

ATLANTIC SAPPHIRE SALMON FARM



PROJECT
INDUSTRY
LOCATION
PRODUCTS

Atlantic Sapphire Salmon Farm
Marine; Water Treatment & Storage
Homestead, FL, USA
Penetron System

ATLANTIC SAPPHIRE SALMON FARM

CASE SUMMARY

The first phase of construction of the Atlantic Sapphire Salmon Farm in Homestead, Florida highlights an innovative, sustainable farming method for Atlantic salmon – and a healthy alternative to more energy-intensive meats. The Penetron System of crystalline products was used to ensure a durable (concrete) home for all those fish.

A once sprawling tomato field only 15 miles (24 km) from the warm waters of Biscayne Bay in Southern Florida, the Atlantic Sapphire farm is now growing a new crop: Atlantic salmon. In a region famous for growing fruit, vegetables, and ornamental plants – and alligators – there now stands a world-class salmon farming facility.



From tomato fields to salmon tanks: The Atlantic Sapphire Farm's 36 massive concrete recirculating saltwater "grow-out tanks" were waterproofed with PENETRON ADMIX SB.

The \$130-million facility is now the world's largest land-raised salmon farm. Based on Atlantic Sapphire's "Bluehouse" aquaculture technology, the 380,000-square-foot (35,303 m²) "farm" hatches and grows the fish to around 10 pounds (4.5 kg) - which takes about 22 months from egg to full-grown salmon - with no hormones, antibiotics or pesticides. All operations, including processing the fish, are now ramping up and will reach full capacity in 2020.

As it turns out, cold-water, protein-rich fish like Atlantic salmon are well-suited for farming in Southern Florida, thanks to the ideal geological structure the Atlantic Salmon project engineers found in the Homestead, Florida location. Because salmon is one of the few fish species that migrates from fresh water to salt water, both freshwater and (larger) saltwater concrete tanks were needed for the Atlantic Sapphire Salmon Farm. The Homestead facility taps 12 wells for both freshwater and saltwater.

The project engineers at OHL, the general contractor, needed a durable solution for the concrete water tanks that would meet requirements to protect the reinforcing steel from the salt water and chemicals in the water - for both the water treatment tanks and the fish tanks. Furthermore, OHL was working under tight budgetary and scheduling constraints; the company's engineers looked to Penetron for a solution.

Together with the project engineers and Supermix, the ready-mix supplier, Penetron reviewed the project's numerous design considerations for the enormous concrete water tanks. The application of virtually the complete product range of the Penetron System – including crystalline admixtures and topically-applied materials – was approved once the time and cost savings became apparent.

Whether as a crystalline admixture (PENETRON ADMIX SB), topically applied crystalline slurry (PENETRON), repair mortar (PENECRETE MORTAR), or rapid setting repair mortar (PENEPLUG), the Penetron System reduces permeability by permanently sealing microcracks, pores and capillaries to effectively protect concrete against water penetration and the effects of deterioration. The crystalline products also provide the added benefit of self-healing cracks over the service life of the structure. For example, PENETRON ADMIX reduces concrete permeability by up to 98% and is classified as a "permeability-reducing admixture for hydrostatic conditions" (PRAH) by the American Concrete Institute (ACI).

Supermix treated over 5,000 yd³ (3,823 m³) of concrete with PENETRON ADMIX SB - in soluble bags - for the tank structures. Concrete repairs and finish work were done with topical applications of PENETRON and PENECRETE MORTAR.

Today, the 36 massive recirculating saltwater "grow-out tanks" are chilled to about 59°F (16°C) with 454,000 gallons (1,719 kiloliters) of recycled water circulating in each of the 65-foot (20-m) wide and 22-foot (7-m) deep tanks.

Expansion Already Planned

Work for the Penetron team was not finished when the first fish shipped to market. Planning for the 2nd phase of the Atlantic Sapphire project is now in progress, which will be located on the adjacent 20-acre site. The Atlantic Sapphire owners also have an option to buy the nearby 40 acres - where currently papayas are grown - for a potential Phase 3 expansion.

Aquaculture is the fastest-growing food production sector in the world and Florida's innovative Atlantic Sapphire Salmon Farm represents the next level of sustainable farming. In comparison, a rancher needs

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4-10 pounds of feed to raise a pound of beef; salmon farmers need only 1.1 pounds of feed for a pound of fish. This is not only a more economical and sustainable use of resources; it produces a healthier meat than beef - and represents a realistic way to feed the world.

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