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Recovery Planning Advisory Group
Credit Distribution and Firming Methods

Name of Method:

- Self-Firming with AWBA LTSCs

Description of Method:

- AWBA LTSCs are transferred to a subcontractor through CAWCD, at no cost, for recovery by the firming entity in place of a CAP delivery.

This Method works well . . .

- If a subcontractor has well capacity to recover credits.
- To keep the firming water cost low.
- To delay the necessity of developing new infrastructure for recovery of LTSCs.

This Method may be less suitable . . .

- If there is limited well infrastructure.
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Additional Comments:

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#2

Recovery Planning Advisory Group

Credit Distribution and Firming Methods

Name of Method:

- Credit Exchange between CAWCD and Subcontractor

Description of Method:

- A CAP Subcontractor with a scheduled delivery to an Underground Storage Facility agrees to have CAWCD hold recovery well permits for its wells, and to accept recovered water in exchange for a reduced delivery of CAP water to the USF. The CAP water that was not physically delivered is available to firm other CAP customers. This is a water-for-water exchange with CAWCD providing the recovered water and the subcontractor providing the CAP water for CAWCD to deliver to users that require direct delivery of firming water.

This Method works well . . .

- With CAP customers performing annual storage and recovery.
- When the CAP customer is storing at or near a USF with AWBA LTSCs.
- To satisfy interstate recovery during shortage and non-shortage conditions.
- Because it does not require increased well pumping.
- To keep the firming water cost low.
- To delay the necessity of developing new infrastructure for recovery of LTSCs.

This Method may be less suitable . . .

- If there are subcontractors performing ASR unwilling to enter into Recovery Exchange Agreements.
- If subcontractors are unwilling to accept LTSC's from certain facilities which limits the flexibility of this method.

Additional Comments:

- Subcontracts must be willing to have their wells permitted by CAWCD as recovery wells.

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Credit Distribution and Firming Methods

Name of Method:

- Indirect Recovery by CAWCD and Subcontractor or Other Party

Description of Method:

- LTSCs are pumped from recovery wells permitted by CAWCD and delivered by a CAP recovery partner to fulfill a portion of a CAP customer's order that would have otherwise been directly delivered. The CAP water that was not physically delivered through exchange is available to firm other customers. In this method, recovered water is not returned directly to the CAP system, but is either used directly or placed into a conveyance system other than the CAP.

This Method works well . . .

- When a CAP recovery partner or third party has additional recovery well capacity available to use when CAP deliveries are reduced.
- When recovered water can either be directly used or placed into a conveyance system other than the CAP system and delivered to the customer.
- To satisfy interstate recovery during shortage and non-shortage conditions.

This Method may be less suitable . . .

- If there is no unused well capacity available.
- If there is no connection to third party wells.
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Additional Comments:

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Recovery Planning Advisory Group
Credit Distribution and Firming Methods

Name of Method:

- Direct Recovery from New CAWCD Wellfield

Description of Method:

- CAWCD constructs and permits well(s) in proximity to the CAP aqueduct that are used to recover LTSCs transferred by the AWBA. CAP discharges the recovered water into the canal. The water qualifies as "Firming Water" under the System Use Agreement, and is delivered to customers, or classes of customers, that are firming by the AWBA. The method increases the total volume of physical water in the CAP system.

This Method works well . . .

- When dedicated well capacity is needed to meet customer demands
- When credit exchange and indirect recovery capacity is limited
- To satisfy interstate recovery during shortage and non-shortage conditions
- To reduce the Fixed OM&R rate for all CAP customers because the delivery volume is increased

This Method may be less suitable . . .

- When timing is critical
- If upfront funding is constrained
- If capital costs for the construction or rehabilitation of infrastructure are excessive
- When the water requires treatment before introduction
- If infrastructure is idled for long periods
- If appropriate sites within proximity to the CAP canal are limited

Additional Comments:

- Costs will be affected by the water quality standards adopted by CAWCD & USBR

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Credit Distribution and Firming Methods

Name of Method:

- Leverage LTSC (Long Term Storage Credit) Accrual

Description of Method:

- During shortage conditions there will likely continue to be Municipalities/Utilities that continue to be able to accrue LTSC's. Example: Tucson Water presently has the ability to accrue LTSC's at a rate of more than 30% of its entitlement. A shortage that resulted in a cut of 15% for CAP customers would still mean that Tucson could continue to accrue LTSC's during that shortage. In lieu of (or to delay) building expensive recovery and treatment facilities for Water Bank recovery (that would get intermittent use), Tucson could be paid to not accrue some of its credits in that year, and Water Bank could have that water delivered to customers who cannot withstand the shortage cuts.

This Method works well . . .

- To (at a minimum) delay the need for recovery and treatment facilities from facilities such as Tonopah
- Reduces near term costs, as it will be less expensive to pay a Utility/Municipality to not accrue some of its LTSC's than it will be to construct recovery, and treatment facilities, as well as operate those facilities, and maintain them in operational condition until needed.
- Preserves Water Bank LTSC's stored at locations such as Tonopah, for future deeper shortages on the River.
- It is not limited to use within a single AMA. Example: Water originally intended to be delivered to an entity such as Tucson Water (where it might accrue LTSC's) could instead be delivered to surface water treatment plants in the Phoenix AMA.

This Method may be less suitable . . .

- If shortage conditions result in a need to cut deliveries to customers such that there is no ability for Municipalities/Utilities to accrue LTSC's. At that point recovery could still be instituted for facilities such as Tonopah, as the LTSC's accrued at those locations will not have been depleted.

Additional Comments:

- During shortage conditions residential and commercial customers will naturally curtail their water usage, which should also help with the ability for utilities/municipalities to leverage their LTSC accrual.

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Credit Distribution and Firming Methods

Name of Method:

- Lower Santa Cruz Recovery using CAP canal.

Description of Method:

- Physical Recovery through wells that discharge into the Central Arizona Project Canal. A local entity could use the ad valorem tax money to drill, complete, and connect wells as needed. This should be accomplished in a timely method and with a specific volume needed by approach.

This Method works well . . .

- Water can be efficiently recovered as needed in a timely manner
- Canal is the main conduit and can deliver water to current M and I subcontractors south of Lower Santa Cruz Project
- Physical, "wet" water recovery
- Long Term Storage Credits could be recovered as well

This Method may be less suitable . . .

- How to schedule well drilling and connection
- Depending on available land for well location. Power, and canal infrastructure
- Some evaporation losses in Canal
- Canal capacity could be limited due to other water availability
- Mechanism for power billing, maintenance and control
- Water Quality issues such as PFOS could be an issue

Additional Comments:

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Credit Distribution and Firming Methods

Name of Method:

- SRP-CAP Interconnection Facility (SCIF)

Description of Method:

- This approach would require new infrastructure to be built that would allow Salt & Verde River water to be delivered into the CAP canal. SRP would recovery AWBA credits and deliver those credits to the CAP canal for direct delivery to M&I customers on the CAP canal. AWBA has over 400,000 af of credits stored within the SRP water service area that could be recovered and delivered through the SCIF

This Method works well . . .

- When AWBA credits stored within the SRP water service area are needed to be delivered to a municipal treatment plant on the CAP canal
- Can be used both upstream and downstream of the new interconnect facility
- Not limited to operational exchanges

This Method may be less suitable . . .

- When time is of the essence, new infrastructure is required
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Additional Comments:

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Recovery Planning Advisory Group Credit Distribution and Firming Methods

Name of Method:

- USF Credit Distributions for Non-Wheeling Partners

Description of Method:

- In TAMA some AWBA credits are stored in USFs owned and operated by entities other than CAP such as Tucson Water. Using existing infrastructure and agreements, USF operators can recover and deliver AWBA credits to their storage and wheeling partners.

But what about the case where AWBA credits need to be distributed to entities which do not currently have storage and wheeling agreements with the USF operator? In this case the USF operator will pump AWBA credits from its own facility for its own use while leaving a portion of its CAP allocation in the canal for the use of the other entity. This will require a credit transfer of existing AWBA storage credits in the USF to the USF operator.

This Method works well . . .

- When the entity not involved in a wheeling agreement with the USF operator can receive direct deliveries from CAP.

This Method may be less suitable . . .

- When the entity not involved in a wheeling agreement with a USF operator cannot receive direct deliveries from CAP.

Additional Comments:

- The owner/operator of a USF should have the authority to manage that facility for recovery of their own credits and recovery of AWBA credits designated for them as they see fit. However, for non-USF operators, recovery of AWBA credits should be limited to the actual physical credits stored in that facility. For instance, AWBA credits physically stored at a GSF and intended for the use of a party other than Tucson Water should not be recovered from a Tucson Water-operated USF, unless specifically agreed to by Tucson Water.

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Credit Distribution and Firming Methods

Name of Method:

- AWBA credit transfers pumped by Tucson Water

Description of Method:

- AWBA firming credits can be transferred to entities
- Firming credits will be pumped by Tucson Water and wheeled to entities
- During shortage this method could supplement cuts to allocations

This Method works well . . .

- Wet water is being wheeled to entities who hold credits
- Water will be available to entities who do not own recharge projects
- Inter AMA firming could be used as a model

This Method may be less suitable . . .

- Where entities must have wheeling agreements and recovery permits to Tucson facilities
- For entities that do not have an infrastructure connection to Tucson's delivery system

Additional Comments:

- Wet water pumping at CAVSARP or SAVSARP increases Tucson Water's total storage capacity
- A question of who the recovery costs are paid to?

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Credit Distribution and Firming Methods

Name of Method:

- SRP-CAP Operational Exchange

Description of Method:

- SRP and CAP water delivery systems have a one-way interconnect whereby CAP water can be delivered into the SRP water delivery system. This approach relies on balancing water orders for CAP and SRP water on both systems to meet operational needs throughout the calendar year. AWBA has over 400,000 af of credits stored within the SRP water service area that could be recovered and delivered through the SRP system or exchanged with CAP water

This Method works well . . .

- When CAP water is scheduled to be delivered to SRP system
- When AWBA credits stored within SRP water service area are schedule to be delivered to customers at their SRP points of delivery
- No additional infrastructure required
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This Method may be less suitable . . .

- Limited by scheduled M&I deliveries of CAP water to SRP system
- Only available for delivery off SRP delivery system. Not available at municipal CAP water treatment plants
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Additional Comments:

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Credit Distribution and Firming Methods

Name of Method:

- AWC Proposal #1 - Indirect Recovery Method

Description of Method:

- CAWCD constructs strategically located recovery wells and infrastructure that will be used to deliver water to the subcontractor's water campus/treatment plant. Subcontractor will bear all O&M cost for the recovery wells and treatment of recovered CAP water, subject to certain water quality parameters. Subcontractors will pay capital cost to construct or expand water treatment plant capacity to accept recovered CAP water. Subcontractor's recovery method will allow CAP water to be delivered to other subcontractors that would otherwise not be available.

This Method works well . . .

- Significantly reduces O&M cost and capital cost for treatment plant and recovery wells to CAWCD.
- Addresses water quality issues
- If recovery well sites with close proximity of the CAP canal are not available
- When dedicated well capacity is needed to meet customer demands

This Method may be less suitable . . .

- Where water quality of recovered water is not suitable for existing nitrate and arsenic water treatment plants
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Additional Comments: Capital and O&M cost avoided by CAWCD and other subcontractors

- For an Arsenic Plant, the capital cost is \$2,000.00 dollars per ac/ft. The cost of treatment can range from \$150.00 to \$200.00 dollars per ac/ft.
- For a Nitrate Plant, the capital cost is \$3,000.00 dollars per ac/f. The cost of treatment can range from \$500.00 to \$600.00 per ac/ft

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Recovery Planning Advisory Group Credit Distribution and Firming Methods

Name of Method:

- AWC Proposal #2 - Combination of Indirect Recovery Method with Direct Recovery Component.

Description of Method:

- In addition to the benefits of AWC recovery method #1; CAWCD would construct strategically located wells to allow recovery of stored CAP water into the CAP canal to satisfy non-potable uses of CAP water

This Method works well . . .

- Significantly reduces O&M cost and capital cost for treatment plant and recovery wells to CAWCD
- Addresses water quality issues
- When dedicated well capacity is needed to meet customer demands
- Provide physical supply
- Recovery wells located within two to three miles of CAP canal or non-potable CAP customers

This Method may be less suitable . . .

- If water quality parameters are incompatible with existing groundwater water treatment plants
- If recovery well sites within close proximity of the CAP canal are not available

Additional Comments: Capital and O&M cost avoided by CAWCD and other subcontractors

- For an Arsenic Plant, the capital cost is \$2,000.00 dollars per ac/ft. The cost of treatment can range from \$150.00 to \$200.00 dollars per ac/ft.
- For a Nitrate Plant, the capital cost is \$3,000.00 dollars per ac/f. The cost of treatment can range from \$500.00 to \$600.00 per ac/ft
- O&M cost for pumping recovery well borne by participating subcontractors and not CAWCD or other subcontractors

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Recovery Planning Advisory Group Credit Distribution and Firming Methods

Name of Method:

- AWC Proposal #3 – Indirect Recovery Method

Description of Method:

- Subcontractor recovers stored CAP water in advance of or in preventing shortage. Subcontractor still delivers CAP water to GSF instead receiving its CAP water
- Recovery well to subcontractor groundwater water treatment plant from recovery wells constructed by CAWCD.
- O&M of recovery and treatment paid by subcontractor
- Capital cost of treatment paid by subcontractor subject to acceptable water quality parameters treatable by water treatment plant

This Method works well . . .

- M&I priority water delivered to GSF, CAGRDR accrues credits.
- May work in concert with DCP & DCP+
- Reducing impacts to aquifer from irrigation districts pumping
- Allows direct delivery to non-potable users
- Water stored at GSF accrues LTSC for CAGRDR, with cost of CAP water net of GSF contribution paid by CAGRDR.

This Method may be less suitable . . .

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Additional Comments: Capital and O&M cost avoided by CAWCD and other subcontractors

- For an Arsenic Plant, the capital cost is \$2,000.00 dollars per ac/ft. The cost of treatment can range from \$150.00 to \$200.00 dollars per ac/ft.
- For a Nitrate Plant, the capital cost is \$3,000.00 dollars per ac/f. The cost of treatment can range from \$500.00 to \$600.00 per ac/ft

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Recovery Planning Advisory Group
Credit Distribution and Firming Methods

Name of Method:

- Direct Credit Distribution and Self-Firming

Description of Method:

- Subcontractor receives LTSC directly from AWBA, Subcontractor utilizes its own wells to recover (firm) shortage amount. This method requires the beneficiary subcontractor of the LTSC to obtain a Recovery Well Permit and is the sole benefactor of the credits.

This Method works well . . .

- When the subcontractor has adequate well capacity to recover its own AWBA LTSCs.
- When direct recovery through CAP is unavailable or cost prohibitive.
- When the subcontractor's water demand is near its annual allocation of Colorado River Waters.

This Method may be less suitable . . .

- If CAWCD participation is required for AWBA distribution of credits.
- If a regional recovery solution is requested.
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Additional Comments:

- This method may require a statutory change so that subcontractors being firming by the AWBA can directly receive LTSCs to self-firm.

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Credit Distribution and Firming Methods

Name of Method:

- Resale of Subcontract Order During Shortage

Description of Method:

- Taking into account any cuts to the M&I pool due to shortage, Subcontractor A makes its CAP order with some water scheduled for delivery to a USF for storage. Subcontractor B, like other subcontractors, due to cuts to the M&I pool is firming with paper credits provided by AWBA via CAWCD. Subcontractor A offers to resell the Project water scheduled for storage to Subcontractor B pursuant to Subarticle 4.3(e)(i) of its subcontract. Subcontractor B compensates Subcontractor A with AWBA-provided paper credits of an equivalent value for the subcontract water received.

This Method works well . . .

- When some subcontractors need firming with wet water delivered via the CAP canal
- When other subcontractors are planning to store Project water during shortage
- When subcontractors wish to receive value for capital charges paid
- When storing subcontractors wish to retain control over how they use their subcontract water property rights

This Method may be less suitable . . .

- For a large number of subcontractors requiring firming with small amounts of wet water in the CAP canal i.e., transaction complexity
- If coordination of firming services by CAWCD requires it legally controls the water
- If recipients of paper firming credits from AWBA are prohibited from using them to acquire, and thus be firming with, wet water
- If storing subcontractors are unwilling to resell their scheduled water
- If CAWCD and/or USBR are unwilling to sign off on the “appropriate agreements” required for resale of Project water by the subcontract

Additional Comments:

- This method avoids an absurd, but currently probable situation where one entity would be storing water in the ground for paper credits while another entity pays a premium to recover water, tied to identical paper credits, from the ground.