**Pima-Maricopa Irrigation Project**
Education Initiative
2002-2003

*Restoring water to ensure the continuity of the Akimel O'otham and Pee Posh tradition of agriculture*

# *Ashurst-Hayden Diversion Dam: 1916-1922*

***Part 31***

In May of 1916, Congress authorized funds to begin construction of the Florence Diversion Dam and all necessary controlling works "for the irrigation from the natural flow of the Gila River of Indian lands on the Gila River Indian Reservation and private and public lands in Pinal County." Added was a proviso granting the Secretary of the Interior authority to divide the water for use on the reservation and on private and public lands "in accordance with the respective rights and priorities" of each as "determined by agreement of the owners thereof with the Secretary of the Interior."

The project, recommended by the Indian Service in 1914, could not be undertaken until "satisfactory adjustments of the rights to the water" were made. Such adjustments were deemed substantially completed in May of 1919 by Interior Secretary John Barton Payne and, on April 30, 1920, the Florence-Casa Grande Project was declared feasible and construction was set to begin. To ensure completion of the project, construction had to begin within one year of May 1, 1920, although it was expected that work would "start as soon as arrangements can be made to get same under way."

Charles Real Olberg was charged with designing and constructing the Florence dam. After a stint with the US Geological Survey and the Reclamation Service (in charge of field work in the Salt River Valley in 1902-03), Olberg joined the Indian Irrigation Service and was assigned to the Los Angeles District Office, which oversaw Arizona field activities. While Olberg resigned in 1917 to serve in World War One, he rejoined the Indian Service in 1919 and would build both the Florence and Sacaton diversion dams and San Carlos (Coolidge) Dam.

The concrete and metal weir diverts water from the river.

The site selected for the Florence dam was 12 miles east of Florence on the north bank of the river at a location known as Price Station on the Arizona Eastern Railroad. Here the Gila River flowed between two granite rock outcroppings about 400' apart. This rock would serve as the abutments for the dam. The riverbed itself, however, was found to be a deep alluvial canyon. Boring tests indicated that the sand was more than 100' deep. To avoid constructing a more costly dam anchored to bedrock, Olberg chose to construct an Indian weir (or floating) dam developed in the 19th century by British engineers in India. Such a dam includes an impervious slab of concrete stretching across the river and anchored on either end to the granitic rock. Not anchored to bedrock, the dam "floats" on the sand, with water flowing under the dam having "no velocity" (or strength), thereby ensuring that erosion and eventual structural failure do not occur. The dam was designed to withstand a flood of 150,000 cubic feet per second.

Olberg began testing the foundation for the Florence dam in December of 1916 and by October of 1917 had completed the final surveys on the dam. By early the following year construction plans were completed and the process of soliciting bids was set to begin. The plans called for the construction of a 396' long concrete diversion dam to span the river and divert water through a series of intake gates into the Florence Canal. The floating dam was to be 212' wide. On the upstream side, a 16' long apron with a 3' lip was designed to prevent water from eroding under the dam. In the middle is a 56' long slab of concrete that varies between two and five feet in thickness. On top of this is a 10' high concrete ridge, or weir, with a 2' high metal flashing on top. This weir is the only part of the dam

above ground. On the downstream side of the dam is a 140' span of talus, or heavy rock mixed with concrete, two feet thick designed to prevent erosion. The estimated cost of the structure was $142,622.

Nine intake gates convey water from the river into the canal.

On the south end of the diversion dam were the intake gates of the Florence Canal. Originally there were nine 4x8 regulator gates on the intake. These gates were located four feet above the riverbed and skimmed water from the river with a minimum of silt entering the canal. Concrete reinforced piers separate the gates. A road was built over the gates to access the site. The dam was designed to annually divert 300,000 acre-feet of water.

A concrete wall surrounds and extends above the intake gates to protect them from the river. On the inside of the intake gates (and within the piers) was located the hydraulic equipment used to operate the gates. Four sluice gates extended on the northwest corner of the intake and were designed to release into the river the sand and silt that would build up in front of the gates. An electrical motor originally operated the hydraulic equipment and was housed in the westernmost bay above the intake gates. Power for operating the pump was located in the powerhouse just south of the dam. Power was generated via a gas engine and generator. A pipe three feet in diameter was built under the river to transport water to a small canal on the north bank.

A single gate has replaced the original sluice gates.

With World War One raging in Europe, construction equipment and material were difficult to acquire and expensive. When the contract went to bid in the summer of 1920, no bids were received. As a result, Assistant Commissioner of Indians Affairs Edgar B. Merritt announced in December of 1920 that the dam would be built by "force account," rather than through contract. This meant the Indian Service would build the dam itself and pay for construction as the bills came in. On January 12, 1921, Interior Secretary Hubert Work approved of the plan and construction was set to begin.

Construction of the dam had to correspond with the seasonal flooding of the Gila River. To avoid spring floods, excavation of the foundation and the pile driving had to begin on May 1. To avoid summer flooding, the pouring of the concrete had to begin around June 1 in order to be completed by July. Olberg constructed a temporary rail siding on the north bank of the river (and parallel to the Eastern Arizona Railroad) to bring in supplies. A 400' narrow gauge railroad trestle was then built over the river to be used in speeding the process of pouring concrete, which was mixed on either side of the river to further hasten the process.

The pouring of concrete began on June 10 and was completed within three weeks. Shortly after completion of the concrete work, the first flood of the summer destroyed the temporary railroad trestle. Work was delayed until October, when the crest of the dam was constructed. Olberg admitted he spent "many days and sleepless nights" planning, organizing and constructing the dam. Only after he completed the task of "paving the wide stream bed with its massive block of concrete over which the ever threatening flood pass harmlessly," could he relax. By the end of October 1921, the foundation and piers for the intake gates had been poured and by March 1922 most of the work was completed.

While the diversion dam was being constructed, a superintendent's cottage was built and a variety of tents were erected for the more than 450 men—including many Pima and Papago—that worked on the dam. A mess house and kitchen, along with showers and bathrooms were temporarily constructed as well. A variety of shops (pipe, sheet metal, wood working, blacksmith, concrete and rock crushing) and a lighting plant were also built. Permanent structures included the powerhouse and the operator's house for the engineer overseeing the dam.

Congress originally appropriated an amount "not to exceed $175,000" to construct the dam. Rising material and labor costs after the war and the use of a force account brought the total cost of the

dam to $244,005. The Florence Diversion Dam was dedicated on May 10, 1922, and renamed the Ashurst-Hayden Diversion Dam, after Arizona Senator Henry Ashurst and Arizona Representative Carl Hayden, both of whom played important roles in bringing the dam to completion. While unable to attend the dedication, President Warren Harding telegraphed Olberg, congratulating him on the completion of the dam. With the dam, Harding wrote, "fifty years of strife and disputation between Indians and white (sic) regarding the distribution of the waters of the Gila River" had ended. The *Casa Grande Dispatch* noted, "Casa Grande was almost depopulated for [the dedication, with e]veryone who could possibly leave [and attend the ceremony] doing so."

The dam was an "integral part of the San Carlos Reclamation project," Hayden wrote in a prepared statement to those in attendance at the dedication. With it, the floodwaters of the river could be put to beneficial use on the reservation. A diversion dam now spanned the river and diverted river water into the intake gates and canal head on the south bank. The Florence Canal, now under government operation, had a capacity of 1,000 cubic feet per second and was designed to carry water to 62,000 acres of land. Construction was now set to begin on the Sacaton Dam and the necessary laterals to convey water to the reservation.

## Diversion Dam Word Search

Find the words listed below in the grid. Words can go horizontally, vertically and diagonally in all eight directions.

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| K | X | Q | N | M | M | J | V | M | F | J | L | V |
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ABUTMENT: Something that supports a structure, such as a bridge.
ALLUVIA: The sedimentary material deposited by flowing water in a riverbed.
CONTRACT: A formal agreement between two or more parties.
DIVERSION DAM: A structure that changes the direction of water.
FEASIBLE: Is considered possible and can be done.
FORCE ACCOUNT: To pay for something as the bills are due rather than by contract.
GRANITIC: Made up of a course grain igneous rock.
PROVISO: To place a condition or qualification on something.
TRESTLE: The framework (bridge) that supports a railroad track.
WEIR: A structure that directs the flow of water.

***Teacher Plan for "The Ashurst-Hayden Diversion Dam, 1916-1922"***

## Terms to know and understand

- Proviso
- Feasible
- Abutment
- Alluvia
- Granitic
- Weir
- Trestle

## Objectives

Students will be able to:

1. Describe the general timeline and purpose behind the Ashurst-Hayden Diversion Dam.
2. Analyze the pros and cons of direct participation in political matters and understand the reasons why such involvement is important.

## Critical Thinking:

- What are the pros and cons of being able to negotiate on your own, rather than having someone speak on your behalf and acting without your input? What advantages are there in negotiating on your own behalf? Are there any risks you take if you negotiate on your own? What risks are there is someone negotiates on your behalf? How can you ensure that the person speaking on your behalf actually works for your gain and betterment?

## Activities

- In the Congressional debate on the Florence-Casa Grande Project, many members of Congress specifically noted their desire that the Pima and Maricopa would have first rights to the waters diverted by the Ashurst-Hayden Diversion Dam. Yet, the Indian Service and the Carl Hayden opposed such restrictions, fearing there would not be enough support from local non-Indian landowners. As a compromise, the Secretary of the Interior was granted the authority to negotiate an agreement with all parties regarding the allocation of the water. Since the Pima and Maricopa were considered "wards of the government," they were not allowed to speak on their own behalf. The Secretary was authorized to speak on their behalf. As a result, a landowner's agreement was negotiated in 1918 and was not as protective of Pima water rights as many members of Congress had been led to believe when they voted for the project. Have students define an issue, with two opposing views. Then have one side sit quietly on the sidelines while the first group negotiates with the teacher (representing the Secretary of the Interior) who speaks on behalf of the second group. Then discuss which group was better able to have their voice heard and their wishes fulfilled. Explain this is why it is essential that students participate in governmental affairs and that their leaders speak for themselves, not having someone speak for them.

## About P-MIP

The Pima-Maricopa Irrigation Project is authorized by the Gila River Indian Community to construct all irrigation systems for the Community. When fully completed, P-MIP will provide irrigation for up to 146,330 acres of farmland. P-MIP is dedicated to three long-range goals:

- Restoring water to the Akimel O'otham and Pee Posh.
- Putting Akimel O'otham and Pee Posh rights to the use of water to beneficial use.
- Demonstrating and exercising sound management to ensure continuity of the Community's traditional economy of agriculture.