



WATER
FRAC AND PRODUCED WATER
TREATMENT AND HANDLING





Equinox Engineering is a world class provider of EPCM services to the global oil and gas marketplace.

Equinox has industry leading expertise in Conceptual, and Front End Engineering Design (FEED), Detailed Engineering Design, Procurement and Construction Management and has successfully executed over 6,000 significant projects around the world including the United States, Canada, South America, Australia, the Middle East, Europe and Asia.

Equinox has industry leading expertise in engineering design and installation of frac water handling and water treatment projects associated with the oil and gas industry. Our experience with water treatment issues (produced, fresh, brackish, saline, brine, disposal) and solutions include lime softening, ion exchange softening, evaporation, reverse osmosis, advanced oxidation, thermal vapor recompression, and thermal distillation.



Capabilities



TANK / C-RING STORAGE

Equinox has designed multiple water storage facilities using a variety of designs best suited for each application. Standard designs include C-ring, shop-built tanks, field erected tanks, and water storage ponds.

Our experience with shop-built tanks is focused on finding the optimized tank size and design to best suit the requirements of the facility. Smaller facilities typically utilize API 12F designs, while the larger batteries use API 650 designs. Equinox works with the tank fabricators to manage all piping and Instrument interfaces to ensure an easy integration during construction with a high level of operability through the tanks' lives. Tank batteries have ranged in size from two to 20 tanks large, of variable volumes.

Equinox has designed and installed a variety of field-constructed tanks ranging in size from 10,000 bbl to 200,000 bbl. This work includes all foundations, containment, access, piping, fire protection/detection, leak mitigation, and instrumentation required to support the tanks. Based on the fluid parameters, and the operating philosophy, Equinox have used fixed roof, external floating roof, and internal floating roof designs.

WATER PUMP STORAGE

Equinox has designed and executed a variety of water handling pump projects, ranging from simple water utility pumps, to high-integrity fire-water pumps, to highly-corrosive produced water pumps. We select and specify the pump best suited for the owner's application, based on process requirements, required reliability, capital costs, and long-term operating costs.

Equinox has designed water pumps for the following applications:

- Steam/Steam condensate systems
- fire water systems,
- source water (river caisson sumps)
- raw water well systems
- submersible pond pumps
- water injection
- slurry and water cleanout pumps
- chemical injection pumps
- water booster process pumps

Equinox ensures each pump we specify has an appropriate balance of plant for successful integration - including upstream / downstream filtration, suction head, start-up and turn-down characteristics, and seal plans.

SITE WATER RUN OFF STORAGE

Governmental regulations require surface storm water run-off containment for lease sites that contain oil and gas processing facilities. Equinox has completed the drainage design for hundreds of lease sites which include containment ponds ranging from 50,000 to 500,000 cubic feet. The pond volume calculations are completed in accordance with the location's storm intensity, duration, and frequency curves (IDF data). Methods of containment include, but are not limited to, geomembrane liners, compacted clay liners, and geosynthetic clay liners.



WATER GATHERING / DISTRIBUTION PIPELINES

Equinox has designed hundreds of kilometers of fresh and brackish source water gathering systems utilized for steam generation for thermal projects, as well as for hydraulic fracturing in unconventional reservoirs. We also specialize in produced water gathering systems or flow-back water pipelines (including sour water, oily water, brackish and saline) as well as water treatment, disposal or recycling. Equinox has a wide range of experience with a variety of pipeline composite and traditional materials of construction as well as leak detection systems; which allows our experts to recommend fit for purpose solutions to our clients.

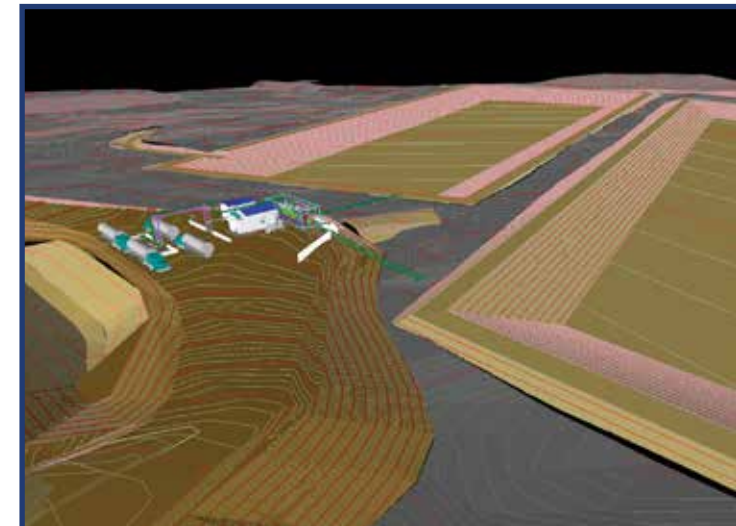


POND WATER STORAGE

Equinox designs fit for purpose storage pond systems including earthworks, liner selection, subliner drainage, leak detection and inlet / outlet piping design.

FRESH WATER INTAKES

Our experience also includes the design and installation of fresh river source water intake systems. The system design included specifying regulatory approved intake screens with consideration to the native fish population as well as the design of temporary damming systems of the river to allow construction activities.



SOURCE / DISPOSAL WATER WELLSITES

Throughout the years, Equinox has executed numerous source and disposal water wellsites for multiple clients. Our standard design includes a modularized piping system with removable buildings to allow for simplified well servicing. Implementation of our modular based design has resulted in minimized field hours and duration associated with construction activities. In addition to the standard modular piping design, Equinox has also developed standardized electrical and communications skids that can be modified to suite the specific project needs.



Selected Projects



DEBOLT WATER TREATMENT PLANT

Equinox executed the complete EPCM services (Engineering, Procurement, Regulatory, Construction Management and Commissioning) for this unique, grassroots frac water treatment facility which was developed to provide freshwater alternatives to supply hydraulic fracturing operations.

Equinox installed a new sour produced water treatment plant utilizing a proprietary, confidential process to reduce the H₂S content of the water to 0 ppm. The design capacity of the facility is 100,000 bpd of inlet sour produced water.

The plant has significantly reduced surface water use and is expected to fulfill a minimum of 80% of the water needed by the clients for hydraulic fracturing operations.

This project won The Environmental Performance Award at the Responsible Canadian Energy Performance Awards hosted by the Canadian Association of Petroleum Producers (CAPP).



PIPESTONE LIQUIDS HUB

Equinox executed FEED, Detail Design and Installation of 30,000 bpd Liquids Terminal and Pumping Station. The project was designed to handle 22,000 bpd of sour condensate and 8,000 bpd of produced water, estimated at approximately \$85 MM TIC.

Major equipment in the scope of work included inlet separation, condensation stabilization, mercaptan removal, compression, pump packages, condensate storage (15,000 bbl), water storage (10,000 bbl), power and utilities.

8,000 bpd water injection – Disposal water tanks/pumps/metering scope included:

- 1 x 100% Water Injection Pump
- 450 HP Multi-stage centrifugal pump (HPS)
- Turbine Water meter included in package
- Design set up for back up filtration, primary filtration at water source.
- Primary Injection pump for disposal downhole on site
- Equinox completed a Pump selection study, issued RFQs, generated TBE, ordered the pump package, managed the fabricator, and designed the BOP of the pump package and associated equipment.

BRINE POND

Equinox provided the complete engineering, earthworks design, procurement, regulatory and construction support services for the Ethane Storage Facility project. This project was the client's first Ethane Storage Facility and Equinox played a key role in developing the client's engineering design and construction specifications for the project. The project scope included the geotechnical and earthworks design for 2 x 500,000 bbl brine pond including; line selection, leak detection system, as well as entry and exit piping infrastructure.





Equinox delivers focused and experienced

Premium Teams

customized with the best

Technical Expertise

to align with

Client Culture

to ensure repeatable and

Successful Projects



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