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on

"Advancing Federal Water and Hydropower Development: A Stakeholder Perspective"

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Chairman Hageman, Ranking Member Hoyle and members of the Subcommittee, my name is Patrick Sigl and I am the Director of Water and Natural Resources Law at the Salt River Project (SRP). Thank you for the opportunity to testify today to provide SRP's perspective on advancing federal water and hydropower development. SRP is responsible for the care, operation, and maintenance of the Salt River Federal Reclamation Project in Central Arizona (Reclamation Project), one of the Nation's first reclamation projects authorized and constructed under the Reclamation Act of 1902. SRP has a long history of collaborating with the United States and regional partners to develop reliable and cost-effective water and power resources to our flourishing communities in the desert Southwest. SRP is the third largest not-for-profit community based public power entity in the country, providing reliable, affordable, and sustainable electricity to nearly 3,000,000 people in Arizona. SRP is also the largest raw water provider in the Phoenix Metropolitan area. These accomplishments are the legacy of the early visionaries including President Theodore Roosevelt and Congressional leaders, including those on this Committee, who championed the passage of the Reclamation Act for the purpose of developing communities in the arid western United States.

I. The Salt River Project: The First 120 years

A. Introduction

The Salt and Verde Rivers presented significant reliability challenges to Salt River Valley farmers in the 1890's. These challenges centered around inconsistent weather patterns, periods of drought, followed by flashy floods, followed again by drought. An abundance of snowmelt and precipitation in the spring could inundate crops and destroy diversion works. A subsequent dry period resulted in water shortages when water was most needed for irrigation. These early Salt River Valley irrigators, along with other western farmers, sought assistance from Congress through the establishment of a Reclamation Program to build water storage infrastructure, so water could be stored when the system produced it, and used when it was needed.

Recognizing the need, Congress authorized the Secretary of the Interior (Secretary) to construct the Salt River Federal Reclamation Project as one of the first projects under the Reclamation Act of June 17, 1902. The Salt River Valley Water Users' Association (Association), an Arizona Territorial corporation, was organized by landowners in the Salt River Valley to contract with the federal government for the construction of Theodore Roosevelt Dam on the Salt River, located some 80 miles northeast of Phoenix. In 1903, the United States Government approved the Salt River reclamation project and agreed to finance and build Roosevelt Dam for the Salt River Valley landowners. The dam would create storage of water for irrigation of the Salt River Valley lands. In exchange for pledging their land as collateral for the federal loans to construct Roosevelt Dam, which loans have long since been fully repaid, the Salt River Valley landowners received the right to water stored behind the dam. The scope of the project was expanded by acquiring the Arizona Water Company's canal system and constructing the Granite Reef Diversion Dam below the confluence of the Verde and Salt rivers. This provided a complete water delivery system from Roosevelt Dam to the Salt River Valley farmlands.

Shortly after passing the Reclamation Act, Congress continued to refine the authorities for reclamation projects to ensure their success. In 1906, Congress enacted the Townsite Act that authorized the Secretary to contract for the sale or lease of power generated by federal reclamation projects. The receipts from the power contracts would be deposited in the reclamation fund and credited toward the repayment of the project from which the power was generated. Then, in 1914, Congress amended the Reclamation Act to authorize the Secretary to transfer to a local water users' association the care, operation, and maintenance of all or any part of a federal reclamation project works, subject to rules and regulations prescribed by the Secretary.

Under the direction of Secretary Frankin Lane, the United States used these authorities to execute an agreement with the Association dated September 6, 1917 (the 1917 Agreement), wherein the United States turned over and vested in the Association the authority over and responsibility for the care, operation and maintenance of the Reclamation Project, including the water storage reservoirs and water delivery system, all water rights and power privileges, and the right to receive all income from such power privileges arising from its operation of the Reclamation Project. Through the 1917 Agreement, the United States also conveyed to the Association its standing authorities under the 1902 Reclamation Act, the 1906 Townsite Act and the 1914 Reclamation Extension Act to construct additional Reclamation Project works, at its own cost, so long as such works do not impair or diminish project efficiency, project adequacy or project purposes. The United States continues to hold title to all Reclamation Project facilities and maintains a supervisory role and regulatory authority over those facilities.

Secretary Lane was a forward-thinking visionary who recognized the value of delegating the decision making and implementation of operations and maintenance of the Reclamation Project to local interests, who are most familiar with on-the-ground Project conditions and can best and most expeditiously make management and financial decisions. The Reclamation Act already provided those landowners with the foundation for constructing the infrastructure and acquiring and utilizing the water rights. Secretary Lane took the revolutionary step of providing landowners with the financial tools to

succeed, namely the power revenues. Using the authorities provided to it under the 1917 Agreement, including the authority to add water and power facilities to the Reclamation Project at its own cost, and without the consent of the government, SRP was empowered to manage both water and power resources for the benefit of its shareholders, the Salt River Valley, and Arizona more broadly.

To meet the water demands of Association shareholders and other entities, SRP conjunctively manages six dams and reservoirs on the Salt and Verde Rivers in the Gila River Basin, one dam and reservoir on East Clear Creek in the Little Colorado River Basin, and 1,300 miles of canals, laterals, ditches and pipelines to deliver water to approximately 400 square miles of land in the greater Phoenix area. The dam and reservoir system can store approximately 2.3 million acre-feet of water runoff from the Salt and Verde River and East Clear creek systems, making SRP the largest raw water provider in the Phoenix Metropolitan area. The Association also operates over 270 wells located within Reservoir District boundaries to develop underground water supplies for the benefit of its shareholders.

Currently, SRP reservoirs supply water to more than 2 million people in the cities of Phoenix, Mesa, Chandler, Tempe, Glendale, Gilbert, Scottsdale, Tolleson, Peoria, and Avondale. SRP reservoirs also provide water to irrigate agricultural lands, and for other uses within the SRRD. In addition, SRP delivers water stored in Reclamation Project reservoirs to the Salt River Pima-Maricopa Indian Community (SRPMIC), Fort McDowell Yavapai Nation (FMYN), and Gila River Indian Community (GRIC) under the terms of their respective water rights settlement agreements. Additional users of the reservoir water are Buckeye Irrigation Company, Roosevelt Irrigation District, Roosevelt Water Conservation District, and others.

Over the last 120 years, SRP grew not only to be the largest raw water provider in Central Arizona, but developed a public power utility to provide reliable, affordable, and sustainable power. In 1937, the Salt River Project Agricultural Improvement and Power District (District) was organized under Arizona law for the purpose, in part, of financially supporting the Association. The District assumed the obligations of the 1917 Agreement pursuant to a 1937 contract between District and the Association. The District and the Association continue to collaboratively operate the Reclamation Project with the District leading on electrical energy generation, transmission and distribution. Through the District, SRP has become the third largest not-for-profit community based public power utility in the country providing electricity to nearly 3 million people in Arizona. SRP has a diverse energy portfolio that includes nuclear, solar, wind, natural gas, battery storage, coal, geothermal, and hydropower.

B. Construction of Reclamation Project Reservoirs and Hydroelectric Power Generating Facilities

The United States, through the Reclamation Service (the predecessor of the Bureau of Reclamation (Reclamation)) and SRP collaborated to develop the Reclamation Project water storage reservoirs and associated hydroelectric power facilities. These hydroelectric power facilities were the cornerstone of SRP's energy portfolio and served the power needs of the Phoenix metropolitan area and beyond. Roosevelt Dam is located at the confluence of Tonto Creek and the Salt River about 80 miles

northeast of Phoenix in Gila and Maricopa counties. Construction of Roosevelt Dam, the first in the Reclamation Project and the largest masonry dam in the world, began in 1903 and concluded in 1911. Water was first stored behind the dam in 1910. In addition to water storage, the project included a hydroelectric plant, transmission lines, groundwater pumping stations, two concrete diversion dams, over a hundred miles of roads, two miles of tunnels, bridges, buildings, levees, telephone lines, and many miles of Valley canals purchased from private companies.

The generation of hydroelectric power made possible by the completion of Roosevelt Dam was critical to the continued viability and success of the Reclamation Project. As the 1917 Agreement had contemplated, hydropower was the first and most essential tool developed by the Association to meet its repayment obligations to the government. And the Association's development of hydropower was crucial to the economic development and viability of the Salt River Valley more generally. Between 1900 and 1910, Phoenix's population doubled to 11,000 residents. The Valley's urban center continued to develop commercially. Copper mines, newspapers, laundries, hotels, flour mills, meat packers, machine and lumber companies, processing plants, and other businesses associated with agriculture continued to locate in the Valley. All required electrical power. Accordingly, the Association looked to expand the Project's hydroelectric power generation capacity.

In 1922, C.C. Cragin, Chief Engineer of the Association, and others completed a detailed study, titled, "Report on Proposed Additional Hydro-Electric Power Development of the Salt River" (the Cragin Report). Among other recommendations, the Cragin Report proposed that the Association build a series of dams below Roosevelt to be used for hydroelectric power production. Following the recommendations of the Cragin Report, and pursuant to the authority conferred on SRP to fund and construct additional Project works under the 1917 Agreement, SRP built three additional dams in the 1920s on the Salt River below Roosevelt Dam—Mormon Flat Dam (Canyon Lake), Horse Mesa Dam (Apache Lake), and Stewart Mountain Dam (Saguaro Lake). These dams increased the water supply available to SRP and, as envisioned by the Cragin Report, provided additional hydropower production.

In response to increasing power demands in the late 1960s and early 1970s, SRP made a significant investment to expand and upgrade these Salt River reservoir hydropower generation facilities. Beginning in the early 1940s, the Association realized that twenty-five cycle electrical power (compared to sixty cycle) was becoming obsolete. Twenty-five cycle power produced a perceptible flicker in lighting and cost the consumer more in electrical equipment. In response, SRP implemented its Hydro Expansion and Frequency Unification Project (HEFU) from 1969 to 1973. Through the HEFU Project, SRP, at its own cost, upgraded the Mormon Flat, Roosevelt, and Horse Mesa generation facilities to sixty cycle electrical power and installed pump back hydroelectric power. These upgrades increased the hydroelectric capabilities by providing a more dependable power load.

In addition to the Salt River, the Secretary withdrew land from the public domain along the Verde River in 1903 and 1904 for the purpose of constructing irrigation facilities for SRP. Using this withdrawn land, Bartlett Dam was constructed in the 1930s and Horseshoe Dam, upstream from Bartlett, was completed early in 1946. Both dams represent a commitment by the Reclamation Project to develop water

supplies for use by both SRP shareholders and non-SRP shareholders, including the Salt River Pima Maricopa Indian Community, the City of Phoenix, and regional mining interests. Another dam, C.C. Cragin Dam and Reservoir, was added to the system Reclamation Project by the Arizona Water Settlements Act of 2004 (Public Law 108-451). C.C. Cragin Reservoir is located on upper East Clear Creek in the Little Colorado River watershed and has a capacity of 15,000 AF. Water stored in C.C. Cragin Reservoir is pumped over the Mogollon Rim into the East Verde River. Since the completion of the dams, SRP's reservoirs have continuously provided water and hydropower for use by Association shareholders and contractors in the Salt River Valley.

Roosevelt remains the cornerstone of SRP's storage system. The storage capacity in Roosevelt (1,653,043 AF) represents 71 percent of the total SRP surface water storage. As originally constructed, Roosevelt Dam was 280 feet high and had a water storage capacity of 1,284,205 AF. Capacity slightly increased and decreased over time as the spillway was modified and silt accumulated. As part of the United States work to complete the Central Arizona Project, from 1989 through early 1996, Reclamation undertook a $430 million modification, raising Roosvelt Dam 77 feet in elevation and creating three distinct storage pools. The modification increased the water conservation storage capacity by 20%, added 556,000 AF of dedicated flood control space (FCS), and 1,220,000 AF of Safety of Dams (SOD) surcharge capacity to address dam safety concerns. The new conservation space was dedicated to storage capacity for regional cities who appropriated water rights under state law to use outside the Reservoir District boundaries.

Raising Roosevelt Dam also necessitated a key environmental compliance commitment by SRP. Once construction of Roosevelt Dam was complete, environmental conservation groups raised concerns that SRP's operations of the modified reservoir were impacting threatened and endangered species protected under the Endangered Species Act (ESA). In response, SRP worked with the U.S. Fish and Wildlife Service (FWS) to develop a habitat conservation plan and received an incidental take permit under Section 10 of the ESA to mitigate the impacts of reservoir operation and maintenance activities on protected species. Section 10 of the ESA provides nonfederal actors with the legal means of avoiding unauthorized "take" of listed species while implementing protective species conservation measures. Pursuant to the 1917 Agreement, SRP, a nonfederal entity, is vested with the authority and responsibility for care, operation and maintenance of the Reclamation Project works, including project reservoirs. In approving SRP's Roosevelt Habitat Conservation Plan and issuing the associated incidental take permit, the FWS and Reclamation both recognized that SRP was responsible for Roosevelt operations and, ultimately, for species effects, including "take", associated with those operations. SRP also obtained such ESA Section 10 "take" coverage for its operations and maintenance activities for the Verde River Reservoirs.

II. Salt River Project Today and through the Next 100 Years

SRP and other reclamation projects were built to provide reliable water and power resources in arid areas of the United States – but the need for such resources is more profound today than it was in 1902 when Congress created the Reclamation program. The visionary C.C. Cragin Plan that SRP implemented in the 1920s enabled SRP to develop the hydroelectric power resources that led to the

success of the Reclamation Project over the last century. Development of water storage infrastructure on the system helped meet demand for SRP's shareholders and regional partners. The next 100 years are anticipated to bring even greater demands for water and power in the Salt River Valley. SRP, in collaboration with the United States and regional partners, is developing multiple infrastructure projects to meet these challenges for the next century.

A. Salt River Pumped Storage Project

SRP's power resource challenges are significant. SRP's system is located within the Western Interconnection where current resource plans – including SRP's own Integrated System Plan – forecast unprecedented load growth over the next decade, driven in part by rapid expansion of large energy customers, such as data centers and advanced manufacturing facilities. Temperatures in SRP's service area routinely exceed 110°F in the summer. These conditions produce SRP's highest annual system demand. For instance, last year SRP set a new system peak record, over 8,200 MW on August 4, 2024. SRP's peak demand is expected to grow to nearly 8,500 MW for the upcoming summer 2025 and to more than 11,000 MWs by the summer of 2030. To meet these demands, SRP is making transformative changes to its power generation resource portfolios and its capacity to store energy for long periods of time. Pumped-storage hydroelectricity is such a resource, providing 10+ hours of energy storage by moving water between two reservoirs at different elevations.

Pumped-storage hydro generation allows water to be pumped by hydropower turbines from a lower reservoir during times when power supplies are in excess and stored for later use. When power demand is high, the water is released from the upper reservoir through hydropower turbines on its way back to the lower reservoir, thereby generating electricity. Pumped storage facilities act as large batteries, taking advantage of excess power, water supplies, and elevation differences to meet peak demand. SRP is uniquely situated to use its water and infrastructure resources to take advantage of an abundant local natural resource – sunshine – to meet its increasing power demands.

The proposed Salt River Pumped Storage Project would expand SRP's current hydroelectric generation capacity by adding a new upper reservoir to pair with Apache Lake, in eastern Arizona, as an existing lower reservoir. The upper reservoir and associated power generation infrastructure, including powerhouse, tunnels, and transmission facilities could provide up to 2000 MWs of long duration energy storage, enough power for up to nearly 500,000 homes. The long asset life of 100 years, low degree of major replacement and upgrades over the course of its useful life, and the relatively low operating and maintenance costs (taking advantage of low-cost solar power), combined with operating flexibility for supporting grid reliability, make pumped storage a compelling option to add to SRP's resource portfolio.

Developing additional pumped storage technology brings the Salt River Project full circle. The purpose of the Reclamation Act was to develop infrastructure to make water supplies from western river systems more reliable – i.e. store water when mother nature provides it for later use when its needed. Pumped Storage technology fulfills the same purpose for power resources – i.e. such technology allows the operator to store power when mother nature provides it through sunshine and wind for later use when its needed. The technology to meet those two purposes, over 100 years apart, is the same, and SRP is uniquely situated to deploy it.

B. Verde Reservoirs Sediment Mitigation Project

Over the next one hundred years, the Verde River watershed is expected to experience increased precipitation variability and higher temperatures resulting in less frequent but greater inflow volumes into Bartlett and Horseshoe reservoirs (Verde River reservoirs). Currently, the Verde River reservoirs are undersized in capacity to fully capture flood flows off the Verde River watershed. In 2023, SRP had to release water from Bartlett as the reservoir reached capacity due to heavy winter precipitation in the Verde watershed. The water SRP released from the Verde River reservoirs during that period could have supplied over 1 million households with water for an entire year. In addition to the changing precipitation regime, SRP must contend with the sediment impact of over eight decades of Verde River reservoirs operation. Inflows from the Verde River watershed carry significant sediment loads that have accumulated in the reservoirs reducing the maximum water conservation capacity (by approximately a 36,000 acre-feet (AF) in Horseshoe Reservoir and approximately 15,000 AF in Bartlett). These impacts will continue in the future.

The reduction in inflow frequency and loss of Verde River reservoirs' storage capacity create challenges for SRP to manage these water supplies for central Arizona. The carryover storage capacity in SRP's reservoirs will be critical to successfully adapting water management practices to prepare for the future. Recognizing this, SRP, along with a group of 23 water providers, including tribal, agricultural, and municipal organizations, have partnered with Reclamation to explore solutions through a federal feasibility study, the Verde Reservoirs Sediment Mitigation Project (VRSMP). The purpose of the VRSMP is to study the feasibility of increasing surface water yield from the Verde River reservoir system by, in part, constructing an enlarged Bartlett Dam and Reservoir that would restore lost storage capacity from sediment accumulation at Horseshoe Reservoir and provide additional, new storage space. The feasibility study is also examining approaches for mitigating future reservoir sediment accumulation. The VRSMP, if approved by the Congress at the conclusion of the study, would aid significantly in ensuring future water supply resiliency for the region.

An expanded Bartlett Dam and Reservoir is one proposed alternative that will be evaluated through the feasibility study. The enlarged Bartlett Reservoir would increase the current total water storage capacity on the Verde River by about 350,000 AF, enough to support an additional 1 million Arizona homes, and more than double existing capacity.

Central Arizona water users primarily rely on surface water from the Salt, Verde, and lower Colorado rivers, groundwater, and treated effluent. Changes or variations in the availability of lower Colorado River water supplies and groundwater resulting from, among other things, extended drought highlight the need for maintaining the resiliency of the water supplies from the Verde River. Constructing a larger storage facility on the Verde River would benefit Arizona water users through the provision of additional water supplies, where dam safety, flood control, recreation, fish, and wildlife are potential incidental benefits.

C. SRP-CAP Interconnection Facility

SRP and CAP, along with 12 municipal water providers, are exploring the potential for an interconnection project that would allow non-SRP shareholder water stored in Reclamation Project reservoirs and underground storage facilities to be transported into the Central Arizona Project canal and delivered to water users outside the Salt River Reservoir District. The proposed SRP-CAP Interconnection Facility (SCIF) would mirror the existing interconnection between the CAP and SRP systems that enables CAP water to be transported into SRP's canal system for delivery. The SCIF would permit certain non-SRP shareholder supplies to be transported into the CAP canal and enable innovative exchange opportunities with downstream CAP water users. The proposed interconnection would also enable strategic recharge and direct delivery opportunities for SRP generating stations located in Pinal County.

The SCIF would increase the use of existing infrastructure, including the CAP, and provide additional flexibility for coordinated operations between two of the largest water providers in the state. Above all, the facility provides resiliency for municipal providers in central Arizona during periods of severe shortage in the Colorado River basin.

D. Planned Deviation to the Modified Roosevelt Water Control Manual

Expected increased temperatures and higher precipitation variability on the Salt and Verde River watersheds – resulting in drier dry periods and wetter wet periods. Successful water management of these watersheds will require that operations of existing water infrastructure to be adaptable to changing drought and precipitation patterns to meet the water resource needs of Central Arizona.

When the United States raised Roosevelt Dam on the Reclamation Project in the mid-1990s, 24 feet of the dam raise was dedicated to flood control under the Flood Control Act of 1944 under the jurisdiction of the U.S. Army Corps of Engineers (USACE). SRP, USACE, and Reclamation developed an agreement and water control plan in 1996 where SRP agreed to evacuate water entering the flood control space within 20 days of it entering such space to protect downstream lands and infrastructure from flooding. Such agreement allowed for future planned deviations from the water control plan.

As a water management measure, SRP, along with other water users on the Salt River, sought such a planned deviation to evacuate the water over a longer time period, while maintaining the safety of Roosevelt Dam and downstream communities. In June, 2024, the USACE approved SRP's proposal to temporarily extend the amount of time SRP must evacuate water from a portion of the Flood Control Space from 20 days to 120 days. The plan, which would authorize the temporary extension to occur once a year for three out of the next five years, will allow farms and communities downstream to use the water and reduce releases of flood water from Roosevelt Dam into the normally dry Salt River. The Plan could allow SRP to deliver up to 109,000 acre-feet per year in those 3 years to water users that have rights to such water and could support about 330,000 households in the Phoenix metropolitan area for a year. The supplies made available during flood periods will help reduce groundwater use and supplement supplies for communities impacted by Colorado River shortages.

The USACE and Reclamation determined the plan would have no adverse impact on the safety of Roosevelt Dam or downstream communities. The proposal is the result of a collaborative effort between

SRP, Reclamation, USACE, FWS, the Forest Service, and a consortium of local cities, tribes, and agricultural districts. Over the five-year period, SRP and partners will review the value of the revised operation to determine if requesting a permanent change to flood operations is warranted.

III. Conclusion

SRP has a long history of collaborating with the United States and regional partners to develop reliable and cost-effective water and power resources for our growing communities in the desert Southwest. Such collaboration has resulted in numerous accomplishments over the decades. The challenges ahead are significant. SRP is located in one of the hottest and dryest parts of the United States. Our community is fortunate to have a robust economy that drives growth and demand for water and power. The support of Congress, the federal agencies, and regional partners will be key to meet the challenges of the next century which will include collaborating to develop new water and power infrastructure. Based on Federal workforce resources and capabilities, it would be very helpful to empower SRP to timely proceed with development, including design, construction, environmental and cultural reviews and permitting. We look forward to meeting the expectations set by the early visionaries of the Reclamation program to build strong and resilient communities.