

Yuma Desalting Plant: 2003

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The Yuma Desalting Plant is a 72 million gallon-per-day, reverse osmosis plant located adjacent to the Colorado River in Yuma, Ariz. The U.S. Bureau of Reclamation constructed the plant during the 1980s at a cost of about \$245 million to serve two purposes: salinity control and water recovery for the Colorado River.

Salinity Control

The salinity of the Colorado River at its source high in the Rocky Mountains is about 50 parts per million (ppm). Before development of the West, the salinity at the northern Mexico border was about 400 ppm. During the 1960s, the salinity at the border increased to concentrations as high as



Yuma Desalting Plant; Colorado River in the background.

1,200 ppm. This increase was caused by the return flows of numerous irrigation projects and cities along the river, where unabsorbed irrigation water percolated through mineral-rich soils and dissolved the minerals. In order to keep the groundwater table from rising and drowning the plants, this saline water was drained back to the river, thus increasing its salinity for downstream users.

In 1961, Mexico expressed concerns that the high salinity in that country's portion of the Colorado River allotment was causing lower crop yields in the Mexicali Valley. The United States subsequently agreed to control the salinity to not more than 115 ppm above the salinity of the river arriving at Imperial Dam, which is located just north of Yuma. To accomplish this goal, the agriculture return flows from the Wellton Mohawk Irrigation and Drainage District, east of Yuma, were diverted to the sea at the Gulf of California.

Reverse Osmosis units at the Yuma Desalting Plant

Water Recovery

Today, the Colorado River is allotted fully among the seven Colorado River basin states and Mexico. Bypassing of the saline water from the Wellton Mohawk Irrigation District results in a loss to the river system of approximately 108,000 acre-feet per year. The Yuma Desalting Plant is designed to recover about 75 percent (or 73,000 acre-feet per year) of this lost water, and deliver high quality water to the Colorado River for eventual use in Mexico. If the plant, which is currently not in use, were to be operated, the remaining 25 percent of the water containing the



concentrated salts would continue to bypass the river system and be discharged to the sea in the Gulf of California. To make up for the loss of water attributable to this waste stream, canal lining or groundwater pumping within the United States could be considered in the future.

Decreased Water Supplies

Construction of the Yuma Desalting Plant was completed in 1993, but the facility operated, for testing, only in 1994. Since then, water storage in the Colorado River reservoirs has been adequate to meet all requirements. However, this year the river system storage has dropped to 61 percent of capacity, and continued drought in the river basin may require operation of the plant in the near future. Further affecting distribution of Colorado River water, on Jan. 1, 2003, California's water diversions

were cut back to its authorized allotment of 4.4 million acre feet when the California water agencies could not agree on a long-range plan to limit water usage to their apportionment.

Stakeholders, Effects of Opening Plant

There are many stakeholders involved in the potential operation of the Yuma Desalting Plant, including:

- The federal government, which would have to foot the bill.
- Mexico, which is concerned about its water allotments, quality of the water received and the border environmental issues.
- The water agencies involved in obtaining their allotment of water for each of the seven basin states.
- The many agriculture irrigation districts along the river concerned with the integrity of their water supplies.
- The Southern California cities receiving Colorado River water.
- Arizona cities along the river, as well as cities such as Phoenix and Tucson that receive Central Arizona Project water.
- The various Colorado River, and other, Indian tribes.
- Federal government agencies, such as the Bureau of Reclamation that would have to operate the plant, the Environmental Protection Agency, Fish

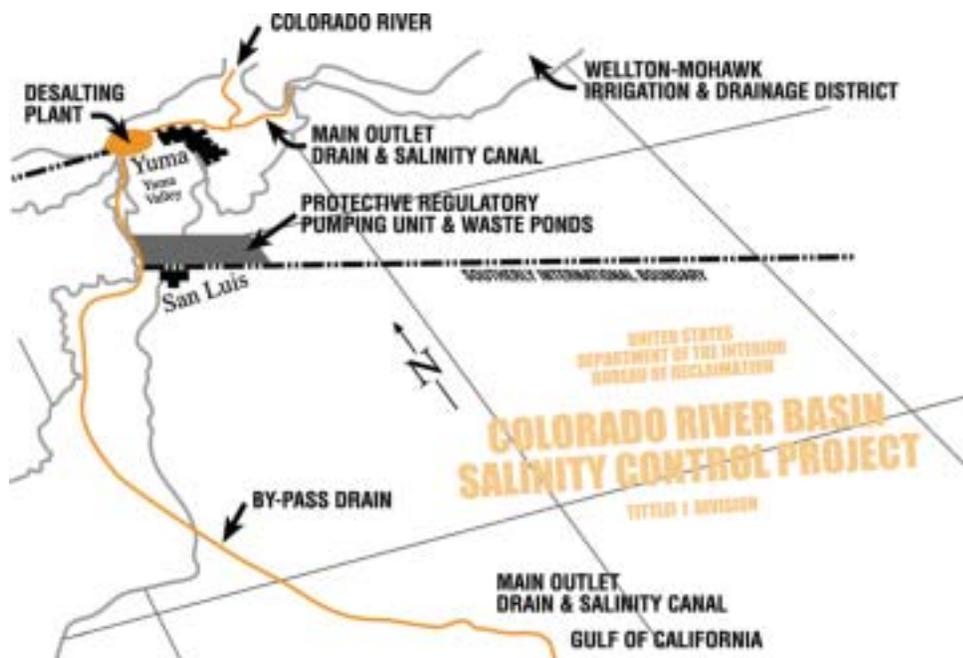
and Wildlife, and the Army Corps of Engineers.

- Arizona Department of Environmental Quality.
- The many environmental groups, each with its own interests.

In addition to concerns of these stakeholders, opening the plant will affect regional water supplies and wetlands in many other ways. For instance, the bypass of the Wellton Mohawk drainage water over the past several decades has created a viable marshland within Mexico. This marshland is located in the old river delta at the north end of the Gulf of California and is called the Cienega de Santa Clara. If the Yuma desalting plant were opened for operation, the amount of water entering this marsh would decrease by approximately 75 percent, and the salinity would increase to about 8,200 ppm. This reduced flow and higher salinity would adversely affect the current marshland and related habitat. This issue has been a point of contention for some environmentalists and will probably have to be addressed before the plant is placed in operation.

Plant operations would also result in a waste stream mixture of calcium carbonate and magnesium hydroxide sludge, as well as sand and algae from the desalting plant

See Yuma Desalination, page 25



Yuma Desalination, continued from page 21

pretreatment process. This waste, about 325 tons per day, is planned to be disposed of in drying ponds constructed on the Yuma Mesa near the Mexican border. Each pond covers one to two acres and is 13 feet deep. This sludge disposal area is sufficient for more than 50 years of plant operations. As ponds are filled and dried, they will be covered with soil to blend into the desert landscape. The buried sludge eventually will become a limestone-like deposit.

The future of the Yuma Desalting Plant and the solution for water supply and quality along the Colorado River are still unknown. With so many stakeholders and potential operational effects to take into account, it will be a considerable challenge to identify an operating scenario that would be satisfactory to all. However, as drought conditions continue in the Southwest, it seems likely that operation of the Yuma Desalting Plant will be seriously considered.

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