



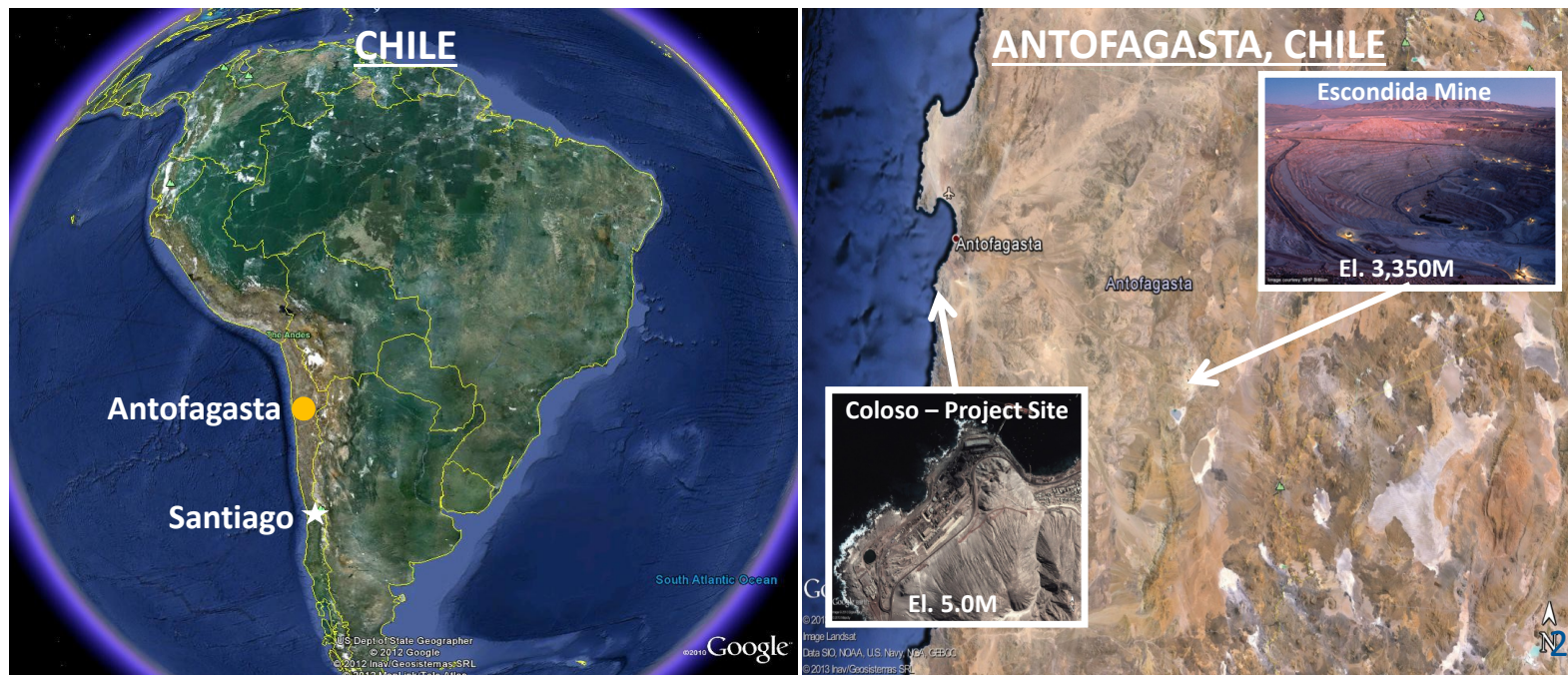
What It Takes to Bring Water to the Driest Place on Earth

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PROJECT LOCATION





WATER USE IN COPPER MINING

- Copper mining & processing
 - Concentrators (Flotation)
 - Electrowinning
 - Transportation
 - Dust suppression
- Limited fresh water supplies

ESCONDIDA WATER SUPPLY OVERVIEW



Water Production:

- Marine Works – 181 mgd hyd. cap
- SWRO – 57 mgd initial phase
- Infrastructure sized for 91 mgd

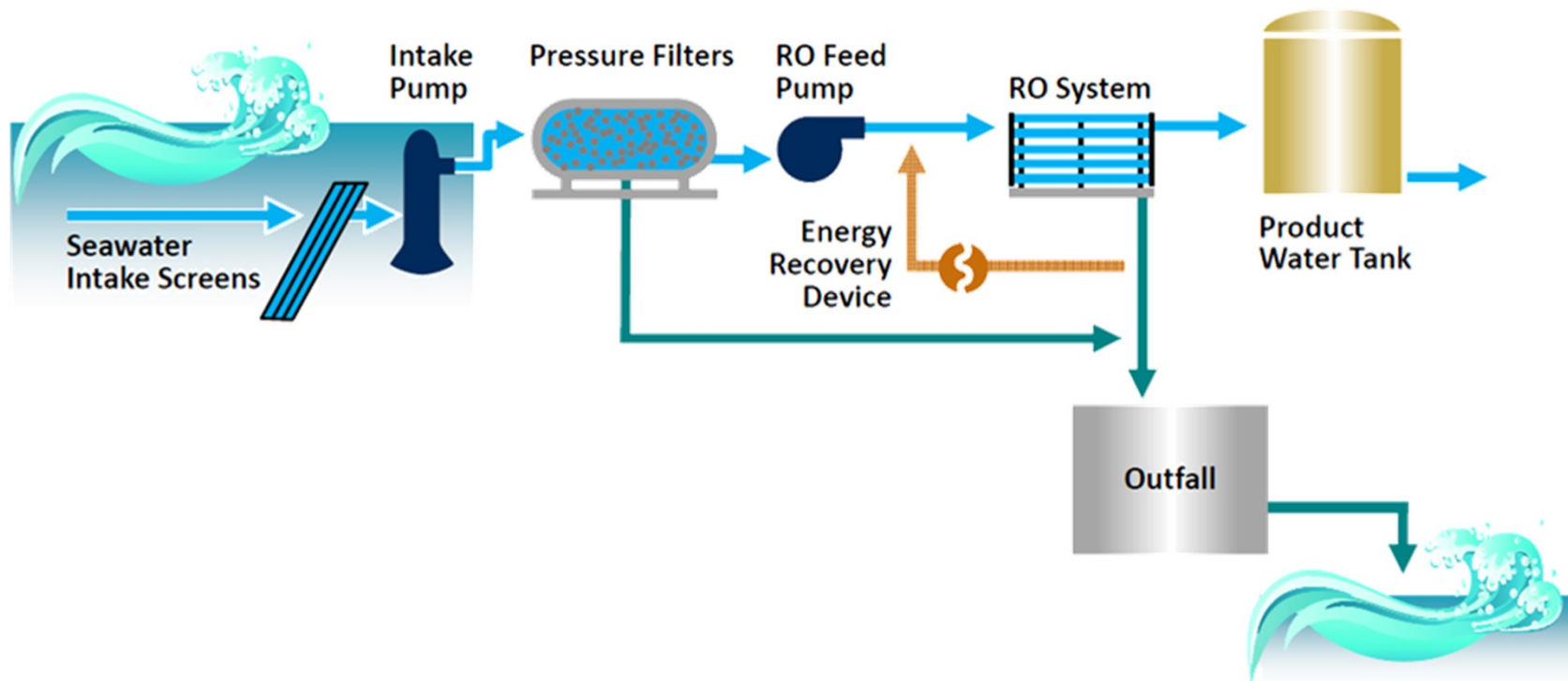
Water Conveyance/Storage:

- 4 high pressure pump stations
- Two parallel pipelines, 110 mi long
- 129 MG Storage Reservoir

Energy Infrastructure:

- High voltage substations
- High voltage transmission lines

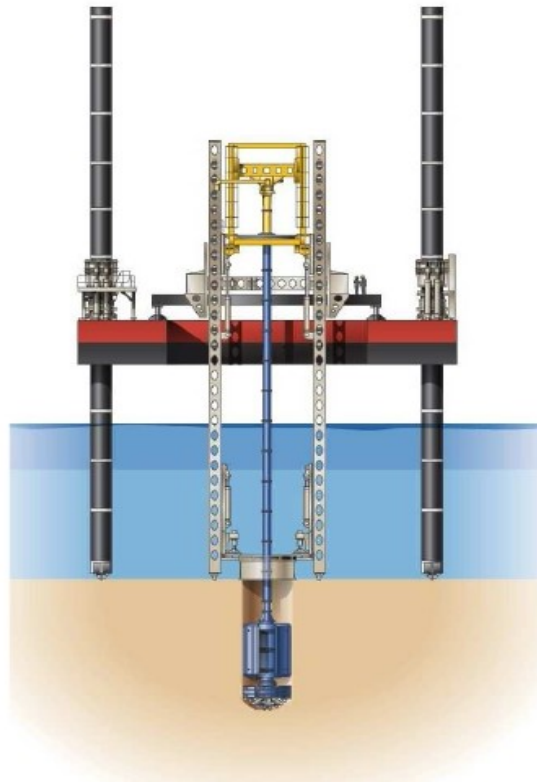
SEA WATER REVERSE OSMOSIS (SWRO) PROCESS



Intakes and Outfall - Microtunneling



Marine Works Sea Water Intake Structure Excavation



Sea Water Intake and Brine Discharge Diffuser



Sea Water Influent Pump Station Excavation



Hard rock required blasting! >>> Mucho dinero



- **9 Vertical Diffusion Vane Pumps**
 - 9 pumps, each 540 l/s (8,560 gpm)
 - 16m (52.5ft) pump column
 - Super Duplex Stainless Steel
 - 900 kW (1200 hp) motors
- **Traveling Band Screens**
 - Max flow rate = 4,256 L/s (97 MGD)
 - Super Duplex Stainless Steel



Pretreatment: Dual Media Filtration

- **2 Stages**
 - 1st Stage: 36 pressure filters
 - 2nd Stage: 24 pressure filters
- **Carbon Steel Vessels**
 - 14 m (46 ft) total length
 - 4 m (13 ft) diameter
- **Media: Anthracite/Sand**
- **Ferric chloride and polymer**



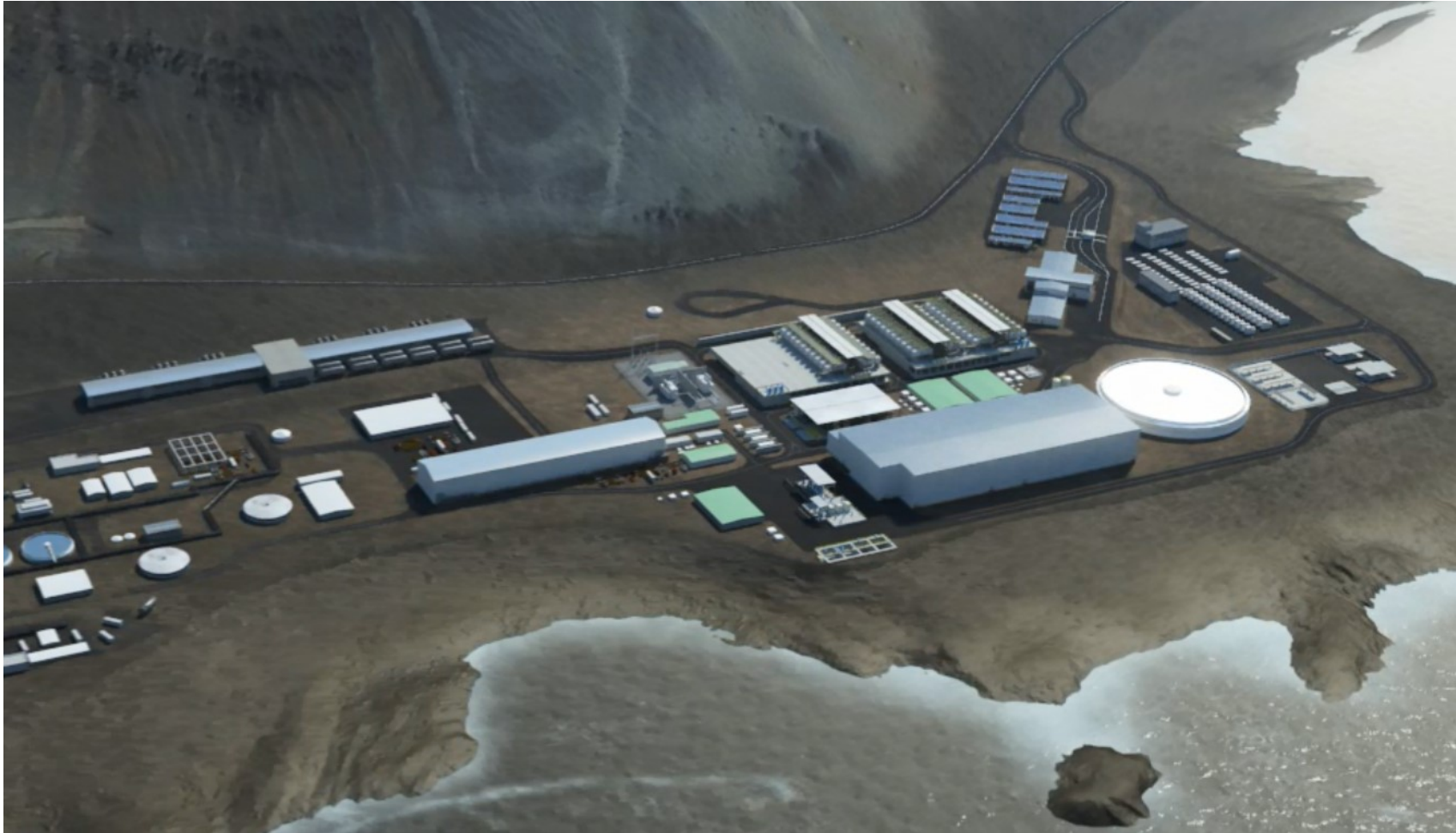
Reverse Osmosis

- Horizontal Split Case high pressure pump, 540 l/s (8,560 gpm) at 75 bar (1100 psi)
- 9 RO racks (275 pressure vessels/rack)
- 270 l/s (4,280 gpm) permeate per RO Rack
- 50% Recovery

Construction: 2014 -2017



As Modeled



As Built





Gracias!

Preguntas?