

## UTILITY COMMITTEE MINUTES

February 3, 2005

The Utility Committee of the City of Mesa met in the lower level meeting room of the Council Chambers, 57 East 1st Street, on February 3, 2005 at 9:31 a.m.

COMMITTEE PRESENT	COMMITTEE ABSENT	STAFF PRESENT
Janie Thom, Chair Tom Rawles	Rex Griswold	None

Chairman Thom excused Committeemember Griswold from the meeting.

1. Hear an update on arsenic remediation from City wells.

Utilities Manager Dave Plumb stated that Water Quality Supervisor Alan Martindale was present to update the Committee on the current status of the law and staff's activities regarding arsenic remediation.

Mr. Martindale utilized a PowerPoint presentation (a copy is available for review in the City Clerk's office) to provide information on staff's efforts to enable the City to comply with the Environmental Protection Agency's (EPA) Arsenic Rule.

Mr. Martindale advised that the current Maximum Contaminant Level (MCL) of 50 parts per billion (ppb) allowed by the EPA for arsenic in drinking water will change to an MCL of 10 ppb effective January 23, 2006. He noted that the new MCL also requires changes to the Consumer Confidence Report (CCR) requirements. He explained that the Arsenic Rule defines arsenic as a "chronic" drinking water carcinogen, which means that the damage from exposure would occur over a long period of time. Mr. Martindale noted that the EPA based their determination on a 70-year exposure at two liters per day, and they utilized studies conducted in Taiwan and Chile that indicated an increased risk of bladder, lung and skin cancer. He noted that no studies have been completed in the United States. Mr. Martindale advised that "high exposure" to arsenic would be at the 300 to 400 ppb, and "low exposure" would be any number less than 300.

Mr. Martindale stated that EPA's health risk cost analysis estimated that the national cost to comply would be \$180 to \$205 million, and that the benefit of compliance would be \$140 to \$198 million. He added that an analysis conducted by the American Water Works Association indicated that the national cost to comply would be significantly higher. Mr. Martindale noted

that the natural occurrence of arsenic is higher in western states than in other parts of the country. He advised that the City investigated "treatment" and "non-treatment" options to address the problem, and he noted that the non-treatment method would be more cost effective and have less of a negative impact on the City. Mr. Martindale stated that staff approached the problem by recognizing that "treatment" options would also be necessary in order to comply with the regulations. He advised that the "alternate monitoring approach" allows an average of samples to be considered, including some higher and some lower than the MCL, provided that the annual average is lower than the MCL standard. He noted that this approach was the result of a successful lawsuit filed against the EPA in which Mesa was a participant.

Mr. Martindale stated that remediation efforts such as cleaning and "down hole" development on several City wells have been successful. He explained that arsenic occurs naturally in the ground and groundwater, but that the sources of the arsenic may be different. He advised that staff's investigation of methods to accomplish remediation at the well site resulted in the discovery that different locations within the well could have different arsenic levels. Mr. Martindale explained that at one well site, water from one section of the well could meet the MCL standard without requiring treatment or affecting production. He added that a different well site could require treatment that reduced production to a level where operation of the well was no longer feasible. Mr. Martindale stated that surface water sources have low arsenic levels, and that staff investigated the possibility of blending surface water with well water in order to comply with the EPA standard.

In regard to treatment options, Mr. Martindale reported that staff reviewed the treatment required at individual well sites, and that staff considered the possibility of utilizing a common site to treat a cluster of wells. He advised that the City of Mesa partnered with Arizona State University (ASU) and a local consultant to test arsenic removal media and technologies in a process similar to that utilized to remove carbon. Mr. Martindale noted that the joint effort resulted in the testing process being accomplished more efficiently and timely in a laboratory environment than at the well site. He added that the City of Mesa's efforts with regard to this unique testing approach have received national attention.

Mr. Martindale stated that City staff has reviewed bench level testing (which is accomplished in the laboratory), pilot testing (which is undertaken at a well site), and full-scale treatment to remove the arsenic in order to bring the water source into compliance. He advised that few arsenic removal facilities exist in the United States, but last year Phoenix became one of the first cities in the country to have an operational, full-scale plant. Mr. Martindale explained that the EPA provides a list of "best available technologies," but the technologies were designed to test surface water systems predominantly located in the eastern United States rather than western water or well water systems. He advised that substances found in western water, particularly silica, phosphate and vanadium, are designated as "competing contaminants" because they are more prevalent than arsenic and significantly lengthen the time required for the treatment process.

Mr. Martindale reported that the City initiated a pilot project at the Falcon Field 4 well site in order to evaluate the effectiveness of different types of arsenic removal media. He advised that products and technology are changing rapidly as a result of many companies attempting to address the arsenic remediation issue. Mr. Martindale noted that media tested a year and a half ago at the Falcon Field 4 well site has been significantly improved. He explained that utilizing media recommended by the EPA could require adding to the water certain chemical elements,

many of which are considered to be hazardous, in order to restore the pH balance. Mr. Martindale noted that the City's well sites are not staffed on a 24 hour basis, and that storing hazardous material at these sites could pose a potential risk to the general population. He stated that staff's goal is to identify an arsenic removal media that does not affect the pH balance of the water. Mr. Martindale advised that staff identified higher performing media, which provided sufficient data to enable staff to estimate the City's cost for full-scale treatment.

Mr. Martindale advised that the following CCR language is required for the indicated arsenic levels:

Greater than 5 ppb but less than 10 ppb.

"While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against balancing the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems."

Greater than 10 ppb & less than 50 ppb.

"Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer."

Addressing the compliance strategies for 13 wells, Mr. Martindale stated that eight sites exceed 10 ppb of arsenic and five sites range between 8 and 10 ppb. He noted that test numbers fluctuate, and therefore staff has included the additional five sites to ensure that all wells will be in compliance. Mr. Martindale advised that priorities were based on the wells that are required to function in order to operate the system, the wells that best fit into the schedule, and the cost to bring each well into compliance. He also noted that a parallel path development would be required in order to address time constraints.

Mr. Martindale reviewed the City's lab and pilot testing:

Falcon Field 4

- The Falcon Field 4 well site was one of the first in the nation to be tested, and pilot testing was completed in early 2004.
- The media identified as "best" in the test may be outdated.

In response to a question from Committeemember Rawles, Mr. Martindale explained that evaluations of media effectiveness change as comparisons are made to new products and technology on the market. He also noted that media performance varies from one well site to another due to different levels of arsenic and different levels of "competing contaminants." Mr. Martindale reported that Falcon Field 4 (FF 4) is the worst well site in the City or Mesa, and that the treatment proposal is presently at 90 percent design and will be ready for the formal bid process in the near future. He provided the following facts regarding the Falcon Field 4 well site:

- The City's highest levels of arsenic at 32 ppb.
- One of the highest producing wells in the City.
- Low levels of "competing contaminants" are present.
- Located at a strategic point in the City's distribution system.

Noting that City Well 26 (CW 26) is also a key well site, Mr. Martindale advised that two media that had good test results at FF 4 were not as effective at CW 26. He stated that pilot testing at FF 4 took eight months, and that bench scale testing at CW 26 was accomplished in seven weeks. He also advised that well sites in the Desert Wells 11 (DW 11) and the Desert Sage 9 (DS 9) zones would be tested in the next few months.

Mr. Martindale stated that an analysis completed by the consultant indicated that based on the number of on-site treatment facilities and the increased regulatory requirements, three (3) additional Utility positions would be required to meet these needs. He also noted that staff would require a higher level of certification in order to address the increased complexity and location of the systems.

Addressing the costs to implement arsenic treatment, Mr. Martindale advised that the competitive market and improved technology have reduced prices. He noted that the price for media has reduced from \$4 per pound several years ago to \$2 or less per pound in the current market. Mr. Martindale stated that in order to meet the EPA compliance deadline of January 2006, the City could not afford to delay implementation of arsenic remediation efforts. He identified the following locations as the "Can't wait, must act now sites" and listed the associated costs:

Arsenic Treatment Costs

- Falcon Field 4 (Arsenic)
  - \$4.7 million

Mr. Martindale noted that FF 4 is a very expensive site due to the high levels of arsenic.

- Falcon Field 15 (Arsenic and Nitrate)
  - Basin water lease (5 year)
  - \$100,000 mobilization
  - \$900,000 O & M (Operation and Maintenance)

Mr. Martindale advised that the FF 15 is a new site at Power Road and Guadalupe that is in the process of being equipped. He explained that this location would provide experience in setting up a modular system. Mr. Martindale also noted that arsenic remediation technology is changing rapidly, and that leases provide the City with flexibility without being committed to a process that may be obsolete in five years.

- City Well 26 (must be available by October 2006 for Val Vista dry up)
  - Absorptive media (5 year lease with buyout)
  - \$1,600,000 O & M
- Desert Wells 11 (Arsenic) – Critical DW zone well
  - Absorptive media (5 year lease with buyout)
  - \$1,640,000 O & M
- Desert Sage 9 (Arsenic) – Critical DS zone well

- Absorptive media (5 year lease with buyout)
- \$1,770,000 O & M

In response to a question from Committeemember Rawles, Mr. Martindale advised that the costs listed above include five years of Operations and Maintenance expense with a buyout at the end of the five-year lease. He summarized that the total project cost for eight wells (FF 4 plus seven additional wells) is estimated to be \$2 to \$3 million per site.

#### Projected Total Cost

- 8 wells (FF 4 & seven more with 5 year lease with buyout)
  - \$115,400,000 to \$21,700,000
- Additional wells (5 year lease with buyout)
  - Estimate \$2,000,000 to \$3,000,000 per site.

Mr. Martindale noted that additional wells would provide additional redundancy and flexibility to the existing system. He added that an analysis of the costs by the consultant and staff indicate that the five-year lease is the best alternative for the City.

Addressing the regulatory climate, Mr. Martindale advised that EPA does allow extensions, but the Arizona Department of Environmental Quality (ADEQ) does not.

Mr. Martindale summarized the presentation by outlining the following recommendations:

- Complete the treatment facility Falcon Field 4.
- Lease (or purchase) Basin Water ion exchange treatment for Falcon Field 15.
- Pursue five-year leases with buyout provisions for modular treatment systems at City Well 26, Desert Well 11 and Desert Sage 9.
- Continue remediation efforts for wells with arsenic levels lower than 11 ppb.
- Pursue short-term extensions with ADEQ.

Mr. Martindale stated that the official position of ADEQ is that no extensions will be allowed; however, he noted that specific issues exist for which exceptions may be allowed. Mr. Martindale explained that the Central Arizona Project (CAP) Water Treatment Plant is undergoing a growth phase and the construction tie-in will occur at the same time (January through March of 2006) that the City is required to comply with the EPA Arsenic Rule. He advised that ADEQ staff have expressed a willingness to cooperate with the City by providing a short-term extension in which to comply with the Arsenic Rule. Mr. Martindale added that the final recommendation is as follows:

- Continue studies at Mesa well sites.

Responding to a question from Committeemember Rawles regarding the EPA's national cost estimates to comply with the Arsenic Rule, Mr. Martindale agreed that the estimate of \$180 to

\$205 million is unrealistic. He added that the EPA determined that the new standard will save between 14 and 25 lives annually in the United States.

Committeemember Rawles expressed the opinion that the regulation appears to be illogical, but he concurred that the City was required to comply. He asked if the EPA and ADEQ have been advised of the City's cost estimates so that the EPA may provide more realistic assessments in the future.

Mr. Martindale responded in the affirmative, and he also noted that the EPA studied a stable population in Millard County, Utah where the arsenic level of the water was 50 to 150 ppb. He advised that when the preliminary results indicated that the population had lower incidences of cancer than the foreign studies, the EPA discontinued the study. The EPA explained that because the majority of the study's population consisted of Mormons who did not smoke and drink, the study was not representative of the United States' population.

Committeemember Rawles urged staff to continue testing the well sites and new technologies.

Chairman Thom expressed the opinion that the studies from Chile and Taiwan were likely impacted by other environmental factors.

Mr. Martindale concurred with Chairman Thom, and he noted that similar comments have been made to the EPA. He added that another significant issue of disagreement with the EPA is the difference between "high level" and "low level" exposure. Mr. Martindale explained that the Arsenic Rule is based on high-level exposure extrapolated in a straight line to low levels, but he noted that many scientists disagree with this method.

Discussion ensued relative to the fact that water standards could address other substances in the future, that the *Safe Drinking Water Act* requires a review of standards every six years; that new rules have to be proposed every six years; and that current efforts regarding drinking water standards are addressing microbiological contamination.

Mr. Martindale stated that vendors representing new remediation media and technologies contact staff on almost a weekly basis. He added that at a certain point in time, the City must make a decision to move forward with the remediation effort in order to comply with regulations in a timely manner. He further stated that staff is attempting to select a process that could continue to be utilized in the future as improvements are made to the media.

In response to Chairman Thom's suggestion relative to the City delaying a decision regarding the process and media in order to secure the best and most cost effective technology, Mr. Martindale noted that Maricopa County officials stated that all of the major Valley systems will be in compliance by the year 2006, and that all water supplied to Valley customers will have arsenic levels less than 10 ppb. He added that the County officials outlined actions that would result if a City failed to comply: the City would be required to provide written notification to each customer, the City would be assessed a \$10,000 fine per incident per well site, and the City's new subdivision plats would not be approved until the City complies with the MCL standard.

Mr. Martindale noted that the EPA requires treatment of all water even though only a small amount is utilized for drinking and cooking. He added that a less expensive approach would be to provide each water customer with a reverse osmosis system

In response to questions from Chairman Thom, Mr. Martindale advised that less than one percent of the water provided to homes is utilized for cooking and drinking needs. He added that almost 50 percent of Mesa's water customers have alternative sources in the home, either a water treatment system or purchased water. He stated that blending was a part of the Water Master Plan, but he cautioned that blending a good source with a lesser one could result in both being below the MCL standard, or the cost of the infrastructure to accomplish the blending could be more than the cost to treat an individual well. Mr. Martindale explained that the City planned to "cluster" future wells so that several could be easily blended or treated at a central location.

Chairman Thom reported that she has been addressing the issue of creating additional lakes as a means of providing the City with an additional source of surface water.

Mr. Martindale stated that surface water sources are more renewable than groundwater sources. He noted that the City of Mesa is presently interested in acquiring the Verde Water Treatment Plant from the City of Phoenix, which would increase storage on the Verde River side. He offered to assist Chairman Thom in her efforts.

Chairman Thom advised that assistance could be provided in the form of letters from the City to the State Natural Resources Chairman in the Legislature and letters to the Salt River Project. She stated that Assistant to the City Manager Jim Huling informed her that the ADEQ Chairman was the only authority for the 5 ppb recommendation.

Mr. Martindale stated that he was unaware of a recommendation for 5 ppb by ADEQ. He advised that the EPA did consider the 5 ppb level, and he expressed the opinion that the EPA may reconsider that level again in the future. He added that ADEQ was promoting levels in the range of 20 to 25 ppb prior to adoption of the Arsenic Rule.

Chairman Thom noted that ADEQ does not want to permit extensions, and she inquired regarding the process for policy development.

Mr. Martindale explained that the position regarding extensions is based on ADEQ's interpretation of the Arsenic Rule. He added that ADEQ does not prohibit extensions, but at the present time extensions are not being granted. He expressed the opinion that smaller systems may be allowed extensions, but extensions for larger systems may be difficult to obtain. He noted that Mesa's unique situation relative to the CAP treatment plant would result in a very short extension that would save \$8 to \$10 million.

Chairman Thom stated the opinion that improvements in technology would provide the greatest assistance to the City, and she thanked staff for the presentation.

Mr. Plumb responded to Committeemember Rawles' inquiry by noting that the presentation was an update for the Committee, and that contracts for related projects would be presented to the Council in the future.

2. Hear an update on graywater issues.

Mr. Plumb introduced Utility Conservation Supervisor Ann Testa who was present to provide an update on graywater issues.

Ms. Testa utilized a PowerPoint presentation (a copy is available for review in the City Clerk's Office). She also provided a copy of a "Residential Graywater Reuse Fact Sheet" (see Attachment) to each member of the Committee. She stated that the following was a definition of graywater:

"Wastewater that is collected separately from the sewage flow that originated from a washing machine, bathtub, shower or sink; but not from a kitchen sink, dishwasher or toilet."

Ms. Testa advised that the use of graywater has the potential to save 35 gallons per person in new construction and 46 gallons per day in existing homes. She noted that the difference between new and existing construction is that new homes are equipped with low flow fixtures. She outlined the following uses for graywater:

- Household gardening.
- Lawn and landscape irrigation.
- Composting.
- Irrigation of citrus and nut trees.

Ms. Testa noted that citrus and nut trees are the only food producing trees that can be flooded with graywater. She advised that a graywater drip system must be utilized for other food producing plants and trees.

Ms. Testa advised that in the past the process to obtain a permit to utilize graywater was complicated. She advised that in January 2001, ADEQ adopted a simplified process, the Reclaimed Water Type 1 General Permit, which includes the following:

- No formal notification to ADEQ.
- No review or design approval.
- No public notice, reporting or renewal.

Ms. Testa noted that the simplified permit process requests that the user follow the "13 Best Management Practices" (see Page 3 of the Attachment) and meet local building code requirements. She added that the City of Mesa's requirements regarding graywater systems are as follows:

- Modification or alteration to an existing plumbing system requires a permit.
- Included in the building permit for new construction.

Ms. Testa reported that House Bill 2323 has been introduced to propose a tax credit for the installation of a water conservation system. She advised that a "water conservation system" in the bill is defined as a system specifically designed to collect graywater or accomplish water harvesting for the purpose of outdoor use. She explained that water harvesting refers to water that is collected from the rooftop and stored for eventual outdoor use. Ms. Testa noted that the bill proposes a tax credit of \$200 to builders who incorporate graywater systems in new construction, and a tax credit of up to \$1,000 for homeowners who install a system after the home is constructed. She added that the credits are proposed to be effective in tax year 2006.

In response to a question from Chairman Thom, Ms. Testa advised that presently she is unaware of local contractors who install graywater systems. She noted that the ADEQ's simplified permit process and the proposed tax credits could create interest in these types of systems.

Chairman Thom suggested that House Bill 2323 be promoted in the customer newsletter that is included with City of Mesa utility bills. She expressed support for the utilization of graywater systems.

Mr. Plumb advised that graywater conservation enables the customer to utilize a considerable amount of their water twice. He noted that Mesa's water treatment plants produce a "near drinking water" quality of water that is then recharged. He added that Mesa presently has a high level of return on water resources, and that extensive utilization of graywater could result in long-term savings for the City by reducing the amount of water that flows into the treatment plants.

Committeemember Rawles stated the opinion that utilization of graywater is an excellent conservation practice. He noted that extensive use of graywater systems could negatively impact the revenue of the City's utility operations, and he commented that the City has the continuing dilemma of promoting conservation while ensuring that revenues remain stable.

Chairman Thom thanked staff for the presentations.

3. Adjournment.

Without objection, the Utility Committee Meeting adjourned at 10:42 a.m.

I hereby certify that the foregoing minutes are a true and correct copy of the minutes of the Utility Committee meeting of the City of Mesa, Arizona, held on the 3<sup>rd</sup> day of February 2005. I further certify that the meeting was duly called and held and that a quorum was present.

---

BARBARA JONES, CITY CLERK

baa

Attachment

# Residential Graywater Reuse Fact Sheet

## **What is graywater?**

Graywater is household wastewater, collected separately from your sewage flow that originates from the clothes washer, bathtub, shower or bathroom sink. It does not include water from a kitchen sink, dishwasher or toilet.

## **Why reuse graywater?**

Graywater represents the largest potential source of water savings for residential customers. Arizona Department of Water Resources estimates 35 gallons of graywater is generated each day per person in new construction, increasing to approximately 46 gallons each day per person in existing homes, or about 30,000 to 50,000 gallons of graywater per year.

## **Do I need a permit to use my graywater?**

If you calculate that your family will generate less than 400 gallons of graywater a day, you will not need a permit from the Arizona Department of Environmental Quality (ADEQ), but you must abide by the 13 best management practices (BMP's) outlined by ADEQ's Residential Graywater Reuse Rules, which went into effect January 2001. Many of these rules are based on the results of a graywater study conducted in the Tucson area, which can be viewed at [www.watercasa.org/research/residential/resindex.htm](http://www.watercasa.org/research/residential/resindex.htm).

Any modifications or alterations to an existing plumbing system will require a permit from the City of Mesa.

## **How do I safely use my graywater?**

### **At my home**

- Your residence must lie outside of the active flood plain.
- The graywater must originate from your residence.
- Your graywater must only be used for landscape irrigation at your residence.
- Your graywater must never be allowed to leave your property.

### **My system**

- Your graywater system needs to have a way to discharge to the septic or sewer system in the event of plugging or any other problem with your graywater quality or the system itself.
- Piping should be PVC or ABS.
- Make sure your graywater storage has a secure cover for safety and mosquito control.
- If above ground, make sure your graywater storage system is childproof.

**Do's**

- Your irrigation system should be operated to efficiently provide sufficient water to your plants while minimizing loss from deep percolation beyond the root zone.
- Filter your graywater with something as simple as a stocking to trap hair and lint.
- Regularly check your graywater system to be sure it is functioning properly.
- Use graywater for flood or drip irrigation only.
- Divert your graywater to your sewer or station system when laundering diapers or dyeing clothes.

**Don't**

- Don't drink your graywater.
- Don't use water from the laundering of diapers because the bacterial contamination is too high and is a health risk.
- Don't use water that contains hazardous chemicals such as those used for cleaning car parts, washing of greasy or oily rags, disposal of solutions from home photo labs or similar hobby activities.
- Don't allow your graywater to pond beyond what is necessary to effectively irrigate your plants. Standing water increases health risks and provides breeding opportunities for mosquitoes.
- Don't use your graywater for spray irrigation.
- Don't irrigate root or leaf crops (carrots, lettuce) intended for human consumption.
- Don't reuse your graywater if any family member has an infectious disease such as diarrhea, hepatitis or internal parasites.

## Reclaimed Water Type 1 General Permit

*Although you don't have to apply to receive a formal permit for permission to use graywater, you must abide by the 13 best management practices (BMPs), which were developed to protect public health and water quality.*

1. First and foremost, avoid human contact with graywater.
2. You may use graywater for household gardening, composting, and lawn and landscape irrigation, but it should not run off your own property.
3. Do not surface irrigate any plants that produce food, except for citrus and nut trees.
4. Use only flood or drip irrigation to water lawns and landscaping. Spraying graywater is prohibited.
5. When determining the location for your graywater irrigation, remember that it cannot be in a wash or drainage way.
6. Graywater may only be used in locations where groundwater is at least five feet below the surface.
7. Label pipes carrying gray water under pressure if confusion between graywater and drinking water pipes is possible.
8. Cover, seal and secure storage tanks to restrict access by small rodents and to control disease-carrying insects.
9. Hazardous chemicals such as antifreeze, mothballs and solvents cannot be in graywater. Do not include wash water from greasy or oily rags in your graywater.
10. Gray water from washing diapers or other infectious garments must be discharged to a residential sewer or other wastewater facility, or it can be disinfected prior to its use.
11. Surface accumulation of graywater must be kept to a minimum.
12. Should a backup occur, graywater must be disposed into your normal wastewater drain system. To avoid such a backup, consider using a filtration system to reduce plugging and extend the system's lifetime.
13. If you have a septic or other on-site wastewater disposal system, your graywater use does not change the system's design requirements.

*Source: Using Gray Water at Home, ADEQ publication No. C01-06*