

Potable Water Plants & Mid-Year Treatment Plant Update

The [previous edition of *The Quarterly Mexico Water Report*](#) included an extensive analysis of wastewater treatment plant infrastructure and growth plans through the end of 2009. This edition will cover new information from the Conagua National Treatment Plant Inventory (December 2009) for potable water and wastewater plants as well as the expectations and realities for the first half of 2010 through 2011.

Potable Water Plant Infrastructure

While the number of potable water plants is about one-third the number of wastewater plants, they are still an important and growing segment. In 1994, Mexico had 300 potable water treatment plants, of which 233 were in operation. By 2000 those numbers grew to 400 plants (336 in operation) with 110,118 liters per second (l/s) installed capacity and 78,319 l/s in treated flow. In 2007, Mexico had 621 total plants (541 in operation) and made up for a lag in installed capacity for the first time since 2004. At the end of 2008, Mexico had just over 683 potable water plants with an installed capacity of 130,878 l/s with a treated flow of 87,310 l/s. At the end of 2009, Mexico had added an additional 27 plants, representing a 4.5% increase, which resulted in a 3.1% increase in treated flow (to 90,040 l/s) but with only a 1.7% increase in installed capacity (133,090 l/s).

The number of plants in a state is not a good indicator of installed capacity or water treated. Sinaloa has the most plants (142), but it ranks seventh for installed capacity and fifth for most water treated. The plants in a number of states are small and/or handle very low flows. The three states with the largest installed capacity and treated flows (State of Mexico, Jalisco, and Nuevo Leon) are in or around the three largest cities in Mexico. The 47 plants in these three states account for less than 7.5% of the total number of plants, but represent about 40% of installed capacity and 35% of all water treated.

The Federal District, with 38 treatment plants (the fifth largest concentration in the country), treats 40% of the volume treated by the State of Jalisco, just over 30% of the amount handled by Nuevo Leon, and less than 18% of that handled by the State of Mexico. In fact, although Guadalajara and Monterrey have considerably smaller populations, they have 15% more installed capacity than the State of Mexico and Federal District, home to 25 million people combined.

Over 80% of the treatment processes used in potable water treatment plants fall into one of the following three categories: Conventional Clarification (31%), Reverse Osmosis (27.5%), and Patent Clarification (22%). However, 67% of installed capacity and 69% of treated water are handled by

Conventional Clarification plants, with Direct Filtration a distant second (18% of installed capacity and 16% of flow treated) and Patent Clarification third (less than 8% of installed capacity and flow treated). It is important to note that while 27.5% of potable water plants use reverse osmosis technology, they make up less than 1.5% of installed capacity and flow treated.

Only three states do not rely on conventional clarification for less than 75% of their potable treatment plant technologies - Nuevo Leon (less than 20%), Baja California (20%), and Sinaloa (just over 40%). States that have made commitments to “alternative” process technologies for potable water include Zacatecas, Colima, and Durango (Reverse Osmosis); Sinaloa (Patent Clarification and Iron/Manganese Treatment); Baja California, Nuevo Leon and to a lesser extent the Federal District and Tamaulipas (Direct Filtration).

Wastewater Plant Infrastructure

At the end of 2008, Mexico had 1,833 wastewater plants in operation with an installed capacity of 113,024 l/s with a treated flow of 83,640 l/s, equivalent to 40% of all generated municipal wastewater. At the end of 2009, Mexico had added an additional 196 plants, representing a 10% increase, which resulted in a 5.4% increase in treated flow (to 88,127 l/s) and an almost 7% increase in installed capacity (120,862 l/s).

Unlike the potable water plant situation, wastewater treatment capacity and treated flow amounts are much more equally distributed throughout the country with only 25% of the treated flows and installed capacity in the four states around the three main urban areas of Mexico City, Guadalajara, and Monterrey (State of Mexico, Federal District, Jalisco, and Nuevo Leon).

Over 80% of the treatment processes used in Mexico fall into one of the following four categories: Sludge (546 plants, 46% of treated flows), Stabilization Ponds (707, 16%), Advanced Primary (16, 11%), and Aerated Ponds (32, 8%). There are some "alternative" technologies in use: dual plants (10, 4.75%), biological percolating technology plants (42, 5.25%), and RAFA or WASB plants (162, 1.5%). Mexico has 158 septic facilities and 81 Imhoff tank facilities, but these plants treat less than 1% of flows. Aerobic (7 plants), anaerobic (52 plants), and biological (18 plants) technologies are used in these plants also to treat less than 1% of flows.

In addition to sludge facilities that exist in all states but Chiapas, two-thirds of states have a significant numbers of plants or flow treatment that use other technologies:

- Aerated Ponds – Baja California, Durango, Sonora, Tlaxcala
- Stabilization Ponds – All states except Baja California, Campeche, Federal District, Hidalgo, Morelos, Queretaro, Quintana Roo, Yucatan
- Advanced Primary – Baja California, Chihuahua, Guerrero, Puebla, Sinaloa
- Anaerobic – Jalisco and Veracruz
- Dual – Aguascalientes, State of Mexico, and San Luis Potosi
- Biological Filters/Percolators – Chiapas, Jalisco, Morelos, Nayarit, Queretaro, Tabasco
- Septic Systems – Sinaloa and Aguascalientes, Queretaro, Veracruz, Colima

- RAFA or WASB – Colima, Guanajuato, Jalisco, Puebla, Queretaro, Tlaxcala, Veracruz
- Enzymatic Reactor – Sinaloa, Zacatecas
- Oxidation – Baja California, Jalisco
- Wetlands – Oaxaca, Chihuahua
- Primary/Sedimentation – Guanajuato
- Imhoff Tanks – Tabasco

Updated Wastewater Plant Information

During the last four years, Mexico has constructed 244 plants and rehabilitated 50 plants. Of those, 99 new plants were built last year and 11 existing plants were rehabilitated in 2009. At the end of 2009, 59 plants were still under construction and 36 went out to bid in the first quarter of 2010. Approximately 100 plants were scheduled for construction in 2010. In the late summer, 64 plants were still on schedule for bids in 2010. However, at the half way point this year, only 24 plants were still planned for construction and only three had actually been built.

When asked about the existence of so many discrepancies between the number of plants scheduled for construction, construction bids, and actual completions, Conagua officials clarified that it had nothing to do with lack of budgeted money or budget outlay delays. They stressed that the availability and attractiveness of funding and financing were even better in 2010 than in 2009. In 2009, Conagua generally provided only 50% funding to municipalities for the construction of plants. In 2010, the APASO program funding allowed the federal government to provide up to 64% of funds for construction and with the special Fondo Concurable, this federal funding availability increased to 70% of plant costs. These progressive financing and funding options will remain in place in 2011 and into the foreseeable future. Because of midterm elections, many states (Zacatecas, Hidalgo, Puebla, Veracruz, Aguascalientes, Sinaloa, Oaxaca, among others) postponed bids and construction. Two states, Hidalgo and Oaxaca, returned significant amounts of funding for plant construction to Conagua. Several plants (Queretaro, Jalapa, Poza Rica, Veracruz, Juarez, Parral, San Juan del Rio) that should have come on line in the first half of the year were delayed. Also, the large Caracol and Zumpango plants in Central Mexico, which were slated for late 2010 are almost certainly going to be pushed back into 2011. As a result of these political decisions and delay situations combined with previous plant construction plans, 2011 should be as good of a year or better than 2009, especially for medium-sized plants, and over 100 plants should again be bid and built during 2011.