WATER COMMITTEE
Thursday, March 16, 2023, 9:30 AM
SRP Administration Building
1500 N. Mill Avenue, Tempe, AZ  85288

Committee Members:  Paul Rovey, Chairman; Leslie C. Williams, Vice Chairman; and Anda McAfee, Randy Miller, Krista O’Brien, Mark Pace, and Jack White Jr.

Call to Order
Roll Call

1. **CONSENT AGENDA:** The following agenda item(s) will be considered as a group by the Committee and will be enacted with one motion. There will be no separate discussion of these item(s) unless a Committee Member requests, in which event the agenda item(s) will be removed from the Consent Agenda and considered as a separate item ................................................................. CHAIRMAN PAUL ROVEY

   - Request for approval of the minutes for the meeting of February 21, 2023.

2. **Solar on Canals** .......................................................... ROBERT PANE

   Informational presentation regarding a proposed study to investigate the costs and potential benefits of installing solar panels over open canals.

3. **Wintertime Cloud Seeding Potential in the White Mountains of Arizona** .......................................................... JAMES WALTER

   Informational presentation regarding a recently completed study by the Desert Research Institute on wintertime cloud seeding potential in the White Mountains of Arizona to enhance snowfall production.

4. **SRP Aquifer Management Research and Analysis** ...............SHARON MORRIS

   Informational presentation regarding SRP aquifer management research and analysis, including groundwater modeling of potential future pumping scenarios and the impact of increased groundwater pumping on water levels in the SRP water service area.

5. **Report on Current Events by the General Manager and Chief Executive Officer or Designees** ........................................ MIKE HUMMEL

6. **Future Agenda Topics** .......................................................... CHAIRMAN PAUL ROVEY
The Committee may vote during the meeting to go into Executive Session, pursuant to A.R.S. §38-431.03 (A)(3), for the purpose of discussion or consultation for legal advice with legal counsel to the Committee on any of the matters listed on the agenda.

The Committee may go into Closed Session, pursuant to A.R.S. §30-805(B), for records and proceedings relating to competitive activity, including trade secrets or privileged or confidential commercial or financial information.

Visitors: The public has the option to attend in-person or observe via Zoom and may receive teleconference information by contacting the Corporate Secretary's Office at (602) 236-4398. If attending in-person, all property in your possession, including purses, briefcases, packages, or containers, will be subject to inspection.

THE NEXT WATER COMMITTEE MEETING
IS SCHEDULED FOR TUESDAY, APRIL 18, 2023

03/09/2023
A meeting of the Water Committee of the Salt River Project Agricultural Improvement and Power District (the District) convened at 9:30 a.m. on Tuesday, February 21, 2023, from the Board Conference Room at the SRP Administration Building, 1500 North Mill Avenue, Tempe, Arizona. This meeting was conducted in-person and via teleconference in compliance with open meeting law guidelines. The District and Salt River Valley Water Users’ Association (the Association) are collectively known as SRP.

Committee Members present at roll call were P.E. Rovey, Chairman; L.C. Williams, Vice Chairman; and A.G. McAfee, R.J. Miller, K.H. O’Brien, M.V. Pace, and J.M. White Jr.


In compliance with A.R.S. §38-431.02, Andrew Davis of the Corporate Secretary’s Office had posted a notice and agenda of the Water Committee meeting at the SRP Administration Building, 1500 North Mill Avenue, Tempe, Arizona, at 9:00 a.m. on Friday, February 17, 2023.

Chairman P.E. Rovey called the meeting to order.

Consent Agenda

Chairman P.E. Rovey requested a motion for Committee approval of the Consent Agenda, in its entirety.

On a motion duly made by Board Member M.V. Pace and seconded by Vice Chairman L.C. Williams, the Committee unanimously approved and adopted the following item on the Consent Agenda:

- Minutes of the Water Committee meeting on January 17, 2023, as presented
Corporate Secretary J.M. Felty polled the Committee Members on Board Member M.V. Pace’s motion to approve the Consent Agenda, in its entirety. The vote was recorded as follows:

YES: Board Members P.E. Rovey, Chairman; L.C. Williams, Vice Chairman; and A.G. McAfee, R.J. Miller, K.H. O’Brien, M.V. Pace, and J.M. White Jr. (7)
NO: None (0)
ABSTAINED: None (0)
ABSENT: None (0)

2024 Association Water Budget

Using a PowerPoint presentation, Michael S. Mendonca, SRP Senior Director of Water Services, stated that the purpose of the presentation was to provide information regarding the Association’s proposed Fiscal Year 2024 (FY24) water function budget, which will include proposed Calendar Year 2024 (CY24) water pricing. He stated that the Association’s water function budget will be included as part of the District’s overall water function budget for FY24.

Mr. M.S. Mendonca said that by 2035, 60% of the irrigation and drainage operations and maintenance expenses will be met from electric revenues, and the total amount of financial support to water system operations and maintenance will not exceed 2.5% of total electric revenues.

Mr. M.S. Mendonca reviewed forecasts for the District’s support of the Association’s water functions, as a percentage of electric revenues from FY21 to FY35. He provided the draft Statement of Revenues and Expenses Association budget for FY24 with changes from FY23.

Mr. M.S. Mendonca reviewed the proposed price and fee recommendations along with the changes from CY23 to CY24. He compared price per acre-foot to the cost charged by other districts as of CY23 and reviewed the draft Association capital budget for FY24 with changes from FY23. Mr. M.S. Mendonca concluded with a discussion of next steps.

Mr. M.S. Mendonca responded to questions from the Committee.

Copies of the PowerPoint slides used in this presentation are on file in the Corporate Secretary’s Office and, by reference, made a part of these minutes.

Council Member M.L. Farmer; and Ms. K.J. Barr entered the meeting during the presentation.

Per and Poly-Fluoroalkyl Substances (PFAS) Overview
Using a PowerPoint presentation, Robert M. Vertefeuille, SRP Manager of Environmental Laboratory and Field Services, stated that the purpose of the presentation was to provide information regarding PFAS, including a description, status of known health risks, and efforts by the Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (ADEQ).

Mr. R.M. Vertefeuille provided the following explanation of PFAS according to the Agency for Toxic Substances and Disease Registry: widely used long-lasting stable chemical bonds which provide non-stick/water-resistant properties and are mobile and bioaccumulate. He stated that more than 5,000 types of PFAS exist.

Mr. R.M. Vertefeuille provided diagrams of long-chain PFAS compounds known as Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS), which are the compounds being phased out by the industry and most widely studied and used. He said that PFAS can be found in the following places: fire extinguishing foam, personal care products, household products and dust, manufacturing or chemical production facilities, food (e.g., fish, dairy products), food packaging, drinking water, solid/water near waste sites, and biosolids.

Mr. R.M. Vertefeuille stated that the EPA is conducting research on PFAS health effects contained in consumer products, industrial exposures, and contaminated drinking water, and outlined the EPA’s proposed key actions. He provided details of the EPA’s lifetime drinking water health advisory levels, along with the ADEQ’s developments in Arizona of its assessment monitoring and areas of PFAS detection.

Mr. R.M. Vertefeuille concluded with a discussion regarding SRP’s approach in assembling a cross-functional team to assess issues pertaining to the monitoring of PFAS regulatory activity, tracking of developing science, and initiation of conversations with municipal drinking water providers. He responded to questions from the Committee.

Copies of the PowerPoint slides used in this presentation are on file in the Corporate Secretary’s Office and, by reference, made a part of these minutes.

Messrs. T.J. Burnett, J.W. Hubbard, and A.S. Kosednar left the meeting.

Executive Session: Legal Issues and Legal Risks re: PFAS

Chairman P.A. Rovey requested a motion to enter into executive session, pursuant to A.R.S. §38-431.03(A)(3), to have discussion or consultation with attorneys and give instructions related to the legal issues and legal risks associated with PFAS, including their interaction with SRP water supply and operations, and a report on anticipated regulatory trends from the EPA and the ADEQ.

On a motion duly made by Board Member J.M. White Jr., seconded by Board Member M.V. Pace and carried, the Water Committee convened into executive session at 10:20 a.m.
Corporate Secretary J.M. Felty polled the Committee Members on Board Member J.M. White Jr.'s motion to enter into executive session. The vote was recorded as follows:

YES: Board Members P.E. Rovey, Chairman; L.C. Williams, Vice Chairman; and A.G. McAfee, R.J. Miller, K.H. O'Brien, M.V. Pace, and J.M. White Jr.  (7)

NO: None  (0)

ABSTAINED: None  (0)


Report on Current Events by the General Manager and Chief Executive Officer or Designees

Mike Hummel, SRP General Manager and Chief Executive Officer, reported on a variety of federal, state, and local topics of interest to the Committee. He provided updates on the watersheds, budgets, and the Coolidge Expansion Project (CEP).

Mmes. M.M. Klein and S.S Morris; and Messrs. B.F. Pane and R.M. Vertefeuille left the meeting during the report.

Future Agenda Topics

Chairman P.E. Rovey asked the Committee if there were any future agenda topics. None were requested.

There being no further business to come before the Water Committee, the meeting adjourned at 10:54 a.m.

John M. Felty
Corporate Secretary
Agenda

• Current solar on canal projects
• Benefits and challenges
• Objectives
• Next Steps
Solar on Canal Projects

- India
- Gila River Indian Community
- Turlock Irrigation District
Potential Benefits to SRP

- Use of existing BOR land
- Evaporation savings
- Impacts to aquatic vegetation growth
- Renewable generation source
Maintenance Considerations

- Safety and clearance concerns for equipment
- Reduce maintenance efficiencies and increase costs
- May require specialized equipment
- Increased shade may increase infestation of quagga mussels
Study Locations

Arizona Falls

PERA Club
ASU Research Objectives

• Evaluate site locations
• Measure and calculate potential evaporation savings
• Investigate solar panel efficiency
SRP/Consultant Objectives

- Determine optimum system design
- Investigate impacts to aquatic vegetation
- Evaluate maintenance efficiency considerations
- Understand cost/benefit
- Assess public safety implications
- Develop options for distribution interconnection
- Study invasive species infestation
## Installation Estimates

<table>
<thead>
<tr>
<th>Description</th>
<th>Utility Scale (1-Axis Tracking)</th>
<th>Canal Mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Modules ($/kW)</td>
<td>416</td>
<td>416</td>
</tr>
<tr>
<td>Additional Electrical Equipment ($/kW)</td>
<td>288</td>
<td>288</td>
</tr>
<tr>
<td>Site and Structure ($/kW)</td>
<td>185</td>
<td>2,626 - 4,981</td>
</tr>
<tr>
<td>Indirect Costs ($/kW)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Engineering Fee &amp; Constr. Man. ($/kW)</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Total Plant Cost, $/kW</td>
<td>959</td>
<td>3,400 - 5,755</td>
</tr>
</tbody>
</table>
# Economic Analysis for 1 MW System

<table>
<thead>
<tr>
<th>Description</th>
<th>Utility Scale (1-Axis Tracking)</th>
<th>Canal Mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Factor (%)</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>Annual Energy (MWh)</td>
<td>2,891</td>
<td>1,752</td>
</tr>
<tr>
<td>Total Plant Cost ($/MWh)</td>
<td>331</td>
<td>1,300 – 3,200</td>
</tr>
<tr>
<td>LCOE ($/MWh)*</td>
<td>30 - 41</td>
<td>110 - 190</td>
</tr>
</tbody>
</table>

*Lazard Levelized Cost of Energy Analysis*
Next Steps

- Conduct ASU baseline data gathering at two proposed sites
- Select SRP design consultant
- Develop preliminary design plans
- Collect data and evaluate results
- Explore federal funding sources
Questions?
Wintertime Cloud Seeding Potential in the White Mountains of Arizona

Water Committee Meeting

March 16, 2023

James Walter
Cloud Seeding 101

- Clouds that exist in sub freezing environments contain both ice crystals and liquid cloud drops (supercooled liquid water)
- Ice crystals grow at the expense of the liquid cloud drops through sublimation
- Due to limited Ice crystals in sub freezing clouds the precipitation production is limited and inefficient
- Increasing the number of ice crystals increase precipitation efficiency
Cloud Seeding 101
SRP’s History with Cloud Seeding
What’s Different?

Cloud seeding for snow: Does it work? Scientists report first quantifiable observations

Researchers traced transition of ice crystals into snowflakes
WHITE MOUNTAIN APACHE TRIBE
A Sovereign Tribal Nation

(Approval of Winter Cloud Seeding Research Memorandum of Understanding with Salt River Project)

WHEREAS, the White Mountain Apache Tribe has sovereign authority over the water resources within the Fort Apache Indian Reservation including investigation and management of precipitation and snowfall for the purpose of administering and promoting the availability of the Tribe’s water resources; water conservation planning and development; and

WHEREAS, the establishment of a research partnership between the White Mountain Apache Tribe and the Salt River Project to investigate the feasibility of winter water augmentation through winter cloud seeding over the upper Salt River watershed would be beneficial to the White Mountain Apache Tribe and Salt River Project.

WHEREAS, the White Mountain Apache Tribe and the Salt River Project agreed to jointly develop research objectives, prepare requests for proposals from qualified mutually agreed upon vendor(s), and actively participate in any research that is initiated as a result of this partnership and

WHEREAS, Salt River Project has agreed to provide funding for on-ground upper Salt River winter cloud seeding research, with the option to work additional, jointly agreed upon funding process as included in the MOU, which is attached to this resolution and incorporated by reference herein;

WHEREAS, Cheryl Park, Director of the WMAT Water Resource Department, has negotiated the terms of a proposed MOU between the White Mountain Apache Nation and Salt River Project, with the involvement of water rights counsel Cooley, Godish, who concludes that he has no legal objection to the proposed research and partnership as described in the attached Water Resource Agreement

WHEREAS, the MOU provides that either party can terminate the MOU upon written request to the other party within 30 days of written notice of the effective date of the termination.

WHEREAS, the MOU specifically states that the sovereign immunity of the White Mountain Apache Tribe is not waived by the Tribe signing the MOU.

WHEREAS, it is recommended by Water Resources Program Director Cheryl Park that the MOU be approved, and the Tribal Council the following resolution:

The Salt River Project and the White Mountain Apache Tribe will provide the White Mountain Apache Tribe with valuable knowledge along the terms of the memorandum of understanding. The MOU is a significant step towards enhancing water resources for the Tribe.
White Mountain Cloud Seeding Climatology

Research Tasks

1. Evaluate cloud seeding potential using long-term climate observations

2. Evaluate cloud seeding potential using a high-resolution numerical weather model

3. Identify potential target area and cloud seeding methodologies

4. Perform cost benefit analysis from results of task 1-3 and a hydrology model
Cloud Seeding Potential or Frequency

- Frequent seeding opportunities during all winters studied
- Seeding opportunities were associated with higher terrain
- Seeding opportunities were associated with active periods of precipitation
- Greatest seeding opportunities associated with clouds between 9,000 and 13,000 feet (115-400+ hours during an average winter)
Target Area and Seeding Methodology
Benefits

**100-Hour Program**

**Snowpack (snow water – aka SWE)**
- 50,000 af of snow water at a cost of $4 /af from ground-based seeders
- 50,000 to 100,000 acre-feet of snow water at a cost of $7 to $14 /af from aircraft

**Surface Water Flows**
- Result in 10,000+ acre-feet of surface water flows at a cost of $21 to $70 /af
Benefits

Economic Benefits
- Increased winter recreation
- Summer/Fall hunts

Forest Health Benefits
- Increased soil moisture
- Shorter fire season
- Cooler microclimates

Ecological Benefits
- Cooler stream temperatures
- Improved riparian areas
- Improved springs

Climate Benefits
- Enhanced snowpack
- Offset increase in snow loss
Potential Next Steps

Continued collaboration with White Mountain Apache Tribe

Enhanced precipitation/temperature measurements

Measure supercooled liquid water
- Cameras on icing sticks
- Icing sensor
- Radiometer

Small scale pilot program
- A couple generators seeding a small target area
- Sample snow for evidence of seeding
- Control / target analysis

Larger scale pilot program
- Sample snow for evidence of seeding
- Control / target analysis
thank you!
Aquifer Management Research and Analysis

Water Committee Meeting
March 16, 2023

Sharon S. Morris & Shuyun Liu
Aquifer Management

- CAP Water Supply Shortage
- Potential Groundwater Pumping Increase
  - Reduction in GSF deliveries
- Long-term Storage Credit Recovery
Historical SRP Pumping vs. Planned Future SRP Pumping

Historical SRP Pumping
(1983-2021)

Planned Future SRP Pumping
(2021-2125)
Evaluate SRP Peak Pumping on Water Level Conditions

- Updated ADWR’s Salt River Valley (SRV) Regional Groundwater Flow Model
- Focused on GRUSP Area
- 20-year Projection Period
- Four Model Scenarios

Active Model Area: Approximately 2,500 square miles
# Groundwater Model Scenarios

## Four Model Scenarios, 20-year Projection Period (2023-2043)

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>SRP Pumping (AFY)</th>
<th>Est. East Valley City Pumping</th>
<th>Est. RWCD Pumping</th>
<th>Est. Other Non-SRP Pumping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1 = Baseline</td>
<td>130,000</td>
<td>10-year average</td>
<td>10-year average</td>
<td>10-year average</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>200,000</td>
<td>2 X 10-year average</td>
<td>35,750</td>
<td>10-year average</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>300,000</td>
<td>2 X 10-year average</td>
<td>35,750</td>
<td>10-year average</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>400,000</td>
<td>2 X 10-year average</td>
<td>35,750</td>
<td>10-year average</td>
</tr>
</tbody>
</table>
Baseline Model
Scenario Simulated
Depth to Water

- Projection Period: 2023 to 2043
- SRP Pumping of 130K AFY
Baseline Scenario: SRP Pumping of 130K AFY

Simulated Depth to Water (ft) in GRUSP Area in Baseline Scenario
- 10-year (2033): 85~230 ft
- 20-year (2043): 85~236 ft
- Depth to water is 1-5 ft greater in most areas in 2043 than in 2033
Simulated Water Level Decline from Baseline Scenario (2023-2043)

Additional WL Decline in GRUSP Area from 130K AFY (baseline) to:

- 200K AFY Pumping = 100~150 ft
- 300K AFY Pumping = 150~200 ft
- 400K AFY Pumping = 250~315 ft

03/16/2023 Water Committee Presentation, S. Morris and S. Liu
Comparison of Hydrographs at GRUSP Monitoring Wells for SRP Pumping Scenarios
Comparison of Hydrographs at GRUSP Monitoring Wells for SRP Pumping Scenarios

Simulated Depth to Water at GRUSP MW-1 in 2043:

<table>
<thead>
<tr>
<th>Projected Pumping</th>
<th>Depth to Water Below Land Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>130K AFY</td>
<td>174 ft</td>
</tr>
<tr>
<td>200K AFY</td>
<td>300 ft</td>
</tr>
<tr>
<td>300K AFY</td>
<td>370 ft</td>
</tr>
<tr>
<td>400K AFY</td>
<td>429 ft</td>
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</tbody>
</table>
## Study Results Over 20-year Projection Period

<table>
<thead>
<tr>
<th>SRP Pumping Volume</th>
<th>Est. DTW in GRUSP Area</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>130K AFY (Baseline Scenario)</td>
<td>85~236 (ft)</td>
<td>DTW = current conditions</td>
</tr>
<tr>
<td>200K AFY</td>
<td>200~388 (ft)</td>
<td>DTW = pre-GRUSP era</td>
</tr>
<tr>
<td>300K AFY</td>
<td>270~456 (ft)</td>
<td>DTW = pre-groundwater code era (1980s)</td>
</tr>
<tr>
<td>400K AFY</td>
<td>330~519 (ft)</td>
<td>DTW = pre-1980s Model crashed after 20-year simulation</td>
</tr>
</tbody>
</table>
Key Takeaways

• Up to 200,000 AFY SRP pumping without significant depletion in GRUSP area

• Next steps:
  • Further evaluate projections of non-SRP pumping within SRP water service area
  • Work with municipalities to gain a better understanding of their recovery planning
Thank You