must be tied to an assured water supply. We'll touch on - touch more on that in a bit.

The Code also allowed for some expanded use of groundwater through withdrawal permits; these are similar to groundwater rights, except they're limited both in volume and duration. There are a number of different types of withdrawal permits, but they're generally issued in relation to mining or industrial uses. Depending on the type of permit, there are different criteria that must be met; and, well, sometimes when they're issued, it can be controversial.

Now, as far as wells go, all wells statewide are required to be registered with ADWR. New wells have to be drilled by a licensed well driller and they must be permitted through DWR. For all existing wells that were drilled before 1980 when the Groundwater Code went into effect, the well owner must register his well with DWR. There are over 13,000 wells currently registered within the Tucson Active Management Area.

With a few exceptions, large new wells in AMAs are subject to well spacing and well impact rules. There are specific criteria set forth in the well rules, such as the five-year, ten-foot draw-down analysis illustrated here. I'll give you a minute to watch what it does. These rules are meant to protect existing well owners from being unduly impacted by pumpage from a new well, but note that they do not address long-term water level declines; for that, we have the Management Plans.

The Code provided for creation of a Management Plan for each AMA every ten years, with conservation requirements for each sector, including farms, water providers, industrial uses in mining, water use projections into the future, planned for augmentations of supplies, and a conservation assistance program.

Pursuant to the Code and Management Plans, municipal providers in the past have been required to meet a gallon-per-capita-per-day limit. For turf facilities, like golf courses, and for agriculture, there has been a volume limitation on use so, in effect, an allotment to which they're limited. Best Management Practice Programs for industrial, agricultural and municipal uses are becoming available. There are also Management Plan incentives for the use of renewable supplies such as effluent.

The recharge program was established after the Code's inception, but it's been an increasingly important tool that's help the State use renewable supplies earlier and more extensively than would otherwise have been possible. Recharge is one of ADWR's more complex programs so, of course, you must - there are lots of permits, forms and regulatory requirements. But, in terms of complexity, it's hard to beat the Assured Water Supply Program.

The Department adopted its Assured Water Supply Rules in 1995. The Assured Water Supply requirements trace their lineage to two different policy objectives; the first of which is con- - consumer protection.

There had been a history in Arizona of land being sold without water. In 1973, the State adopted requirements that dictated that water adequacy had to be determined for land before it was sold. If it was found that there was an

inadequate supply of water for a piece of property, that land could still be sold, but the inadequacy of the water supply had to be disclosed to buyers. Water adequacy rules still apply outside the AMAs.

Now, within AMAs, the Assured Water Supply Rules prohibit the sale of land without water. A developer subdividing land must either demonstrate that there's an onsite supply to meet the projected demands for 100 years, or they must be served by a water provider who has done that demonstration of a 100-year supply for their entire service area. The physical supply can be groundwater down as far as 1,000 feet, but the majority of that water must be replenished with renewable supplies.

The second policy objective is to meet the water management goals of the AMA. Since the adoption of the Assured Water Supply Rules in 1995, all subdivisions must contribute to Safe-Yield by directly or indirectly relying on renewable supplies. With the exception of a minimal phase in allowance, growth is not allowed to rely on mined groundwater. So, these rules strongly influence municipal water management. In the Tucson AMA, more than 90% of the municipal demand is covered by the Assured Water Supply provisions.

Now, just prior to the rules taking effect in 1995, a mechanism was created to allow developers and others to satisfy the renewable supply requirement, even if they don't have their own renewable supply. The CAGRDR does not help you demonstrate a 100-year physical supply, but it does recharge water to offset the groundwater pumping by its members. Because Safe-Yield is an AMA-wide goal, the Assured Water Supply Rules allow the CAGRDR and others to replenish the aquifer anywhere within the AMA, not necessarily just where the pumping occurs.

Now, for more on how the CAGRDR operates and how it links with the Assured Water Supply, here is Cliff Neal.

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**PRESENTER #3
CLIFF NEAL, P.E. MANAGER, CAGRDR:
ASSURED WATER SUPPLY RULES AND
ROLE OF CENTRAL ARIZONA
GROUNDWATER REPLENISHMENT
DISTRICT**

MR. NEAL: Hi. Hope I can figure this out. As Jeff said, my name's Cliff Neal. I manage this - the Central Arizona Groundwater Replenishment District, and I thought I'd start out

by making sure that there's not - or try to clear up some misconceptions about the C- - what the CAGRD really is. It's really not a stand-alone district, in spite of - of it being called a "District" itself, Central Arizona Groundwater Replenishment District; it's actually part of the Central Arizona Water Conservation District, CAWCD. And I think that you've had a discussion with Larry Dozier, who is the Assistant - or WD General Manager of CAWCD, at your last meeting.

CAWCD's initial role was to subcontract and repay the United States federal government for the construction of the Central Arizona Project; it also then took on the responsibility of operating and maintaining the Central Arizona Project aqueduct system. Then, in the mid-' 80s, we - we got the authority to develop - or plan, develop, and construct and operate recharge projects. And then in 1993, the Legislature saw fit to give CAWCD the authority to provide replenishment services within its three-county service area, Maricopa, Pinal and Pima Counties. So, CARGD then is really just one of the authorities of CAWCD, not a stand-alone district, and there's been a lot of confusion on that and I wanted to make sure that's clear.

CAGRD's primary role then is to, basically, be a replenishment contractor; to provide replenishment services for water providers and landowners within the three counties where we serve. As Jeff indicated, CAGRD's role is not to be a water provider to its members but, basically, to serve the aquifers in the AMAs where we - where we do replenishment. We support the Assured Water Supply Program that the state's put into place, and that's - that's primarily our role.

There are two types of members in the CAGRD; member service areas are when a water provider enrolls its entire service area. In that case, that's where the water provider has decided to get a designation of Assured Water Supply for its service area, and so then enrolls its - its entire service area in - in the GRD.

For those cases where the water provider has chosen not to, for whatever reason, to get a designation of Assured Water Supply, then each new subdivision within that service area needs to prove up its own Assured Water Supply through getting a certificate of Assured Water Supply; and, in that case, those - those subdivisions are enrolled as member lands of the CAGRD. So, that's the - the two types of members.

A key distinction between these two types of members is actually how they pay for replenishment. Member Service Areas, the water provider is required every year to submit a report to us telling us what their total groundwater use is in the service area and what their excess groundwater use is; that

's the amount that we have to replenish. And so we send a direct bill to the water provider to pay the costs of that replenishment.

It's significantly different for member lands. In that case, the water provider submits a report to us indicating how much groundwater and excess groundwater is delivered to each parcel within each subdivision of the member lands. We apply our CAGR assessment rate to each of those parcel's groundwater use, and then that - that become part of their property tax bill; that assessment is collected through there. So, it's a significantly different way of collecting money, depending on the type of member.

This is a map - let's see if I can figure out the - there we go - okay - this is a map of the Tucson AMA, which you've seen several times; it depicts where our members are located. The small green dots are the member lands, and you can see the primarily down in the Green Valley area - we also have some up in the - up in the northern and in over - kind in the - the little areas where the big water providers are not serving.

The shaded areas represent the designated water providers who are enrolled as member service areas; we have nine of them in the Tucson AMA. All the water providers who have designations of Assured Water Supply are member service areas of the GRD; that's a little bit different than up in the Phoenix AMA; there's four or five that are not members, but are - but are designated, so . . .

This is a graph showing what our historic replenishment obligations have been - there comes Tucson, okay? Each of the bars represents what our total obligation has been. We enrolled our first members in 1995. So, obviously, our replenishment obligations didn't start picking up until a couple years after that point when - when houses and whatnot were - were built.

The different colors represent each of the AMAs that are - that - that we serve. The - the blue is the west portion of the Phoenix AMA; the red is the east portion of the Phoenix AMA; the green, which is a very small portion, nearly zero so far, is Pinal Active Management Area; and then the yellow represents what our obligations have been for the Tucson AMA. You can see they've - not surprisingly - just grown pretty steadily over the last ten or 12 years.

This is a graph from our current Plan of Operation which was submitted to the Department of Water Resources in '94, and approved in '95. You can see that it projects that our total replenishment obligation out at about the 2035 time frame is about 225,000 acre-feet per year. The vast majority of that obligation is going to be in the Phoenix AMA; again, that's the

blue and the - blue and the red. The Pinal - the Pinal and Tucson AMA obligations are projected to be relatively small. We'll see how that changes over the - in the next Plan of Operation.

As you can imagine, with the 225,000-acre-foot projected obligation, we have to worry about water supplies, just like everyone. Part of our Plan of Operation is to show the Department of Water Resources the potential water supplies that would be available over the next 100 years to meet those obligations, and this pie chart represents what we propose to DWR to be potentially available supplies to the CAGR. You see that the - we have CAP Indian leases of - that we are in the process of seeing that we can lease them from the Indians.

Effluent arrangements with cities and towns in - in the three Active Management Areas. On-river water supplies from the Colorado River through option arrangements and (inaudible) arrangements with farmers and Indian communities on the river, and then importing groundwater from those basins in the west portion of the state that the statutes allow groundwater to be imported from.

M&I subcontract which we currently hold, which were contracts held by providers that serve members lands no longer need them; they were transferred to the CAGR (inaudible) obligations, and then we'll work on a spot market excess water availability for that - that remaining slice of our water rights.

That's the end of what I have, and I think Laura's up next. Thank you.

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**PRESENTER #4
LAURA GRIGNANO, WATER RESOURCES
SPECIALIST, ADWR TUCSON AMA: TUCSON
AMA WATER SUPPLY AND DEMAND
("WATER BUDGET"); RECHARGE;
OVERDRAFT**

MS. GRIGNANO: Good evening. So now that you've gotten a sense of the regulatory framework in the Tucson Active Management Area, let me walk you through what has happened to water supply and demand over the last two decades in the AMA. I'll start by describing the water use trends, and then I'll discuss the supplies used to meet those demands.

As you might expect, municipal demand has continued to increase over time as the region's population has grown.

Municipal demand is now 58% of the total water used in the Tucson AMA. Agricultural demand has fluctuated somewhat over time due to crop prices and subsidies, but the trend of non-Indian ag demand is starting to show a slight decline; this decline is predominantly due to the urbanization of farmland. Non-Indian agriculture is now 26% of the total water demand in the Tucson AMA.

The water used by the large metal mining operations in the Green Valley area has also varied over time, usually corresponding to the price of copper, with peak use in the mid-'90s, then a slow decline over the next decade. In the last few years, however, with copper prices at all-time highs, mining use is starting to climb back up. Currently, mining use is approximately 11% of the overall AMA demand. And, finally, other industrial uses have bumped along at a relatively constant rate, and they currently account for approximately 5% of the overall demand.

Now, golf isn't usually considered a separate sector but, because of its visibility in the desert, it tends to get a lot of scrutiny, so let's talk about golf supply and demand in a little more detail. There are approximately 45 golf courses in the Tucson AMA, and these accounted for approximately 6% of the AMA's total water use in 2006.

First, let's look at the graph on the left. As you would expect, the number of golf courses - as the number of golf courses in the AMA increased over the last two decades, water use by the golf sector has also increased, though a growing portion of that demand has been met with reclaimed water, and that's shown in purple. This graph shows not only how turf demand has changed, but how we are putting a portion of our growing effluent supply to use.

As Ken mentioned earlier, most of the region's effluent is discharged into the Santa Cruz River; a fair amount of that does recharge the aquifer, but there is ongoing interest in managing that supply to a higher degree. Currently, more than 14,000 acre-feet of effluent receives additional treatment and is delivered through the City's reclaim system. As you can see from the golf course map on the right, that system now extends throughout the metro region, and was recently connected to systems as far north as Oro Valley. Purple dots represent courses now using reclaimed water; and yellow dots represent courses still on groundwater; green represent courses using CAP credits or surface water.

In addition to - in addition to using more reclaimed water, the region is also putting a greater portion of its CAP water to use. Since the end of Tucson's Water's direct delivery more than a dozen years ago - shown here in yellow - the

region's use of CAP water has steadily increased. Most of that use has been through direct recharge - shown here in light blue. Direct recharge is when water is delivered to large basins or washes where it can infiltrate rather quickly. We also have used CAP water at local farms where a credit is earned for groundwater that would've otherwise been pumped; this is called "indirect recharge," and is shown in green.

Agriculture also has been taking some CAP water that does not earn an offsetting credit; this water is called "non-Indian ag pool water" or "NIA water" - shown here in aqua. And, finally, the Tohono O'odham have been using CAP water on their farms and for recharge - and that's shown here in pink. So, as you can see recharge is the primary way the Tucson's AMA - Tucson AMA is using its renewal supplies.

As Jeff briefly explained earlier, recharge activity is tracked and regulated by ADWR, and serves a variety of purposes. Some recharged water is being used to satisfy annual requirements of the Assured Water Supply Rules and some is being stored for later use. This pie chart shows some of the largest recharge credit holders in the Tucson AMA; the Arizona Water Banking Authority is by far the largest. Recharge has allowed Arizona to use its renewable supplies earlier and more extensively than otherwise possible, but it is also one reason that tracking the components of our water budget has become much more complex.

A water budget is a tool that provides an accounting of gains and losses, or fluxes of water in a specific area over a specific period of time. The Tucson AMA's water budget in 1985 was relatively straightforward and simple: There was no CAP, no recharge, no Arizona Water Banking Authority, and no Assured Water Supply Rules to factor in. Now, how- - now, however, as you can see from this illustration of a more current water budget, there are a myriad of components that need to be considered. The Tucson AMA's management goal of Safe-Yield is tightly linked to the water budget calculation of overdraft. Overdraft occurs when an aquifer's losses exceed its gains over a period of time.

Currently, ADWR is in the process of calculating overdraft for all five AMAs using a standardized budget - budget template. The numbers I'm about to present today are still in draft form, but - but should be finalized sometime in - in July. This work is part of the Department's assessment of the AMAs, which will eventually lead to the development of the Fourth Management Plans.

This slide shows us a number of important things: It shows us that overdraft, illustrated by the red bars, is still a major policy concern is 2006; however, it also shows us that

overdraft in 2006 is approximately 25% less than it was in 1985, in spite of the fact that the population has doubled since 1980. Some of this was due to reduction in agriculture and improved conservation, but the main factor is the increased use of renewable supplies, primarily in the municipal sector, and the renewal supplies are shown in yellow; groundwater supplies are shown in blue.

We can take this approach one step further and using the third Management Plan, Water Use and Supply Project- - Projections, display what things might look like in 2025 when overdraft is reduced to close to 50,000 acre-feet; this scenario involves a greater reduction in active farmlands and the use of more renewable supplies by all three sectors.

So, in summary, even as a region continues to grow, the Tucson AMA is making progress toward Safe-Yield, and we expect to continue to see groundwater reductions and increase use of renewable supplies in the future. It is, however, important to note that, as our population continues to grow, it will start to get more difficult and expensive to secure each new increment of renewable supply. Furthermore, as we get closer to achieving Safe-Yield, the attention of water managers is increasingly focused on areas without direct access to these non-groundwater supplies. Thank you.

CHAIRMAN JIM BARRY: Thank you, Laura.

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<p>CALL TO THE AUDIENCE</p>

QUESTIONS AND ANSWERS WITH PRESENTERS

CHAIRMAN JIM BARRY: All right. We'll - we'll open it to questions for these four - (phone ringing) - it's not me - anybody have any questions in the audience? Yes?

UNIDENTIFIED FEMALE SPEAKER: (Inaudible; not speaking into a microphone.)

CHAIRMAN JIM BARRY: If they're willing to do so, I have no problem with that. Okay. Now that you're all up there, does anybody have any questions? We'll start here.

UNIDENTIFIED MALE SPEAKER: (Inaudible; not speaking into a microphone) - large amount of recharge, are you satisfied with recovery of that recharged water? (Inaudible).

MR. NEAL: I'll take that. In - in part because the - the largest block of water is held by the Arizona Water Banking

Authority, and it's held for a number of different purposes, and one of those purposes is for firming the subcontract supplies of CAP in times of shortage - of declared shortage on the Colorado River. CAWCD, CAP has a responsibility of doing that recovery and is partway through a recovery planning process.

The - a conceptual plan was presented to the community; it was approved by the CAWCD Board; it was also presented and approved by the local groundwater users, Advisory Council; and we're now working on the implementation phase of the recovery planning process. There's a meeting in the Tucson field office on July 2nd to do the kick-off for that phase of the recovery planning. We expect that to be probably a year-long process, but there is an ongoing process to make sure that we can get the water back out of the ground for - both for times of shortage on the Colorado and, also, for interstate recovery. We've stored water both in this AMA and the other AMAs on behalf of Southern Nevada Water Authority that we covered earlier.

CHAIRMAN JIM BARRY: I think there's a question right there. We'll move across the room. Okay.

KIP VOLPE: Yes, this is for Cliff Neal.

CHAIRMAN JIM BARRY: Could you give us your name, please, for the record?

KIP VOLPE: Kip Volpe (ph.), Vail Water Company.

CHAIRMAN JIM BARRY: Thank you.

KIP VOLPE: I noticed on your - on your chart, your bar chart, that while the - your obligation for future provisions for water has increased over the state, it looked like Tucson AMAs has actually shrunk, and what would be the cause of your future obligations shrinking in Tucson?

MR. NEAL: I think probably what you're referring to is our historic obligations; that chart. What we had negotiated with the City of Tucson was a Member Service Area Agreement in which they agreed to report a 5,000-acre-feet-per-year as excess groundwater through the years 2001 through 2006, just as - just as a way of generating revenues for the CAGR, kind of as a payment for en- - enrollments. Tucson's enrollment fee was about \$50 at the point that they enrolled, and the only way that CAGR generates revenue is if their members actually report excess groundwater use and pay us an assessment. So, that was - that was by arrangement; that arrangement ended in - '07 was the first year, and that's why you saw that kind of shrink down in '07. Does that answer it for you? Okay.

CHAIRMAN JIM BARRY: Bob, we've got Chris Avery saying this is not a meeting, 'cause we don't have a quorum and the members of the Committee are not - are asked to not ask questions. The audience can, but - but we can't.

ALTERNATE MEMBER BOB COOK: (Inaudible; not speaking into a microphone.)

CHAIRMAN JIM BARRY: Now, you are - now you don't because you're a member - alternate, but you don't. I'm sorry.

UNIDENTIFIED FEMALE SPEAKER: It's a catch 22.

MARGOT GARCIA: Margot Garcia. In - in looking at what's happening to the mining, I wondered if you could comment at all about the Rosemont - the proposed Rosemont mine, what it would do to those kinds of projections. There's a lot of discussion about where their water might come from and how that would impact some of your slides and projections of tables.

MR. TANNER: Rosemont Copper Mine has a mineral extraction permit - one of those controversial things I mentioned; it allows 6,000 acre-feet per year of groundwater withdrawal; and that's a 20-year permit. Now, there's been talk in the community about possible recharge and recovery of water, other options. We haven't had any applications that have been submitted. So, what we have on the table at Department of Water Resources is 6,000 acre-feet per year of groundwater. Laura, do you want to . . .

MS. GRIGNANO: Just to put that in perspective, the - the current mines - and I showed you the graph that fluctuate, depending on the price of copper - the current mines are using about - a little more than - probably 30 to 35,000 acre-feet currently, so that would add about five to 6,000 acre-feet to that, if they used what their Mineral Extraction Permit is good for.

CHAIRMAN JIM BARRY: Any other questions?

MR. NEAL: Let me -

CHAIRMAN JIM BARRY: Oh -

MR. NEAL: - and one other piece of that, too, and that is that Augusta Resources, which is the parent company, has an excess CAP contract - this is not a long-term contract; it's a year-to-year ability to acquire CAP water - spot-market CAP water - and they have been recharging that water in the lower Santa Cruz Recharge Facility and accruing long-term storage credits for that activity.

MS. GRIGNANO: One more thing to add to - and I - I'm not exactly clear on the figures - but, I do believe in our projections in the Third Management Plan, we were projecting that the mines were using more than they're using right now, just the ones that are in existence, and I think that might've been around 40,000, but I'd have to check that figure. So, we're still under that, so . . .

NANCY FREEMAN: Augusta Resource -

CHAIRMAN JIM BARRY: Could you give us your name, please, for the record?

NANCY FREEMAN: Sure.

CHAIRMAN JIM BARRY: Thank you.

NANCY FREEMAN: Nancy Freeman. Augusta Resource plans to use a dry stack tailing (inaudible), which really hasn't been tested in the U.S. at all, and should they decide that they need more water, couldn't they just go in and get another permit for another 6,000 feet for 20 years? So there's - this is just a pie-in-the-sky estimate at 6,000.

MR. TANNLER: If they applied for a second Mineral Extraction Permit, or applied to modify the one that they have now, they would need to back up with evidence why they need more water. They would need to supply documentation showing that they needed "X" amount more. So, it is - it is theor- - theoretically possible that they could get more - more water if they needed it.

DALE KYES: Dale Kyes (ph.). I'm looking at your bar chart for 2025. The overdraft numbers are look - still pretty significant. Is this an admission that it's not possible to reach Safe-Yield by 2025?

MS. GRIGNANO: Well, again, that was in the Third Management Plan; those were the Third Management Plan pro- - projection, and we're currently working on the assessment; that will lead us into the Fourth Management Plan. We'll also be working on new pro- - projections based on the results that we get from the assessment that we're working on, so they could change.

MR. TANNLER: One other thing I'll - I'll add to that, to get to Safe-Yield we're going to need to, of course, continue to conserve water, but it's also going to be very important to find new sources of renew- - of renewable supply; that's - that's what's likely to get us closer to Safe-Yield.

COLETTE ALTAFFER: Colette Altaffer. I - I'd just like clarification on the Assured Water Supply designation. If you a member land and you are located in an Active Management Area, but you are not located anywhere near infrastructure, water infrastructure, like Tucson's Water infrastructure, does that mean when you get a contract with CAGR that, in essence, you are saying on paper that 8% of your groundwater, or 8% of your water is groundwater and 92% is renewable sources but, in reality, 100% of your water is groundwater?

UNIDENTIFIED MALE SPEAKER: Cliff, take a shot at that?

MR. NEAL: Yeah, if it's - if they don't take direct delivery of re- - renewable sources and they are going to rely solely on groundwater then, yeah, the - the water that will be delivered to those homeowners will be groundwater; however, to comply with the consistency with management goals, it has to be

replaced or replenished, and that's - if it's a member land, that's CAGR's job; if it's not a member land, somebody else may be doing it for them, but that's - I think you're - you're correct. Do you have - anybody have anything to add to that?

MR. SEASHOLES: Just - just to clarify, the - there's a phase in allowance, 8% under the cur- - in the Third Management Plan of - the groundwater doesn't have to be replenished, so there's just - there's a small block of water that's part - that does not require this offsetting replenishment.

In the Fourth Management period in 2010 and - through 2020, that drops to 4%, and then it drops to zero. So, the - the 8% just represents the portion of the groundwater that does not - that's associated with the certificate that doesn't require Cliff to replenish, but the - all of the water that's pumped by the - associated with that - that certificate with the member land is considered groundwater.

CHAIRMAN JIM BARRY: Any other questions?

UNIDENTIFIED MALE SPEAKER: Yeah. Yeah, I'm sorry. Did I scare you? I have a couple questions.

CHAIRMAN JIM BARRY: Can you give us your name, please?

UNIDENTIFIED MALE SPEAKER: (*Transcriber's Note: This gentleman is very hard to understand due to an accent.*) My name is (inaudible). One of the questions is about the reuse of effluent. From the presentation, I had the impression that the wastewater effluent is reused for the golf course and irrigation purpose. So, the question is: Wastewater can also be reused for (inaudible) purpose, reused for (inaudible) technology and (inaudible) water to the (inaudible) quality and we can recharge that and pump it out, so this is one application which might be of interest in some areas of the work. So, the question is: Is this something we can consider for this planning?

The second question is about the salt. You know, we are relying on the CAP water, which has a very high concentration of salt, so (inaudible) from the CAP water of the (inaudible) salt, you know, deposit in this area, so which may result in the steady increase of the groundwater salt concentration. So, it is something also of this study. Thank you.

MS. GRIGNANO: The first - the first issue that you brought up, I believe that the municipal providers are looking into that for - for future use, using reclaimed water for potable use.

And, yes, you're right, as we use more - as we reuse water - as groundwater we use through the reclaim system gets

saltier and saltier, the more times you - you use it, as well as CAP - so, yes, salt - salt will become an issue, the more renewable supplies we use - we use in the area. I think Phoenix is experiencing - you know, they - they have been experiencing those issues sooner than we have because of their - more surface water supplies and saltier supplies.

CHAIRMAN JIM BARRY: Anything else?

TRACY WILLIAMS: Good evening. This is Tracy Williams. And I have a couple of questions for Cliff, and I'm really glad you came all the way and we could finally get a little more acquainted. It's not -

MR. NEAL: It's on.

TRACY WILLIAMS: Hello?

MR. NEAL: I hear you. I can hear you loud and clear.

TRACY WILLIAMS: I usually don't need a mic. Where will the water to meet the replenishment obligations come from? I - I would like to have a dialogue, so I have four questions for you. And then, once you answer one, if you would indulge me, I'll answer - ask the second one.

MR. NEAL: It's the Chairman's show, so if that's okay with the Chairman, it's fine with me.

I had - I had put up a bar chart - I mean, a pie chart on here - indicating the portfolio of supplies that's in the Plan of Operation that includes effluent on the imported groundwater, Indian leases of - of Indian CAP water, along with CAPNI subcontract that we currently hold, and then some spot markets, so it's a - it's a portfolio of supplies. So - so, hit me with your next one and I'll know your -

TRACY WILLIAMS: Okay.

MR. NEAL: - extension on that one.

TRACY WILLIAMS: What effect will the CAGRD's activities to obtain additional water supplies have on the plans of other entities?

MR. NEAL: That's a good question. I hope it will have - I hope that we'll be able to work together, because I don't know if - if you noticed from the map that I showed but, basically, other - any other entities in the - at least in the Tucson Active Management Area that's out looking for supplies are already members of the CAGRD. So, we won't be competing with those folks because, to the extent they can get a renewable supply themselves and deliver it directly, it reduces our obligation, and we don't have to get the supplies. So, from that perspective, we shouldn't - I hope we shouldn't be competing with them.

Now, if you're talking about mines or something else, that's - that's - may be a different story, and I think we would be competing directly with that type of a - of an entity, but

for - as far as the municipal uses and the - and - and those municipal providers, I hope - I hope we won't be competing; at least I hope they don't think we'll be competing with them, because we don't plan to.

TRACY WILLIAMS: Have you figured out the costs? We never see any money associated with the replenishment. Is there any pie chart with money?

MR. NEAL: Well, our Plan of Operation - under our Plan of Operation, we made a projection that the cost to acquire those water rights would be about - over a quarter of a billion dollars. In our initial work with respect to effluent, that's looking like we've undershot that.

So, I don't know if you've been - been following what's going on with our Board of Directors over the past six or eight months, they've been looking at new rates and fee structures for CAGR members; and, in fact, made a fairly significant increase in rates and fees just last week to address those increased projections of costs.

TRACY WILLIAMS: Thank you. And are we allowing too much growth not based on showing the 100 years' worth of firm supply to occur in the Tucson AMA?

MR. NEAL: I'm - I don't think so, because I think that any - any new growth has to show 100 years' of firm supply. Now, when you say - what do you - what is your definition of "firm supply?"

TRACY WILLIAMS: That's what we're trying to figure out here.

MR. NEAL: Okay. Well, in order for a certificate to be -

TRACY WILLIAMS: Firm supply to me is not pay for water, for one. Firm supply would be drinkable, potable, good for the environment, wet water.

MR. NEAL: Well, that's - that's a heavy-duty requirement. No, the Department of Water Resources' job is to make an analysis, or review an analysis of the water supplies that any new prospective Assured Water Supply applicant proposes to use, and that would include groundwater backed up by replenishment from CAGR.

So, from the perspective of a homeowner and a new certificate - a certificated area or a homeowner in a designated provider service area, DWR should have - and I think - and I think they do - should have reviewed the analysis showing whether there will be water to serve that - that project; I mean, that's part of the - the proof of an Assured Water Supply is showing there's water physically, legally, and continuously available for 100 years; that it meets quality requirements;

that it's consistent with the goal; and - and there's a couple of other ones I don't remember, Tracy, but that's their job.

Our job then is, to the extent that any of that is groundwater, we find a renewable supply and bring it in and keep the - keep the aquifers, the AMA in Safe-Yield. Our job isn't to deliver water to the homeowner; the homeowner's getting water from their provider. I don't know if that answers your question. I hope - I hope it starts to.

CHAIRMAN JIM BARRY: Anybody else? Any other questions? Yes?

COLETTE ALTAFFER: Yes, Colette Altaffer again. I just have two questions. One is: When you get subsidence, your aquifer loses some of its capacity to hold water, does that aquifer ever recover? And, if so, does it recover to 100%, or only 80%?

And then, second of all, is it possible for someone to have an Assured Water Supply designation or certificate and still drill a well deeper than 1,000 feet?

MR. NEAL: The answer to the first question is: It depends. The answer to the second question is: Yes. So, there - there can be some recovery; some elastic rebound if water levels are brought back up in an area of subsidence, but that does, in fact, depend. You can have an elastic compaction of the subsurface layers and you don't get all of that back. I'm not a - Jeff is - so, you'd have to ask him how much you get back.

There is some confusion about the depth of wells relative to the assured supply requirements associated with the maximal draw-down. The analysis that's done for either - for an application for assured supply, if it's based on groundwater, shows that the projected decline of the water levels can't exceed 1,000 feet or the bottom of the aquifer, whichever is shallower; that isn't a prohibition on the depth of the well - operational wells. Oftentimes for - for production purposes, or for other operational reasons, wells are drilled deeper and screened deeper. The 1,000-foot requirement is not a prohibition against deeper than 1,000-foot wells.

CHAIRMAN JIM BARRY: Dale?

DALE KYES: Dale Kyes again. To what extent do your projections take into account the continuation of long-term drought, perhaps very significant drought in the southwest, and the very real possibility that the Arizona's allocation from the Colorado River can be cut back significantly?

MS. GRIGNANO: I'll - I'll address the projections that I showed on the 2025. I think we kept - we - we kept the net natural recharge at an even keel throughout the years. I

think - is that fair to say? Or we did not include the drought? That was done in 1995, so . . .

DALE KYES: So, would the next plan include some anticipation of droughts, or at least some uncertainty about it?

MS. GRIGNANO: That would be - that - that would be a good thing to talk about as we're working on those projections, yes.

MR. NEAL: Let me - if I add - add to what - CAGR's projections. CAGR's projections are admittedly conservatively high. We did not assume a drought, because we assume that in a drought people will start cutting back. Our obligations reflect normal kind of pumping activities, so just to make sure that you're clear on that; that's what our projections represents, so . . .

VINCE VASQUEZ: Just a point of clarification, I think for Ken.

CHAIRMAN JIM BARRY: You want to give us your name, please?

VINCE VASQUEZ: I'm sorry. Vince Vasquez. You said 60 million acre-feet of groundwater, Tucson AMA? I just wanted to put the overdraft thing in perspective saying the 50,000 acre foot draw-down or overdraft -

MR. SEASHOLES: Yeah.

VINCE VASQUEZ: - and 60 million acre-feet of available groundwater and, if my math's correct, that's 1,200 years of - I mean, given localized declines, that 1,200 years without - that's -

MR. SEASHOLES: I didn't want to respond to that. There wasn't actually a question there, but I'm going to respond it anyhow, which is: The calculation of how much groundwater there is - first of all, that's a rather loose estimate; it is done by - this comes out of work done by the USGS and ADWR - down to 1,200 feet. How much water is there down to 1,200 feet? There's - as the - one of the maps that I showed, showed the aquifer extends many thousands of feet, ten - down to 10,000 feet in some places, but that number is not especially meaningful - it's a very large number - but, it's not very meaningful in terms of a water supply, because if you actually tried to access that 60 million acre-feet, you would make the place unliveable because you would have severe consequences associated with subsidence, fishering, drop in water quality.

So, there is a lot of water down there, but taking that water and assuming that it's available to use in an area that's urbanized is not a very good assumption; and that is, in fact, a major reason why overall Water Management goal of Safe-Yield makes sense.

UNIDENTIFIED MALE SPEAKER: I just wanted to clarify (inaudible; not speaking into a microphone) procedures (inaudible).

VINCE VASQUEZ: But, there is a legal requirement that we reach Safe-Yield as well.

MR. SEASHOLES: Attempt to achieve.

CHAIRMAN JIM BARRY: Any other questions? I - I want to thank Ken, Jeff, Cliff and Laura; that was very good. We appreciate your coming here and . . . (applause). Why don't we take a short break and then we'll get Tucson Water and Wastewater to get up here and give us their words of wisdom.

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(Break taken at this time.)

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PRESENTERS #5
CHRIS AVERY, INTERIM DEPUTY
DIRECTOR TUCSON WATER AND ERIC
WIEDUWILT, INTERIM DEPUTY
DIRECTOR, RWRD: CUSTOMER
DEMOGRAPHICS; WATER DEMAND;
WATER QUALITY; WATER SUPPLIES

MR. AVERY: - and the way that these demographics work out is illustrated by this diagram on this slide. Tucson Water's total services are approximately 225,000; and, of those 225,000 customers, about 29,000 are septic-only largely located in those three areas: Tucson Mountains, older parts of the Catalina Foothills, and the Tanque Verde Wash area.

In addition, Pima County has approximately 20 - 260,000 separate accounts; and, of those accounts, approximately 64,000 are not Tucson Water customers. Those customers are located in the Metropolitan Domestic Water Improvement District Area, the Town of Oro Valley, Town of Marana, Green Valley, and other unincorporated areas of Tucson. The overlap accounts for 196,000 accounts, or approximately two-thirds of the total customers are shared in common by Pima County Wastewater and Tucson Water.

Last - two weeks ago, last meeting, we - we showed this slide that shows Tucson's use in the year 2007, and we'll talk a little bit about what an acre foot is later, but I think it's important to note that if gasoline were sold in acre-feet, an acre foot of gasoline would cost about \$1.3 million. And, if you pay more than a buck for your bottle of beer, it costs you

about \$4 million an acre foot or more. So, an acre foot's a substantial amount of water.

Tucson Water's customer demographic works out this way: About 93% of our customers' accounts are residential, either single-family residential or multi-family residential, with the remainder commercial and industrial accounts. About 75% of our water use also goes to serve residential use, whether single-family or multi-family residential customers. Twenty-five percent of our water use goes to support commercial customers. This 25% of Tucson Water's delivery is what, essentially, supports the backbone of Tucson's economy.

And two weeks, when I answered the question about how much water is used outdoors, I answered that about 45 to 50% of the water is used outdoors, and that's based on the residential category. If you add the total between residential, multi-family, and commercial, about 40% of the water that Tucson delivers to its customers is served outdoors and isn't available to the wastewater systems for recapture.

This is a way those demographics work out on the single-family and multi-family categories. You can see that most of the water used for single-family, as well as multi-family customers is used outdoors. The other dominant consumers of water in both categories are toilets and washing machines in - in these particular categories. And that, as we move forward to discuss conservation in the - in future discussions, those uses are going to form some of the prime candidates for conservation potential in the Tucson Water Service Area.

In the commercial and industrial category, you can again see that outdoor water use and restroom use here are the predominant consumers of - of water in that particular sector. And, when you look at reclaimed use by customer category - you know, Laura also showed how reclaimed water is - is distributed spatially throughout the system - and in Tucson Water's particular system, you can see that the dominant users of reclaimed water are golf courses, and that dominancy's even more enhanced when you understand that most of the deliveries to Pima County for the Arthur Pac - former Arthur Pac Golf Course, now called Crooked Tree, and to the Town of Oro Valley, also go to golf course usage, and the remainder is to parks and schools and to other customers, including private residences and outdoor landscaping. By far the majority of customers on the reclaimed system are located in this category in terms of numbers, but their volumetric use is small.

How does this all work out? Well, in 2007, we estimate that Tucson Water served about 80% of the potable municipal and industrial water that was served in the Tucson

area, and the entire economy of the Tucson area was about \$27 billion in gross domestic product. So, I think it's fair to say that 136,000 acre-feet of Tucson Water delivery supported a \$22 billion economy in our service area.

How does that compare? Well, statewide, on the municipal and industrial sector, approximately 1.88 million acre-feet supported a municipal and industrial economy in Arizona of \$210 billion, which averages out to about \$110,000 an acre foot. For agriculture, 5.16 million acre-feet supported an approximate \$2.3 billion economy; and, even rounding up, you get \$450 an acre foot.

And Tucson is especially efficient in its use of water. The way it works out in the Tucson area, an acre foot of water delivered to Tucson Water's customers supports about \$160,000 worth of gross domestic product.

Here's some of the recent water use trends. This is a chart that shows Tucson Water's accumulated deliveries in - in - in potable water over the last decade, and you can see that there's a relatively steep climb for the first few years. And, starting in 2002, some interesting things started to happen in Tucson Water's demographics. That's even more interesting when you take into account what was happening in terms of our increased number of customers or accounts. Between 1998 and 2007, you can see that we grew from approximately 175,000 accounts to the 230,000 accounts that we have today.

What does that mean with a flat supply, increasing number of accounts? It means decreasing demand per account; and, in fact, these numbers with - are - are - are very startling to me. If you look at this number, you can see that between 1998 and 2007, the average customer of Tucson Water's use diminished from somewhere around 21 Ccf per month to somewhere around 17 Ccf per month. And, although there's some statistical variation in this sample, I think it's fair to say that, on a per-customer basis, or per-account basis, Tucson Water's demands have decreased about 15 to 20% over the last ten years on a - on that per-account measurement.

As we move forward, the fact that the water that Tucson delivers supports a robust economy, and the fact that Tucson Water's deliveries to customers has diminished on a per-account basis over time means that we have a lot of opportunity to meet the challenges of the future, and we'll talk a little bit about those challenges in a few minutes when we get into the water resources picture.

I'd now like to introduce Eric Wieduwilt, whose the Acting Deputy Director of Pima County Wastewater, or Pima County Water Reclamation Department. I've been practicing that for two months and I just can't quite get it.

MR. WIEDUWILT: Thank you, Chris. Good evening everybody. I do want to start out to say that after the presentation we saw on the AMA talking about customer demographics is not really exciting. So, hang on, let us go through this information.

Two points that I think you'll walk away with when we get done with this part of the presentation. The first is that between our two agencies, there's a lot of similarities; and the second thing is there's also a lot of differences, and those are the ones we'll try to emphasize as we go through.

Again, to refresh your - your memory of where we are with Pima County Regional Wastewater Reclamation Department, we have three major metropolitan facilities: Ina, Roger, and the Randolph Park Facility, and eight sub-regional facilities that serve those areas that we call "non-metro."

If you look at the customer demographics pie chart on the lower right, about 10% of our customers come from those outlying areas, and 90% come from the metropolitan area. As Chris mentioned . . . our two current service areas overlap a bit. There's also outlying areas where Tucson Water supplies - and we do not supply equal wastewater service, other areas that we do the wastewater service for other water companies, and scattered throughout are those septic systems Chris mentioned in the foothills predominantly, but we also have them in central Tucson; they're everywhere.

Looking at our demographics for our customers, 92% are residential, and the remaining small percentage are industrial and commercial. We separate our two, industrial/commercial, residence, because of our pretreatment program. I'll go into that in a little more detail in a second.

If we look at by-volume, I think we're seeing the same numbers that - that Chris presented. The commercial/industrial portions use a lot more water than they do number of customers. We are also seeing our residential water usage dropping dramatically. And I think, as we update our design standards, we have to take that into account; that we are becoming much more efficient in our water use and that which we send down to the wastewater system.

Our industrial customers cover the gamut of everything you could imagine is in the City of Tucson; listed a few of them, anywhere from meat packing to laundromats, to pet clinic mortuaries. We have 1,557 industrial customers, and we do have a regulatory requirement to have a pretreatment program where all the significant industrial dischargers are monitored. We have 607 permitted businesses right now, and the intent is to protect the biological activities in our treatment plants, and

to make sure the effluent that we discharge has a minimal amount of contaminants and pollutants.

Looking at our major water suppliers that we serve from the wastewater side, Tucson Water, Oro Valley, Metro Marana are the larger ones. The pie chart goes from top center to the right if you wanted to try to match colors with names. And then from that smaller chunk, we have a large diverse group of water providers that we provide the sewer service to.

We'll also mention that these numbers, we have references of which report they came from. When our report is developed at the end of this process, that reference document will be incorporated. So, walk away with maybe the percentage distributions, and don't focus so much on the specific numbers.

In 2007, we also implemented a program that is an outreach subsidy program for those residents that need some help with their sewer user bills and we can - you can show right now we have a total of 1,233 enrolled currently, divided into different tiers of needs for their sewer user bills.

Very exciting. That's the end of the demographics part. We'll going now - at - open the floor for questions for customer demographics, and then Chris will come back and we'll short of tag team as we move into the resource part of it. So, any questions?

UNIDENTIFIED FEMALE SPEAKER: (Inaudible; not speaking into a microphone.)

MR. WIEDUWILT: Six percent of our customers come from metropolitan.

TRACY WILLIAMS: Okay. This is for Chris Avery. Tracy Williams. (Inaudible; not speaking into a microphone) in the southlands that - and - and you said that you were obligated to serve, and can you explain what that obligation is?

MR. AVERY: Sure. I'd be glad to. Generally, the law in Arizona states that when a city that owns a municipal water company generally has an obligation to provide water on a more-or-less equal basis to all of the areas or spaces in the City limits, and so the City of Tucson's City limits include that - that large southlands area that hasn't been developed yet, but the annexation of those lands brought with it an obligation that Tucson Water provide service to the res- - the future residents of those areas on the same basis as residents who may - might move in somewhere else.

TRACY WILLIAMS: (Inaudible; not speaking into a microphone.)

MR. AVERY: The area that's shown on the map is the area within the City limits. There's - there's a Swan southlands area that's owned by Diamond Ventures, I think - am I getting that right? That isn't within the City limits, but the

- generally that area's called the "southlands," and there was an annexation that was done approx- - Albert you got the answer to that? Eight years ago? Yeah, eight to ten years ago, there was a large annexation on the south - south side of Tucson.

UNIDENTIFIED FEMALE SPEAKER: I was wondering when you were talking about the water usage going down in Tucson since 2002, if you did figures on how many people dug their own wells and got off the grid because, obviously, the people that wanted to invest in drilling their own well and getting off the grid were people that were heavy water users?

MR. AVERY: I can answer that question partially, but not completely. We've got folks at Tucson Water who are looking into this question extensively, and the question of whether private well ownership might be a factor, it - it's not a - it's not a factor that we think is important, but it's something that I will look into and get back to you with an answer about some estimate for the number of private wells that may have been drilled since 2002 and what their effect might've been on our - on our customer demographics.

There's no question that there were some private wells that were drilled in the - in the Tucson Water Service Area during that period of time, but that era is largely over now with some recent amendments to the Arizona Revised Statutes that preclude the drilling of private wells, or exempt wells, within a Water Provider Service Area.

UNIDENTIFIED FEMALE SPEAKER: Thank you.

COLETTE ALTAFFER: Colette Altaffer. That annexation that occurred in the southlands area, when that annexation occurred the pre-annexation agreement indicates that the State retained both the mineral and the grazing rights. Is it possible that they could permit some form of mining to occur in that area that would then throw off your water projections?

MR. AVERY: I don't know the answer to that question. Albert - Albert, though - Albert Elias, the City of Tucson Planning Director, can probably help you with that, though.

MR. WIEDUWILT: You know, Col- - Colette, on that question, I'm - I'm not aware of any provision in there regarding mining rights, but I suppose, in theory, the State Land Department could grant a license for someone to do some kind of mining in that area. I know that that was never really contemplated from the City's point of view, and I think if they did try to issue a mining license in that area, they would be required to notify the City and - so, I don't think that was ever given, you know, much thought, and I think the way the system is set up for them to issue a mining license, I would say it's probably pretty unlikely.

MR. AVERY: I can answer the question from a quasi-geological point of view, and - and the answer to that question is that the southlands annexed area is largely alluvial basin fill and the - I don't know what the depth of the hard rock is there, but it's substantial.

COLETTE ALTAFFER: So - so, if there's a sand-and-gravel operation in there, how much water do they typically use?

MR. AVERY: I don't know the answer to that question either. Laura - Laura can help you, though. We got lots of expert here, yeah. Right? Got to be careful I don't overstep myself here. All right.

After talking about customer demographics, it's now time to talk a little bit about available water resources, and I'd like to start my discussion tonight with a little bit of a reference to an article that appeared in the newspaper this morning that was a consequence of a talk that was given yesterday morning at the Water Resources Research Center Conference at the Biltmore in the Phoenix.

And one of the presentations during that conference was a look to the future about how the tri-county, CAWCD Service Area would be using water 40 years from now, and one of - one of the components of the speaker's talk was a discussion of how Colorado River Water, effluent, and groundwater would be used 40 years from now. And the speaker predicted that the - there would be dramatic reductions in the use of - in groundwater pumping, almost to effectively zero in the three-county area; that reclaimed water would form about 30% - that reclaimed water would be captured at about a 40% rate; and that it would be distributed to customers at about a 30% rate; and that most of the major contractors of - of Colorado River Water and the CAP canal would use Recharge and Recovery Operations in order to forestall the short-term effects of drought, shortages, or infrastructure failures on the CAP. And I'm here to report today, as we go through this presentation, that Tucson and Tucson Water is already 40 years ahead of the game with respect to all those water resources.

Let's talk about those three resources: Colorado River Water, groundwater and effluent. The most important resource in Tucson's past has always been groundwater, and it's the source of supply that we relied upon virtually from the inception of the City of Tucson until the year 2000. And we talked a little bit about the groundwater system and supply in last - in the last meeting, and - and about the infrastructure that Tucson Water built over the years and that's still available to deliver that source of supply to Tucson.

As - as - as for legal rights to groundwater, Tucson currently has legal access to about 1.7 million acre-feet of groundwater credits under the Assured Water Supply Rules. In addition, it has access to an additional 2 million acre-feet of credits in 2025 that are primarily based on farmlands that Tucson Water purchased in Avra Valley in the 1970s and '80s, and it's this supply that will provide an important backup supply for the region in the future.

One of the reasons we're not relying upon groundwater as a source of supply was illustrated in the earlier presentation by ADWR, and I don't want to get into this too far except to note some interesting things about this map. One of them is that on a regional basis there were substantial depletions in the aquifer; and the other is that there's an interesting little comment here down on the south side; that's a consequence of the Pima Mine Road Recharge Project that's been operated by the City and the Central Arizona Water Conservation District since the late 1990s; that Recharge Project is putting water into the aquifer upstream of the central well field in Tucson.

If you look on the Tucson area a little bit closer, you can see that the groundwater declines in the - in the City of Tucson and Tucson Water's Service Area are primarily concentrated in the central well field that's located about where we are right now, and a little bit to the north. And if you look at that groundwater decline from 1950 to 2000, you see depletions in - in some areas of about 300 to 350 feet. But, since Tucson has started relying on - increasingly relying on Colorado River Water as a source of supply, some of the worst effects of those groundwater declines has started to become attenuated. There we go, 2000, today. So, in addition, you can see that even more water in the last seven years is coming in from Pima Mine Road.

We talked a little bit earlier in this meeting about subsidence. This is a little graph that overlays subsidence effects on top of the groundwater declines in the Tucson region, and one of the interesting drives I think - to think about this is if you took a drive along Twenty-Second Street from "A" Mountain to the Pantano Wash, you'd come across an area where subsidence effects in the last 20 years or so range from three to four inches, four to five inches - about where we are right now - and starting to feather out toward the Pantano Wash.

If you're to take a similar drive along a similar cross-section in some of the aquifers in the Phoenix area, you would see similar kinds of numbers across the ten-foot trans-set. In Luke Air Force Base, though, those numbers would be in meters; not in inches. And the difference would be a

couple of blocks in this wall behind me to the - the entire depth of the wall behind me in terms of subsidence effects that are produced from 300 feet of draw-down.

So, when you heard earlier from Ken Seasholes that Tucson has a deep and productive aquifer, this measure of subsidence effects is one way to analyze that. And this aquifer remains as an emergency source of supply for Tucson Water and its customers into the future and it provides a buffer against unvariables (sic) and uncertainties on the Colorado River.

So, let's talk about Colorado River resources. As mentioned two weeks ago, Tucson Water uses Recharge and Recovery as a method of use - using its Colorado River allocation. And those Recharge and Recovery Projects located in Avra Valley, as well as Pima Mine Road - that's down about here - connect us to a much larger system on the Colorado River, including the entire Seven Basin States.

Right now, the City of Tucson CAP allocation is 144,191 acre-feet a year. In addition, the City of Tucson has a Central Arizona Groundwater Replenishment District Membership of 12,500 acre-feet a year, and that means that the Central Arizona Water Conservation District has some obligation to deliver approximately 157,000 acre-feet a year to these Recharge and Recovery Facilities. And if there are any issues about the Central Arizona Groundwater Replenishment District and its proximity to areas where water can be beneficially used, those questions are largely attenuated by Tucson's Operation of Storage and Recovery Projects along the Central Arizona Project canal, as well as infrastructure available to deliver those supplies directly to its customers.

Let's talk a little bit about the Seven Basin States. We - we had some questions earlier in this presentation about the effects of the drought that began on the Colorado River system in 1999. And one of the ways to react to a drought is to sort of cover your hands - cover your eyes with your hands and pretend like nothing's happening, and the other way is to try to respond collectively to a crisis that effects not just Tucson, but the entire western region, and that's what the Seven Basin States have done.

As of last spring, the Seven Basin States entered into novel arrangements about how to manage the Colorado River during times of shortage, and what those agreements do, in the first respect, is manage Lake Powell, which stores two years' of Colorado River supply, and Lake Mead, which stores another two years' of Colorado River supply in some kind of conjunctive fashion.

We've heard a lot about Arizona - Central Arizona Project allocation and the fact that it's junior priority on the

river, and Larry Dozier talked about that extensively two weeks ago. We'd like to show you a little bit about how the shortage-sharing criteria that were developed as a result of the Seven Basin States' agreement work with respect to the water supplies that Tucson Water has entitlement to.

Here's how it works: Lake Mead, when it's full, has a capacity of 26 million acre-feet; that's about two years' worth of runoff on the Colorado River. Right now, the elevation, after the unpredictable weather of the last decade or so, is at about 1,110 feet in elevation, which means that the reservoir is about 40% at capacity, or 11.9 million acre-feet. If the elevation of Lake Mead were to drop to 1,075 feet - something that's actually never happened during the entire history of the reservoir - the lowest it's ever been is in 1955 when there was a huge drought on the Colorado River, Lake Mead's elevation went to 1,089 feet, and elevation also dropped to 1,089 feet in 1965 when the Bureau of Reclamation began taking Colorado River and filling Lake Powell. However, if Lake Mead drops to 1,075 acre-feet, or about another million and a half acre-feet from today, we end up with a tier-one shortage, and that tier-one shortage takes about 400,000 acre-feet off of the - Arizona's allocation and - and leaves that water in the reservoir to try to maintain water levels.

If Lake Mead drops another 2 million acre-feet or so, to 10,050 (sic) feet in elevation, another 100,000 acre-feet or so comes off of Arizona's allocation. And, finally, if it drops another 2 million acre-feet or so, to 5.8 million acre-feet, or 10,025 (sic) feet, there's another shortage. But, none of these shortages that are predicted or accommodated by the Seven Basin States' shortage-sharing agreement would reach Tucson Water's current allocation which is protected, along with other municipal and tribal allocations of Colorado River Water.

And the one of the ways that Tucson Water has been able to protect this allocation is by building the CAVSARP and SAVSARP Storage Projects in Avra Valley which, as of this summer, we'll be able to take all of Tucson's Colorado River allocation and protect it from shortage.

Let's talk about effluent resources for a minute.

MR. WIEDUWILT: I'm back.

MR. AVERY: Thank you.

MR. WIEDUWILT: Of course, when we talk about effluent resources it's - again, remember we have the metropolitan area and then the outlying area. Staff also puts this map on my presentation so I remember where I work. Another reminder they also throw at me is the acre-foot conversion. We, in Wastewater, work in the million-gallons-per-day world. They

like to say that, "By the way, water is in acre-feet; about the size of a soccer field, one foot deep."

When we talk about the difference between our effluent from the sub-regional areas in the metropolitan facilities, this chart, again, is very similar to our demographics, 6% comes from that outlying eight smaller sub-regional facilities, and the largest portion - portion from the metropolitan area. Roger Road Facility discharges both to the Santa Cruz River and is the primary source of water, effluent to the Reclaimed Water System of Tucson Water. Ina Road, currently right now, is solely discharging into the Santa Cruz River; and Randolph Park, located not too far from here, is also solely tapped into the Tucson Water Reclaimed Facility System.

To quickly break down the contribution of our smaller facilities, this chart has both their effluent discharge and, at the bottom in light blue, what the primary type of effluent discharge is. We have the range of surface discharge percolation, evaporation, and some reuse and reclaimed water use on a few of the facilities. But, it's a very small part when we talk about where are the available effluent sources within our system.

When we look at the metropolitan area only, Roger Road, Ina Road, and Randolph, we can see that 23% is currently going to the reclaim system and the remainder is going to surface discharge, and that portion of surface discharge is already allocated through this formula, and I won't spend too much time on it. Chris will also go through a similar display, but we can show that the largest contribution is the dedication to the Southern Arizona Water Right Settlement Act - thank you - and other players in our effluent pool.

This is also an example of some water rights coming from a managed recharge project that we have on the lower Santa Cruz showing, again, the proportional distribution; and, again, the reclaimed water rights will be discussed with Chris also.

We can't leave the topic of wastewater rights until we also show that we do have Type I, Type II, and surface water rights within Pima County primarily conveyed to the purchase of property, and this water currently is used for environmental in-stream uses, riparian habitat, and ranching.

Last - last, but not least, how can we not talk about biosolids when we talk about wastewater? We are talking about resources. At this point, our resources, we do pay to have them disposed of in land application, but we are constantly looking at what the viability is of using these biosolids as compost material and to gain some revenue from it. With that, we go back to Chris.

MR. AVERY: It's one thing to talk about effluent entitlements and the - and the rights to effluent as a resource, and another thing to talk about how it's actually used in the Tucson region today. And I - I'd like to show you a breakdown of how - one of the questions we got two weeks ago was a question of how the effluent allocations work as a consequence of the 1979 IGA. And I hope - I hope that you'll bear with me a little bit. I know this graphic is complicated and it's made even more complicated by my diction at times, but I think we can through and show you comprehensively how effluent's allocated in the Tucson region from the Roger, Ina Road, and Randolph Metropolitan Treatment Plants.

So, let's start with an assumption that there's approximately 68,000 to 200 (sic) acre-feet a year that are discharged from the - those plants. The first cut of allocation of effluent is to the Secretary of the Interior under the Southern Arizona Water Right Settlement Act, which was an Act that settled the Water Rights Claims of the Tohono O'odham Nation to - to the re- - to water in the region. And this obligation is held by the Secretary of the Interior in trust for the - for the Nation and is to be used beneficially to provide a water supply for the Tribe in times of drought or shortage.

The remainder is approximately 40,000 acre-feet; of that, the City and the County reached an agreement in the year 2000 that allocates as much as 10,000 acre-feet of this water for use for conservation of riparian habitat restoration purposes. Although the - the pool of water was initially established for habitat mitigation plans under Section 7 in anticipation of - of the listing of the Pygmy Owl - and some of that's changed over time - so the current usage on the conservation effluent pool is currently zero. But, if the conservation effluent pool were to be used, there would be a remainder of 30,000 acre-feet available for use. Today, there's about 40,000 acre-feet of effluent that remains after the conservation effluent pool and SAWRSA cuts.

Of that, the 1979 IGA between the City of Tucson and Pima County splits the remainder on a 90/10 basis. So, of the 40,000 acre-feet that are available today, the County has rights to 4,000 acre-feet of water, and the City of Tucson, and other water providers, have rights to about 36,000 acre-feet of that effluent; that's further divided up today in the following three ways: Oro Valley has an effluent agreement with the City of Tucson that delivers the approximate share of effluent to Oro Valley that Oro Valley delivers wastewater to those Metropolitan Treatment Plants; and the same arrangement has been reached between the City of Tucson and the Metropolitan Domestic Water Improvement District. So, today, that results in an allocation

of 31,000 acre-feet a year to Tucson, 23,000 acre-feet a year to Oro Valley, and 2,700 acre-feet a year to Metro.

We've all cooperated together on a managed recharge project in the Santa Cruz River, and that further complicates the accounting a little bit, but I'll take you through that. So, Tucson's remaining effluent of either 23,300 acre-feet, or 31,000 acre-feet, we use about 13,000 acre-feet currently in the reclaim now.

Now, remember, the vision for the future of the CAWCD Service Area is that as much as 30% of effluent generated in the area will be reused for reclaimed water. Well, of Tucson's 30,000 acre-feet of supply, or - or 40,000 acre-feet of supply, Tucson currently delivers about 30% to its customers in the form of reclaimed water, so we're 40 years ahead of the game. That leaves 18,000 acre-feet that flow into the managed recharge project.

The way the recharge project works is half the water that makes it to the aquifer is left in the aquifer as a cut to the aquifer and the water provider holds the remaining 50%, minus evapo-transpiration losses. So, this is how the project worked as recently as last year. Ten thousand acre-feet of that 18,000 acre-feet were recharged; that was split in half; 5,000 acre-feet in credits; 5,000 acre-feet to the aquifer; and about 1,500 acre-feet were lost to evapo-transpiration; that leaves 5,500 acre-feet. Now, remember, this 5,500 acre-feet is less than Tucson's obligation under the conservation effluent pool. So, in essence, the entire volume of water that's available to the City of Tucson today is used in one purpose of another, or reserved for use for a specific purpose.

This is the way all of those resources stack up to meet Tucson Water's current Assured Water Supply filing with the State of Arizona, and this is a fairly complex process, but I'd like to take you through it a little bit quickly and show you how it works.

Basically, the bulk of Tucson Water's supply for Assured Water Supply purposes is this Colorado River Water allocation. Other renewable sources of supply are sort of found here in bits and pieces. There's a 4% incidental recharge credit here and CAGR membership. In addition, there's some groundwater accounting and supplies here that make a total portfolio of 184,000 acre-feet a year of Assured Water Supply water that's currently available to the City of Tucson, and has been accepted by the Department of Water Resources as part of its 100-year Assured Water Supply. And the way the Department counts future demands, it counts a current total delivery demand, as well as future anticipated demands over a ten-year

period. And so for Assured Water Supply accounting purposes, that total is 142,000 acre-feet a year.

One recent way that we were asked by the City of Tucson Mayor and Council to account for water is on some sort of sustainable basis. And I've spent a lot of time trying to avoid the definition of "sustainable," especially given the context of this Committee. But, what we're talking about here, in terms of the information we've provided to the Mayor and Council, is what are the renewable supplies that are currently available to the City of Tucson? And the way those stack up is as follows: There's about 5,500 acre-feet of incidental recharge credits. We talked a little bit about those two weeks ago. A Colorado River allocation, and Central Arizona Groundwater Replenishment District Membership. That stacks up against our current deliveries in the following way on the potable side: We currently delivered about 129,000 acre-feet. Those numbers, depending on - on what year you're counting - this is a future look - and that leaves about 33,000 acre-feet a year available of sustainable supply to the City.

In addition, the effluent entitlement's about 31,000 acre-feet. We currently use about 13,000 acre-feet, and that leaves about that 18,000 acre-feet that are also available for future supply, and leaves a total of about 50,000 acre-feet of available renewable resources to the City.

Let's go - let's go forward to the year 2020. We talked about this pie chart a little bit in the last week's presentation. In the year 2020, we expect to deliver about 175,000 acre-feet of water to our customers, and we'll hold firm with that demographic, at least for a while- until we try to figure out the cost of the relatively flat usage in our service area over the last five years. The way we - we predict that those supplies will be delivered: Again, majority Colorado River Water, some small slice of renewable groundwater; it's primarily based on incidental recharge, and the CAGR membership, and increasing reliance on effluent.

And, in addition to those supplies, the City will also have a remaining portfolio of supplies that may or may not be available to it, and I've tried to list these supplies in order of surety, if you will. So, we know that we got 2 million acre-feet of redeemable groundwater accounts, and we expect that our 1.- - current 1.7 million-acre-foot groundwater credits will be reduced by about 200,000 acre-feet of pumping between now and 2020.

In addition, we will have an unused effluent supply and - and, if discharges from the area's wastewater treatment plants increase over time, that supply available to Tucson will increase proportionately, as well as to the other water

providers. And one of the reasons for that is that the SAWSRA obligation of 28,200 acre-feet is fixed. So, although, it - it forms a majority, or a substantial component of Tucson's effluent supplies, the Tucson region's effluent supplies today, its proportionate share will diminish over time as more water's discharged from Pima County's Wastewater Treatment Plants.

In addition, the Central Arizona Project, at some point in the future, is going to have to allocate non-Indian agricultural water; and - and we expect that the region as a whole, and Tucson Water in particular, will - will play a part in that reallocation. And one of - one of the benefits of having Recharge and Recovery is that non-Indian agricultural supplies are not likely to be protected from shortage, but in times of normal flows on the Colorado River, or in times of surplus, those Recharge and Recovery Projects can put that water to use.

In addition, the - the Central Arizona Water Conservation District has started the ADD water process; Larry Dozier talked about that a little bit two weeks ago, and we expect to participate in that process. During yesterday's presentation, the estimate was that that may be as much as 350,000 acre-feet of water available to the three-county service area.

One other additional source of supply that's available to the community as a whole, if not exactly to Tucson Water in the traditional sense have - having a source of supply that's owned by the water utility and delivered to customers, is rainwater harvesting.

In addition to that there are Indian leases. One final component of supply that a lot of folks who are interested in future water resources challenges like to talk about is desalinization, and that can take a lot of different forms; it doesn't necessarily have to take the form of nuclear power to electric plants in the Gulf of Mexico; it can be used even to remediate locate supplies, or brackish groundwater supplies that might not otherwise be available for use.

And one of the things I'd like you to think about as we move forward to try to meet these challenges in the future is that chart that we put up here a while ago and talks about the economic return that municipal and industrial users get from water.

So, in addition to having a diverse portfolio of supplies, in addition to being about 40 years ahead of the curve on - on the resources that Tucson Water has, we also have a vibrant and robust economy in the City of Tucson that makes very efficient use of the water resources that we deliver and that produces large economic returns from that water. Those large

economic returns allow us to be innovative, creative in solving the water resources challenges of the future, and we hope that we' ll be able to take you forward on that journey and to understand what those challenges are, both from a supply, energy and water quality and infrastructure perspective as we move forward through this process. Thank you very much.

CHAIRMAN JIM BARRY: Are you going to take questions now, yes?

MR. WIEDUWILT: Sure.

CHAIRMAN JIM BARRY: Questions? Yeah.

CHRIS BRUX: My name is Chris Brux (ph.) Where you talk about the -

MR. AVERY: Great name.

CHRIS BRUX: - the available groundwater credits that - that will - the City will have access to -

MR. AVERY: Yeah.

CHRIS BRUX: - associated with ag land that's been purchased -

MR. AVERY: Yeah.

CHRIS BRUX: - could you explain briefly how those credits come about and - and what the significance is of those credits? You mentioned they become available in 2025?

MR. AVERY: Yeah. I can do it, but I can't do it briefly; it's a really complicated question. But, the - the simple answer is that the - the City of Tucson, as a consequence of purchasing large volumes of - of large acreage of cotton farms and fields in Avra Valley beginning in the mid-1970s, obtained some groundwater credits as a consequence of, basically, retiring that former agricultural use. And the sum total of those credits, depending on how they're accounted for - and it's extremely complicated, and I won't even try to get into it here - but, the idea is that if Tucson Water manages its resources wisely over the next 18 or so years and uses Colorado River Water for Recharge and Recovery, we - we will have an account of groundwater credits that are available to us in 2025 of approximately 2 million acre-feet. And those numbers can change depending on how much water's pumped between now and then. But, it's, essentially, a credit for retiring farm fields in Avra Valley that would otherwise have pumped water from the 1970s until today, and into the future.

UNIDENTIFIED FEMALE SPEAKER: (Inaudible; not speaking into a microphone.) Hi. I'm - I'm interested in the effluent and the reclaimed concept that you talked about and tying it together with last week's or two week's ago presentation, and seeing that Pima County is upgrading its system to deal with the different grades and, like, there's Type A, A+, B. Can you

address that why Pima County is going up to the highest grade possible?

MR. WIEDUWILT: I think I can partially address that. We operate under regulatory constraints where our water quality has to meet State regulations and federal - federal regulations under the Clean Water Act. The two major upgrades we're doing at the Roger Road Plant and the Ina Road Plant are regulatory-driven. We are moving toward an A+ delivery system, which is the cleanest possible water, and it's - nitrogen removal is the - the foundation of what we're being asked to do for those two treatment plants.

We have also - outlying facilities started out with a B level water quality, because the uses were primarily percolation and evaporation. As we see opportunities to move that water into reclaimed systems, A+ is the standard that we'd like to seek there, and many of our - two of our smaller plants that serve water to developers are providing A+ water to those. So, we respond to the needs of people that can use the reclaimed water, and where we don't have that need and we don't have a regulatory requirement, it's much more beneficial from a cost standpoint not to do that expensive upgrades and to continue just to recharge that water into the aquifer.

NANCY FREEMAN: Nancy Freeman. What is the grade of water that's being put on the golf courses and the schools and parks?

MR. AVERY: I can answer that question on a general basis. There's an exception at Silverbell Golf Course, they use effluent directly from the Pima County Wastewater Treatment Plant. But, for the rest of the system that's served by Tucson Water's Reclaim System, we deliver what's called "A+ water," and that means it's water that meets the highest standards for turbidity (ph.) or clarity, but which has some additional nitrate in it.

NANCY FREEMAN: A+ water has additional nitrates in it?

MR. AVERY: We deliver A - we - I'm sorry - we deliver Class A water to our customers and - and that water has - meets the turbidity standards, but has some slight excess nitrate depending on the time of year and the way we operate our recharge facilities. My

NANCY FREEMAN: Thank you.

MR. AVERY: - my bad.

CAROL HELLER: Hi, I'm Carol Heller. I'd like to ask about the biosolids. What kind of crops are - is - is this - is this used upon? And what prevents the runoff from getting into surface water or into groundwater? What kind of contaminants are in the biosolids?

MR. WIEDUWILT: I think we owe you probably a lot more detailed explanation than what I can provide now, and that was one of the questions that's on our to-be-answered list. So, let me assure you we'll answer the questions about the pollutants that we sample for our biosolids and what measures are in place to keep any contamination from happening. So, I'm going to defer those questions to a more technical - I can tell you that we are supplying a Class B biosolid; it's land-applied to 24 farms in - in the Marana area; it's non-food source, primarily cotton, agricultural use, and it's all regulated and permitted by the State, so there are quite a number of chemical tests that are done on the biosolids before it's delivered, and all land-applied, I believe, within 48 hours is a requirement.

MARGOT GARCIA: Margot Garcia. I wonder if you could comment on the impact of the Court case last week saying that Marana owns all its own wastewater now on some of the slides and projections that you've put forward today?

MR. WIEDUWILT: I apologize, but I'm going to have to defer comment; that - that Court is - that case is still in litigation; there's still a lot of issues that need to be resolved, so I'm going to have to defer comment until we get that resolved from the Court side. Sorry.

COLETTE ALTAFFER: Colette Altaffer. Just a few questions. We are treating a certain amount of water for TCE contamination. We pull it out of the ground, we treat it, and then we deliver it to homes. Is that water part of our Assured Water Supply?

MR. AVERY: It is at the moment. Let me show you where it is. The - the TARP account is - is right here, and it's this little sliver of water right - right there on the graph, and that - those - those Tucson Airport Remediation Project accounts will diminish in time as the plume starts to become remediated and will eventually disappear as an important component of our Assured Water Supply. But, for now, they do form a component of Assured Water Supply, and - and they also form an important part of containing the plume and remediating the chemical that's in the groundwater.

And I guess I'd like to point out just - just for fun that, in the 15 years that that project has operated, there has been no exceedance of the - of the water quality standards; in fact, there's been no detection of any TCE in the water that's been produced by that facility.

COLETTE ALTAFFER: Second question: You showed some graphs early on indicating the subsidence; in some cases, we were shown actually an increase in water level.

MR. AVERY: Yeah.

COLETTE ALTAFFER: What was the baseline point on those things? Did we start from when we first started counting subsidence? Have we lost, say, 200 feet before we began counting these numbers?

MR. AVERY: The answer to that question is - is that we don't have precise measurements of the amount of subsidence that occurred prior to 1987 when the United States Geological Survey installed the current baseline monitoring stations.

I think - I can confidently say, though, that the - the period of time during which subsidence was measured in Luke Air Force Base is comparable; it's about 30 years instead of 20 years; and the amount of groundwater declines, they're also comparable on the neighborhood of 300 feet.

And so I would expect - and - and - and I'm not a geophysicist - but, I would expect that these subsidence numbers, instead of looking at them as absolute numbers, if they're looked at as - as numbers based on a 20-year snapshot, they still - they may not be perfect, but they do show that the Tucson aquifer, which is - which is - is robust and productive, does suffer from fewer subsidence effects than some aquifers elsewhere in the State.

COLETTE ALTAFFER: And then, finally, the facility that we have in Avra Valley where we're banking water, is that considered part of the Water Banking Facility Program and - yes or no - and -

MR. AVERY: Yes.

COLETTE ALTAFFER: - it is. And do we know how much water we've actually banked and how much we have down there?

MR. AVERY: ADWR can - showed those numbers earlier in their presentation this evening. I'd like to point out, though, that there are two facilities that are important: One is our facilities in Avra Valley, and the other is that Pima Mine Road Facility that 's located down near the new Desert Diamond Casino, actually, and - and that's responsible for the - actually, it' s responsible for this plume of - of - of - I should not use the word "plume;" right? Is responsible for this mound of - of - of groundwater in the area; that's a consequence of the Pima Mine Road.

RON PROCTOR: I'm Ron - Ron Proctor. At least a couple of your graphs have shown that the Colorado River Water supply is a major component of - of, say, of Assured Water. What would - I don't know if you can go back to that graph of the reservoir there.

MR. AVERY: Yeah.

RON PROCTOR: At what point would the water need to drop before there would be major repercussions to Tucson's water supply?

MR. AVERY: Nobody really knows the answer to that question. I can tell you one absolute number, and that is if the water drops below the dead pool in Lake Mead where the water can't get out, then you got serious repercussions.

But, the - the shortage-sharing criteria are - are an adaptive management tool, and what they - what they do is keep water in Lake Mead that would otherwise be discharged to meet the region's obligations. And I think that the example of the recent shortage-shar- - -sharing agreement shows that if Lake Mead elevations were to drop dramatically that the Seven Basin States would be able to come together and figure out how to deal with that issue.

And I - I think it's also important to remember that, in anticipation of - of variability on the Colorado River, the Water Bank has put water into the Tucson AMA. Tucson Water has put storage credits into the Tucson AMA. We've built Recharge and Recovery Facilities, and we still have some small supply or, you know, it's - it's an important resource, we don't want to waste it, but we still do have access to groundwater supplies if things were to get really bad on the Colorado River. That's not to say that things are perfect in the Tucson region if something goes wrong with Lake Mead, but it does suggest that we're positioned as well as anyone who relies on Colorado River Water for a major source of supply to withstand the kind of variations that appear in Colorado River supplies as a result of tree-ring dating and other methods.

RON PROCTOR: Can I just follow that up -

MR. AVERY: Yeah.

RON PROCTOR: - with -

MR. AVERY: Sure.

RON PROCTOR: How much - how many years of bank is in - is there currently, I guess, in the - in the Col- - what's been banked by the Colorado River for Tucson?

MR. AVERY: If I recall - if I recall, it's about 600,000 acre-feet in Tucson. Is that . . .

UNIDENTIFIED MALE SPEAKER: (Inaudible; not speaking into a microphone.)

MR. WIEDUWILT: It's about 300,000; it's a lit- - or 350,000 -

MR. AVERY: Yeah.

MR. WIEDUWILT: - currently.

UNIDENTIFIED MALE SPEAKER: And how many years (inaudible; not speaking into a microphone)?

MR. WIEDUWILT: The number of years would depend on how much of a cut-back there is. Even in a shortage, even if we get down into this pool of firm supplies, you would still be delivering portions of those supplies. So, the - the amount of

it you have banked away is really representative of filling the gap. The amount that we're targeting for this AMA, for the Water Banking Authority, represents what the projections were for 100 years' worth of shortages, and the shortages get more frequent in the future, and that number's about 800,000 acre-feet.

MR. AVERY: I guess, from my perspective - and I don't know the answers to all of these questions on Colorado River shortage and drought - but, I do think it's important to say that there are a lot - that - that a lot of thought has been given to the problem, not just since 1999, but from the very inception of the Central Arizona Project, and that - that there are a lot of really bright people who are trying to figure out this issue, even as we move forward, and that Recharge and Recovery operations give you a way to attenuate the year-to-year, you know, even a couple-year-to-couple-year effects of those shortages by not being reliant on water being actually in the canal as your source of supply.

NANCY FREEMAN: Nancy Freeman. I just interviewed John Mawhinney, so I have the 2.8 million acre-feet from the Water Banking Authority on my mind, so the 800,000 would be Tucson's share?

MR. WIEDUWILT: The Water Banking Authority is storing water for multiple purposes, including for interstate purposes, and they've stored quite a bit of that water in the Pinal AMA. They've not stored as much in the Tucson AMA; like you said, about 350,000.

The - I would reiterate what Chris has said generally about the way the Tucson area - and Tucson Water in particular - is positioned to handle the variability of the supply. There are multiple strategies being put in place, both by the individual utilities, CAP itself, and the Basin States to address the - the variability; the Water Banking Authority is one piece of that; to try to store as much of this water we have available now for later use. We've got - we have a ways to go in terms of meeting as much as we'd like to have in the ground, but we do have a large reservoir of supply available to be able to mit- - to mitigate it in that short term.

NANCY FREEMAN: Of the water that we have stored in the ground, how much of that still needs infrastructure constructed to remove it?

MR. AVERY: I - I can say - I can answer that question with respect to the - Avra Valley and - and the answer to that question is that right now we have the ability to recover some of that water through our current infrastructure. We also - and we'll talk about this in a couple of weeks when we talk our current infrastructure, and then four weeks from now when we

talk about future infrastructure - but, we do have recovery pipelines, well fields in, et cetera, included in - in our capital improvement program over the next couple of years in order to address those - those challenges.

NANCY FREEMAN: So, what you're saying is if tomorrow we had to pull that out, we would have difficulty getting all of it back out?

MR. AVERY: No, if we needed to pull it out tomorrow, we'd be able to pull out what we need. What we're trying to do with our CAP is make sure that we have the resources available and the infrastructure to meet our - our future needs long into the future. We don't intend to rebuild the Avra Valley pipelines in ten years because they're too small.

NANCY FREEMAN: And, as far as these Water Banking Facilities go, do they have a life span on them?

MR. AVERY: I think that's a really good question. We think that the Recharge and Recovery Facilities that we've built in - in Avra Valley, as well as Pima Mine Road, have a 50-year life span, and I think that's a reasonable estimate; they - they may be able to last longer than that; it may be that, as we go forward 20 or 30 years, that we'll need to do more maintenance. But, they're fairly simple facilities, they - they're - they're, essentially, basins that are excavated in the ground and a well field and recovery system, and the components, even though Recharge and Recovery is a relatively new concept, the well field's recovery pipelines, booster facilities, et cetera, are - are components of groundwater-based water delivery systems, and have been for the last 100 years, and I think it's reasonable to estimate their life span at 50 years.

MARGOT GARCIA: Margot Garcia. Just one more. In thinking about some of your earlier slides, actually, way back at the beginning -

MR. AVERY: Okay.

MARGOT GARCIA: - where you were looking at all the components of the water use, I was interested - you - I don't recall you had anything for leaks, and I know most water systems have a leak factor, and I kind of wondered what your - what the one is for Tucson Water, and - and how that plays into the system overall?

MR. AVERY: I - I went over that really fast -

MARGOT GARCIA: Okay.

MR. AVERY: - but I think we do have a component for leaks. Basically, it's about 7% of our use on single-family, and a similar percentage on multi-family.

MARGOT GARCIA: Is that something you're working on to bring that number down as a way of conserving water?

MR. AVERY: Yeah, and for - for a couple of reasons: It's important to ensure that we're able to deliver water on a reliable basis to our customers, and it's also important that - that leaks be detected by our customers quickly and that they be - be repaired quickly, because I can tell you having done this new job for the last couple of months that it's not much fun serving a huge water bill on someone whose water bill's been \$20 a month for the last couple years and then, all of a sudden it's \$400 or \$500. And so leaks aren't good for anyone, and - and they don't result in - in any kind of meaningful revenue to the Department; they're a huge hassle in terms of staff; they're a distraction and - and a serious issue for our customers and they're not in anyone's interest.

CHAIRMAN JIM BARRY: Thank you. Well, we got through it.

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CERTIFICATE

I hereby certify that, to the best of my ability, the foregoing is a true and accurate transcription of the audio recording of (Presentations, and Questions & Answers with Presenters) excerpts of the City County Water & Wastewater Study Oversight Committee Meeting held on June 25, 2008.
Transcription completed: August 26, 2008.

DANIELLE L. KRASSOW-TISDALE